



Draft Environmental Assessment

City of New Haven – Inland and Coastal Flood Resiliency Project

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City of New Haven, New Haven County, Connecticut

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FEMA

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Acronyms and Abbreviations

APE	Area of Potential Effects
BCA	Benefit-Cost Analysis
BMP	Best Management Practice
BRIC	Building Resilient Infrastructure and Communities
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIRCA	Connecticut Institute for Resilience and Climate Adaptation
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
DEEP	Connecticut Department of Energy and Environmental Protection
DPS	Distinct Population Segment
EA	Environmental Assessment
EFH	Essential Fish Habitat
EJ	Environmental justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
IPaC	Information for Planning and Consultation
LNAPL	Light nonaqueous phase liquid

MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NATA	National-Scale Air Toxics Assessment
NEPA	National Environmental Policy Act
NLEB	Northern long-eared bat
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
PM	Particulate Matter
RSRs	Remediation Standard Regulations
SHPO	State Historic Preservation Office
SVOC	Semi-Volatile Organic Compounds
THPO	Tribal Historic Preservation Officer
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
VOC	Volatile organic compounds

SECTION 1. Introduction

1.1. Project Authority

The City of New Haven has applied to the Federal Emergency Management Agency's (FEMA) Fiscal Year 2021 Building Resilient Infrastructure and Communities (BRIC) program for financial assistance to fund green and gray infrastructure solutions to address inland flooding and coastal erosion in its downtown area (Proposed Action). The BRIC grant program is authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended (Pub. L. No. 93-288) (42 U.S.C. § 5133).

Under the BRIC program, FEMA provides technical and financial assistance to State, Local, and Tribal governments to assist in the implementation of cost-effective hazard mitigation measures that are designed to reduce injuries, loss of life, and damage and destruction of property, including damage to critical services and facilities resulting from natural disasters. The Connecticut Division of Emergency Management and Homeland Security is the applicant partner for the Proposed Action and the City of New Haven (City) is the subapplicant.

FEMA prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations to implement NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and FEMA guidance for implementing NEPA (U.S. Department of Homeland Security Instruction 023-01-001 and FEMA Instruction 108-01-1). FEMA is required to consider potential environmental impacts before funding or approving actions and projects. The purpose of this EA is to analyze the potential environmental impacts of the proposed project and alternatives, including a No Action alternative. FEMA used the findings in this EA to determine whether to prepare an environmental impact statement or to issue a finding of no significant impact (FONSI).

1.2. Background

The City of New Haven is located in South-Central Connecticut along the Long Island Sound in New Haven County. The project area is located in the Long Wharf district, which is an approximate 350-acre portion of the city at the center of commerce, industry, and medical care. The Long Wharf district is intersected by Interstate 95 and bordered on the east side by Interstate 91. The Union Station and the Northeast Rail Corridor railyard that supports Amtrak, Metro-North, and Shoreline East is in the norther section of the Long Wharf District. The Long Wharf shoreline and Park is in the southern portion of the project area and is a significant cultural, recreational, and ecological asset that offers the district views of New Haven Harbor.

The impact area is the larger Downtown New Haven area where inland flooding occurs. The Downtown New Haven area is an approximate 835-acre area that is bordered by the rail line going north from Union Station to Trumbull Street in the east. It is bordered by Trumbull Street, Grove Street Cemetery, and Lake Place to the north and includes portions of the Dixwell, Dwight, and Hill neighborhoods to the west. The Long Wharf district is the southern portion of the Downton New Haven area (**Figure 1-1**).

The Long Wharf district is in special flood hazard area (zones VE and AE) and is susceptible to coastal flooding, as evidenced by the Hurricane of 1938, and more recently by Hurricanes Irene (2011) and Sandy (2012). The City experiences repeated inland and coastal flooding at several locations within the Downtown New Haven area, including frequent flooding of Route 34, Union Avenue, and Temple Street. These locations are crucial to the functioning of the city and the regional transportation system. Flooding also impacts key facilities, including the police station, Union Station and the railyard, and the post office. The inland flooding is the result of a lack of storm sewer capacity underneath the railyard that is compounded by sea level rise and increased storm frequency, which puts the area at greater risk of coastal flooding along with losses, disruptions, and damage. Increased sea levels have also resulted in higher tides and storm surges, which have increased coastal erosion along the shoreline, which makes underground utilities more vulnerable.

Phase I, awarded on May 24, 2023, included (1) completing engineering design of drainage improvements, (2) securing permitting for living shoreline and outfall structure, (3) Benefit-Cost Analysis (BCA) update, (4) providing documentation related to environmental and historic preservation requirements, and (5) subsurface exploratory work (borings, test pits, geoprobes). Phase II includes all construction elements of the proposed project and is the primary subject of the EA.



Figure 1-1 Project Impact Area

SECTION 2. Purpose and Need

The purpose of FEMA’s BRIC grant program is to support States, local communities, Tribes, and territories in reducing the risks from disasters and natural hazards. The Downtown New Haven area has been subject to recurrent significant flooding events that have caused damage to transportation and public services infrastructure as well as residential and commercial properties. The purpose of the Proposed Action is to reduce peak flows into the storm sewer system to mitigate flooding within the Downtown New Haven area and lessen coastal erosion along the Long Wharf coast to reduce vulnerability to underground utilities. The project is needed because the current drainage system under the railyard is undersized and often backflows during 10-year or greater storm events. Intense wave action and higher tides have increased coastal erosion along the Long Wharf shores, making inland and underground infrastructure vulnerable to flooding.

SECTION 3. Alternatives

This section describes the No Action alternative, the Proposed Action, and alternatives that were considered but dismissed.

3.1. No Action Alternative

Under the No Action alternative, FEMA would not undertake or fund any action. There could be a range of possible outcomes if FEMA funding is not provided, depending on the amount of alternative funding available and priorities established by the community. To provide a consistent basis for comparison to the Proposed Action, it is assumed, for the purposes of this EA, that structures and facilities would remain in their current state. Downtown New Haven would continue to experience recurring flooding and damage, and coastal flooding and erosion along Long Wharf Park would continue; thus, the risk of damage to property and infrastructure would remain.

3.2. Proposed Action Alternative

To help address the inland flooding and coastal erosion, the Proposed Action comprises two projects—(1) adding additional storm sewer capacity underneath the railyard and (2) creating a living shoreline along the coast of Long Wharf (**Figure 3-1**).



Figure 3-1 Impact Area

3.2.1. ADDITIONAL STORM SEWER CAPACITY

Additional storm sewer capacity includes the installation of approximately 3,200 feet of new 10-foot diameter stormwater pipe that would be installed from north of West Water Street under the parking lot adjacent to the street (northeast of the police station) to a new outfall location in New Haven Harbor (west of the parking lot at 501 Long Wharf Drive Canal Dock Boathouse) (**Figure 3-1**). The stormwater pipe would be installed 30 to 40 feet belowground using microtunneling technology to pass below critical infrastructure and avoid service disruption to the railyard. Three shafts would be dug to facilitate installation using microtunneling.

The first shaft (launching shaft) would be located at the starting point of the pipeline, just north of West Water Street, and would be approximately 25 feet in diameter and 45 feet deep. Once the new pipe is in place, the first shaft would be converted to a 25-foot-diameter access manhole. Energy baffles would be installed to dissipate energy from incoming stormwater flows and a sluice gate would be installed to allow for closing and dewatering the pipe during maintenance activities.

The second shaft (receiving shaft) would be located just east of Brewery Street and south of Route 34 and would be approximately 35 feet in diameter and 45 feet deep. Once the new pipe is in place, the shaft would be converted to a 35-foot-diameter access manhole.

The third shaft (receiving shaft) would be located at the new outfall in New Haven Harbor and would be approximately 55 feet wide x 30 feet long x 40 feet deep. A cofferdam, likely constructed from sheet piles, would be used for shoreline work. The cofferdam would be installed from either a work platform extending into New Haven Harbor or by barge. Sheet piles would be driven in place using a vibratory hammer. Most work to install the outfall will be done within the cofferdam. Excavation below mean high water of 35 foot x 35 foot x 30 foot (approximately 1,360 CY) would occur via loaders and dump trucks. Once the new pipe is in place, the shaft would be converted to an outfall structure. Tide gates and a 67-foot x 51-foot riprap pad would be installed to dissipate energy from the outfall pipe.

The new pipe would be connected to the existing sewer system from the first shaft. A 10-foot by 8-foot doghouse manhole would be constructed to connect the new pipe to existing pipe from West Water Street using 60 feet of 54-inch-diameter pipe. Stormwater flow from Route 34 would be connected to the new pipe through a new chamber connecting to existing 54-inch pipe. The total excavated volume to install the new pipe would be approximately 17,000 cubic yards and the excavated volume for the shafts is approximately 4,865 cubic yards.

3.2.2. LIVING SHORELINE

A fringe marsh living shoreline, approximately 3,400 feet long and 100 feet wide, would be constructed along Long Wharf Park from the Long Wharf Park Pier to the Vietnam Veterans Memorial Park on the western side of New Haven Harbor. The living shoreline would (1) remove invasive species, (2) create a future marsh migration zone, (3) convert tidal flats to narrow low marsh, and (4) place wetland sills to reduce wave energy on the shoreline and newly created habitat. Approximately 3.4 acres of tidal flats would be converted to low marsh, sills, and future marsh migration zone.

Approximately 0.33 acre of invasive common reed (*Phragmites australis*) would be removed in the northern area of the living shoreline. Roots would be excavated, and imported sand would be used to fill the area to its original grade. The area would be planted with native maritime shrubs and grasses. Sand would be added to the northern corner of the project area to allow visitors to access the shore.

Fill would be brought in and added to the upper intertidal zone, thereby raising the elevation above the current high-tide level and creating a future marsh migration zone (10 to 20 feet wide). Maritime shrubs and grasses would be planted along the base of the revetment. The future marsh migration zone would have a maximum elevation of 4 feet North American Vertical Datum 1988 (NAVD88), before sloping down to meet the new marsh fill.

A mixture of gravel, cobble, and sand fill would be added between the existing low marsh along the coast and new wetland sills. The fill would be graded and portions would be planted with smooth cord grass (*Spartina alterniflora*). The new fill area would be elevated to 1.8 feet (NAVD88).

Twenty-three wetland sills consisting of low-crested granite stone would be installed in the intertidal zone to reduce wave energy and protect the marsh. The sills would be approximately 80 feet long and 25 feet wide and spaced 25 to 35 feet apart to maintain tidal circulation and allow for movement of fish and wildlife. Each sill would measure between 3.5 and 5.5 feet high (NAVD88), with 4-foot-wide crests.

3.3. Additional Action Alternatives Considered and Dismissed

The City evaluated several alternatives to reduce inland flooding and coastal erosion. For inland flooding, they evaluated two additional alternatives—(1) diverting stormwater to other sewer sheds and nearby waterbodies and (2) increasing subsurface storage systems. Diverting stormwater involves installing gravity flow sewer lines and pump stations to divert the water further west in the sound or east into the Quinnipiac River. This alternative would require additional length of piping to reach waterbodies located further away. This alternative is not cost-effective given the distance of the pipe diversion that would be required. This alternative was dismissed because it was cost-prohibitive and did not provide additional benefits compared to the Proposed Action. Increasing subsurface storage included installing underground flood storage systems and additional green infrastructure to capture the excess stormwater. The City implemented some additional green infrastructure throughout the Downtown New Haven area (**Section 5**); however, these types of infrastructure did not provide enough benefits to reduce flooding significantly during the 10-year, 24-hour storm. Therefore, further development of underground flood storage systems was dismissed.

For coastal erosion, the City evaluated one additional alternative—enhancing the revetment. This alternative included enhancing the capability of the existing revetment system to provide greater shoreline protection, which included increasing armor stone size and crest elevation, flattening revetment slopes, and adding scour protection at the top and bottom. This alternative would provide additional shoreline protection, but it would not address any ecological impacts and could worsen or accelerate these impacts. It also does not address any considerations for use of the site as a recreational asset. Therefore, the enhancing revetment alternative was dismissed.

Lastly, an Alternative No-Action option was considered. The City or private property owners might construct some non-FEMA-funded projects that could include repairs, minor mitigation, and restoration projects that would otherwise likely not be eligible for FEMA funding. These projects would be properly engineered and permitted but may not provide the same level of protection as the Proposed Action and would not necessarily be connected or constructed in a coordinated fashion to provide protection across property boundaries. Specific actions may take longer to implement under the Alternative No-Action option because of the need to gather sufficient funding for construction. This option would not result in long-term resilience or coordinated hazard mitigation.

SECTION 4. Affected Environment, Potential Impacts, and Mitigation

This section describes the environment potentially affected by the alternatives, evaluates potential environmental impacts, and recommends measures to avoid or reduce those impacts. When possible, quantitative information is provided to establish potential impacts; the significance of potential impacts is based on the criteria listed in **Table 4.1**. The study area generally includes the project area and access and staging areas needed for the alternatives. If the study area for a particular resource category is different from the project area, the differences will be described in the appropriate subsection.

Table 4-1. Evaluation Criteria for Potential Impacts

Impact Scale	Criteria
None/Negligible	The resource area would not be affected, or changes or benefits would be either nondetectable or, if detected, would have effects that would be slight and local. Impacts would be well below regulatory standards, as applicable.
Minor	Changes to the resource would be measurable, although the changes would be small and localized. Impacts or benefits would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse effects.
Moderate	Changes to the resource would be measurable and have either localized or regional-scale impacts/benefits. Impacts would be within or below regulatory standards, but historical conditions would be altered on a short-term basis. Mitigation measures would be necessary to reduce any potential adverse effects.
Major	Changes would be readily measurable and would have substantial consequences on a local or regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse effects would be required to reduce impacts, though long-term changes to the resource would be expected.

4.1. Resources Not Affected and Not Considered Further

The following resources (Table 4-2) would not be affected by either the No Action alternative or the Proposed Action because they do not exist within the project area or the alternatives would have no effect on the resource. These resources have been removed from further consideration in this EA.

Table 4-2. Resources Eliminated from Further Consideration

Resource Topic	Reason for Elimination
Farmland Protection Policy Act	Project does not affect prime or unique farmland.
Safe Drinking Water Act	Project site is not located above a sole source aquifer, nor would it impact one.
Wild and Scenic Rivers Act	According to the National Wild and Scenic River System database, the closest National Wild and Scenic River is the Great Egg Harbor River, which is approximately 30 miles southwest of the proposed project area. Thus, the alternatives would have no effect on wild and scenic rivers.
Coastal Barrier Resources Act	Project is not located in a Coastal Barrier Resource System Unit or Otherwise Protected Area.
Land Use and Planning	None of the alternatives would change existing or future land use in the area.
Comprehensive Environmental Response, Compensation and Liability Act	Project is not in or near a Superfund site.

4.2. Topography, Soils, and Geology

The project area is in the Long Island Sound Coastal Lowland ecoregion, which was historically vegetated with coastal hardwood forests; however, much of the natural vegetation has been removed for urbanization (U.S. Environmental Protection Agency [EPA] 2018). The area is developed by buildings, roads, and other developments and is relatively flat at a low elevation. In both areas, the natural topography and soils have been previously disturbed and/or altered.

According to a geotechnical study performed by GZA GeoEnvironmental in 2020 for this project, the project area is composed of artificial fill to 10 to 15 feet below the surface and organic silty clay followed by clayey silt to approximately 30 feet below the surface followed by stratified drift, glacial till, and Arkose bedrock.

4.2.1. NO ACTION ALTERNATIVE

Under the No Action alternative, there would be no construction; therefore, no changes to soils, topography, or geology would occur. The undersized pipes would remain susceptible to backflowing that could wash soils away and alter topography within the area. However, due to the developed nature of the area, there would be a negligible impact to topographic changes and soil lost from the overflowing pipeline.

Along the Long Wharf shoreline, wave action and higher tides would contribute to erosion along the coast, which would result in moderate changes in topography and soil loss along the coast. Inland, there would likely be little erosion from storm surge as the area is built up. Therefore, the No Action alternative could have a moderate negative effect on soils and topography in areas where flooding contributes to erosion. There would be no impact to geological resources because bedrock is at 30 feet or greater below the surface and would not be impacted by pipeline backflow or coastal erosion.

4.2.2. PROPOSED ACTION

During construction of the stormwater pipe, microtunneling and shaft installation would excavate approximately 17,000 cubic yards of soil to be removed to an off-site location (**Section 4.14** contains disposal information). All aboveground work would be done on paved and previously disturbed soils and there would be a minor short-term impact to underground soil loss during construction of the pipeline. As microtunneling would occur 30 to 40 feet belowground, topography would only change at the access shafts and outflow locations. Topographical changes would be negligible owing to the built-up nature of the area.

For the living shoreline, the placement of fill along the coast for marsh creation and the installation of wetland sills may cause sedimentation that would be minimized with Best Management Practices (BMPs) and permit conditions (**Section 4.5**). The topography would be altered during construction of the living shoreline along the coast and there would be a moderate short-term adverse impact on soils and topography from the construction of the living shoreline.

In the long term, topography would be slightly altered where the access shafts were installed and at the outfall. However, these changes would be negligible because the shafts would be built within a highly developed area and would match that surrounding elevation. The outfall would slightly alter the topography directly as the outfall but would not change any of the surrounding topography. The expanded storm drainage would reduce the amount of flood-related soil loss within the area from backflow-related runoff. However, because of the built-up nature of the area, there would likely be a long-term negligible benefit to soils. The topography along the shoreline would be permanently altered after completion of the living shoreline. However, it would provide erosion protection along the coast, thereby reducing soil loss, sedimentation, and topographic changes since the marshes and wetland sills are designed to dissipate wave energy and trap sediments within the plant roots. Thus, there would likely be a moderate benefit to topography and soil within the coastal area.

The Proposed Action work for both projects would be above bedrock, and storm surge and erosion would not affect bedrock in the area (owing to its depth). Thus, there would be no effect on geological resources.

4.3. Air Quality

The Clean Air Act, as amended, requires EPA to establish National Ambient Air Quality Standards (NAAQS) for six pollutants harmful to human and environmental health, including ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, lead, and particulate matter (PM), including PM that is less than 10 micrometers in diameter (PM₁₀) and fine particulate matter less than 2.5 micrometers in diameter (PM_{2.5}) (EPA 2016a). Fugitive dust, which is considered a component of PM, can also affect air quality. Fugitive dust is released into the air by wind or human activities, such as construction, and can have human and environmental health impacts. Federally funded actions in nonattainment and maintenance areas for these pollutants are subject to conformity regulations (40 CFR Parts 51 and 93) to ensure that emissions of air pollutants from planned federally funded activities would not cause any violations of the NAAQS, increase the frequency or severity of NAAQS violations, or delay timely attainment of the NAAQS or any interim milestone. According to the EPA Green Book (EPA 2023a), New Haven County is currently a non-attainment area for two NAAQS criteria pollutants—2008 and 2015, 8-hour ozone—which are at severe and moderate levels, respectively (EPA 2023a).

4.3.1. NO ACTION ALTERNATIVE

Under the No Action alternative, there would be no short-term impact because construction activity would not occur that could result in emissions from the use of gas or diesel-powered equipment. Fugitive dust would not be created from construction-related ground disturbance. However, flood-related repair activities would require the temporary use of gas and diesel-powered equipment resulting in emissions as well as ground disturbance resulting in fugitive dust. Road detours could increase vehicle emissions because vehicles would be traveling further to reach their destination. Thus, there would be a negligible, recurring, long-term adverse effect on air quality from repairs and detours. No permanent sources of emissions would be created.

4.3.2. PROPOSED ACTION

Under the Proposed Action, the use of some construction equipment and vehicles would result in the short-term release of air pollutant emissions. The excavation and tunneling equipment are primarily electric; emissions would primarily result from the use of fleet vehicles. Construction equipment would result in ground disturbance that could create fugitive dust. PM, nitrogen dioxide, and carbon monoxide would be the primary air pollutants of concern during construction from the use of equipment, which could worsen ozone if the pollutants react with sunlight (EPA 2023b). Ground disturbance, and associated fugitive dust, would be minimized by using microtunneling technology to install stormwater pipe. The associated fugitive dust for the living shoreline fill placement would need to be minimized following BMPs. Construction equipment operation would be required to meet current EPA emissions standards (EPA 2016a) and all other local, state, and federal regulations. Therefore, the Proposed Action would have a negligible short-term adverse effect on air quality from temporary construction-related emissions and fugitive dust that would be mitigated through the application of EPA emissions standards and minimized by using microtunneling. The City would need to verify that these measures were employed in an After-Action Report that would be provided to FEMA no later than submission of the FEMA grant closeout package.

A general conformity applicability analysis will be completed for the Proposed Action to determine the potential levels of non-attainment criteria pollution that may be emitted during the project. The general conformity analysis would ensure the Proposed Action would not exceed the annual de minimis levels for criteria pollutants under general conformity regulations.

Post construction, the Proposed Action would reduce flood hazards in the project area and associated emissions from road detours and flood-related repairs. The project would not create a new source of permanent air emissions. There would be a negligible, long-term, and beneficial effect from the reduced risk of flooding that avoids flood-related emissions from road detours and repairs.

4.4. Climate

Climate change refers to changes in the Earth's climate caused by a general warming of the atmosphere. Its primary cause is emissions of greenhouse gases, including carbon dioxide and methane. Climate change can affect species distribution, temperature fluctuations, and weather patterns.

Executive Order (EO) 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, directed federal agencies to review and address regulations that conflict with national objectives, such as reducing greenhouse gas emissions, strengthening climate resilience, and prioritizing environmental justice and public health.

Climate change in Connecticut is expected to result in rising sea levels and increased rainfall intensity and frequency, with more rain arriving during a single rain event. Rising sea levels result in higher high tides that lead to increased flooding farther inland and increased shoreline erosion (EPA 2016b). Connecticut Institute for Resilience and Climate Adaptation (CIRCA) data show that sea level rise in the New Haven coastal area would likely be approximately 0.5 meters higher than the national datum in Long Island Sound by 2050 (CIRCA 2023).

4.4.1. NO ACTION ALTERNATIVE

Under the No Action alternative, no construction activity would occur that could increase greenhouse gas emissions from the use of gas and diesel-powered equipment. Thus, there would be no impact on climate change in the short term. In the long term, climate change could increase adverse flood-related effects on people and property located within the floodplain, depending on the extent of sea level rise and increased precipitation. The use of gas and diesel equipment for intermittent flood and erosion-related repairs would increase greenhouse gas emissions during repair activities; however, no permanent sources of emissions would be created. Thus, there would be a negligible recurring long-term adverse effect on climate change from the use of emission producing equipment for flood- and erosion-related repairs. There could be a minor long-term adverse effect on people and property from climate-related increases in flooding and associated damage.

4.4.2. PROPOSED ACTION

Under the Proposed Action, the use of gas and diesel equipment for construction would temporarily increase greenhouse gas emissions. Given that climate change is a global-scale issue, emissions associated with construction of the Proposed Action would be negligible at the global scale and therefore would have a negligible adverse effect on climate change in the short term. In the long term, emissions from intermittent flood- and erosion-related repair activities would be reduced. Thus, there would be a negligible long-term beneficial effect from the reduction of flood- and erosion-related damage and associated emissions from repair activities. No permanent sources of emissions would be created as part of the Proposed Action.

The living shoreline would reduce the risk of flooding associated with climate-related rising sea levels by elevating habitat and providing wave attenuation above the high-tide line. The placement of wetland sills would reduce the risk of scour and erosion from higher high tides associated with the CIRCA-projected extra 0.5-meter sea level rise for the New Haven coastal area. Thus, there would be a negligible long-term beneficial effect from the reduced risk of flood damage associated with climate-change-related sea level rise and higher high tides.

4.5. Surface Waters and Water Quality

The Clean Water Act (CWA) of 1977, as amended, regulates the discharge of pollutants into water, with sections falling under the jurisdiction of the U.S. Army Corps of Engineers (USACE) and EPA. Section 404 of the CWA establishes the USACE permit requirements for discharging dredged or fill materials into waters of the United States. Connecticut Department of Energy and Environmental Protection (DEEP) issues water quality certifications under Section 401 of the CWA for the discharge of dredged materials, dredging, and dredged material disposal in waters of the United States.

Under Section 402 of the CWA, the National Pollutant Discharge Elimination System (NPDES) regulates both point and nonpoint pollutant sources, including stormwater and stormwater runoff, via a permitting system. Activities that disturb one or more acres of ground are required to apply for a NPDES permit through DEEP.

CWA Section 303(d) requires states to identify waters that do not or are not expected to meet applicable water quality standards with current pollution control technologies alone. Under Section 303(d), states must develop Total Maximum Daily Loads (TMDLs) for impaired waterbodies. A TMDL establishes the maximum amount of a pollutant or contaminant allowed in a waterbody and serves as a planning tool for restoring water quality. In Connecticut, DEEP is responsible for compliance with Section 303(d) of the CWA.

The project is within the Mill River-Frontal Long Island Sound watershed that drains into the New Haven Harbor (Connecticut Environmental Conditions Online 2023). The watershed is highly urbanized and developed; it also has a history of industrialization and fill, which has impacted water quality. The Connecticut Year 2022 Integrated Water Quality Report issued by DEEP contains a list of waters requiring a TMDL, which is also known as the 303(d) list or Category 5 waters. New Haven Harbor is on the list of 303(d) waters (impaired waters) because of polychlorinated biphenyls, oil and grease, nutrients, enterococcus, and dissolved oxygen (EPA 2022). New Haven Harbor is within Connecticut's central estuarine segmentation basin.

4.5.1. NO ACTION ALTERNATIVE

Under the No Action alternative, no construction activity would occur that could result in the discharge of pollutants, such as oil leaks or spills, or ground disturbance and associated transport of sediment into surface waters that adversely impact water quality. No in-water work would occur that could disrupt sediments or aquatic vegetation. Thus, there would be no short-term adverse effect from construction-related runoff or work occurring within water. In the long term, receding floodwaters and eroded soils from recurrent flooding and stormwater runoff can transport sediments from the coastal area, contaminants from nearby industrial facilities, and hazardous materials (such as oil and grease) into waterways, thereby adversely affecting conformance with TMDLs in New Haven Harbor. The No Action alternative would have a minor long-term adverse effect on water quality.

4.5.2. PROPOSED ACTION

Under the Proposed Action, the new pipeline would be constructed away from surface waters and with minimal ground disturbance from the use of microtunneling technology. The new pipeline outfall would include placement of fill (i.e., riprap) in New Haven Harbor for the outfall. Construction of the living shoreline would include removal of vegetation, excavation, grading, and the placement of fill in the central estuarine segmentation basin, New Haven Harbor. Removing vegetation can impact water quality because plants filter pollutants; removing plants reduces overall water filtration. Vegetation removal, excavation, and grading could result in sedimentation from ground disturbance. Use of construction equipment may result in leaks and spills of contaminants. The City has obtained a 401 DEEP Protection License Certificate of Permission (License No. 202302022-COP) and has applied to USACE for a Section 404/10 Individual Permit (Corps File No. NAE-2020-01866) for the living shoreline portion of the Proposed Action. Further coordination with DEEP and USACE would be required for the new pipeline. The City would also submit an annual monitoring report for the Living Shoreline work (first five years) to CT DEEP's Commissioner of Energy and Environmental Protection. In addition, an NPDES general stormwater construction permit issued by DEEP may be required for the Proposed Action and further coordination would be required. Adherence with all permit conditions would be required, therefore minor short-term adverse effects on water quality is expected from construction activities occurring in water and the potential for equipment-related leaks and spills.

In the long term, the new pipeline and living shoreline would likely reduce the risk of flooding and coastal erosion and the associated risk of floodwaters transporting sediment and contaminants into waterways. The newly created habitat for the living shoreline would likely assist with soil stabilization because plant roots bind soils together, thereby filtering contaminants because plant roots carry water into soils, thus improving water quality. Wetland sills would reduce the risk of erosion by reducing the force of waves (breaking waves) before reaching shoreline soils. The increased erosion protection would reduce the risk of underground utilities (including sewer lines) from damage, reducing the chance of water contamination. Thus, there would be a moderate long-term beneficial effect from the reduced risk of receding floodwaters and coastal erosion polluting nearby waterways. The Proposed Action is likely covered under the DEEP Municipal Separate Storm Sewer System General Permit; coordination with DEEP would be required to ensure applicability.

4.6. Wetlands

EO 11990, Protection of Wetlands, requires federal agencies to consider alternatives to work in wetlands and limits potential impacts on wetlands if there are no practicable alternatives. FEMA regulation 44 CFR Part 9, Floodplain Management and Protection of Wetlands, sets forth the policy, procedures, and responsibilities to implement and enforce EO 11990 and prohibits FEMA from funding activities in a wetland unless no practicable alternatives are available. Activities that disturb wetlands would also require a permit from USACE under Section 404 of the CWA.

The new stormwater pipeline is not located within or near wetlands. The pipeline outfall and living shoreline work would occur within estuarine and marine wetlands (U.S. Fish and Wildlife Service [USFWS] 2023a) (**Figure 4-1**).



Figure 4-1. Project Area Wetlands

4.6.1. NO ACTION ALTERNATIVE

Under the No Action alternative, there would not be any construction activity that could result in the removal of wetland vegetation or discharge of pollutants and sedimentation into wetlands. Thus, there would be no short-term adverse effect on wetlands (because there would be no construction activity). In the long term, ground disturbance from repetitive flooding and coastal erosion could result in the loss of wetland areas along the coast; receding floodwaters could transport pollutants or sediment into wetlands. Sea level rise could also result in the loss of wetland habitat because the developed nature of the harbor does not allow for wetland migration. Thus, there would be a minor long-term adverse effect on wetlands, depending on the frequency of flooding and the extent of erosion and sea level rise.

4.6.2. PROPOSED ACTION

The new pipeline would be constructed in an urban and developed area, away from wetland resources (except for the outfall, which would be constructed within the dry and would only disturb previously constructed elements). BMPs would be used to minimize runoff into the wetlands, having a minor short-term impact. Approximately 3.4 acres of fill would be placed in wetlands along Long Wharf Park. The placement of fill would transition existing tidal mudflats into low marsh planted with native species. Therefore, construction activity for the living shoreline would likely result in moderate short-term adverse effects to wetland habitat from the placement of fill and use of equipment that would disrupt soils and vegetation. Construction impacts for both projects would be minimized with implementation of the conditions required in CWA permits (**Section 4.5**).

A Certificate of Permission has also been issued by CT DEEP's Land and Water Resource Division for work in tidal waters per sections 22a-359 through 22a-363h of the Connecticut General Statutes. The City would be required to comply with all conditions in CT DEEP's Certificate of Permission (License No. 202302022-COP).

In the long term, the stormwater pipe would reduce the amount of backflow runoff entering the wetlands. Runoff exiting the outfall would be dissipated by the energy baffles and riprap and would comply with all permitting requirements (**Section 4.5**), thereby reducing contamination of wetlands at the outfall. The living shoreline project would restore and expand wetland habitat along the shoreline as well as reduce the risk of flooding and receding flood waters carrying contaminants into wetland resources. Wetlands would be elevated above the high-tide line to reduce degradation from flooding and would likely allow for wetland habitat migration as sea levels rise. The placement of wetland sills would reduce erosion of wetlands by reducing wave energy that can disrupt vegetation and soils. The living shoreline would also follow a maintenance and monitoring plan to ensure wetland health is maintained. Thus, there would be a moderate long-term beneficial effect from the restoration and expansion of wetlands—reduced risk of wetland degradation associated with flood-related contaminants, erosion-related loss of habitat, and the potential for wetland migration with sea level rise.

Through the 8-Step analysis, FEMA determined that the Proposed Action was the only practicable alternative, and there were no practicable alternatives outside of wetlands (**Appendix A**).

4.7. Floodplains

EO 11988, Floodplain Management, requires federal agencies to avoid, to the extent possible, short-term and long-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development wherever there is a practical alternative. FEMA regulations (44 CFR Part 9.7) use the 1-percent-annual-chance flood as the minimal area for floodplain impact evaluation. FEMA follows an 8-step decision-making process to ensure compliance with EO 11988, which requires the evaluation of alternatives to the use of a floodplain prior to funding the action.

The Proposed Action area is in the 1-percent-annual-chance floodplain (in Zones AE and VE). The FEMA Flood Insurance Rate Map 09009C0441J, effective July 7, 2013, established base flood elevations (**Figure 4-2**). Flood elevations and durations are expected to worsen with sea level rise and climate-change-related increases in precipitation.

4.7.1. NO ACTION ALTERNATIVE

Under the No Action alternative, there would not be any construction that could potentially release contaminants into the floodplain. Thus, there would be no short-term adverse effect (because no construction activity would occur, and no fill would be placed in the floodplain).

However, in the long term, residential and commercial properties surrounding the project area and within the impact area (and the people who occupy both areas) would continue to be at risk of loss of life and property damage from wave action and inland flooding that result from future storm events. Without the proposed improvements, the amount of land subject to inland flooding in and around the project area would likely increase in future years because of increased storm frequency and intensity, as well as sea level rise. Erosion would degrade existing coastal habitat and potentially exposing underground utilities, thereby adversely effecting floodplain functions such as water filtration and providing habitat for sensitive species. There would be no placement of fill within the floodplain that could help restore it to its natural function. Thus, there would be a long-term moderate adverse effect on the floodplain from recurrent flooding and erosion within the impact area.

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Figure 4-2 Floodplain Map

4.7.2. PROPOSED ACTION

Under the Proposed Action, construction activity would occur in the floodplain for the new sewer pipe and living shoreline. Construction activities could result in the accidental release of hazardous materials from vehicles and equipment or from disturbance of contaminated soils. Ground disturbance could also erode soils and cause sedimentation in the floodplain. Therefore, there would be a minor short-term adverse effect on the floodplain from construction activity and the associated soil disturbance and potential for release of hazardous materials.

In the long term, fill placement for the living shoreline could alter flood storage capacity. The project area is urban and developed in nature. Therefore, the Proposed Action would not support additional development in the floodplain. The Proposed Action would reduce the risk of flood damage by creating increased stormwater drainage capacity in the central harbor area and increasing floodplain habitat along Long Wharf Park. Low marsh vegetation planted along Long Wharf Park would improve existing habitat, and associated recreation and aesthetics, and reduce the potential for erosion in the floodplain by stabilizing soils. Rock sill on the seaward side of the marsh would minimize erosion and scour from waves. Thus, there would be a moderate long-term beneficial effect on the floodplain and property located in the floodplain from the reduced risk of flood- and erosion-related damage and improved floodplain habitat.

Potential adverse impacts would be avoided and minimized through design measures and permitting conditions. Potential adverse effects would be minimized if all permit and grant conditions are adhered to (44 C.F.R. 9.11(d)(5)).

The Proposed Action would require a Floodplain Development Permit through the City of New Haven, which would demonstrate consistency with the NFIP (9.11(d)(6)). There is also an in-process flood management certificate for the Living Shoreline (License Number 02203630-FM), and the City may also need a flood management certificate for the storm sewer line work. The City has also obtained a 401 DEEP Protection License Certificate of Permission (License No. 202302022-COP) and has applied to USACE for a Section 404/10 Individual Permit (Corps File No. NAE-2020-01866) for the living shoreline portion of the Proposed Action. Contaminated media and construction wastes would be required to be managed in accordance with U.S. EPA and CT DEEP regulatory standards, including handling, testing, BMPs, and disposal (See Section 4.14).

Permits would include conditions to avoid, minimize, and mitigate for impacts on water quality, including but are not limited to siltation and erosion control measures (e.g., silt fences), turbidity control, site restoration measures (e.g., replanting exposed soils with native vegetation), work within the water, and prevention of accidental release of hazardous waste.

The Proposed Action would reduce the risk of flood damage by creating increased stormwater drainage capacity in the central harbor area and increasing the elevation of floodplain habitat along Long Wharf Park. Low marsh vegetation planted along Long Wharf Park would improve existing habitat, and associated recreation and aesthetics, and reduce the potential for erosion in the floodplain by stabilizing soils. Rock sill on the seaward side of the marsh would minimize erosion and scour from waves and associated sedimentation within the floodplain. The Proposed Action would restore existing degraded floodplain habitat and retain the floodplain function of Long Wharf Park. The Proposed Action would restore and expand wetland habitat as well as reduce the risk of flooding

and receding floodwaters carrying contaminants into wetland resources. Wetlands would be elevated above the high tide line to reduce degradation from flooding and would likely allow for wetland habitat migration as sea levels rise. Rock sill would reduce erosion of wetlands by reducing wave energy that can disrupt vegetation.

Through the 8-Step analysis, FEMA determined that the Proposed Action was the only practicable alternative ((9.11(d)(5)) and is a functionally dependent use (9.11(d)(1)(i)); therefore, no practicable alternatives exist outside the floodplain and potential effects would be minimized (44 CFR 9.11(d)(5); **Appendix A**).

4.8. Coastal Resources

The Coastal Zone Management Act (CZMA) is administered by states with coastal shorelines to manage coastal development through a Coastal Zone Management Plan (CZMP). The CZMA requires federal actions, within or near the coastal zone, to be consistent with the enforceable policies of a state's federally approved coastal management program. To guide development and resource management within the coastal area, DEEP has identified and promulgated substantive policies.

The Connecticut CZMP has the general policy to preserve and enhance coastal resources with additional policies specific to resource types. The Connecticut Coastal Management Act specifies policies which, in summary, seek to (1) promote nonstructural solutions to flood and erosion problems, (2) promote the use of existing developed shorefront areas for marine-related uses, (3) regulate shoreland use and development in a manner that minimizes adverse impact to coastal resources, and (4) locate sewer and waterlines to encourage concentrated development and avoid sewer and water extension into coastal resources (except to accommodate existing uses with limited capacity).

The project is located within the Connecticut coastal zone. It includes industrial land uses and transportation infrastructure as well as Long Wharf Park and associated low marsh areas.

4.8.1. NO ACTION ALTERNATIVE

Under the No Action alternative, no construction activity would occur within the coastal zone that could result in short-term adverse effects on coastal resources. In the long term, the risk of flooding and coastal erosion would not be reduced. Ground disturbance from continued flooding and associated erosion could result in adverse effects to coastal resources, such as disruption or loss of vegetation and reduced access to recreational opportunities at Long Wharf Park. The disruption or loss of vegetation could adversely affect habitat for fish or result in reduced aesthetic enjoyment at Long Wharf Park. Thus, there would be a minor long-term adverse effect on coastal resources from flood- and erosion-related vegetation loss and reduced access to recreational and aesthetic opportunities. The No Action alternative would not be consistent with coastal zone management policies because it would not preserve or enhance coastal resources and could result in the loss of tidal wetlands and their values, as defined in the CZMP, depending on the extent of future flood damage, erosion, and sea level rise.

4.8.2. PROPOSED ACTION

Under the Proposed Action, construction activity would occur within the coastal zone and within tidal waters. Long Wharf Park would be closed during construction, temporarily reducing public access to coastal resources. Construction of the stormwater pipe outfall and living shoreline would require work in coastal waters, including the temporary removal of vegetation and placement of fill. Thus, there would be a moderate short-term adverse effect on coastal resources from reduced access, removal of vegetation, and placement of fill. In the long term, coastal resources would be enhanced by improving the shoreline along Long Wharf Park and drainage within the coastal zone. Coastal resources would be protected from degradation by installing wetlands sills to reduce wave energy and associated erosion and providing a wetland migration zone to accommodate sea level rise. Thus, there would be a moderate long-term beneficial effect from the enhancement of coastal resources and protection from degradation associated with wave energy and sea level rise.

The project would be consistent with coastal zone management policies because the natural function of tidal features would be maintained and improved, thereby providing additional habitat for plants and animals as well as recreational and aesthetic enjoyment. Additionally, the project would be consistent with coastal zone management policies because it would protect tidal features from wave action and sea level rise. The new sewer line would be located in coastal resources and would align with coastal zone management policies (because it would accommodate existing uses with limited capacity). The living shoreline is a nonstructural solution for erosion and flooding and, thus, in alignment with coastal zone management policies. A coastal consistency determination would be required in accordance with the CZMA; the City would need to implement all mitigation measures identified in the consistency determination.

4.9. Vegetation

The densely developed urban area within the New Haven Harbor support managed lawns and ornamental vegetation. Several trees are located within Long Wharf Park, and landscaped shrubs and trees are located within the Vietnam Veterans Memorial Park (DEEP 2019a).

Habitat areas along the shoreline include a narrow beach, tidal low marsh, and unvegetated intertidal mudflats. Based on the habitat assessment conducted in 2022, vegetation within the narrow beach area includes dense beach grass (*Ammophila breviligulata*) mixed with bittersweet nightshade (*Solanum dulcamara*), sea rocket (*Cakile edentula*), high-tide bush (*Iva frutescens*), seaside goldenrod (*Solidago sempervirens*), common mugwort (*Artemisia vulgaris*), wild four-o'clock (*Mirabilis nyctaginea*), and sparsely scattered invasive common reed (*Phragmites australis*). Sandy habitat above the high-tide line occurs at the northernmost extent of the project area and is dominated by a large stand of common reed along with common saltwort (*Salsola kali*), high-tide bush, wild peppergrass (*Lepidium virginicum*), sea rocket, common mugwort, wild four-o'clock, orach (*Atriplex patula*), pokeweed (*Phytolacca americana*), hedge bindweed (*Calystegia sepium*), rugosa rose (*Rosa rugosa*), seaside goldenrod, field mustard (*Brassica rapa*), curly dock (*Rumex crispus*), ragweed (*Ambrosia* spp), and tree of heaven (*Ailanthus altissima*). Areas above the existing revetment are predominantly mown lawn/grasses, but the vegetation within the edges between the mown field and the revetment include common reed, common mugwort, tree of heaven, bull thistle (*Cirsium vulgare*), mullein (*Verbascum hapsus*), butter and eggs (*Linaria vulgaris*), Asiatic bittersweet

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(*Celastrus orbiculatus*), queen anne's lace (*Daucus carota*), Virginia creeper (*Parthenocissus quinquefolia*), English plantain (*Plantago lanceolata*), common milkweed (*Asclepias syriaca*), and primrose (*Oenothera biennis*).

A review of the DEEP Natural Diversity Data Base was conducted by GZA in association with the habitat assessment they conducted in 2022. Based on this review, one State Species of Special Concern—the eastern prickly pear (*Opuntia humifusa*)—was found to historically occur at the south end of the project area. However, the plant was not observed during the habitat assessment conducted in 2022, so it is likely that the species no longer occurs in the area (owing to competition from the invasive common reed, which has colonized the area in dense stands).

Invasive Species

EO 13112 requires federal agencies to prevent the introduction of invasive species and provide for their control to minimize the economic, ecological, and human health impacts caused by invasive species. The invasive common reed is present in the project area and is a concern throughout the beach areas. Other invasive species that occur within the project area include the bittersweet nightshade, common mugwort, rugosa rose, and tree of heaven (Connecticut Invasive Plants Council 2018).

4.9.1. NO ACTION ALTERNATIVE

Construction activity would not occur under the No Action alternative and therefore would have no impact on vegetation in the short term. Over time, recurrent flooding from future storm events could disturb existing vegetation, allowing the existing invasive common reed to colonize disturbed areas and spread within and throughout the living shoreline project area, outcompeting native plants. Erosion could also reduce the amount of soils available for vegetation habitat. Therefore, the No Action alternative would have long-term, minor adverse effects on vegetation through the introduction or spread of invasive species and reduced habitat from erosion.

4.9.2. PROPOSED ACTION

The installation of the new stormwater pipe under the Proposed Action is not expected to require vegetation removal, as work would occur in previously disturbed areas and primarily underground. Therefore, the installation of the stormwater pipe would have no short-term impacts on vegetation in the project area. The construction of the living shoreline under the Proposed Action would convert tidal flats to low marsh, creating 3,400 feet of vegetated marsh edge habitat. To accomplish this, existing vegetation within the tidal flats and beach areas would be removed during grading and placement of the rock sill, sediments, and other materials. Additionally, soils disturbed during construction would be susceptible to invasive species growth; however, the General Conditions in the USACE CWA Permit would require that an invasive species control plan would be implemented to ensure that invasive plants would not outcompete native plantings, as described in the USACE Section 404/Section 10 Permit Application for the Proposed Action. Thus, there would likely be short-term, minor adverse effects on existing vegetation during the construction of the living shoreline.

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The construction of the living shoreline would involve removing the invasive common reed in the project area and replanting with native species. Within the low marsh, plantings would consist of smooth cord grass. Within areas above the low marsh, native maritime shrubs and grasses would be planted, including marsh elder (*Iva annua*), high-tide bush, northern bayberry (*Morella pensylvanica*), American beachgrass (*Ammophila beviligulata*), seaside goldenrod, common milkweed, American searocket (*Cakile edentula*), Virginia rose (*Rosa virginiana*), American holly (*Ilex opaca*), eastern red cedar (*Juniperus virginiana*), Carolina sea lavender (*Limonium carolinianum*), and sweet grass (*Hierochloa odorata/Anthoxanthum nitens*). The native plantings and other habitat conditions established during the implementation of the Proposed Action would be monitored and maintained to prevent invasive species from proliferating in the long term. Both the installation of the stormwater pipe and the construction of the living shoreline would reduce the risk of flooding in the project area during future storm events, which would reduce the likelihood of native vegetation being disturbed by floodwaters. Therefore, the Proposed Action would likely have long-term, moderate, beneficial effects related to vegetation and invasive species from the replacement of existing invasive plant species with native vegetation.

4.10. Fish and Wildlife

Fish and wildlife include the species that occupy, breed, forage, rear, rest, hibernate, or migrate through the project areas. Regulations relevant to fish and wildlife include the Connecticut Endangered Species Act, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and the Magnuson-Stevens Fishery Conservation Act. Wildlife species listed under the federal Endangered Species Act are evaluated separately in **Section 4.11**.

Common wildlife that use the project area likely include those adapted to living near humans, including eastern cottontail (*Sylvilagus floridanus*) and raccoon (*Procyon lotor*). Recent wildlife observations in Long Wharf Park include red fox (*Vulpes vulpes*), several species of insects, and other invertebrates such as Atlantic sand fiddler crab (*Leptuca pugilator*) and Atlantic horseshoe crab (*Limulus polyphemus*) (iNaturalist 2023).

The Connecticut Endangered Species Act, passed in 1989, designates Species of Special Concern, which includes native species that have a naturally restricted range or habitat in the state and have a low or declining population or have been extirpated from the state. The yellow-crowned night heron (*Nyctanassa violacea*), a State Species of Special Concern, was observed in the Long Wharf Nature Preserve during surveys in 2022; however, no rookeries or nesting colonies were observed on-site. According to the DEEP Natural Diversity Database, two other State Species of Special Concern may occur in the project area—the northern diamondback terrapin (*Malaclemys terrapin terrapin*) and blueback herring (*Alosa aestivalis*). Neither of these species have been recorded in the project vicinity (iNaturalist 2023). Nesting habitat for the northern diamondback terrapin is considered very limited in the project area as there is little to no open sandy area, although individuals could bask on the mudflats and forage within the shellfish beds offshore. Additionally, two state-listed species have the potential to occur in the project area—the northern long-eared bat (*Myotis septentrionalis*, state-listed as endangered) and roseate tern (*Sterna dougallii dougallii*, state-listed as endangered). Because both of these species are also federally listed, they are described in more detail in **Section 4.11**.

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The Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703–711), provides protection for migratory birds and their nests, eggs, and body parts from harm, sale, or other injurious actions, except under the terms of a valid permit issued pursuant to federal regulations. All native birds are protected by the MBTA, and existing habitat in the project area has the potential to support a variety of native bird species. Several migratory bird species could occur in the project area; during the habitat assessment conducted in August 2022, migratory birds observed in the project area included great egret (*Ardea alba*), yellow-crowned night heron, ring-billed gull (*Larus delawarensis*), laughing gull (*Leucophaeus atricilla*), osprey (*Pandion haliaetus*), semipalmated plover (*Charadrius semipalmatus*), black-bellied plover (*Pluvialis squatarola*), European starling (*Sturnus vulgaris*), and northern mockingbird (*Mimus polyglottos*). Based on a review of the USFWS Information for Planning and Consultation (IPaC) database, several additional species of migratory birds are expected to use the project area; migratory bird nesting is expected to occur between April 15 and October 31 (USFWS 2023b).

The Bald and Golden Eagle Protection Act of 1940 prohibits the take, possession, sale, or other harmful action on any golden or bald eagle, alive or dead, including any part, nest, or egg (16 U.S.C. 668(a)). Bald eagles (*Haliaeetus leucocephalus*) are known to occur around large waterbodies and prey on fish, waterfowl, shorebirds, and other small animals (USFWS 2023c). Suitable habitat occurs within the project area, and a known bald eagle nest is located in Evergreen Cemetery, approximately 1.5 miles northwest of the project area (eBird 2023). Golden eagles (*Aquila chrysaetos*) are known to be sensitive to human activity and typically occur in areas near hills, cliffs, and bluffs (USFWS 2023d). Given the project area's coastal location adjacent to a highly developed area, golden eagles are not expected to occur within the project area.

The Magnuson-Stevens Fishery Conservation and Management Act fosters the long-term biological and economic sustainability of our nation's marine fisheries. Under the act, the National Marine Fisheries Service (NMFS) designates essential fish habitat, which is defined as "those waters and substrate necessary for federally managed species to spawn, breed, feed, and/or grow to maturity." All federal agencies are required to assess the potential effects of proposed actions and alternatives on Essential Fish Habitat (EFH), and to consult with NMFS on any actions that could adversely affect EFH. According to the NMFS EFH mapper, the project area is within designated EFH for various life stages of the following 16 highly migratory species and mid-Atlantic and New England species: sand tiger shark (*Carcharias taurus*), smoothhound shark complex (*Mustelus* spp.), black sea bass (*Centropristis striata*), bluefish (*Pomatomus saltatrix*), little skate (*Leucoraja erinacea*), windowpane flounder (*Scophthalmus aquosus*), Atlantic mackerel (*Scomber scombrus*), Atlantic herring (*Clupea harengus*), longfin inshore squid (*Loligo pealeii*), pollock (*Pollachius* spp.), winter skate (*Leucoraja ocellata*), Atlantic butterfish (*Peprilus triacanthus*), winter flounder (*Pseudopleuronectes americanus*), summer flounder (*Paralichthys dentatus*), red hake (*Urophycis chuss*), and scup (*Stenotomus chrysops*) (NMFS 2023a).

4.10.1. NO ACTION ALTERNATIVE

There would be no construction impacts on fish and wildlife, migratory birds, and EFH in the short term. Wildlife habitat within the impact area would continue to be susceptible to flooding. However, because of the built-up nature of the area and the mobility of species, there would be a negligible impact on wildlife. Natural wildlife habitat along the shoreline would continue to be impaired by the presence of invasive common reed, and the absence of functioning marsh habitat would continue to facilitate shoreline erosion caused by storm surge, sea level rise, and flooding. Therefore, habitat for wildlife and migratory birds in the project area would remain low-quality, and sediments from the eroded shoreline would likely continue to be deposited in the adjacent EFH. Thus, the No Action alternative would have long-term, minor adverse impacts on wildlife, migratory birds, and EFH.

4.10.2. PROPOSED ACTION

Noise and disturbances associated with the installation of the stormwater pipe and the construction of the living shoreline and associated vegetation removal may cause wildlife and migratory birds using the project area to flee to adjacent habitats, resulting in increased energy expenditure, competition for food and habitat, and predation risk. Although suitable habitat for the northern diamondback terrapin is limited within the project area, any basking or foraging individuals present in the project area could be disturbed by construction noise, vibration, and increased turbidity in the water column and would be expected to avoid or move away from the project area. Fish species, including blueback herring, if present, would be expected to do the same in response to construction activities associated with the living shoreline. Therefore, construction of the Proposed Action would likely have a short-term, minor adverse impact on common wildlife species, migratory birds, and bald eagles.

The closest known bald eagle nest is approximately 1.5 miles northwest of the project area. Effects on bald eagles would be limited to behavioral responses to disturbance (i.e., avoiding or flying away from the project area). FEMA coordinated with CT DEEP's Wildlife Division on December 6, 2023 and it was confirmed that there are no known eagle nesting territories within 660 feet of the project area (CT DEEP 2023). No further consultation with USFWS is required.

GZA conducted an assessment of effects on EFH. The assessment concluded that the construction of the living shoreline would result in tidal flats being lost or converted to low marsh areas and areas covered with stone sills. Water quality in the harbor could be degraded due to increased turbidity associated with project activities. Construction impacts would be minimized by implementing erosion and sediment control measures, including floating turbidity curtains, silt fencing, and hay bale barriers. Sediment and soil stockpiles and construction-related pollutants would be prevented from entering surface waters. All conditions of federal, state, and local codes and regulations and issued regulatory permits and approvals including time-of-year restrictions for construction would be implemented. FEMA consulted with NMFS on October 25, 2023 regarding impacts to EFH and NMFS responded on November 30, 2023 stating the Proposed Action may adversely affect EFH and provided conservation recommendations: 1) soil erosion, sediment and turbidity controls should be used; and work producing greater than minimal turbidity or sedimentation should be done during low tide, 2) temporary work structures (e.g., timber mats, stone access pads) should be completely removed, and habitats should be fully restored to pre-construction conditions, and 3) a draft

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monitoring plan for the living shoreline elements and annual post-construction monitoring reports should be sent to NFMS and FEMA for review (NMFS 2023c). While the reporting schedule will be dictated by final permitting, reporting would likely either be annual or at 1, 3, 5 years. FEMA replied to NOAA on 1/24/2024 and accepted the recommended conservation measures. With the implementation of these measures, the Proposed Action would likely have a short-term, minor adverse impact on EFH during construction.

The existing habitat conditions in the portion of the project area where the new stormwater pipe would be installed are not expected to change in the long term. The Proposed Action would replace the existing invasive vegetation in the living shoreline project area with native plantings and could create a functional marsh habitat that is less prone to erosion and more resilient during flood events compared to the existing habitat. Additionally, the Proposed Action would create localized microhabitats within the project area, facilitating the colonization and use of the project area by a greater diversity of species. Because the living shoreline component would likely increase habitat quality and species diversity within the project area and both project components would result in reduced flood risk within and around the habitats present in the project area, the Proposed Action would likely have long-term, minor beneficial effects related to common wildlife species, State Species of Special Concern, migratory birds, and bald eagles.

The reduction in flooding and shoreline erosion would improve water quality within the EFH by reducing the pollutants and sediments transported into EFH. Additionally, a monitoring and maintenance plan would be implemented following completion of the Proposed Action to monitor and maintain the nearshore sand margin, marsh, sills, and newly planted vegetation. Therefore, the Proposed Action would likely have long-term, minor beneficial effects related to EFH.

4.11. Threatened and Endangered Species and Critical Habitat

The Endangered Species Act (ESA) of 1973 gives USFWS and the National Marine Fisheries Service authority for the protection of threatened and endangered species. This protection includes a prohibition on direct take (e.g., killing, harassing) and indirect take (e.g., destruction of habitat).

The ESA defines the action area as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action” (50 CFR 402.02). Therefore, the action area where effects on listed species must be evaluated may be larger than the project area where project activities would occur. The action area extends beyond the project area to encompass the potential effects of noise and turbidity generated during construction. Given that project work would occur in an urbanized area in which ambient noise levels are likely elevated, it is expected that noise from construction activities would attenuate to the ambient noise levels in the terrestrial environment within 500 feet of project work. The farthest-reaching effect of construction underwater is expected to be noise from vibratory pile driving associated with installation of the cofferdam, which may extend up to 1,500 feet from work area (at the outfall location). Thus, to account for potential noise and turbidity impacts, the action area includes a 500-foot buffer extending from the project area on land and a 1,500-foot buffer extending from the project area in New Haven Harbor.

Affected Environment, Potential Impacts, and Mitigation

The USFWS IPaC database was used to identify proposed, threatened, and endangered species that may potentially occur in the action area. In addition, information available from NMFS was used to identify potential fish species that could occur in the action area. All ESA-listed species that may be near the action area are listed in **Table 4-3** (USFWS 2023b; NMFS 2023b) and are briefly discussed subsequently. No designated critical habitat occurs within or adjacent to the action area.

Table 4-3. Federally Listed Species with the Potential to Occur Within or Near the Project Area

Common Name	Scientific Name	Federal Status
Mammals		
Northern long-eared bat	<i>Myotis septentrionalis</i>	Endangered
Birds		
Red knot	<i>Calidris canutus rufa</i>	Threatened
Roseate tern	<i>Sterna dougallii dougallii</i>	Endangered
Fishes		
Atlantic sturgeon (all Distinct Population Segments (DPS))	<i>Acipenser oxyrinchus oxyrinchus</i>	Carolina DPS: Endangered Chesapeake Bay DPS: Endangered New York Bight DPS: Endangered South Atlantic DPS: Endangered Gulf of Maine DPS: Threatened
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	Endangered
Green sea turtle, North Atlantic DPS	<i>Chelonia mydas</i>	Threatened
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	Endangered
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered
Loggerhead sea turtle, Northwest Atlantic DPS	<i>Caretta caretta</i>	Threatened

Sources: USFWS 2023b, NMFS 2023b
Key: DPS = distinct population segment

Northern long-eared bat (NLEB): NLEBs hibernate in caves and mines during the winter and roost under exfoliating tree bark or other tree crevices during the summer. Summer roosting habitat comprises wooded or semi-wooded areas with dead standing trees or other suitable roost trees. Existing trees within Long Wharf Park may provide summer roosting habitat for the NLEB. However, there are no known hibernacula in the City of New Haven and no known maternity roost trees have been mapped as of 2019 (DEEP 2019b). The trees in Long Wharf Park tend to be planted in linear patterns parallel to the shoreline with each exposed to the wind off the harbor. Given that the action area is a highly developed area and that the species typically prefers large tracts of contiguous forest, the NLEB is unlikely to use the action area.

Affected Environment, Potential Impacts, and Mitigation

Red knot: Red knots nest in the arctic but use marine habitats, including sandy beaches, saltmarshes, and lagoons with adequate invertebrate prey along the New England coast, for migrating and overwintering. The tidal flats and low marsh areas within Long Wharf Park may provide foraging habitat for the red knot during migration. The Atlantic horseshoe crab (*Limulus polyphemus*), which is the primary food source for migrating red knots, has been observed in the action area (iNaturalist 2023). However, habitats that may be suitable to support horseshoe crabs are patchy and regularly disturbed by park users. Although the red knot is regularly observed during migration at the Sandy Point Bird Sanctuary, which is approximately 1.2 miles south of the action area, the most recent observation of the species in the project vicinity (at Long Wharf Nature Preserve) was in 1988 (eBird 2023).

Roseate tern: The roseate tern nests on offshore islands. During migration, individuals forage in coastal waters and roost on beaches and estuaries. While there are no reported observations of roseate terns in the action area, the species is regularly observed in small numbers at the Sandy Point Bird Sanctuary (eBird 2023).

Atlantic sturgeon: Atlantic sturgeon inhabit rivers and coastal waters between Canada and Florida. Adult and subadult Atlantic sturgeon may be present in and adjacent to the action area year-round.

Shortnose sturgeon: Adult shortnose sturgeon hatch in freshwater and spend most of their lives in freshwater, generally staying close to shore when they do enter marine waters. Adult shortnose sturgeon are assumed to be present in and adjacent to the action area between April 1 and November 30.

Sea turtles: Adult and juvenile turtles could be present from May 1 to November 30.

4.11.1. NO ACTION ALTERNATIVE

Under the No Action alternative, current conditions, including the limited use of the action area by federally listed species, would not change. Thus, there would be no effect on threatened and endangered species in the short term or long term.

4.11.2. PROPOSED ACTION

No trees would be removed under the Proposed Action. Work would not be conducted during nighttime hours when individual NLEBs may be foraging in or near the action area. While unlikely, if NLEBs are roosting in trees within or near the action area, noise and other disturbances may cause them to seek other roosting habitat readily available in adjacent shoreline areas, such as the Long Wharf Nature Preserve. In the long term, marsh creation and establishment of native vegetation communities could increase the available insect prey for the NLEB; therefore, the Proposed Action may slightly benefit the NLEB in the long term. FEMA has determined that the Proposed Action would have no effect on the NLEB.

Affected Environment, Potential Impacts, and Mitigation

Red knots may avoid the action area during construction within their migration period. However, they could readily use the undisturbed habitat at Sandy Point Bird Sanctuary and other areas nearby that they currently inhabit. The Proposed Action is not expected to have a permanent effect on horseshoe crab movement or use of the action area by breeding horseshoe crabs, as the proposed stone sills would have gaps that allow for the movement of horseshoe crabs. Additionally, all work below mean high tide would be prohibited from May 10 to July 15 to protect horseshoe crab spawning and egg development, as described in the USACE Section 404/Section 10 Individual Permit Application developed for the Proposed Action, and as conditioned in the CT DEEP Certificate of Permission (License# 202302022-COP). Implementation of the Proposed Action would result in the creation of salt marsh habitat and native vegetation communities, increasing the species' prey base and the amount and quality of suitable habitat for red knots in the action area in the long term. Therefore, FEMA has determined that the Proposed Action would have no effect on the red knot.

Similar to the red knot, the roseate tern may avoid the action area during construction within their migration period. However, they could readily use the undisturbed habitat at Sandy Point Bird Sanctuary and other areas nearby that they currently inhabit. The Proposed Action would result in the creation of salt marsh habitat and native vegetation communities, which would increase the amount of available prey for the roseate tern in the long term. Therefore, FEMA has determined that the Proposed Action would have no effect on the roseate tern.

If the Atlantic sturgeon, shortnose sturgeon, or sea turtles were to be present in New Haven Harbor during construction of the living shoreline, project activities would likely cause these species to avoid the action area due to noise or degraded water quality (i.e., turbidity). However, construction impacts would be minimized by implementing erosion and sediment control measures, including floating turbidity curtains, silt fencing, and hay bale barriers. Sediment and soil stockpiles and construction-related pollutants would be prevented from entering surface waters. Vibratory pile driving would be used to install the cofferdam near the outfall location, rather than an impact hammer. Vibratory pile driving creates lower underwater sound pressure levels versus an impact hammer and is often used as an alternative method to a mitigate sound pressure (Caltrans 2020).

All conditions of federal, state, and local codes and regulations and issued regulatory permits and approvals, including time-of-year restrictions for construction, would need to be implemented. The Proposed Action would create functional marsh habitat that is less prone to erosion and more resilient during flood events compared to the existing habitat. This reduction in shoreline erosion would improve water quality and, therefore, habitat for listed marine species within New Haven Harbor. Additionally, a monitoring and maintenance plan would be implemented following completion of the Proposed Action to monitor and maintain the nearshore sand margin, marsh, sills, and newly planted vegetation. Thus, the Proposed Action may slightly benefit listed marine species in the long term. Therefore, with the implementation of the measures described, FEMA has determined that the Proposed Action *may affect, but is not likely to adversely affect* the Atlantic sturgeon, shortnose sturgeon, and listed sea turtles.

FEMA consulted with NMFS regarding endangered marine species on October 25, 2023; the consultation is in process. A status update will be provided in the Final EA and any conservation recommendations provided by NMFS will become a condition of the FEMA grant.

Affected Environment, Potential Impacts, and Mitigation

Based on the above analyses, construction of the Proposed Action would result in negligible to minor short-term adverse impacts on listed species. Given that the Proposed Action would restore/improve habitat for the listed species described above, it is expected to have negligible to minor beneficial effects on listed species in the long term.

4.12. Cultural Resources

Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (16 U.S.C. 470f), requires that activities using federal funds undergo a review process to consider potential effects on historic properties that are listed in or may be eligible for listing in the National Register of Historic Places. Cultural resources include prehistoric or historic archaeology, historic standing structures, historic districts, objects, artifacts, cultural properties of historic or traditional significance (referred to as Traditional Cultural Properties) that may have religious or cultural significance to federally recognized Indian tribes), or other physical evidence of human activity considered to be important to culture, subculture, or community for scientific, traditional, religious, or other reasons. FEMA met this obligation to consider impacts to cultural resources through its Section 106 of the NHPA consultation. Section 106 of the NHPA, as amended and implemented by 36 CFR part 800, outlines the required process for federal agencies to consider a project's effects to historic properties.

Pursuant to 36 CFR part 800.4(a)(1), the Area of Potential Effects (APE) is defined as the geographic area(s) within which the undertaking may directly or indirectly affect cultural resources. Within the APE, effects to cultural resources are evaluated prior to the undertaking for both Standing Structures (above ground resources) and Archaeology (below ground resources).

The Connecticut State Historic Preservation Officer (SHPO) maintains an online mapping system of historic properties called ConnCRIS. FEMA used this database and discussions with the SHPO's office on archaeological sites, along with the National Register of Historic Places database, as part of our efforts to identify significant cultural resources that could be impacted by a project. Cultural resources are defined as prehistoric and historic sites, structures, districts, buildings, objects, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons.

The project is located in the Long Wharf area of New Haven, which stretches inland from the west side of New Haven Harbor northwest to Union Avenue. The Long Wharf Pier Structure, located at 389 Long Wharf Drive, is located just outside the project area. According to the National Register and the State Register, there are no previously listed historic or cultural resources within the project area. Furthermore, there are no standing structures within the project area that were assessed for historic significance. According to coordination with the SHPO, there are no known archaeological resources in the project area. The project area is confined to previously disturbed soils that are fill, eroded soils, or previously deposited soils.

FEMA consulted with SHPO and the Tribal Historic Preservation Officers (THPOs) of the Delaware Tribe of Indians, Mashantucket Pequot Indian Tribe, The Mohegan Tribe of Indians of Connecticut, and the Narragansett Indian Tribe on September 7, 2023. FEMA sent a finding of "No Historic Properties Affected" to the SHPO and THPOs. The SHPO concurred with FEMA's determination of effect on September 14, 2023. No responses were received from the THPOs.

4.12.1. NO ACTION ALTERNATIVE

Current conditions would not change under the No Action alternative and there would be no impacts to standing structures or archaeological resources. Effects would be **none**.

4.12.2. PROPOSED ACTION

Although the proposed action involves significant ground disturbance, there are no cultural resources within the project area and the work is confined to previously disturbed soils with no known archaeological resources. FEMA will include conditions on the project for inadvertent archaeological discoveries, as well as staging and access area, should archaeological resources be discovered during construction. Effects would be **none to negligible**.

4.13. Environmental Justice

Executive Order 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All, defines Environmental Justice (EJ) as the just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, tribal affiliation or disability, in agency decision-making and other federal activities that affect human health and the environment. EO 14096 builds upon EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which requires agencies to identify and address any disproportionately high and adverse human health or environmental effects its activities may have on minority or low-income populations.

In accordance with EO 12898, Environmental Justice: Interim Guidance for FEMA EHP Reviewers, environmental justice populations are defined as meeting either or both of the following criteria:

- Populations within the project benefit area contain a minority or low-income population that is equal to or exceeds 50 percent (%) of the population.
- One or more EJ Index (e.g., air quality pollutants, traffic proximity and volume, proximity to hazardous waste sites) equals or exceeds the 80th percentile compared to the average of the state.

CEQ (1997) defines the term "minority" as persons from any of the following groups: Black, Asian or Pacific Islander, American Indian or Alaskan Native, and Hispanic. Residents of areas with a high percentage of people living below the federal poverty level may be considered low-income populations. The EJ Indices combine environmental indicators with socioeconomic indicators to identify areas where there may be a disproportionate exposure to environmental pollution.

The study area includes the project area and the Downtown New Have impact area (**Figure 3-1**). **Table 4-4** depicts the percentages of minority and low-income populations for the benefit area and the county for comparison. **Table 4-5** depicts the EJ Indices for the benefit area and the State.

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Table 4-4. Environmental Justice Population Demographic Indicators

Demographic Indicator	Benefit Area	Environmental Justice Population Present
People of Color (percentage)	58%	Yes
Low-Income (percentage)	47%	No

Source: EPA 2023c

Table 4-5. Environmental Justice Indexes

EJ Index	Index Percentile in State	Environmental Justice Population Present ¹
National-Scale Air Toxics Assessment (NATA)	0	No
NATA Respiratory	0	No
Toxic Releases to Air	92	Yes
Particulate Matter	69	No
NATA Diesel Particulate Matter	87	Yes
Ozone	80	Yes
Lead Paint	55	No
Traffic	93	Yes
Risk Management Plan Sites	79	No
Treatment and Disposal	98	Yes
National Priorities List	28	No
Underground Storage Tanks	95	Yes
Wastewater Discharge	56	No

Source: EPA 2023c

Notes: ¹ Index equals or exceeds the 80th percentile compared to the average of Washington State; therefore, an environmental justice population is present.

As shown in **Table 4-4** and **Table 4-5**, the study area meets the criteria for containing environmental justice populations based on thresholds for minority populations and multiple EJ indices. EPA defines minority populations as individuals who list their racial status as a race other than White alone and/or list their ethnicity as Hispanic or Latino (all people other than non-Hispanic White-alone individuals).

4.13.1. NO ACTION ALTERNATIVE

Under the No Action alternative, no construction activity would occur that would result in short-term effects to environmental justice populations, such as increases in noise from equipment use, reduced air quality from equipment emissions, or reduced access to roads and recreational activities during construction. In the long term, the risk of flooding would not be reduced. Flood waters would continue to inundate roads and Long Wharf Park, lengthening commute times and reducing access to employment locations or recreational opportunities. Flood waters could damage hazardous materials sites, increasing the risk of exposure to contaminants and pollutants or potentially degrading water quality in a community overburdened by proximity to hazardous material sites. Thus, there would be minor to moderate long-term effects to environmental justice populations from the continued risk of flooding, depending on the extent of flood damage and need for road detours and repairs. Impacts from flooding could result in disproportionately high and adverse effects to EJ populations.

4.13.2. PROPOSED ACTION

Under the Proposed Action, construction activity would result in short-term increases in noise and air quality emissions from the use of equipment. Construction would require temporary closure of Union Avenue, North Frontage Road, and Route 34 that could cause reduce access to employment or recreational opportunities. Increases in noise and air quality emissions would be minimized through compliance with local noise ordinances, including time-of-day work limitations, and through the application of EPA emissions standards. Detours would be provided for road closures. Thus, there would be minor short-term adverse effects associated with the use of construction equipment and temporary road closures. Short-term impacts would fall equally on both EJ populations and the general population in the area and therefore would not disproportionately affect an EJ population. In the long term, the reduced risk of flooding and erosion impacts associated with repair-related activities and risk of exposure to hazardous materials would provide a moderate benefit to all populations, including EJ populations, by maintaining access to transportation facilities and public utilities and services (e.g., Long Wharf Park). Ancillary benefits from the living shoreline would include water quality improvement, habitat creation, increased economic opportunity, and improvement to public health. Thus, there would be a minor long-term beneficial effect on all populations, including EJ populations, from flood risk reduction.

4.14. Hazardous Materials and Solid Wastes

Hazardous materials are those substances defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act, and the Toxic Substances Control Act. The Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, which was further amended by the Hazardous and Solid Waste amendments, defines hazardous wastes. In general, both hazardous materials and waste include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, may present substantial danger to public health or to the environment when released or otherwise improperly managed.

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Hazardous materials may be encountered in the course of a project, or they may be generated by the project activities. To determine whether any hazardous waste facilities exist in the vicinity or upgradient of the proposed project area, or whether there is a known and documented environmental issue or concern that could affect the proposed project area, a search for Superfund sites, toxic release inventory sites, industrial water dischargers, hazardous facilities or sites, and multiactivity sites was conducted using EPA's NEPA Assist website and a past technical memorandum.

A review of the project area was performed using EPA's NEPA Assist online tool and a past technical memorandum prepared by Fuss & O'Neil in October 2018 for this project. The NEPA Assist review identified one former Resource Conservation and Recovery Act-regulated hazardous waste generator site within 10 miles of the project area (EPA NEPA Assist 2023). There are no Superfund sites (site regulated under CERCLA) in or near the project area. Soil and groundwater sampling identified contaminants within 15 feet of the ground surface, including semi-volatile organic compounds (SVOCs) and petroleum hydrocarbons in the soil and heavy metals in the groundwater. These contaminants were found in the sewer line project area, where impacted soils and groundwater were at the shaft locations, and the along the tunnel alignment for the proposed tunnel. Soil and groundwater exceedance locations were found near the locations of Shaft 1 and Shaft 2. For groundwater sampling, the State of Connecticut defines groundwater through the Ground Water Quality Classification, a vector database that includes water quality classification information for all areas of the State (DEEP 2015).

CT DEEP's Remediation Division confirmed the presence of polychlorinated biphenyl in the railyard area. They believe that the fuel oil is predominantly a light nonaqueous phase liquid (LNAPL), meaning that the majority of the diesel fuel is expected to be floating on top of the water table. Since much of the Long Wharf area is constructed on urban fill, the project area is likely to contain coal, ash, slag, and other human-made materials. Some contaminants may be present in the fill at concentrations that exceed the direct exposure criteria or pollutant mobility criteria in DEEP's Remediation Standard Regulations (RSRs).

4.14.1. NO ACTION ALTERNATIVE

Under the No Action alternative, contaminated soil would remain undisturbed on-site because no construction activity would occur. Thus, there would be no short-term impact. However, recurrent flooding would continue to occur because of the undersized stormwater management system. Flooding could mobilize contaminated soils within the project vicinity and pose a risk to human health and safety by causing accidental releases of hazardous soils and groundwater. Receding floodwaters could carry hazardous materials into the nearby Long Island Sound. However, owing to the built-up area, contaminated soil mobility would be minimal (**Section 4.2**). Thus, there would likely be a minor intermittent long-term effect from the continued risk of flooding and damage that could lead to the dispersal of hazardous materials.

4.14.2. PROPOSED ACTION

The Proposed Action would result in the disturbance of contaminated soil in the area of the drilling shafts. The subsurface pipe would likely be beneath the light non- aqueous phase liquid, however tunneling equipment entering and exiting the ground at the three shaft locations would likely pass through the LNAPL layer or other shallow areas of contamination. The use of mechanical equipment throughout the project area could also release fuels, oils, and lubricants through inadvertent leaks and spills. However, project activities would need to adhere to state and local regulations to reduce the risk of hazardous leaks and spills.

The City would be required to manage excavated drill cuttings in accordance with U.S. EPA and CT DEEPs regulatory standards. Excavated soils and groundwater would need to be tested to determine if any contamination concentrations exceed RSR criteria. Roll-off containers would be required for material pending testing, if practical. Any material exceeding RSR criteria would need to be properly disposed. Any cuttings stockpiled above-ground would need to be managed in accordance with CT DEEP's General Permit for Contaminated Soil and/or Sediment Management.

The City would be required to coordinate with CT DEEP's Remediation Division throughout construction. If new hazards are encountered, construction activities would be suspended in the area of the impacted soil and no further work would be done in that area without written authorization from CT DEEP. The City of New Haven would be required to provide FEMA with a summary of reporting and handling of any previously unknown areas with contaminated media (including a written authorization from CT DEEP to resume work, if applicable) in an After-Action Report.

The City would be required to manage any construction and demolition (C&D) wastes produced by the Proposed Action in accordance with CT DEEP regulations. Waste must be disposed of at a facility permitted for construction and demolition debris (aka bulky waste). The City would be required to provide FEMA with the name/location of the facility/landfill used for the project, or a statement explaining how the debris was reused or recycled if not taken to an authorized disposal facility, in an After-Action Report. In the short-term, there would be minor short-term impact from C&D wastes. In the long-term, there would be negligible effect due to proper disposal requirements.

As long as all regulatory standards are met and BMPs are followed, there would only be a minor short-term impact from hazardous materials. In the long term, decreased flooding would likely reduce the potential for flood-related spills and release of hazardous materials into the project area. The sewer line project would reduce flood-related spills by adding drainage that would redirect flooding to the New Haven Harbor. The shoreline project would reduce flood-related spills by adding fringe marsh to create habitat, reduce wave energy, and protect the existing infrastructure. Thus, the Proposed Action would likely have a minor long-term beneficial effect from the reduced risk of flood-related release of hazardous materials.

4.15. Noise

Sounds that disrupt normal activities or otherwise diminish the quality of the environment are considered noise. Noise events that occur during the night (10:00 p.m. to 7:00 a.m.) are more disruptive than those that occur during normal waking hours (7:00 a.m. to 10:00 p.m.). Assessment of noise impacts includes the proximity of the Proposed Action to sensitive receptors, which are defined as an area of frequent human use that would benefit from a decreased noise level.

The City regulates noise levels through the City of New Haven Code, Title 3, Chapter 18, Article 2, Section 18: Noise Control, which prohibits noise levels above 70 decibels (dB) adjacent to other industrial or commercial zones (City of New Haven 2023). Land uses that are considered sensitive to noise effects are referred to as noise-sensitive receptors (e.g., schools, residences, libraries, hospitals, and other care facilities). There are no noise-sensitive areas within the project area; however, there are residences, the Hill Central School, and the Yale New Haven Hospital within the impact area. Construction noise is exempt from the code as long as it is conducted between 7:00 a.m. and 10:00 p.m. on Mondays through Saturdays, and 9:00 a.m. and 9:00 p.m. on Sundays unless otherwise authorized by the City. Construction activities can exceed the 70 dB level with approval from the building official or director of the Department of Public Works (City of New Haven 2023).

4.15.1. NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no construction-related noise causing short-term impact on noise levels. However, periodic flooding of city streets would continue to occur, thus creating the need for ad hoc construction activities to repair flood damage. Construction activities to repair flood damage would temporarily increase noise levels in the immediate vicinity of the work. However, any construction that may occur would not exceed 62 dB established by the City's ordinance. Thus, there would be reoccurring minor long-term effects because of the associated construction noise during repairs.

4.15.2. PROPOSED ACTION

Under the Proposed Action, construction activities would likely temporarily increase noise levels in the project vicinity. Construction activities would be conducted during daytime hours and abide by all applicable state and local noise regulations. The work would also be conducted within railyard, commercial, and coastal areas away from any noise-sensitive receptors. Thus, there would be a minor short-term increase in noise levels during construction that would not impact noise receptors. Post construction, noise levels would likely return to pre-construction levels and the risk of flooding would likely be minimized, thus reducing occasional increases in noise from flood-related repairs near noise receptors. Therefore, the Proposed Action would likely have a negligible long-term beneficial effect on noise levels.

4.16. Transportation

The project area is in New Haven's downtown waterfront district and is a hub for transit and roadways to and through the area. Interstate 95 runs parallel to Long Wharf Park and extends to the east to connect with Interstate 91. The project construction area would generally encompass Union Avenue, Sargent Drive, Interstate 95, and Long Wharf Drive. Regular bus transit service is provided along Sargent Drive by CT Transit.

The Northeast Rail Corridor crosses the project area and includes New Haven Union Station at 50 Union Avenue, a regional rail station used by more than 700,000 Amtrak customers and more than 1 million Metro-North Railroad users yearly. The Additional Storm Sewer Capacity project would cross under the railyard, approximately 400 yards northeast of New Haven Union Station.

4.16.1. NO ACTION ALTERNATIVE

Under the No Action alternative, construction activity would not occur and transportation services would not be impacted by construction in the short term. Ad hoc flood control efforts may be implemented that could require street closures. Flooding would continue to inundate the Long Wharf Park and streets such as Union Avenue, North Frontage Road, and Route 34, resulting in roadway and sidewalk closures, rerouting of transit services, and potentially impeding the use of the railyard. Construction for flood-related repairs may result in road closures that could disrupt transit services. Therefore, periodic flooding and construction activities for ad hoc flood-related repairs would result in a minor long-term adverse effect from road closures, transit service cancellation, and rerouting of both motorized and nonmotorized transportation modes (New Haven 2023).

4.16.2. PROPOSED ACTION

Vehicles, equipment, and personnel would access staging and construction areas via the local road network and could result in additional traffic on nearby streets. Equipment would be staged within the project area so that there would likely not be an increase in congestion from trucks waiting to access the construction zone. No rerouting of transit services or rail services are expected to occur because the storm sewer line would be constructed underground. Therefore, the Proposed Action would likely have a minor short-term adverse effect on transportation from some additional traffic during construction.

Post construction, the Proposed Action would reduce the risk of flooding in the Long Wharf commercial district that currently results in repeated street closures. In addition, the Proposed Action would also reduce the risk of flooding to New Haven Union Station and railyard. The living shoreline would provide protection against storm surge and flooding, reducing the frequency that motorists and pedestrians would be exposed to dangerous flooded roadway conditions. Thus, there would be long-term moderate benefit to transportation within the impact area.

4.17. Public Services and Utilities

The project area is served by major utilities and infrastructure, including electric, water, storm and sewer lines, and regional utilities throughout the project area. The United Illuminating Company is the public utility company that provides electricity to the project area. The South-Central Connecticut Regional Water Authority provides water, and the Greater New Haven Water Pollution Control Authority provides sewer service. Other public services include Long Wharf Park, a linear urban park between Interstate 95 and New Haven Harbor, provides more than 3,500 feet of public access and runs along the coast of New Haven Harbor. Every year it attracts more than 500,000 visitors (New Haven 2023).

The storm and sewer system includes multiple outfalls located along the Long Wharf shoreline that are fitted with tide gates. Several of these outfalls are combined storm-sanitary sewer outfalls. A regional 36-inch sanitary sewer force main carries sewage west to east under Long Wharf Park to the regional wastewater treatment plant. A 115-kilovolt (kV) electrical transmission line also traverses the living shoreline project area under Interstate 95 and adjacent roadway.

4.17.1. NO ACTION ALTERNATIVE

Under the No Action alternative, construction activity would not occur and utility services would not be disrupted. Erosion near the coastal sewer sanitary system from storm-induced erosion could cause disruption of this line which would affect 65,000 customers. Disruption of the electrical transmission line by flood waters would affect the resilience of the electrical grid in the region by causing power outages, instability of the transmission lines structure, and affect the safety of the surrounding community. Coastal erosion could also impair the functionality of Long Wharf Park affecting visitors and recreational uses. Therefore, the No Action alternative would have **moderate long-term effects** on public services and utilities from flood-related damage, erosion, and disruptions.

4.17.2. PROPOSED ACTION

Under the Proposed Action, construction activities would avoid utilities in the area because the proposed work would occur along the living shoreline, or underground using microtunneling technology for the sewer line project, causing no short-term impact from either project. The construction of the living shoreline would add fill and wave attenuation features that would reduce erosion and protect the underground utilities in the vicinity. The reduction in flooding within the project benefit area would reduce flood-related impacts on public utilities and services in the long term. The sewer line project would decrease flooding and storm-induced erosion in the impact area, which would help public and utility services to not be interrupted. The living shoreline project would reduce coastal erosion and not affect the nearby electrical transmission line, which would maintain the stability of the electrical grid in the area. Thus, there would likely be a negligible short-term impact on utility services in the area and moderate long-term benefits.

4.18. Public Health and Safety

The Yale New Haven Hospital, Robert T. Wolfe public housing facility, and the New Haven Police Department provide public health and safety services in the impact area (**Figure 3-1**). Yale New Haven Hospital is situated on three separate campuses (20 York Street, 789 Howard Avenue, and 60 Temple Street). The Robert T. Wolfe public housing facility for the elderly and disabled is located at 49 Union Avenue, across from the Union Station parking garage. The New Haven Police Department is located at 1 Union Avenue, approximately 700 feet north-northeast of Union Station. Both services are located near roads subject to flooding.

The New Haven Fire Department, located outside of the impact area (at 952 Grand Avenue), is the main source of fire support for the impact area.

4.18.1. NO ACTION ALTERNATIVE

Under the No Action alternative, construction activities would not occur, having no short-term impact on public health and safety resources. Periodic flooding would continue that could damage critical public health and safety facilities and cause road closures that would adversely affect access to and from those facilities. Additionally, inundated roadways could necessitate rerouting emergency vehicles, thereby adding response time to public health and safety emergencies, which would limit emergency response vehicle access to Yale New Haven Hospital. Flooding could cause power outages, reduce water quality from the backup of sewage lines, and transport hazardous pollutants, exposing people to health hazards (**Section 4.17**). Thus, in the long term, there would be intermittent minor adverse impacts under the No Action alternative.

4.18.2. PROPOSED ACTION

The Proposed Action would likely result in short-term negligible adverse effects to public health and safety because temporary impacts to traffic during construction could reduce emergency response times (**Section 4.17**). However, in the long term, there would be minor beneficial effects from the reduced burden on emergency services due to flood-related emergency calls. In addition, the inundation of roads within the project benefit area would be reduced, thereby resulting in less need to reroute emergency vehicles and allow access to public safety facilities. The potential for damage to critical public health and safety facilities would be reduced over the long term, having a minor beneficial effect.

Affected Environment, Potential Impacts, and Mitigation

4.19. Summary of Effects and Mitigation

Table 4-6 provides (1) a summary of effect determinations that could result from implementing the Proposed Action, (2) any required agency coordination efforts or permits, and (3) any applicable proposed mitigation or BMPs.

Table 4-6. Summary of Impacts and Mitigation

Resource	Effect Determination(s)	Agency Coordination or Permit(s)	Mitigation/BMPs
Topography, Soils, and Geology	<ul style="list-style-type: none"> • Negligible short-term adverse impact during construction of the pipeline; moderate short-term adverse impact during construction of the living shoreline • Negligible long-term benefits from pipeline work; moderate long-term benefits in the coastal area • Geology – no effect on geological resources 	Clean Water Act Section 404 permit; Section 401 permit; NPDES permit	Compliance with all permit conditions
Air Quality and Climate Change	<ul style="list-style-type: none"> • Negligible short-term adverse impacts on air quality and climate • Negligible long-term beneficial effect on air quality and climate 	A general conformity analysis would be required	Construction vehicles would comply with current EPA emissions standards
Surface Waters and Water Quality	<ul style="list-style-type: none"> • Minor short-term adverse effect • Moderate long-term beneficial effect 	Clean Water Act Section 404 permit; Section 401 permit; NPDES permit	Compliance with all permit conditions
Wetlands	<ul style="list-style-type: none"> • Moderate short-term adverse effect • Moderate long-term beneficial effect 	Clean Water Act Section 404 permit; Section 401 permit; NPDES permit; CT DEEP Certificate of Permission for work in tidal waters	Compliance with all permit conditions

Affected Environment, Potential Impacts, and Mitigation

Resource	Effect Determination(s)	Agency Coordination or Permit(s)	Mitigation/BMPs
Floodplains	<ul style="list-style-type: none"> • Minor short-term adverse effect • Moderate long-term beneficial effect 	Floodplain Development Permit	Compliance with all permit conditions
Coastal Resources	<ul style="list-style-type: none"> • Moderate short-term adverse effect • Moderate long-term beneficial effect 	Coastal Consistency Determination	N/A
Vegetation	<ul style="list-style-type: none"> • No short-term effect from pipeline work; Minor short-term adverse effect from shoreline work • Moderate long-term beneficial effect 	N/A	An invasive species control plan would be included as a General Condition in the USACE Clean Water Act permit
Fish and Wildlife	<ul style="list-style-type: none"> • Minor short-term adverse effect on wildlife, migratory birds, bald eagles, and EFH • Minor long-term beneficial effect on wildlife, migratory birds, bald eagles, and EFH 	Consultation with NFMS regarding impacts on EFH	<ul style="list-style-type: none"> • Compliance with mitigation measures from the 11/30/2023 EFH consultation response, including erosion/turbidity BMPs; work limited to low tide when producing more than minimal turbidity or sedimentation; and temporary structures completely removed and habitats fully restored.

Affected Environment, Potential Impacts, and Mitigation

Resource	Effect Determination(s)	Agency Coordination or Permit(s)	Mitigation/BMPs
Threatened and Endangered Species	<ul style="list-style-type: none"> • Negligible short-term adverse effect on NLEB, roseate tern, and red knot; minor adverse effect on Atlantic sturgeon, shortnose sturgeon, and green, Kemp's ridley, and loggerhead sea turtles • Negligible long-term beneficial effect on NLEB; minor long-term beneficial effect on roseate tern, red knot, Atlantic sturgeon, shortnose sturgeon, and green, Kemp's ridley, and loggerhead sea turtles • The Proposed Action may affect, but is not likely to adversely affect, the Atlantic and shortnose sturgeon, and green, Kemp's ridley, and loggerhead sea turtles 	NMFS Informal Consultation	<ul style="list-style-type: none"> • Erosion-control BMPs would be installed, as necessary, to prevent sedimentation from entering downstream waterbodies • Compliance with all mitigation measures from the pending ESA consultation concurrence
Cultural Resources	<ul style="list-style-type: none"> • No historic properties affected 	SHPO/THPO consultation	Inadvertent Discovery conditions will be placed on this project to be used in the event of unanticipated discovery of cultural resources during major construction
Environmental Justice	<ul style="list-style-type: none"> • No short-term disproportionately high and adverse effect on EJ populations • Minor short-term adverse effect and long-term beneficial effect 	N/A	N/A

Affected Environment, Potential Impacts, and Mitigation

Resource	Effect Determination(s)	Agency Coordination or Permit(s)	Mitigation/BMPs
Hazardous Materials and Solid Wastes	<ul style="list-style-type: none"> • Minor short-term adverse effect • Minor long-term beneficial effect (Hazardous Materials) • Negligible long-term effect (Solid Wastes) 	N/A	<ul style="list-style-type: none"> • Soils, groundwater, and C&D wastes must be managed in accordance with U.S. EPA/CT DEEP regulatory standards. • Newly discovered hazards would suspend work until CT DEEP is authorizes work to resume.
Noise	<ul style="list-style-type: none"> • Minor short-term adverse effect • Negligible long-term beneficial effect 	N/A	<ul style="list-style-type: none"> • Noise-producing equipment use would occur during less-sensitive, waking hours (7:00 a.m. to 10:00 p.m. Mondays through Saturdays and 9:00 a.m. to 9:00 p.m. on Sundays). • Vehicle and equipment runtimes would be kept to a minimum.
Transportation	<ul style="list-style-type: none"> • Minor short-term adverse effect • Moderate long-term beneficial effect 	N/A	N/A
Utilities	<ul style="list-style-type: none"> • Negligible short-term effect • Moderate long-term beneficial effect 	N/A	N/A
Public Health and Safety	<ul style="list-style-type: none"> • Negligible short-term adverse effect • Minor long-term beneficial effect 	N/A	N/A

SECTION 5. Cumulative Effects

This section addresses the potential cumulative effects associated with the implementation of the Proposed Action. Cumulative effects on the environment are those that result from the incremental effects of a proposed action when added to the effects of other past, present, and reasonably foreseeable actions, regardless of the agency (federal or nonfederal) or person that undertakes those other actions (40 CFR 1508.1, 2022). CEQ’s regulations for implementing NEPA require an assessment of cumulative effects during the decision-making process for federal projects. The CFR also states that cumulative impacts can result from *individually minor* but *collectively significant* actions taking place over a period of time.

Work associated with Proposed Action is expected to begin in 2025. See Table 5.1 for an overview of projects related in terms of time and/or proximity.

Table 5-1 Cumulative Actions

Project	Timeline	Location
Bioswales	Completed 2019	Throughout Downtown New Haven (within project impact area)
Long Wharf Park	Work expected to begin 2024 and be completed prior to the Proposed Action	From approximately the Vietnam Memorial to 501 Long Wharf Drive (within the project impact area)
USACE-funded Coastal Storm Risk Project	Work expected to begin 2026 (after the Proposed Action is complete)	Along I-95 (just landward of shoreline work and in proximity of pipe/outfall work)

Bioswales – The City installed bioswales throughout the downtown area. The bioswales are 15-foot by 5-foot gardens installed along the streets. These gardens include sidewalk curb cuts that redirect the flow of stormwater into the garden wherein the water is captured, filtered, and treated in the soil (City of New Haven 2023b). The bioswales capture approximately 70% of the stormwater that enters storm drains, treating approximately 75,000 gallons per year (Long Island Sound Study 2019). Work on the project began in August 2016 and was completed in June 2019.

Long Wharf Park Project – The City has developed the Long Wharf Responsible Growth Plan, which is a visioning plan that provides the framework for transforming the Long Wharf Area into mixed-use districts while addressing infrastructure improvements and resilience to flooding, storms, and sea level rise (Perkins–Eastman 2023). Building off this framework is the Long Wharf Park project. The project would approximately extend from the Vietnam Memorial at the western end to 501 Long Wharf Drive on the eastern end. The existing park would be redesigned to include a food truck area, playground and splashpad, market space, and a 16-foot promenade. A new pier is also envisioned but designs and permitting have not been developed at this time; therefore, the pier is not included in this cumulative effects analysis. Work on project aspects, except for the pier, is expected to begin in 2024.

USACE-Funded Coastal Storm Risk Management Project – The City pursued USACE-funding for an action in the Long Wharf area that includes installation of a floodwall, flood gates, and a pump station (USACE 2020; Figure 5-1). An Environmental Assessment and feasibility study were completed for the project and incorporated here by reference (USACE 2020). The project has been authorized and fully funded; construction is expected to begin in 2026. The Interstate 95 embankment would be augmented with 5,800 linear feet of “T-wall” floodwall, which would be supported by a pile-driven foundation and independent of the existing earthen embankment. Five (5) deployable flood gates (road closure structures; 475 linear feet total) would be installed: One (1) at Long Wharf Drive (60’ W x 8’ H), one (1) at Canal Dock Road (190’ W x 7’ H), one (1) at Brewery Street (65’ W x 3’ H), and two (2) at Exit 46 (total of 160’ W x 5’ tall). The pump station size has yet to be determined.

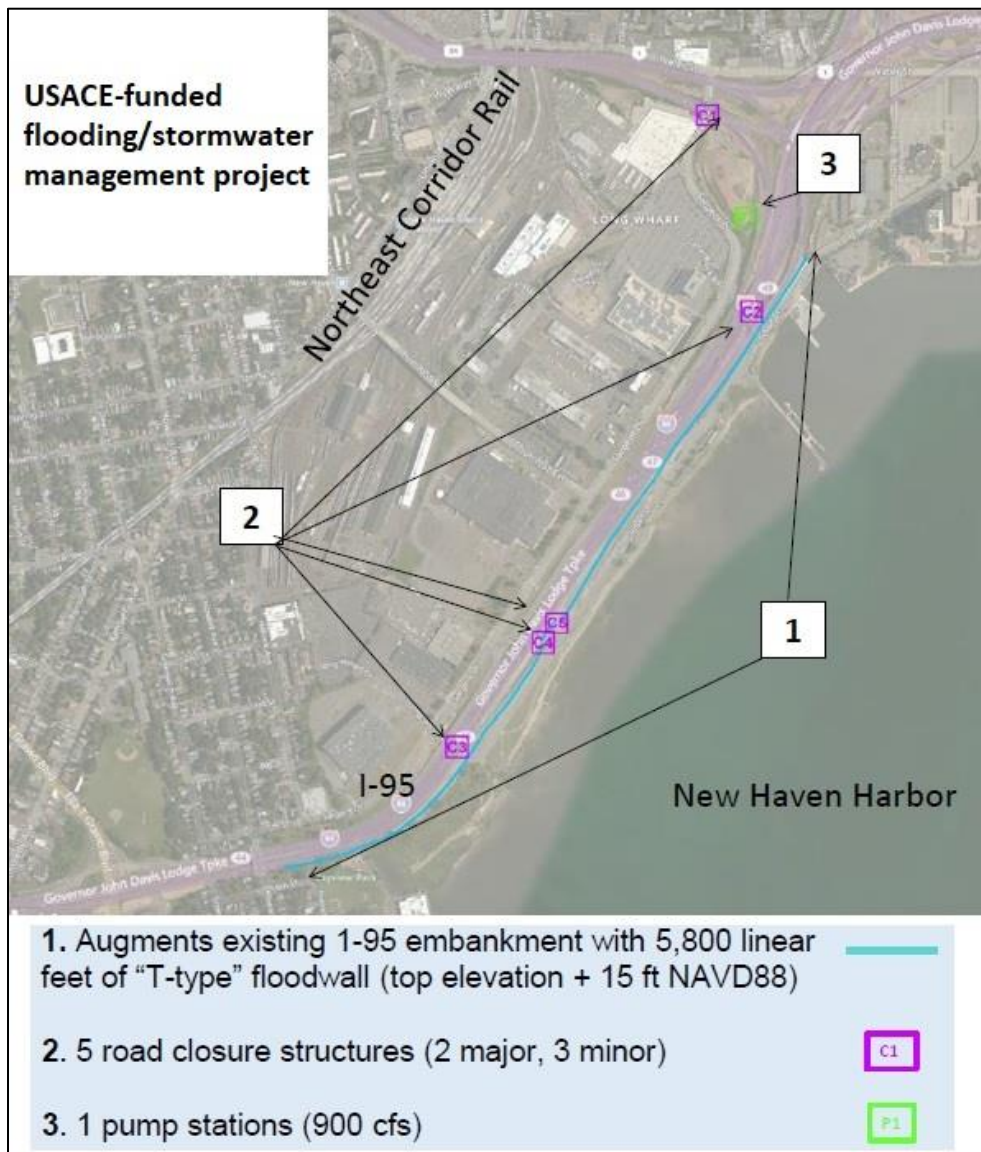


Figure 5-1 USACE-funded Action in the Long Wharf Area (credit: USACE Project Placement)

5.1. Conclusion

There would no short-term impacts because construction work would not overlap in terms of timing with the Proposed Action (the bioswales are complete, the Long Wharf project would be complete prior to the Proposed Action, and the USACE-funded Coastal Storm Risk Project would begin construction after the Proposed Action was complete.)

Five (5) resource topics – Transportation, Floodplain, Water Quality, Public Services and Utilities, and Public Health and Safety – would have an increased effect determination (positive or negative) with additional impacts from the cumulative actions in the long term.

- **Transportation** – The Proposed Action was determined to have a long-term moderate benefit to transportation. While the Bioswales and the USACE-funded Coastal Storm Risk Project would not change this determination, the Long Wharf Park Project could attract additional traffic to the area. While beneficial effects would still occur, the effects determination is decreased to minor given the additional traffic that the additional recreational development could create in the downtown area.
- **Floodplain** – The Proposed Action was determined to have a long-term moderate benefit to the floodplain. The Bioswales and the USACE-funded Coastal Storm Risk Project would not change this determination. The bioswales would provide additional floodwater storage, thus preventing further inundation of the new storm sewer pipe. The USACE-funded Coastal Storm Risk Project would provide a floodwall, closure structures, and a pump station to support an already developed area (along and west of I-95); work would not result in more encroachment nor impact the long-term beneficial impact from the Proposed Action. The Long Wharf Park project would also occur in an already developed area; however, given that additional development would occur in the floodplain, the determination is decreased to minor. The Proposed Action would mitigate some of the flooding within the development area, but the area would still be within an AE flood zone. Further mitigation measures would likely be required for the Long Wharf Project.
- **Water Quality** – The Proposed Action was determined to have a moderate long-term benefit to water quality. While the determination would not change due any of the additional projects discussed in Section 5, it's important to note that the Bioswales and the USACE-funded Coastal Storm Risk Project would increase benefits in the localized area. Furthermore, any additional stormwater management added to Long Wharf Park would maintain or improve water quality at and near the park.
- **Public Services and Utilities** – The Proposed Action was determined to have a moderate long-term benefit to public services and utilities. While the determination would not change due any of the additional projects discussed in Section 5, it is important to note that the Bioswales and the USACE-funded Coastal Storm Risk Project would increase benefits in the localized area. These projects would provide reduced flood risk in the project impact area that could impact public utilities and services.

- **Public Health and Safety** – The Proposed Action was determined to have a minor long-term benefit to public health and safety. All three projects discussed in Section 5 would increase benefits in the localized area and the determination would increase to moderate beneficial effects. The Bioswales reduce flooding and increase water quality, while the USACE-funded project is designed to increase flood and storm resiliency in the area. Long Wharf Park would be modernized and create additional recreational opportunities for the public.

SECTION 6. Agency Coordination, Public Involvement, and Permits

This section provides a summary of the agency coordination efforts and public involvement process for the proposed Inland and Coastal Flood Resiliency Project. In addition, an overview of the permits that would be required under the Proposed Action is included in **Section 6.4**.

6.1. Agency Coordination

FEMA consulted with the SHPO and the THPOs of the Delaware Tribe of Indians, Mashantucket Pequot Indian Tribe, The Mohegan Tribe of Indians of Connecticut, and the Narragansett Indian Tribe on September 7, 2023. The SHPO concurred with the determination that there would be no historic properties affected on September 14, 2023. No responses were received from the THPOs.

FEMA consulted with NMFS on October 25, 2023 regarding impacts to EHF. NMFS responded on November 30, 2023. Conservation recommendations will be included as conditions of the grant.

FEMA initiated informal consultation with NMFS on October 25, 2023 for Marine ESA species. FEMA determined that the Proposed Action may affect, but is not likely to adversely affect, listed species. NMFS requested more information on November 22, 2023. The consultation is in process. An update will be provided in the final EA and any conservation recommendations will be added as conditions of the grant.

Notification issued to USACE regarding the Proposed Action on May 17, 2023. A coordination call was held on June 6, 2023 and subsequent coordination has continued since that time.

6.2. Public Participation

In accordance with FEMA's NEPA procedures, FEMA is releasing this draft EA to the public and resource agencies for a 15-day public review and comment period. Comments on this draft EA will be incorporated into the final EA, as appropriate. This draft EA reflects the evaluation and assessment of the federal government, the decision-maker for the federal action; however, FEMA will consider any substantive comments received during the public review period to inform the final decision regarding grant approval and project implementation. If no substantive comments are received from the public and/or agency reviewers, this draft EA will be finalized as is and a FONSI will be issued by FEMA.

Public Notice for availability of the Draft EA was posted on the following websites and newspapers.

- City of New Haven website at <https://www.newhavenct.gov/government/departments-divisions/engineering/projects>
- FEMA website at <https://www.fema.gov/emergency-managers/practitioners/environmental-historic/nepa-repository>
- [Public notice date place holder for final EA]

Agency Coordination, Public Involvement, and Permits

NEPA, its implementing regulations, and FEMA procedures stress the importance of engagement with partner agencies, applicants, and the public to the extent practicable while preparing an EA. To solicit input on the project and its potential effects, FEMA distributed an EA scoping document to the following agencies on September 26, 2023:

- USFWS, New England Field Office
- USDA
- USACE, New England District
- EPA, Region 1
- HUD, Region 1
- Connecticut Division of Emergency Management and Homeland Security
- Connecticut SHPO
- Connecticut DEEP
- Connecticut State Floodplain Administrator

The following is a summary of agency responses:

- USFWS states that the Proposed Action could be benign to listed species, and similar shoreline projects were found to avoid adverse effects.
- Connecticut State Floodplain Administrator provided the in-process flood management certificate for the Living Shoreline (License Number O2203630-FM). They also stated a further flood management certificate may be required for the storm sewer line (the Connecticut Division of Emergency Management and Homeland Security Flood Management General Certification may cover these activities).
- DEEP Land and Water Resources Division provided details for the inclusion of a USACE-funded floodwall and pump station and future Long Wharf development to be included within the EA. These projects are discussed in **Section 5**.
- DEEP Remediation Division confirmed the presence of polychlorinated biphenyl in the general areas of the railyard. They wanted to ensure that the presence of contaminated soil and groundwater were included within the EA. Analysis of these contaminated resources are included in **Sections 4.2, 4.5, and 4.14**.
- The City provided minor scope of work changes that were updated in **Section 3.2** of this Draft EA.
- SHPO responded by stating that they support FEMA's conclusion that the Proposed Action would have little impact on archaeological resources.
- EPA Region 1 provided several comments:
 - For the living shoreline, EPA requested further presentation of the design than was provided in the Scoping Document. **Section 3.2.2** has been refined to include further details about the

Agency Coordination, Public Involvement, and Permits

living shoreline project. EPA also requested that the EA describe any long-term monitoring and contingency planning, which are included within the 401 DEEP Protection License Certificate of Permission (License No. 202302022-COP) and presented further in **Section 4.6**.

- For climate change, EPA requested inclusion of specific climate change projections being used, which are CIRCA projects and have been added to **Section 4.4**. They also recommend the EA detail how stormwater extension projects would alleviate flooding from increased precipitation and stormwater flows brought on by climate change, which is included in **Section 4.4**.
- For stormwater management, EPA requested the inclusion of the applicability of the Connecticut DEEP Municipal Separate Storm Sewer System General Permit (discussed in **Section 4.5**). EPA also recommended that the City explore the use of partial sewer separation, where applicable, to send the first 30 minutes of runoff from smaller storms to the publicly owned treatment works.
- EPA recommended that the EA explore the effectiveness of green infrastructure in combination with the new pipeline as a means to reduce stormwater flows. This is addressed in **Section 5**.
- EPA provided tools in developing the Environmental Justice Section (**Section 4.13**), in which FEMA incorporated its analysis of the alternates on Environmental Justice populations.

The City of New Haven made the draft EA available on its website at <https://www.newhavenct.gov/government/departments-divisions/engineering/projects>. The draft EA was also available on FEMA's website at <https://www.fema.gov/emergency-managers/practitioners/environmental-historic/nepa-repository>. Hard copies of the draft EA were available at the City of New Haven's Engineering Department, 200 Orange St, Room 503. The comment period for the draft EA will start when the public notice of EA availability is published; it will extend for 30 days. Comments on the draft EA may be submitted to eric.kuns@fema.dhs.gov and karen.vale@fema.dhs.gov with the subject line "New Haven Inland and Coastal Flood Resiliency EA." Comments also may be submitted via mail to:

Eric Kuns
Sr. Environmental Protection Specialist
FEMA Region 1
220 Binney Street
Cambridge, MA 02142

6.3. Comments and Responses

[placeholder for final EA]

6.4. Permits and Project Conditions

The City of New Haven, including their contractors, is responsible for obtaining and complying with all applicable Federal, State, and local permits and clearances for project implementation prior to construction. While a good faith effort was made to identify all necessary permits for the preparation of this Environmental Assessment, the following list may not include every approval or permit required for this project. Before, and no later than, submission of a project closeout package, the City must provide FEMA with a copy of the required permits and clearances from all pertinent regulatory agencies. The Town must adhere to the following conditions during project implementation; failure to comply with grant conditions may jeopardize Federal funds. Any substantive change to the approved scope of work would require re-evaluations by FEMA for compliance with NEPA and other laws and executive orders.

- Before construction begins, the City must obtain a Clean Water Act section 402 National Pollutant Discharge Elimination System (NPDES) permit from CT Department of Energy & Environmental Protection (CT DEEP). A copy of the approval/permit, or documentation from the permitting official that an approval/permit is not required, must be forwarded to the State and FEMA for inclusion in the administrative record. Contact Karen Allen, CT DEEP Storm Water Program Supervisor, at karen.allen@ct.gov for more information.
- Before construction begins, the City must obtain approval from the local permitting official responsible for floodplain development. A copy of the approval/permit, or documentation from the permitting official that an approval/permit is not required, must be forwarded to the State and FEMA no later than project closeout for inclusion in the administrative record.
- Before construction begins, the City of New Haven and the State DEMIS must obtain a flood management certificate for both the shoreline work and the storm sewer work. A copy of the certificates, or documentation from the permitting official that a certificate was not required, must be forwarded to the State and FEMA no later than project closeout for inclusion in the administrative record.
- Before construction begins, the City must coordinate with the CT DEEP and obtain a favorable Coastal Consistency Determination, or documentation from the permitting official that a Coastal Consistency Determination is not required. A copy of the determination must be forwarded to the State and FEMA for inclusion in the administrative record. Contact Jeff Caiola, Assistant Director of the Land & Water Resources Division at 860-424-4162 or jeff.caiola@ct.gov; or see CT DEEP's Coastal Management Program Coastal Management website for more information (<https://portal.ct.gov/DEEP/Coastal-Resources/Coastal-Management/Coastal-Management>) to determine Coastal Consistency Determination requirements.
- Before construction begins, the City must obtain a USACE Section 404/10 Individual Permit (Application File No. NAE-2020-01866). A copy of any 404/10 permits received, or documentation from the permitting official that permitting is not required, must be forwarded to the State and FEMA for inclusion in the administrative record no later than submission of a

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project closeout package. The City must comply with all terms and conditions of the issued permit.

Additionally, FEMA would require the City and their contractors to adhere to the following conditions during project implementation.

- Stop Work if archaeological deposits (for example Indian pottery, stone tools, shell, old house foundations, old bottles) are found/uncovered during construction. The project proponent and/or their contractor must immediately stop all work in the vicinity of the find, take reasonable measures to avoid or minimize harm to the finds, secure all archaeological finds (without removing them), and restrict access to the area of the find. The project proponent must immediately report the archaeological discovery to the State Emergency Management Agency (DEMHS) and the FEMA Deputy Regional Environmental Officer Mary Shanks, 617-901-2204. FEMA will determine the next steps.
- Stop Work if human remains are discovered. The project proponent and their contractor must immediately stop all work in the vicinity of the discovery and take reasonable measures to avoid or minimize harm to the remains, project all human remains discoveries, and restrict access to discovery sites. The project proponents and their contractor must follow all state laws associated with the discovery of human remains, including immediately notifying the proper authorities. Violation of state law will jeopardize FEMA funding for this project. The project proponent will inform the Office of the Chief Medical Examiner, the State Archaeologist, the State Emergency Management Agency (DEMHS), and the FEMA Deputy Regional Environmental Officer Mary Shanks, 617-901-2204. FEMA will consult with the SHPO and Tribes, if remains are of tribal origin. Work in the vicinity of the discovery(s) may not resume until consultation is completed and appropriate measures have been taken to ensure that the project is compliant with the National Historic Preservation Act and the Native American Graves Protection and Repatriation Act.
- Staging of equipment and materials and temporary access routes must take place on existing hardened surfaces (for example paved or gravel roadways or parking lots) as proposed in the existing scope of work. This includes, but is not limited to, routes between staging and work areas.
- The City has received a Certificate of Permission from CT DEEP's Land and Water Resource Division for work in tidal waters (License No. 202302022-COP) and must comply with all terms and conditions of the issued permit. The City must demonstrate that construction complied with terms and conditions of Certificate of Permission in the After-Action Report conditioned under NEPA. The After-Action Report must be provided to FEMA and the State no later than submission of the FEMA grant closeout package.
- Appropriate soil erosion, sediment, and turbidity controls should be used and maintained in effective operating condition during construction. Work capable of producing greater than minimal turbidity or sedimentation should be done during low tide. The City of New Haven must demonstrate these measures were employed in the After-Action Report conditioned under NEPA.

Agency Coordination, Public Involvement, and Permits

The After-Action Report must be provided to the State and FEMA no later than submission of the FEMA grant closeout package.

- All temporary work structures (e.g., timber mats, stone access pads) should be completely removed, and habitats should be fully restored to pre-construction conditions. The City of New Haven must demonstrate these measures were employed in the After-Action Report conditioned under NEPA. The After-Action Report must be provided to the State and FEMA no later than submission of the FEMA grant closeout package.
- The draft monitoring plan for the living shoreline elements and annual post-construction monitoring reports must be sent to NMFS (Sabrina.pereira@noaa.gov), the State, and FEMA for review (annually for 5 years or every 1/3/5 years, whichever is applicable).
- The City must comply with conservation measures provided by NOAA Fisheries regarding endangered marine species.
- The City must implement standard air pollution control measures during construction, pursuant to current EPA emissions standards. The City of New Haven must demonstrate that measures were employed in the After-Action Report conditioned under NEPA. The After-Action Report must be provided to the State and FEMA no later than submission of the FEMA grant closeout package.
- The City must minimize noise effects during construction. Construction activities must be restricted to normal business hours to the maximum extent possible. Heavy equipment, machinery, and vehicles utilized at the project area must meet all federal, state, and local noise ordinances. The City must demonstrate that Best Management Practices (BMPs) were employed in the After-Action Report conditioned under NEPA. The After-Action Report must be provided to the State and FEMA no later than submission of the FEMA grant closeout package.
- If previously unknown areas of contaminated soil, sediment, or groundwater (e.g., staining, odor, sheen, elevated field instrument readings, free product, etc.) are observed during construction, the City must STOP WORK and notify CT DEEP Remediation Division (Craig Bobrowiecki: craig.bobrowiecki@ct.gov). Suspected contaminated media must be handled in accordance with state soil and groundwater regulations. In the After-Action Report conditioned under NEPA, the City must provide FEMA and the State with a summary of reporting and handling of any previously unknown areas with contaminated media (including a written authorization from CT DEEP to resume work), or a statement confirming that no inadvertent discovery of contaminated media was observed during construction, no later than submission of the FEMA grant closeout package.
- The City must manage excavated drill cuttings in accordance with U.S. EPA and CT DEEPs regulatory standards. Excavated soils and groundwater would need to be tested and treated before disposal to determine if any contamination concentrations exceed RSR criteria. Roll-off containers must be used for material pending testing, if practical. Any material exceeding RSR criteria would need to be properly disposed. Any cuttings stockpiled above-ground would need to

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be managed in accordance with CT DEEP's General Permit for Contaminated Soil and/or Sediment Management. In the After-Action Report conditioned under NEPA, the City of New Haven must provide FEMA and the State with a summary of management methods used for drill cuttings, above ground stockpiles, and disposal of material exceeding RDR criteria no later than submission of the FEMA grant closeout package.

- Construction and Demolition Wastes must be managed in accordance with CT DEEP regulations. Reuse and recycling are encouraged to the extent possible. Waste must be disposed of at a facility permitted for construction and demolition debris (aka bulky waste). Contact CT DEEP Solid Waste Office at (860) 424-3366 for more information. In the After-Action Report conditioned under NEPA, the City of New Haven must provide the State and FEMA with the name/location of the facility/landfill used for the project, or a statement explaining how the debris was reused or recycled if not taken to an authorized disposal facility. The After-Action Report must be provided to FEMA and the State no later than submission of the FEMA grant closeout package.
- The City must develop an After-Action Report, with photos where applicable, that addresses certain FEMA conditions listed in this Record of Environmental Consideration document. The purpose of the After-Action Report is to demonstrate compliance with Clean Air Act, Endangered Species Act, Executive Order 12898 (Environmental Justice), Executive Order 11990 (Wetlands), Clean Water Act, CT Remediation Standard Regulations (RSRs), and State Solid Waste Regulations. The City of New Haven must provide the State and FEMA with the After-Action Report no later than submission of the FEMA grant closeout package.

SECTION 7. List of Preparers

The following is a list of preparers who contributed to the development of the Inland and Coastal Resiliency Project draft EA for FEMA. The individuals listed below had principal roles in the preparation of this document. Many others contributed, including senior managers, administrative support personnel, and technical staff; their efforts in developing this EA are appreciated.

CDM Smith

Preparers	Experience and Expertise	Role in Preparation
Tran, Danielle	Environmental Scientist	NEPA Documentation
Weddle, Annamarie	Environmental Planner	NEPA Documentation
Salas Mata, Zolanny	Transportation Planner	NEPA Documentation
Jadhav, Ajay	GIS Specialist	GIS
Webb, Brandon	Lead Environmental Planner	NEPA Documentation Review
Giordano, Brock	Senior Cultural Resources Specialist	Quality Control/Technical Review

Federal Emergency Management Agency

Reviewers	Role in Preparation
Vale, Karen	Environmental Planning and Historic Preservation Specialist
Kuns, Eric	Technical Review
Kuns, Eric	Review and approval
Philp, Kathleen	Historic Preservation Specialist

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SECTION 8. References

- Caltrans. 2020. Technical Guidance for the Assessment of the Hydroacoustic Effects of Pile Driving on Fish. CA Department of Transportation. October 2020. <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/hydroacoustic-manual-a11y.pdf>
- Connecticut Institute for Resilience and Climate Adaptation (CIRCA). 2023. Connecticut Sea Level Rise and Storm Surge Viewer. Accessed September 7, 2023, <https://circa.uconn.edu/sea-level-rise-and-storm-surge-viewer/>
- Connecticut Environmental Conditions Online. 2023. Advanced Viewer. Accessed June 29, 2023, <https://cteco.uconn.edu/viewer/index.html?viewer=advanced>.
- Connecticut Department of Energy and Environmental Protection (DEEP). 2023. Email from Brian Hess, CT DEEP Wildlife Division to Karen Vale, FEMA Region 1 re: FEMA Tech Assistance Request: Bald Eagles/New Haven, CT. December 5, 2023.
- _____. 2019a. Draft Integrated Feasibility Report and Environmental Assessment. Fairfield and New Haven Counties, Connecticut, Coastal Storm Risk Management Feasibility Study. Accessed September 18, 2023, <https://www.nae.usace.army.mil/Portals/74/docs/Topics/FairField/Draft-Main-Report-EA-13DEC2019.pdf>.
- _____. 2019b. Northern long-eared bat areas of concern in Connecticut to assist with Federal Endangered Species Act Compliance. Accessed July 7, 2023, <https://portal.ct.gov/-/media/DEEP/NDDDB/NoLongEaredBat-Map.pdf>
- _____. 2015. Ground Water Quality Classifications Polygon. Accessed August 31, 2023, https://cteco.uconn.edu/metadata/dep/document/waterqualityclass_ground_FGDC_FAQ.htm#what
- Connecticut Invasive Plants Council. 2018. Connecticut Invasive Plant List. Accessed September 18, 2023, https://cipwg.uconn.edu/wp-content/uploads/sites/244/2023/04/CT-Invasive-Plant-List-2018_Scientific-Name.pdf.
- eBird. 2023. eBird: An online database of bird distribution and abundance. Cornell Lab of Ornithology, Ithaca, New York. Accessed July 6, 2023, <http://www.ebird.org>.
- U.S. Environmental Protection Agency (EPA). 2023a. Current Nonattainment Counties for All Criteria Pollutants. Accessed June 28, 2023, <https://www3.epa.gov/airquality/greenbook/ancl.html#CT>.
- _____. 2023b. NEPAassist. Accessed July 6, 2023. <https://nepassisttool.epa.gov/nepassist/nepamap.aspx>.

- _____. 2023c. EJSCREEN. Accessed June 28, 2023, <https://ejscreen.epa.gov/mapper/>.
- _____. 2022. "Connecticut's 2022 303(d) List Report and Related Documents." Accessed June 29, 2023, <https://www.epa.gov/system/files/documents/2022-09/2022-ct-iwq-rpt-list.pdf>.
- _____. 2018. EnviroAtlas – New Haven, CT and surrounding area. Accessed July 6, 2023, <https://www.epa.gov/sites/default/files/2018-05/documents/newhavenct.pdf>
- _____. 2016a. "Emissions Standards Reference Guide: All EPA Emissions Standards." Accessed August 8, 2023, <https://www.epa.gov/emission-standards-reference-guide/all-epa-emission-standards>.
- _____. 2016b. "What Climate Change Means for Connecticut." Accessed June 29, 2023, <https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-ct.pdf>.
- iNaturalist. 2023. Observations: New Haven, CT. Accessed July 7, 2023, <https://www.inaturalist.org>.
- Long Island Sound Study. 2019. The Sidewalk Gardens That are Making Water Cleaner in New Haven. Accessed September 6, 2023, <https://longislandsoundstudy.net/2019/11/new-haven-bioswales/>.
- New Haven, City of (New Haven). 2023a. Chapter 18 of New Haven Ordinances. Accessed July 17, 2023, https://library.municode.com/ct/new_haven/codes/code_of_ordinances?nodeId=TITIICOGEOR_CH18OFMIPR_ARTIINOCO.
- _____. 2023b. 2018 SCRCOG Hazard Mitigation Plan – New Haven Projects Update January 2023. Accessed July 17, 2023, <https://www.newhavenct.gov/home/showpublisheddocument/17282/638100681765370000>
- National Marine Fisheries Service (NMFS). 2023a. Essential Fish Habitat Mapper. Accessed September 18, 2023, https://www.habitat.noaa.gov/apps/efhmapper/?data_id=dataSource_12-17aa6db4a11-layer-7-EFH%3A210&page=page_3.
- _____. 2023b. ESA Section 7 Mapper. Accessed July 7, 2023, <https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=a85c0313b68b44e0927b51928271422a>.
- _____. 2023c. Federal Interagency Comment Form. November 30, 2023.
- Perkins–Eastman. 2023. Long Wharf Responsible Growth Plan. Accessed October 5, 2023, <https://www.newhavenct.gov/home/showpublisheddocument/244/637738989364130000>.

- U.S. Army Corps of Engineers. 2020. Fairfield and New Haven Counties, Connecticut: Coastal Storm Risk Management Feasibility Study.
<https://www.nae.usace.army.mil/Portals/74/docs/Topics/FairField/FinalFeasibilityStudy/Final-Main-Report.pdf>
- U.S. Fish and Wildlife Service (USFWS). 2023a. National Wetland Inventory. Accessed June 28, 2023, <https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/>.
- _____. 2023b. Information for Planning and Consultation (IPaC). Accessed July 7, 2023, <https://ipac.ecosphere.fws.gov/>.
- _____. 2023c. Bald Eagle. Accessed July 11, 2023, <https://www.fws.gov/species/bald-eagle-haliaeetus-leucocephalus>.
- _____. 2023d. Golden Eagle. Accessed July 10, 2023, <https://www.fws.gov/species/golden-eagle-aquila-chrysaetos>.

Appendix A

FEMA 8-Step Checklist

EXECUTIVE ORDER 11988 FLOODPLAIN MANAGEMENT EXECUTIVE ORDER 11990 PROTECTION OF WETLANDS 8-STEP ANALYSIS (44 CFR PART 9)

TITLE: City of New Haven – Inland and Coastal Flood Resiliency Project

LOCATION: New Haven, Connecticut, Living Shoreline: 41.294547, -72.917339 to 41.286752, -72.924274; Drainage Pipe: 41. 300702, -72. 925340 to 41. 296891, -72. 915300

PROPOSED ACTION: 1. Install a new drainage pipe in the downtown area to increase storm water capacity, and 2. construct a living shoreline along the coast south of Interstate 95 at Wharf Park in New Haven, Connecticut, to address inland flooding and coastal erosion.

DESCRIPTION OF PROJECT: The City of New Haven proposes to increase stormwater capacity by installing a new drainage pipe in the downtown area and to construct a living shoreline along the coast south of Interstate 95 at Wharf Park to address inland flooding and coastal erosion.

The stormwater capacity portion of the project would include the construction of approximately 3,200 feet of new 10-foot diameter drainage pipeline that would be installed underground using microtunneling technology. The new pipeline would start under the parking lot north of West Water Street to Long Wharf Drive and run under the rail yard (approximately 400 yards northeast of New Haven Union Station), commercial parking lots, and Interstate 95 emptying at the seaward side of long wharf Drive adjacent to the Canal Dock Boathouse.

A fringe marsh living shoreline, approximately 3,400-feet long and 100-feet wide, would be constructed along Long Wharf Park from the Long Wharf Park Pier to the Vietnam Veterans Memorial Park on the western side of New Haven Harbor. The living shoreline would 1) remove invasive species, 2) create a future marsh migration zone, 3) convert tidal flats to narrow low marsh, and 4) place wetland sills to reduce wave energy on the shoreline and newly created habitat. Approximately 3.4 acres of tidal flats would be converted to low marsh, sills, and future marsh migration zone.

STEP 1 Determine whether the proposed action is located in the 100-year floodplain (500-year floodplain for critical actions)

The project area is located within flood zones AE and VE, as shown on the FEMA Flood Insurance Rate Map panel 09009C0441J, effective July 7, 2013. The project area is also in a coastal area that is subject to wave action and future sea level rise. The pipeline outfall and living shoreline work would occur within estuarine and marine wetlands.

STEP 2 Notify the public at the earliest possible time of the intent to carry out an action in a floodplain and involve the affected and interested public in the decision-making process.

Initial Public Notice was posted in the New Haven Register on March 19, 2023. No comments were received. Additionally, FEMA's NEPA Scoping Document was distributed by FEMA to municipal, state, federal partner agencies on April 18, 2023. Comments were received from U.S. Fish & Wildlife Service, CT Floodplain Administrator, CT Department of Energy and Environmental Protection's (DEEP) Land and Water Resources Division, CT DEEP's Remediation Division, The City of New Haven, the State Historic Preservation Officer, and U.S. Environmental Protection Agency Region 1.

STEP 3 Identify and evaluate practicable alternatives to locating the proposed action in a floodplain (including alternatives sites, actions and the "no action" option). If a practicable alternative exists outside the floodplain FEMA must locate the action at the alternative site.

Alternatives:

1. No Action Alternative – Under the No Action Alternative, FEMA would not undertake or fund any action. For the reasonably foreseeable future, high water events and future sea level rise would continue to flood downtown New Haven and damage infrastructure and property. Coastal flooding along Long Wharf Park would continue to cause damage and erosion which could worsen with sea level rise and associated higher high tides that lead to increased flooding farther inland and increased shoreline erosion.
2. Shoreline Alternative – This alternative would include an enhanced revetment thus improving the capability of the existing revetment to provide shoreline protection. The revetment improvements would include increasing the armor stone size and crest elevation as well as flattening the revetment slopes and adding scour protection to the top and bottom. This alternative would provide added protection in response to increasing sea levels; however, would not address any ecological impacts and could worsen or accelerate these impacts. This alternative also does not address considerations for the use of the shoreline as a recreational asset.

3. Drainage Alternative 1 – This alternative would divert stormwater by installing gravity flow sewer lines and pump stations to divert the water further west in the sound or east into the Quinnipiac River. This alternative was dismissed because it was cost prohibitive and did not provide additional benefits compared to the Proposed Action
4. Drainage Alternative 2 – This alternative would increase subsurface storage by installing underground flood storage systems and additional green infrastructure to capture the excess stormwater. The City implemented some additional green infrastructure throughout the Downtown New Haven area; however, these types of infrastructure did not provide enough benefits to reduce flooding significantly during the 10-year, 24 hour storm. Therefore, further development of underground flood storage systems was dismissed.
5. Alternative No-Action Option – The City or private property owners might construct non-FEMA-funded projects (e.g., repairs, minor mitigation, restoration projects). Projects would be properly engineered/permitted but may not provide the same level of protection as the Proposed Action and would not necessarily be connected or constructed in a coordinated fashion to provide protection across property boundaries. Specific actions may take longer to implement and would not result in long-term resilience or coordinated hazard mitigation.

FEMA has determined that the Proposed Action was the only practicable alternative, and there were no practicable alternatives outside the floodplain or wetlands. The Proposed Action is functionally dependent on its location in the floodplain and wetlands (44 CFR 9.11(d)(1)(i)) and potential effects would be minimized (44 CFR 9.11(d)(5)).

STEP 4 Identify the potential direct and indirect impacts associated with the occupancy or modification of floodplains and the potential direct and indirect support of floodplain development that could result from the proposed action. 44 CFR Part 9.10

In the short term, construction activity would occur in the floodplain for the new sewer pipe and living shoreline. Construction activities could result in the accidental release of hazardous materials from vehicles and equipment or from contaminated soils; ground disturbance could erode soils and cause sedimentation in the floodplain. Therefore, there would be a minor short-term adverse effect on the floodplain from construction activity and the associated soil disturbance and potential for release of hazardous materials.

The project area is urban and developed in nature. Therefore, the Proposed Action would not support additional development in the floodplain. The Proposed Action would reduce the risk of flood damage by creating increased stormwater drainage capacity in the central harbor area and increasing floodplain habitat along Long Wharf Park. Low marsh vegetation planted along Long

Wharf Park would improve existing habitat, and associated recreation and aesthetics, and reduce the potential for erosion in the floodplain by stabilizing soils. Rock sill on the seaward side of the marsh would minimize erosion and scour from waves. Therefore, there would be a moderate long-term beneficial effect on the floodplain and property located in the floodplain from the reduced risk of flood- and erosion-related damage and improved floodplain habitat.

STEP 5 Minimize the potential adverse impacts and support to or within floodplains to be identified under Step 4, restore and preserve the natural and beneficial values served by floodplains.

Potential adverse impacts would be avoided and minimized through design measures and permitting conditions. Potential adverse effects would be minimized if all permit and grant conditions are adhered to (44 C.F.R. 9.11(d)(5)).

The Proposed Action would require a Floodplain Development Permit through the City of New Haven. There is also an in-process flood management certificate for the Living Shoreline (License Number 02203630-FM), and the City may also need a flood management certificate for the storm sewer line work (the Connecticut Division of Emergency Management and Homeland Security Flood Management General Certification may cover these activities). The City has obtained a 401 DEEP Protection License Certificate of Permission (License No. 202302022-COP) and has applied to USACE for a Section 404/10 Individual Permit (Corps File No. NAE-2020-01866) for the living shoreline portion of the Proposed Action.

Construction impacts in wetlands would be minimized with implementation of the conditions required in CWA permits. A Certificate of Permission has been issued by CT DEEP's Land and Water Resource Division for work in tidal waters per sections 22a-359 through 22a-363h of the Connecticut General Statutes. The City would be required to comply with all conditions in CT DEEP's Certificate of Permission (License No. 202302022-COP).

In addition to the permits discussed above, minimization measures would include:

- The proposed project is a functionally dependent use (9.11(d)(1)(i)),
- the proposed project as designed meets the criteria as being the only practicable alternative (9.11(d)(5)),
- the proposed project will be conditioned for a floodplain permit demonstrating consistency with the NFIP (9.11(d)(6)),
- The living shoreline would include removing invasive species and installing approximately 3,400 feet of tidal fringe marsh along Long Wharf Park.
- Staging and access areas would be required to remain on hardened surfaces.
- Soils and groundwater would be required to be managed in accordance with U.S. EPA and CT DEEP regulatory standards, including handling, testing, BMPs, and disposal. Any cuttings stockpiled above-ground would be required to be managed in accordance with CT DEEP's General Permit for Contaminated Soil and/or Sediment Management.

Inadvertent discovery of contaminated media would stop would and consultation with CT DEEP would be required.

- All construction and demolition (C&D) wastes must be managed in accordance with CT DEEP regulations.
- The City must obtain and comply with any required Section 404 and 401 permits from the U.S. Army Corps of Engineers and the Connecticut Department of Energy and Environmental Protection, respectively, to comply with the Clean Water Act. These permits would include conditions to avoid, minimize, and mitigate for impacts on water quality, including but are not limited to:
 - Siltation and erosion control measures (e.g., silt fences)
 - Turbidity control
 - Site restoration measures (e.g., replanting exposed soils with native vegetation)
 - work within water
 - Prevention of accidental release of hazardous waste

The Proposed Action would reduce the risk of flood damage by creating increased stormwater drainage capacity in the central harbor area and increasing the elevation of floodplain habitat along Long Wharf Park. Low marsh vegetation planted along Long Wharf Park would improve existing habitat, and associated recreation and aesthetics, and reduce the potential for erosion in the floodplain by stabilizing soils. Rock sill on the seaward side of the marsh would minimize erosion and scour from waves and associated sedimentation within the floodplain. The Proposed Action would restore existing degraded floodplain habitat and retain the floodplain function of Long Wharf Park. The Proposed Action would restore and expand wetland habitat as well as reduce the risk of flooding and receding floodwaters carrying contaminants into wetland resources. Wetlands would be elevated above the high tide line to reduce degradation from flooding and would likely allow for wetland habitat migration as sea levels rise. Rock sill would reduce erosion of wetlands by reducing wave energy that can disrupt vegetation.

STEP 6 Reevaluate the proposed action to determine first, if it is still practicable in light of its exposure to flood hazards or impacts on wetlands, the extent to which it will aggravate the hazards to others, and its potential to disrupt floodplain and wetland resources and second, if alternatives preliminarily rejected at Step 3 are practicable in light of the information gained in Steps 4 and 5. FEMA shall not act in a floodplain unless it is the only practicable location.

The Proposed Action is the most practicable alternative because it would reduce the risk of flood hazards to property located in the floodplain and the minimization measures described in Step 5 would minimize adverse impacts to the floodplain and wetlands. The proposed action is functionally dependent on its location in the floodplain. The alternatives eliminated in Step 3 remain impracticable because (a) the No Action alternative would not address flood hazards and would likely result in the degradation of the floodplain. Continued erosion associated with flooding and wave action would degrade existing coastal habitat thereby adversely affecting floodplain functions such as water filtration and providing habitat for sensitive species. Coastal Alternative 2 (b) would not restore floodplain habitat, (c) Inland Alternative 3 would not be cost-effective because of the distance of pipeline required to transport stormwater to sewer sheds located further away, and (d) Alternatives Outside the Floodplain (i.e., relocation infrastructure) would be impracticable.

STEP 7 Prepare and provide the public with a finding and public explanation of any final decision that the floodplain is the only practicable alternative.

Public notice will be provided by FEMA and the City of Meriden as part of the Environmental Assessment process.

STEP 8 Review the implementation and post - implementation phases of the proposed action to ensure that the requirements stated in Section 9.11 are fully implemented.

The FEMA grant would be conditioned for the City to secure federal, state, and local permits for work in the floodplain. Compliance with all federal, state, and local permits will be determined as part of the grant closeout process. Full detail of the conditions placed on the grant can be found in the Record of Environmental Consideration.