

Final Environmental Assessment

Vermont Route 9 Whetstone Brook
Flood Mitigation Project

Marlboro/ Brattleboro, Windham, Vermont

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FEMA

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APPENDICES

APPENDIX A: Maps and Figures

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LIST OF ACRONYMS

APE	Area of Potential Effects
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPEP	Corrugated Polyethylene Pipe
CWA	Clean Water Act
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OEHP	Office of Environmental Planning & Historic Preservation
SHPO	State Historic Preservation Officer
VTrans	Vermont Agency of Transportation
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VTANR	Vermont Agency of Natural Resources

1.0 INTRODUCTION

Vermont Emergency Management submitted to FEMA (Federal Emergency Management Agency) a Pre-Disaster Mitigation (PDM) grant application on behalf of the Vermont Agency of Transportation (VTrans). The PDM Grant Program is authorized under Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (as amended), 42 United States Code 5133. Under the Pre-Disaster Mitigation grant program, FEMA may provide technical and financial assistance to states and local governments to assist in the implementation of pre-disaster hazard mitigation measures that are cost-effective and 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.

During Tropical Storm Irene (August 2011), the Whetstone Brook watershed experienced catastrophic flooding severely impacting Vermont Route 9 in the towns of Marlboro and Brattleboro in Windham County (**Appendix A, Figure 1**) and reducing access to towns further west. The narrow and steep valley shared by Route 9 and the Whetstone Brook was one of the hardest hit areas in Vermont. The road was fully closed for 10 days and was partially closed (one-lane closure) for an additional 25 days. In response, the President declared a major disaster in Vermont on September 1, 2011 (FEMA-4022-DR). Twelve of Vermont's fourteen counties were included in the declaration: Addison, Bennington, Caledonia, Chittenden, Franklin, Lamoille, Orange, Orleans, Rutland, Washington, Windham, and Windsor.

The National Environmental Policy Act (NEPA) requires FEMA to follow a specific planning process to ensure that it has considered the consequences of a proposed federal action and that the public is fully informed. This includes funding a mitigation project under the PDM grant program. To meet its NEPA requirements, FEMA prepares an Environmental Assessment (EA) to analyze potential effects of the Proposed Action and alternatives to that action on the human environment. That analysis will determine whether the project warrants preparation of an Environmental Impact Statement or will result in a Finding of No Significant Impact (FONSI).

FEMA has prepared this EA in accordance with NEPA, its implementing regulations, and FEMA and Department of Homeland Security policy.

2.0 PURPOSE AND NEED

The purpose of this project is to reduce the risk of future flood damage, hardship, loss, or suffering in the community; protect adjacent properties; and prevent further erosion and increase the resilience of the banks of Whetstone Brook and Vermont Route 9. While numerous repairs were completed in the immediate aftermath of Tropical Storm Irene, additional reinforcement is needed to improve the flood resilience for the highest risk, most vulnerable sections of Vermont Route 9 where the road and river share a very narrow valley, and erosion continues to be a hazard.

3.0 PROJECT LOCATION AND BACKGROUND

Vermont Route 9 is included on the federally designated National Highway System because it provides a major east-west link through southern Vermont that supports long distance trips for people and freight travelling through New England and New York State. It also provides direct access to numerous businesses and homes within Brattleboro and Marlboro and is an essential connection to I-91 for tourism travel to the ski areas and other attractions to the west in Wilmington and Dover, VT (Otto, 2020).

Initial site selection was performed in 2018 using the Vermont Transportation Resiliency Planning Tool (TRPT). The TRPT identifies road embankments, bridges and culverts that are vulnerable to damage from inundation, erosion, and deposition, and prioritizes locations based on the extent of the vulnerability and transportation criticality (TRPT 2020). The TRPT web-based tool was used to initially screen vulnerable sites around the state that incurred frequent damages in the past. This initial review illustrated many vulnerable sites in the Route 9 – Whetstone Brook corridor, and thus

project planning focused on five high priority sites for mitigation along a 3.7-mile segment of Route 9 in Brattleboro and Marlboro, VT located within Windham County. The overall project area starts in Marlboro approximately 0.25 miles west of the Marlboro/Brattleboro town line and extends easterly into Brattleboro 3.45 miles.

Reference numbers, route mile markers and GPS coordinates for the five sites are provided in the following table, attached maps showing the overall project area (**Appendix A, Figure 1**), and close-up maps of each site describe the issues to be addressed at each site (**Appendix A, Figure 2**). All five sites have suffered damage in past events and remain vulnerable, but Site 2 has been identified as one of the most vulnerable locations along the entire Vermont state highway system.

Table 3.1: Project Sites and Locations

Site #	VT Route 9 Mile Marker*	GPS Coordinates	Town	Location Notes
1	8.03 to 8.07	42.87754, -72.68306 to 42.8774, -72.68224	Marlboro	Behind Marlboro Collision automotive garage
2	8.11 to 0.23**	42.87771, -72.68153 to 42.87535, -72.67445	Marlboro/Brattleboro	Crossing over the Marlboro/Brattleboro town line
3	1.46 to 1.53	42.87083, -72.65424 to 42.87102, -72.65297	Brattleboro	Downstream of Stark Road
4	1.82 to 1.88	42.87154, -72.64727 to 42.87173, -72.64599	Brattleboro	Across from a used car dealer
5	3.40 to 3.44	42.86606, -72.61845 to 42.86641, -72.61758	Brattleboro	Approaching and under Bridge 51 just east of Brookwood Drive

*Note MM adjusted from original site selection based on final design.

**Mile markers start at 0.0 when a highway crosses a town boundary and increase from west to east.

4.0 ALTERNATIVES

CEQ has developed regulations for the preparation of environmental documents in compliance with NEPA. These regulations require an investigation and evaluation of all reasonable alternatives, and for those alternatives which were eliminated from detailed study, briefly discuss the reasons for their elimination. This section describes the No Action Alternative, the Proposed Action Alternative, and Alternatives That Were Considered and Dismissed.

4.1 Alternative 1: No Action Alternative

Under the No Action Alternative, FEMA would not provide any federal funding for repairs or measures to mitigate against future flood damage. During storm events, the Whetstone Brook corridor would continue to experience erosion of the stream banks, the stream bottom, and Vermont Route 9 and would remain vulnerable to flood damage.

4.2 Alternative 2: Proposed Action

A combination of standard flood and erosion mitigation practices would be employed to protect Vermont Route 9 and adjacent properties including: construction of flood benches to increase flood storage and reduce flood velocities, repair and reinforcement of road embankments where past armoring is failing, removal of berms that currently channel flood waters towards the road and increase the risk of road failure from erosion, restoration of connectivity to the floodplain by removing sediment bars that prevent flood waters from accessing the floodplain, restoration of flood

chutes to divert flood waters away from Vermont Route 9 and minor road grade adjustments to raise portions of Vermont Route 9 slightly above floodplain elevation. Incidental activities that would be common at all five project sites would also include approximately 4 acres of clearing and grubbing, to include the removal of individual trees, temporary utility relocation, temporary traffic barriers and traffic control (VTrans 2018).

Site #1: This location is near the automotive garage where the river bends around a parking lot built on historic fill placed in the floodplain and then heads directly toward the Route 9 Road embankment. Erosion in this area could lead the river to overflow the riverbanks, flow across the parking lot and flow down Route 9. Work at this location would include constructing a combination of stacked stone toe walls (Riprap, Heavy Type¹) along the river's edge and a stone fill/riprap (Type IV²) sloping embankment. The riprap wall is appropriate at narrower sections where a sloping embankment would constrict the channel or encroach on the available space of the existing park lot. The sloping embankment of stone fill/riprap is appropriate for sections where adequate space exists, and this approach would not encroach on the bankfull channel. For both the wall and slope sections, vegetation would be planted in between the stone joints to resist erosion and add riparian vegetation.

Site #2: This location is near the Marlboro-Brattleboro town line where the waterway is currently in a confined condition from past actions and events. Berms were built up that reduce flood conveyance and have created erosion issues along the edge of the road embankment. An area of floodplain was filled following past flood recovery directing high-velocity flood flows through a narrow channel located along the road embankment leading to ongoing erosion and repetitive damages to the road.

Work at this location would include the removal of berms and historic fill from the floodplain, construction of four sections of stacked stone toe wall (1,075 LF), repair and reinforcement of road embankment with riprap where existing armoring is failing, creation of flood benches at several locations to match elevations on nearby bars, removal and resetting of guardrails, replacement of existing 18-inch corrugated polyethylene pipe (CPEP) cross-drain with 24-inch CPEP, and minor roadway grade adjustments to raise Vermont Route 9 slightly above floodplain elevation. This site will require some tree removal. Like Site 1, the riprap wall is appropriate at narrower sections where a sloping embankment would constrict the channel or encroach on the available space of the existing park lot. The sloping embankment of stone fill/riprap is appropriate for sections where adequate space exists, and this approach would not encroach on the bankfull channel. For both the wall and slope sections, vegetation would be planted in between the stone joints to resist erosion and add riparian vegetation.

Site #3: This location is immediately downstream of Stark Road; previous armoring at this site is failing where repairs were performed following past flood damages. Work at this location would remove and replace the existing failed stacked stone toe wall but would pull back the newly constructed wall to restore bankfull width of the river channel. Traditional sloping riprap is not proposed at this location because space does not exist without filling in the channel. Vegetation would be planted in between the stone joints of the wall to resist erosion and add riparian vegetation. The guardrail at this location would also be replaced.

Site #4: This location is across from a used car dealer where the river is very narrow, and the banks are eroding. Work at this location would construct a stacked stone toe wall. Traditional sloping riprap is not proposed at this location because space does not exist without filling in the channel. Vegetation would be planted in between the stone joints of the wall to resist erosion and add riparian vegetation. Work at this location would also include installing a guardrail and placing fallen trees in the stream (parallel to stream flow) to add roughness and provide habitat.

¹ Riprap, Heavy Type is defined by VTrans specification as stones where the largest dimension shall be greater than 5 feet with the least dimension at least 1/3 the largest dimension.

² Stone fill, Type IV, is defined by VTrans specification where the longest dimension of the stone shall vary from 3-60 inches, and at least 50% of the volume of the stone in-place shall have a minimum dimension of 20 inches.

Site #5: This location is upstream of and under Bridge 51 where the Whetstone Brook passes under Route 9. Work at this location would include repairing voids in the bridge abutment armor, removing the accumulated sediment upstream of the bridge, reforming a flood chute and creation of a flood bench. Work would also include installing a section of riprap with vegetation in the joints of the stone to protect a house as flows approach the bridge (VTrans 2020a).

4.3 Alternatives Considered and Dismissed

4.3.1 Relocation of Vermont Route 9

Relocation of Vermont Route 9 to a new alignment beyond the floodplain and river corridor of Whetstone Brook is the ideal alternative to reduce risk; however, this is not feasible given the narrow and steep valley topography and existing developed land use along the corridor.

4.3.2 Vegetative-Only Solution

At all sites, the erosive forces are too strong for vegetative practices alone to reduce erosion and protect public infrastructure. A vegetative-only solution is technically infeasible and would not meet the purpose and need.

4.4 Effect Evaluation

Effects or impacts means changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives, including those effects that occur at the same time and place as the proposed action or alternatives and may include effects that are later in time or farther removed in distance from the proposed action or alternatives. Effects include ecological, aesthetic, historic, cultural, economic, social, or health. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if the agency believes that the overall effect would be beneficial (40 CFR 1508.1(g)).

When possible, this Environmental Assessment uses quantitative information to evaluate potential effects; otherwise, the potential qualitative effects are evaluated based on the criteria listed in Table 4.1:

Table 4.1: Effect Significance and Context Evaluation Criteria for Potential Effects

Effect Scale	Criteria
None/Negligible	The resource area would not be affected, OR effects would either be non-detectable or, if detected, would be slight and local. Effects would be well below regulatory standards, as applicable.
Minor	Changes to the resource, both adverse and beneficial, would be measurable, but the effects would be small and localized. Adverse effects would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse effects.
Moderate	Changes to the resource, both adverse and beneficial, would be measurable and would be localized or of regional scale. Adverse effects 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 to the resource, both adverse and beneficial, would be readily measurable and would have substantial consequences on a local or regional level. Adverse effects would exceed regulatory standards and mitigation measures to offset the adverse effects would be required to reduce effects. Long-term changes to the resource would be expected.

Not all effect topics are applicable to either the No Action Alternative or the Proposed Action Alternative. The table below lists the resources that have been eliminated from the EA with reasoning.

Table 4.2: Resource Topic Eliminated and Reasoning

Topic	Reason
Wild and Scenic Rivers Act	Whetstone Brook is not a designated Wild and Scenic River and is not currently included as a water body under study for that designation.
Safe Drinking Water Act	There are no Sole Source Aquifers designated by the EPA for the State of Vermont. The Vermont Agency of Natural Resources GIS tool indicates that there are no active Groundwater or Surface Water Source Protection Areas in the vicinity of the proposed project area.
Coastal Zone Management Act	There are no coastal communities in the state of Vermont.
Coastal Barrier Resources Act	There are no Coastal Barrier Resource Units or Otherwise Protected Areas in the state of Vermont.
Magnuson-Stevens Fishery Conservation and Management Act	There is no Essential Fish Habitat designated in the state of Vermont.
Resource Conservation and Recovery Act	There are no hazardous waste sites or producers within or near the project sites, nor are there any downstream that could be impacted by continued flooding.

5.0 AFFECTED ENVIRONMENT AND POTENTIAL EFFECTS

5.1 PHYSICAL RESOURCES

5.1.1 Geology and Soils

5.1.1.1 Existing Conditions

Table 5.1: Existing Site Conditions for Geology and Soils

Site	Geology	Soils & Farmland
1	The surficial geology is glacial till. The primary bedrock type is schist, and the secondary bedrock type is quartzite.	The soils are mapped as 46E, Monadnock and Berkshire soils, 25-60% slopes, very stony. These soils are mapped as NPSL (not prime, statewide, or local importance). The Vermont Agricultural Group number is 11, with limited potential for crop production.
2	The surficial geology is glacial till. The primary bedrock type is phyllite and the secondary bedrock type is quartzite.	The soils series are mapped as #46E, Monadnock and Berkshire soils, 25-60% slopes, very stony, and #64, loamy udifluent. Both soils are mapped as NPSL. The Vermont Agricultural Group number is 11, with limited potential for crop production.
3	The surficial geology is glacial till. The primary bedrock type is phyllite and the secondary rock type is quartzite.	The soil series is mapped as #64, loamy udifluent. This soil is mapped as NPSL. The Vermont Agricultural Group number is 11, with limited potential for crop production.
4	The surficial geology is glaciolacustrine deposits of littoral pebbly sand. The primary bedrock type is phyllite and the secondary bedrock type is metalimestone.	The soil series is mapped as #64, loamy udifluent. This soil is mapped as NPSL. The Vermont Agricultural Group number is 11, with limited potential for crop production.
5	The surficial geology is glaciolacustrine deposits of littoral delta gravel. The primary bedrock type is phyllite and the secondary bedrock type is metalimestone.	The soil series is mapped as #23, Ondawa fine sandy loam, 0-3% slopes, occasionally flooded, and #5D, Windsor loamy sand, 15-25% slopes. Soil #23 is mapped as Prime Agricultural Land, in Vermont Agricultural Group 1. Soil #5D is mapped as NPSL, in Vermont Agricultural Group 8, meaning that it has limitations for crop production which can be overcome.

5.1.1.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, there would be no construction and no direct effects to either soils or geology. Ongoing erosion of Whetstone Brook would continue to occur naturally, particularly at bends in the river. Effects to soils would be **moderate**, but effects to geology would be **negligible**.

Alternative 2: Proposed Action

Of the proposed project sites, only Site 5 is located in an area designated as prime farmland (soil #23). However, based on 2010 census data, this site is located within an urbanized cluster; therefore, it is not subject to the provisions of the Farmland Protection Policy Act as an activity occurring on land that is already urbanized (Part 523.10 FPPA Manual).

Under the Proposed Action, there would be significant excavation and hardening of riverbank at various locations, which will have a positive effect preventing the continued erosion of existing soils and geology. During construction, sediment control structures (silt fence, straw bales, etc.) would be installed to reduce soil erosion and the movement

of sediment into the river, and all disturbed areas would be replanted to prevent future soil erosion. The Proposed Action Alternative would stop the continued erosion and degradation of the local geology and soils by stabilizing the existing stream bed and embankments. Effects to soils would be **minor** and effects to geology would be **negligible**.

5.1.2 Air Quality

The Clean Air Act is a federal law that regulates air emissions from area, stationary, and mobile sources. Air quality standards have been enacted to protect public health and the environment. The standards include lead, nitrogen dioxide, ozone, carbon monoxide, sulfur dioxide, and particulate matter. Areas where the monitored concentration of a pollutant exceeds air quality standards are designated as non-attainment areas. Areas where all pollutants are below the standards are classified as in attainment areas.

The emissions from construction activities are subject to air conformity review unless they are shown to be below the applicable *de minimis* levels (EPA 2012).

5.1.2.1 Existing Conditions

The State of Vermont is considered an Attainment Area for all air quality parameters including the National Ambient Air Quality Standards.

5.1.2.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, there would be no construction project and no construction equipment giving off emissions. However, Vermont Route 9 would remain susceptible to continued flood damage leading to potential detours or road closures which may result in increased vehicular emissions. Effects to air quality would be **negligible**.

Alternative 2: Proposed Action

Under the Proposed Action, the primary effect to air quality at all five sites would be from construction vehicles and equipment. Construction activity would be temporary and, by implementing Best Management Practices (BMPs), e.g., the use of ultra-low sulfur diesel fuel, as required by the Clean Air Non-Road Diesel Rule, emissions would be below the *de minimis* levels. Effects on air quality would be **negligible**.

5.2 WATER RESOURCES

5.2.1 Water Quality

The Clean Water Act regulates discharge of pollutants into water with sections falling under the jurisdiction of the U.S Army Corps of Engineers (USACE) and the EPA. Section 404 of the CWA establishes the USACE permit requirements for discharge of dredged or fill materials into Waters of the United States and traditional navigable waterways. USACE regulation of activities within navigable waters is also authorized under the 1899 Rivers and Harbors Act. Under the National Pollutant Discharge Elimination System (NPDES), the EPA regulates both point and non-point pollutant sources, including stormwater and stormwater runoff. Activities that disturb one acre of ground or more are required to apply for an NPDES permit, through the Vermont Agency of Natural Resources (ANR) as authorized by the EPA. This Section 401 water quality certification is required when obtaining a CWA 404 Permit.

5.2.1.1 Existing Conditions

The area contains the Whetstone Brook in the Vernon Dam-Connecticut River Watershed/Whetstone Brook subwatershed. The Whetstone Brook flows west to east from the hills of Marlboro across Brattleboro before emptying into the Connecticut River in downtown Brattleboro. The brook's headwaters originate at over 1,500 feet above sea level at Hidden Lake. The brook cascades down from steep hills and follows Vermont Route 9 to the Connecticut River flatlands. The brook empties into the Connecticut River at 250 feet above sea level, dropping over 1,250 feet in

just seven miles of stream length. Approximately 69% of the watershed resides in Brattleboro with 29% of the land in Marlboro and 2% of the land within Dummerston (Whetstone 2008). The watershed contains nearly 20 miles of streams and a mix of rural, residential, and urban land. There are no sole source aquifers or any other water bodies within the project limits. The project should improve water quality by eliminating the present erosion problems. Construction of the project would follow the required VTrans Standard Specifications and Erosion Prevention and Sediment Control plans.

5.2.1.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

The No Action alternative would result in minor effects to water quality from erosion of sediment into the Whetstone Brook from continued and more frequent flood events and erosion. The No Action alternative would not affect groundwater. Effects would be **minor**.

Alternative 2: Proposed Action

Under the Proposed Action Alternative, the project proponent would need a CWA 404 permit from USACE, potentially a CWA 401 Water Quality Certificate, and a River Management Program permit from Vermont ANR. Most of the proposed work would be performed out of the active flowing water or during seasonal low flow conditions to minimize effects to water quality. Permits would also include requirements to control work in water and the use of sediment and erosion control BMPs and Erosion Prevention Sediment Control (EPSC) measures. The Proposed Action Alternative would not affect groundwater and effects would be **minor**.

5.2.2 Floodplains

Executive Order (EO) 11988 Floodplain Management requires federal agencies to avoid to the extent possible the long- and short-term adverse effects associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Each federal agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the effect of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities. FEMA uses the 8-Step analysis to evaluate potential effects on and mitigate effects to floodplains in compliance with EO 11988 and 44 CFR Part 9. The Agency of Natural Resources administers and regulates floodplains in Vermont under the Vermont Flood Hazard Area and River Corridor Rules in accordance with the National Flood Insurance Act and the National Flood Insurance Program.

5.2.2.1 Existing Conditions

Per the FEMA Flood Insurance Rate Maps (FIRM Panels: 50025C0370E - Effective Date: 09/28/2007 & 50025C0501E - Effective Date: 09/28/2007), portions of the proposed project are in the Special Flood Hazard Area (100-year floodplain – Zone AE). Sites 1, 2 and 5 are in the mapped floodplain. The mapped 100-year floodplain ends at the Marlboro town line (limit of the study area), but it extends into Brattleboro.

Whetstone Brook is mapped as a river corridor by the Vermont Agency of Natural Resources.

5.2.2.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

The No Action Alternative would maintain the status quo with continued erosion and degradation of the stream bed and banks and storm related flood damages to Vermont Route 9. Whetstone Brook would continue to be cut off from access to existing floodplains. Effects would be **minor**.

Alternative 2: Proposed Action

The Proposed Action Alternative would reduce the risk of future flood damage by creating additional flood storage in the river channel and prevent erosion within the river corridor and outside of the river channel. Gravel and sediment bars and chutes selected for sediment removal are frequently scoured by high river flows as evidenced by the lack of mature trees on them. All proposed sediment excavation would be below ordinary high water but outside of the wetted channel due to the use of cofferdams and work during low flow conditions. This alternative would reduce erosion potential, as flood flows would be able to spread out more, slow down, and flow directly at the bridge opening at Site #5. The bridge would become more hydraulically efficient and be less susceptible to future erosion.

Access to the river for heavy equipment to perform the proposed excavation would require the removal of mature trees in the river corridor. Access would also involve adding temporary fill in the river corridor to allow for equipment access to each proposed site. All temporary fill would be removed when construction is complete. Since the placement of fill for construction access would be temporary, no flood level analysis was completed for this component of the project. A hydrologic and hydraulic (H&H) analysis was completed for the 5 ½ mile segment of the Whetstone Brook encompassing the five proposed project sites. The analysis compares current flood conditions with anticipated post construction conditions of the proposed action. Results of the study indicate the proposed action would result in no rise in flood levels at Sites 1 through 4 and a flood level drop in portions of Site 2. At Site 5, there would be either no rise or a drop in flood levels in all areas except the downstream area of the proposed flood bench where there would be a 0.1-ft rise in flood levels. The anticipated flood level rise would dissipate prior to the VT Route 9 bridge, and no flood rise would be expected for the remainder of the downstream study area (SLR 2021).

Long-term, the proposed project restores some of the natural floodplain functions with the opening of the flood-chute entrances, but all other aspects of the proposed project repair existing infrastructure and maintain the status quo of the Whetstone Brook. Effects to the floodplain would be **Moderate**.

5.2.3 Wetlands

Executive Order (EO) 11990 Protection of Wetlands requires federal agencies to avoid to the extent possible the long- and short-term adverse effects associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. Each federal agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. FEMA uses the 8-step analysis to evaluate potential effects on, and mitigate effects to, wetlands in compliance with EO 11990 and 44 C.F.R. Part 9. The Vermont Agency of Natural Resources, Wetlands Program, administers and regulates wetlands in Vermont.

5.2.3.1 Existing Conditions

Wetlands along the corridor were reviewed by VTrans Biologists and their consulting partners (Bear Creek Environmental) using remote sensing and by completing a wetland delineation in accordance with current wetland delineation methodologies (VTrans 2019, VTrans 2020b). The wetland delineation included a 50-foot buffer on each side of Vermont Route 9. Information from that report further refined original resource work completed for the project sites.

Based on the assessment, no wetlands were identified within any of the project sites. Wetlands have been identified on the north side of Route 9 at Site 3, but the project area and all construction related activities would be on the south side of Route 9. Additionally, the U.S. Fish and Wildlife Service National Wetland Inventory identifies Whetstone Brook as a riverine wetland (Cowardin classification code R3UBH - riverine, upper perennial, unconsolidated bottom and permanently flooded), but this classification does not require the wetland 8-step analysis under EO 11990, because it is not classified as a wetland per Section 7(c) of the Executive Order (USFWS 2021). The National Wetland Inventory did not identify any additional wetlands at any of the five project sites.

5.2.3.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

No wetlands were identified at any of the five project sites, so no effects to wetlands are anticipated from the No Action Alternative. Effects would be **none**.

Alternative 2: Proposed Action

No wetlands were identified at any of the five project sites, so no effects to wetlands are anticipated from the Proposed Action. Effects would be **none**.

5.3 BIOLOGICAL RESOURCES

5.3.1 Wildlife and Fish

5.3.1.1 Existing Conditions

The sites were evaluated by a VTrans Biologist in 2018 and another review occurred throughout this corridor in 2019 by a VTrans Consultant, Bear Creek Environmental (VTrans 2019, VTrans 2020b). Remote sensing mapping and field work was completed to determine existing conditions at each site. Habitat connectivity is bisected along Vermont Route 9 in general. Vermont Agency of Natural Resources mapping clearly indicates that almost the entire Route 9 corridor is a priority connectivity area on the landscape scale. The sites are generally in a forested setting that would likely support migratory bird habitat.

Terrestrial

All sites are within a high priority wildlife corridor. The Site 1 general area was identified both by Bear Creek Environmental and the Marlboro conservation committee as a high priority crossing area (VTrans 2019, VTrans 2020b). A variety of migratory bird species are likely present at the various sites. No active bald eagle nests are mapped near the project sites (VTF&W 2020).

Aquatic

Aquatic species are present at all sites. Common species such as brook trout, aquatic invertebrates, and amphibians are likely present within the immediate area of all five project sites.

5.3.1.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

The No Action Alternative would result in continued flooding, erosion, and accumulation of sediment in the river corridor which could potentially damage natural habitats causing a loss in wildlife. Effects to fish and wildlife would be **minor**.

Alternative 2: Proposed Alternative

Terrestrial/aquatic movement along the Whetstone Brook likely occurs at each of the sites and especially Site 1. Temporary effects related to construction effects would likely occur. Effects to wildlife would be minimized by conducting work in “dry” conditions by use of cofferdams to divert water around work areas, minimizing vegetation removal to the maximum extent practical and using native vegetation when re-establishing vegetation along the riparian zones of the Whetstone Brook. Effects to fish and wildlife would be **minor**.

5.3.2 Vegetation and EO 13112 Invasive Species

Executive Order 13112, Invasive Species, requires federal agencies, to the extent practicable, to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health effects that invasive species cause. Invasive species prefer disturbed habitats and generally possess high dispersal abilities, enabling them to out-compete native species.

5.3.2.1 Existing Conditions

All five sites have a mix of native and non-native invasive species. Table 5.2 below details the plant compositions at each of the five project sites.

Table 5.2: - Native and Invasive Plant Species Composition at Project Sites

Site #	Vegetation	Invasive Species
1	The slope is vegetated by birch and poplar saplings, as well as goldenrods and grasses. Bank erosion has caused several trees, including at least one large hemlock, to fall across the stream. The streambed is shaded by forest dominated by hemlock to the south.	Japanese knotweed (<i>Reynoutria japonica</i>) and coltsfoot (<i>Tussilago farfara</i>).
2	The roadside slope is sparsely vegetated by birch and poplar saplings, as well as herbaceous species such as purple flowering raspberry, goldenrods, grasses, and coltsfoot.	coltsfoot (<i>Tussilago farfara</i>) and Japanese knotweed is known to be present at nearby Site 1.
3	The slope is vegetated by grasses and herbaceous species such as goldenrods, vetch (<i>Vicia spp.</i>) and Queen Anne's lace. Birch and poplar saplings and other shrubs are also present along the streambank.	purple loosestrife (<i>Lythrum salicaria</i>) and coltsfoot (<i>Tussilago farfara</i>). Japanese knotweed is known to be present along nearby sections of Whetstone Brook.
4	The site is vegetated by small sumacs, striped maple and birch saplings, and herbaceous species such as goldenrods, ferns, and grasses.	Japanese knotweed and coltsfoot.
5	The site is densely vegetated by American sycamore, birch, Japanese knotweed, sumac, and grasses.	Japanese knotweed.

5.3.2.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, there would be no tree removal activities and no direct effect to native or invasive species. However, the No Action Alternative would not stop the continued erosion and degradation of the stream bed and the continued loss of existing streambank vegetation and the inadvertent introduction of invasive species. Effects would be **minor**.

Alternative 2: Proposed Action

The Proposed Action was designed to minimize the removal and disturbance of existing vegetation. Additionally, work under the Proposed Action would occur mostly within and adjacent to the stream channel and banks where erosion has already removed much of the vegetation. Areas where disturbance would occur would be revegetated with native plantings and seed mix. Following slope stabilization work, grubbing material will be placed over stone fill and seeded to help restore the banks. USACE and Vermont ANR Stream Alteration permits would also have conditions related to preventing the spread of invasive species. Effects on vegetation and invasive species would be **minor**.

5.3.3 Threatened and Endangered Species

The Endangered Species Act (ESA) provides for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead Federal agency for implementing the ESA in Vermont is the U.S. Fish and Wildlife Service (USFWS). The law requires Federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a “taking” of any listed species of endangered fish or wildlife. “Take” is defined in regulation (50 C.F.R. § 10.12) as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities.”

5.3.3.1 Existing Conditions

The only federally protected species mapped in the project area is the threatened northern long-eared bat (*Myotis septentrionalis*) according to the USFWS’s IPaC. The entire state of Vermont is potential habitat for the northern long eared bat. Critical habitat has not been designated for the species. Suitable roosting habitat consists of trees greater than 3 inches Diameter at Breast Height that exhibit cracks, crevices, holes, exfoliating bark. Riparian zones and hedge rows can also serve as travel corridors for this species (USFWS 2021). There are no rare, threatened, or endangered plant species mapped in the project area by VTANR (VTANR 2020).

5.3.3.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, there would be no tree removal activities and no effect to the ESA-listed northern long-eared bat. Effects would be **none**.

Alternative 2: Proposed Action

Under the Proposed Action, tree removal activities may affect but would not likely adversely affect the ESA-listed northern long-eared bat. Biologists with VTrans initiated consultation for the northern long-eared bat with USFWS on October 14 and October 15, 2020, using the optional streamlined consultation framework for northern long-eared bat under the ESA’s 4(d) rule (USFWS 2020). Per the consultation framework, FEMA and VTrans were able to assume USFWS concurrence after 30 days on November 15, 2020. The Proposed Action was designed to minimize tree clearing to the maximum extent practical to reduce the effects to the northern long-eared bat. Measures taken to accomplish this would include minimizing tree clearing to the maximum extent practical. Effects to ESA-listed species would be **minor**.

5.3.4 Migratory Birds and Bald Eagle

The Migratory Bird Treaty Act of 1918 provides a program for the conservation of migratory birds that fly through lands of the United States. The lead Federal agency for implementing the Migratory Bird Treaty Act is the USFWS. The law makes it unlawful at any time, by any means or in any manner to take any part, nest, or egg of migratory birds. “Take” is defined in regulation (50 CFR 10.12) as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities.”

The Bald and Golden Eagle Protection Act, enacted in 1940, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" Bald and Golden Eagles, including their parts, nests, or eggs. Like the MBTA, the law makes it illegal for anyone to “take,” possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or their parts, feathers, nests, or eggs. There are no Golden Eagles in Vermont

5.3.4.1 Existing Conditions

All of Vermont is in the Atlantic Flyway, an important travel corridor for birds as they migrate north for summer and south for the winter. The Atlantic Flyway encompasses the eastern states and connects northern Canada to South America. It is the most developed of the four flyways in the United States making undeveloped areas along the route where birds can rest and live important to their survival (Ducks Unlimited 2020).

This project area is in a mostly forested area. The Flyway in Vermont is mostly concentrated in Addison and Chittenden Counties where there are abundant croplands, large floodplain wetland complexes and Lake Champlain (Gringas 2020, VTrans 2019). Bald Eagles are likely to be seen in Vermont although a search of the ANR Rare, Threatened and Endangered Species database, which includes maps of nesting pairs of Bald Eagle, did not identify any known active Bald Eagle nests within the project corridor or within five miles of the project footprint (Gringas 2020, VTANR 2020, VTF&W 2020).

5.3.4.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative flooding and emergency repairs could cause temporary disturbance to migratory birds and Bald Eagles. Effects would be **negligible**.

Alternative 2: Proposed Action

Under the Proposed Action Alternative, site preparation, tree removal work and construction activities could cause temporary disturbance to migratory birds and Bald Eagles if any were in the area. The Proposed Action would remove some habitat for migratory birds; however, tree removal has been minimized as part of the design plans, and the number of trees removed would not greatly affect or reduce habitat. The reconnection of chutes and reduction of erosion would benefit fish habitat along the project area providing forage for predatory birds. Migratory bird and Bald Eagle behavior would return to normal post-construction. Effects would be **negligible**.

5.4 CULTURAL RESOURCES

Federal agencies must consider the potential effects of their actions upon cultural resources prior to engaging in any undertaking. 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. Section 106 of the National Historic Preservation Act (NHPA) codifies this obligation and is implemented by regulation in 36 CFR Part 800. The NHPA defines a historic property as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register.” Eligibility criteria for listing a property on the National Register of Historic Places (NRHP) are found at 36 C.F.R. Part 60. While the definition of a cultural resource under NEPA can be broader, FEMA regularly uses Section 106 to meet its obligations to consider effects to cultural resources. For this project, FEMA determined that it was appropriate to utilize its NHPA review to fulfill its NEPA obligations.

Federally funded projects require that effects to cultural resources determined to be eligible for or listed in the NRHP are considered prior to commencing work. To be determined eligible for listing, a cultural resource must meet one or more of the criteria established by the National Park Service. The term “eligible for inclusion in the NRHP” includes all properties that meet the NRHP listing criteria, which are specified in the Department of Interior regulations Title 36, Part 60.4 and NRHP Bulletin 15. Resources that have not been evaluated at the time of the undertaking may be considered potentially eligible for inclusion in the NRHP and, as such, are afforded the same regulatory consideration as listed and nominated properties.

5.4.1 Identification of APE, Historic Context and Consultation Process

Pursuant to 36 CFR 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 Vermont Division for Historic Preservation maintains a database of Vermont's historic properties which is regularly updated, in part based on reports prepared by cultural resources professionals in advance of construction projects that are subject to State Historic Preservation Officer (SHPO) and federal agency review as well as by FEMA's Office of Environmental Planning & Historic Preservation (OEHP). Requirements for review include the identification of cultural resources that may be affected by the undertaking. 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.

5.4.2 Standing Structures

5.4.2.1 Existing Conditions

The project area consists predominately of rural, commercial, and residential development along Vermont Route 9 and the Whetstone Brook corridor. The Whetstone Brook is a tributary of the Connecticut River that runs through the center of Brattleboro, Vermont. The Whetstone Brook was an important part of the economic development of Brattleboro, providing power for mills and factories along the shore of the brook. The first gristmill was established in the area by Governor Wentworth of New Hampshire in 1762, while the region was still under disputed claims between the colonies of New York and New Hampshire. By 1773, the road near the Whetstone Brook contained several sawmills as well as housing for new settlers to the area. Vermont Route 9 is the primary east-west highway in Bennington and Windham counties in southern Vermont.

According to the NRHP, there are no listed properties, districts, or sites within or adjacent to the project area. The closest NRHP-listed resource, the West Brattleboro Green Historic District, is located approximately 1.25 miles southeast of the Site 5 Project Area.

According to the VT Online Resource Center (ORC) there are no properties on the Vermont State Register of Historic Places within the project area. There are three (3) properties within the project area that could potentially be impacted and were accessed for NRHP-eligibility. The Marlboro Collision and Towing building, located at 205 Route 9 in Marlboro (within Site 1), was constructed in 2012, and FEMA has determined that the building is not eligible for listing on the NRHP. The house at 374 Marlboro Road (Route 9) in West Brattleboro is a circa 1910 one-and-a-half-story cape style house clad in painted clapboard with gable front roof and a covered porch on the facade. FEMA has determined that the house is not eligible for listing in the NRHP. The house at 402 Marlboro Road (Route 9) in West Brattleboro is a circa 1890 one-and-a-half-story gable roof dwelling with a porch that wraps about the facade and a portion of the east side of the house. FEMA has determined that the house is not eligible for listing the NRHP. FEMA consulted with the Vermont SHPO's office in February of 2021, and the SHPO concurred that the three (3) properties within the Project Area are not eligible for listing in the NRHP. Therefore, there are no historic properties within the Project Area.

5.4.2.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, the status quo would remain at the project sites and the adjacent residential and commercial properties south along VT Route 9 would remain at the same level of flood risk, and the potential for damage to the properties in Marlboro and Brattleboro would remain. However, the properties within the project area

have been determined not eligible for listing in the NRHP; therefore, there would be no impact on historic properties under the No Action Alternative. The effect would be **none**.

Alternative 2: Proposed Action

The Proposed Alternative would restore the floodplain reducing the flood risk to residential and commercial properties along VT Route 9 and the Whetstone Brook. Therefore, the properties would be protected through restoration of the floodplain. Since none of these properties have been determined historic, the effect would be **none**.

5.4.3 Archaeological Resources

5.4.3.1 Existing Conditions

The ORC did not include any previously identified archeological resources within the Project Area. However, based on the results of an Archaeological Resource Assessment (ARA) that was completed for the five projects sites, it was determined that Site 5 may be sensitive for pre-contact archeological resources. A Phase IB Archaeological Survey was conducted within the Project Area for Site 5. No precontact or historic cultural material was recovered from any of the shovel tests. Therefore, FEMA determined that no further archaeological identification efforts were necessary for the project area.

The results of the ARA and Phase IB Archaeological Survey were submitted to the SHPO in December of 2021. FEMA received SHPO's concurrence with a finding of "No Historic Properties Affected" on December 13, 2021. Based on the information and surveys completed to date, no more archaeological identification efforts are needed for the project area. However, FEMA will include standard conditions for unanticipated archaeological discoveries during construction in the unlikely event that resources are uncovered.

5.4.3.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, the status quo would remain at the project sites, as flood waters would not be reconnected with the local floodplain. However, there are no known archaeological resources within the project area; therefore, no impacts to archaeological resources would be anticipated. The effect would be **none**.

Alternative 2: Proposed Action

The Proposed Alternative would involve ground disturbance associated with construction activities at all five sites; however, based on the results of the ARA and Phase IB Archaeological Survey, there are no known archaeological resources within the project area. Therefore, there would be anticipated no impacts on archaeological resources based on the Proposed Alternative. The effect would be **none**.

5.5 SOCIOECONOMIC RESOURCES

5.5.1 Land Use and Planning

5.5.1.1 Existing Conditions

The project area along all five sites is mostly residential with some commercial properties along Vermont Route 9. The project would not affect any existing land uses nor would it trigger a Vermont Act 250 review (Ramsey 2021).

5.5.1.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, the effect of continued flooding on land use in the area would be **none**.

Alternative 2: Proposed Action

The Proposed Action Alternative would create greater flood storage in the area but would not change the current land use for both natural systems and the surrounding development. The effect would be **none**.

5.5.2 Noise

EPA developed federal noise-emission standards in accordance with the Noise Control Act of 1972 identifying major sources of noise and determining appropriate noise levels for activities that would infringe on public health and welfare in accordance with the law. The EPA identifies a 24-hour exposure level of 70 decibels as the level of environmental noise which will prevent any measurable hearing loss over a lifetime. Likewise, levels of 55 decibels outdoors and 45 decibels indoors are identified as preventing activity interference and annoyance. The levels are not single event, or "peak" levels. Instead, they represent averages of acoustic energy over periods of time such as 8 hours or 24 hours, and over long periods of time such as years (EPA 1974). Additionally, the Federal Highway Administration established acceptable noise levels and ranges for construction equipment (FHWA 2006) and the Occupational Safety and Health Administration established thresholds for occupational noise exposure to protect the health and safety of workers (29 C.F.R. 1926.52). Land uses that are considered sensitive to noise impacts are referred to as "sensitive receptors." Noise sensitive receptors consist of, but are not limited to, schools, residences, libraries, hospitals, and other care facilities.

5.5.2.1 Existing Conditions

The existing noise sources are from vehicles traveling along Vermont Route 9 adjacent to the project area.

5.5.2.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

The No Action Alternative would not involve any construction and would not affect noise levels, traffic flow, or public services. Occasional flooding could temporarily increase noise levels from generators and emergency equipment in the area. Effects would be **negligible**.

Alternative 2: Proposed Action

The Proposed Action Alternative would not have a long-term effect on noise levels in the project area and the effect would be **negligible**. Construction equipment could increase noise levels at the project site but would be temporary and follow local noise control ordinances.

5.5.3 Transportation

5.5.3.1 Existing Conditions

The project area is located adjacent to Vermont Route 9, which is classified by the Vermont Agency of Transportation as a principal arterial roadway with an estimated 2020 Annual Average Daily Traffic of 5,101 to 8,795. The Average Daily Truck Traffic is 710 trucks per day. Bike and pedestrian facilities are limited to the west Brattleboro area, east of Sunset Lake Road, and at the anticipated time of this project's construction, there will be existing sidewalk and freshly installed bike lanes. Otherwise, the corridor will have shoulders that are deemed adequate for bicycle use.

5.5.3.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

The No Action Alternative would not stop the continued erosion and degradation of the stream bed and bank along with the continued loss roadway embankment.

Under the No Action Alternative, flooding at the proposed project sites and downstream could cause temporary road closures and re-routing due to erosion damages or repairs. Effects would be **moderate**.

Alternative 2: Proposed Action

Under the Proposed Action Vermont Route 9 would remain open during project construction and traffic would not need to be re-routed. Route 9 would likely require a lane closure with one-way alternating traffic at Sites 2, 3, and 4 during construction, while sites 1 and 5 will likely only require flaggers to allow construction vehicles to enter and exit the work area. The Proposed Action would prevent future flood damages and road closures during and after storm events and stop existing erosion of the adjacent Route 9 roadway. Effects would be **moderate**.

5.5.4 Public Services and Utilities

5.5.4.1 Existing Conditions

Utilities in the project area have been reviewed and compiled by the VTrans Right-Of-Way Section. Aerial utilities at all five sites include Green Mountain Power (single and/or three phase), Consolidated Communications, FirstLight Fiber, and Comcast. Additionally, there is a Vermont Electric Power Company transmission line at Site 4. The only underground utilities within the project area are at Site 5 and include a Consolidated Communications line. Additionally, the Town of Brattleboro, Public Works Department, Utilities Division has a water main, service, and sewer that runs from approximately Vermont Route 9 M.M. 3.17 easterly along Route 9. There are currently six utility poles carrying a single communications line within the project area at Site 2; all other aerial utilities have been moved to the opposite side of Route 9 at the other sites. The utility poles located within Site 2 will be relocated prior to the anticipated time of the project's construction.

5.5.4.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, flooding could temporarily interrupt utilities in the project area and downstream. Effects would be **negligible**.

Alternative 2: Proposed Action

The Proposed Action Alternative would not interrupt utility services during construction and would mitigate against future utility damages from flooding. Effects would be **negligible**.

5.5.5 Public Health and Safety

5.5.5.1 Existing Conditions

Marlboro and Brattleboro are served by a full complement of emergency, fire, police, and medical services. All of these public health and safety services are dependent on Vermont Route 9 as a principal arterial roadway.

5.5.5.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Under the No Action Alternative, flooding could cause health and safety related issues including emergency vehicle blockage and road damage. Effects to public health and safety would be **moderate to major**.

Alternative 2: Proposed Action

Since Vermont Route 9 will remain open during construction, there would not be any effect on Public Health and Safety. Under the Proposed Action Alternative, reduced flooding could reduce the amount of road closures during and after storm events and lessen the chance of health and safety issues, such as emergency vehicle blockage and increased emergency response times, loss of bridges and roads and damage to homes. Effects on public health and safety would be **moderate to major**.

5.5.6 Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires each Federal agency to identify and address, as appropriate, "disproportionately high and adverse human health or environmental effects" its activities may have on minority or low-income populations. Guidance released by the Council on Environmental Quality following publication of the EO makes clear that environmental effects include economic and social effects when considering Environmental Justice during the NEPA process (CEQ 1997).

The CEQ guidance also provides criteria for identifying minority and low-income populations. Specifically, low-income populations are identified based on the annual statistical poverty income thresholds of the U.S. Census Bureau, and minority populations are defined as persons in the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Any area where the minority population exceeds 50 percent is considered to have an environmental justice population, based on the CEQ guidance.

A population is identified as minority in an area affected by the policy action if "either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis" (CEQ, 1997).

5.5.6.1 Existing Conditions

According to the 2010 U.S. Census data, Marlboro, population 1,078, is in Census Tract 9682 which includes a population of 1,806. The median age is 44.9 and median household income is \$40,000 with 5.7% of the population under the poverty level. The area is 3.6% African American and 91.4% white. According to EJ Mapper there are no minority or low-income populations near or down river of the project sites (EPA 2020).

According to the 2010 U.S. Census data, Brattleboro, population 12,046, is in Census Tracts 9684, 9685, and 9686 which includes a population of 12,046. The median age is 44.9 and median household income is \$45,323 with 19.2% of the population under the poverty level. The area is 2% Asian and 92% white. According to EJ Mapper there are no minority or low-income populations near or down river of the project sites (EPA 2020)

5.5.6.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Because there are no minority or low-income populations near the project sites, the No Action Alternative would have no direct construction effects on Environmental Justice populations. Under the No Action alternative, future storm related damages would affect Environmental Justice and non-Environmental Justice populations equally during use of the road. Effects would be **negligible**.

Alternative 2: Proposed Action

Because there are no minority or low-income populations near the project sites, the Proposed Action would have no direct construction effects on Environmental Justice populations. Under the Proposed Action alternative, prevention of future storm related damages would affect Environmental Justice and non-Environmental Justice populations equally during use of the road. Effects would be **negligible**.

5.5.7 Hazardous Materials

5.5.7.1 Existing Conditions

According to the Vermont Agency of Natural Resources Atlas, there is no current hazardous materials contamination at the project sites (VTANR 2020).

5.5.7.2 Potential Effects and Proposed Mitigation

Alternative 1: No Action

Since there are no hazardous contamination sites in the project areas, under the No Action Alternative, continued erosion would have no effect. Effects would be **none**.

Alternative 2: Proposed Action

The Proposed Action Alternative will not create hazardous waste during or following construction. Effects would be **none**.

6.0 PERMITS AND PROJECT CONDITIONS

The project proponent is responsible for obtaining all required federal, state, and local permits and clearances. While a good faith effort was made to identify all necessary permits in the EA, the following list may not include every approval or permit required for this project.

1. Before construction begins, VTrans must obtain any required Clean Water Act Section 404 and 401 permits from the U.S. Army Corps of Engineers (USACE), Angela Repella (angela.c.repella@usace.army.mil, 802-872-2893), and the Vermont Agency of Natural Resources (ANR) Watershed Management Division (ANR.WSMD401@vermont.gov, 802-828-1115), respectively, and comply with all terms and conditions of the issued permits. VTrans must provide a copy of the approvals/permits, or documentation from the permitting agencies that approvals/permits are not required, to the State and FEMA for inclusion in the administrative record at or before closeout.
2. Before construction begins, VTrans must obtain any required permits from the VT ANR River Management Program, Scott Jensen (scott.jensen@vermont.gov, 802-490-6962). VTrans must comply with all terms and conditions of the issued permit. VTrans must provide a copy of the approval/permit, or documentation from the permitting agency that an approval/permit is not required, to the State and FEMA for inclusion in the administrative record at or before closeout.
3. Before construction begins, VTrans must coordinate with the Vermont Department of Environmental Conservation, Megan McIntyre (megan.mcintyre@vermont.gov, 802-490-6110), to determine if a Construction Stormwater Discharge Permit is required to comply with the National Pollution Discharge Elimination System requirements under Section 402 of the Clean Water Act. VTrans must comply with all terms and conditions of the issued permit. VTrans must provide a copy of the approval/permit, or documentation from the permitting agency that an approval/permit is not required, to the State and FEMA for inclusion in the administrative record at or before closeout.
4. Before construction begins, VTrans must obtain approval from the local permitting official responsible for floodplain development to demonstrate that the Proposed Action is consistent with the criteria of the National Flood Insurance Program. VTrans must comply with all terms and conditions of the issued permit. VTrans must provide a copy of the approval/permit, or documentation from the permitting agency that an approval/permit is not required, to the State and FEMA for inclusion in the administrative record at or before closeout.
5. Before construction begins, VTrans must obtain any required approval from the VT ANR Flood Hazard Area and River Corridor Permit Program, John Broker-Campbell (john.broker-campbell@vermont.gov, (802) 490-6196). VTrans must comply with all terms and conditions of the issued permit. VTrans must provide a copy of the approval/permit, or documentation from the permitting agency that an approval/permit is not required, to the State and FEMA for inclusion in the administrative record at or before closeout.

Additionally, FEMA would require the subapplicant to adhere to the following conditions during project implementation. Failure to comply with grant conditions may jeopardize federal funds.

1. In the event of the discovery of archaeological deposits (e.g. Native American pottery, stone tools, shell, old house foundations, old bottles) VTrans 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 finds. VTrans and their contractor must secure all archaeological discoveries and restrict access to discovery sites. VTans must immediately report the archaeological discovery to the applicant (Vermont Emergency Management (Stephanie A. Smith, State Hazard Mitigation Officer, 802-989-6793)) and the FEMA Deputy Regional Environmental Officer (Mary Shanks, 617-901-2204); FEMA will determine the next steps.
2. In the event of the discovery of human remains, VTrans 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 finds. VTrans and their contractor must secure all human remains discoveries and restrict access to discovery sites. VTrans and their contractor must follow the provisions of applicable state laws, including 13 VSA 3761 (Unauthorized Removal of Human Remains), 13 VSA 3764 (Cemeteries and Monuments – Grave markers and historic tablets) and 18 VSA 5212 (Permit to Remove Dead Bodies), or any amendments or supplanting laws and regulations. Violation of state law will jeopardize FEMA funding for this project. VTrans will inform the Office of the Chief Medical Examiner (Dr. Steven Shapiro, 802-863-7320), the State Archaeologist (Dr. Jess Robinson, 802-272-2509), the applicant (Vermont Emergency Management (Stephanie A. Smith, State Hazard Mitigation Officer, 802-989-6793)) 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 sensitive areas 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.

7.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

- Environmental Assessment “Scoping Checklist” distributed by FEMA to state and federal partner agencies on February 04, 2020. Comments received: USACE had no comment but requested plans and an approximate project timeline; Vermont Wetlands Program commented that any potential wetlands would need to be field delineated during the growing season.
- FEMA coordination with Doug Morin, Vermont Department of Fish & Wildlife regarding Bald Eagle on February 04, 2020.
- Early Public Notice notifying the public of FEMA’s decision to prepare an Environmental Assessment was published in the Brattleboro Reformer on February 12, 2020. No comments were received.
- Coordination with Al Averill, Natural Resource Conservation Service (NRCS) regarding Prime Soils under Farmland Policy Protection Act, February 12, 2020 - February 13, 2020.
- A public information story map of the Vermont Route 9 corridor planning which includes this project was included on the VTrans website under Policy and Planning-Corridor Management - Natural Resources located at <https://storymaps.arcgis.com/stories/0cbf03e2f0404d15b070d321065127e9>.
- Informal consultation initiated under Section 7 of the ESA with U.S. Fish and Wildlife Service occurred on October 14 and 15, 2020; concurrence assumed on November 15, 2020.
- Consultation with State Historic Preservation Office conducted between February 2021 and December 2021.
 - Archaeological Resource Assessment (ARA) conducted on the project area in 2019.
 - FEMA submitted a recommendation for a supplemental ARA and Phase IB Survey for Site Location 5 to the SHPO’s office on February 18, 2021.
 - SHPO concurrence received for a supplemental ARA and Phase IB Survey on March 16, 2021.
 - Updated ARA conducted on the project area based on revised project designs between May 2021 and June 2021.
 - Phase IB Survey Archaeological Survey conducted between April 2021 and November 2021.
 - Phase IB Survey Archaeological Survey results received by FEMA December 6, 2021.

- Section 106 No Historic Properties Affected letter sent to SHPO December 10, 2021.
- SHPO concurrence received on December 13, 2021.

The following documents the opportunities for the public to comment on the decision-making process.

- Public Notice for availability of the Draft EA was posted on the VTrans website: <https://vtrans.vermont.gov/highway/project-delivery-environmental/permitting-review> (direct link at https://vtrans.vermont.gov/sites/aot/files/highway/documents/environmental/PN_EA_VAOTWhetstone_FINAL_2022.01.07.pdf).
- Public Notice for availability of the Draft EA was also published in the Brattleboro Reformer. Public Notice posted on January 14, 2022.
- The Draft EA was made available electronically for public comment and was able to be viewed and downloaded at: <https://vtrans.vermont.gov/highway/project-delivery-environmental/permitting-review> (direct link at https://vtrans.vermont.gov/sites/aot/files/highway/documents/environmental/VAOT%20Whetstone%20Brook%20DRAFT%20EA%20508_2022.01.05.pdf) and FEMA's website at [Region 1 - Environmental Documents and Public Notices | FEMA.gov](#).
- The Draft EA was made available in hard copy at the following location: the Brattleboro Town Clerk's Office, Brattleboro Municipal Center, 230 Main Street, Suite 108, Brattleboro, VT 05301.
- The comment period ended on January 28, 2022, 15 days from the date of the legal notice publication. Written comments could be emailed to david.robbs@fema.dhs.gov or sent to FEMA Regional Environmental Officer, 99 High Street, Boston, MA 02110. If no substantive comments were received, the EA would become final and a Finding of No Significant Impact would be signed.
- No substantive comments were received during the public comment period on the draft EA.

8.0 REFERENCES

- CEQ (Council on Environmental Quality). 1997. Environmental Justice: Guidance Under the National Environmental Policy Act.
- Ducks Unlimited. 2020. <https://www.ducks.org/conservation/where-ducks-unlimited-works/waterfowl-migration-flyways/du-projects-atlantic-flyway>
- EPA (Environmental Protection Agency). 2020. EJSCREEN: Environmental Justice Screening and Mapping Tool located at <https://www.epa.gov/ejscreen>. Site accessed on October 2020.
- EPA. 2012 from CAA. <https://www.epa.gov/general-conformity/de-minimis-emission-levels>.
- EPA. 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Prepared by the U.S. Environmental Protection Agency Office of Noise Abatement and Control, March 1974. Located at <https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF>
- FHWA (Federal Highway Administration). 2006. FHWA Highway Construction Noise Handbook, Final Report. August 2006. Located at: <https://www.nrc.gov/docs/ML0832/ML083250584.pdf>
- Gringas, Glen. 2020. Personal communications between Glen Gringas, VTrans and FEMA staff during writing of the EA.
- NRCS (Natural Resource Conservation Service). 2020. Scoping coordination under the Farmland Protection Policy Act between Eric Kuns, FEMA and Al Averill, NRCS. Emails dated February 6, 2020; February 11, 2020; February 12, 2020; and February 13, 2020.
- Otto, Katharine. 2020. Key themes along the Route 9 Corridor: Sharing known issues and collecting input from Partners along Route 9 between Bennington and Brattleboro in Fall 2020. VTrans report October 14, 2020. <https://storymaps.arcgis.com/stories/0cbf03e2f0404d15b070d321065127e9>
- Ramsey, Jeff. 2021. Personal communications between Jeff Ramsey, VTrans and FEMA staff during the writing of the EA.
- SLR (SLR Consulting). 2021. SLR International Corporation, VT Route 9 PDM Implementation - Brattleboro/Marlboro, Vermont SLR #141.16167.00003, Hydrologic and hydraulics memo dated October 7, 2021.
- TRPT (Vermont Transportation Resiliency Planning Tool). 2020. <https://vtrans.vermont.gov/planning/transportation-resilience>.
- USFWS (U.S. Fish and Wildlife Service). 2021. ECOS Environmental Conservation Online System species profile page for northern long-eared bat. Located at <https://ecos.fws.gov/ecp/species/9045> and accessed on July 22, 2021.
- USFWS. 2020. IPaC Information for Planning and Consultation Streamlined Section 7 Consultation for northern long-eared bat (*Myotis septentrionalis*). <https://ecos.fws.gov/ipac/> accessed October 14 and 15, 2020.
- VTANR (Vermont Agency of Natural Resources). 2020. Vermont Agency of Natural Resources, Natural Resource Atlas. [Vermont ANR - Natural Resources Atlas HTML5 Viewer](#) accessed 6/1/2020.
- VTF&W (Vermont Fish and Wildlife). 2020. Email communication between Doug Morin, VT Fish and Wildlife and Eric Kuns, FEMA regarding presence of Bald Eagle. February 4, 2020.
- VTrans (Vermont Agency of Transportation). 2018. VTrans PDM Route 9. Plan Set prepared for Vermont Agency of Transportation by Fitzgerald Environmental Associates, LLC. December 18, 2018.

VTrans. 2020a. VTrans PDM Route 9. Updated site plan for Site 5. August 27, 2020.

VTrans. 2020b. Marlboro-Brattleboro NH 010-1(57) Natural Resource Clearance. Internal memo from Meg Lout, VTrans Biologist to Jeff Ramsey VTrans Environmental Specialist Supervisor, dated July 23, 2020.

VTrans. 2019. Natural Resource Evaluation, Vermont Agency of Transportation Wilmington-Brattleboro NH 2971 (1) Vermont Route 9, Wilmington, Marlboro & Brattleboro, Vermont. Prepared for Vermont Agency of Transportation by Bear Creek Environmental, LLC. December 5, 2019.

APPENDIX A:
Maps and Figure

*Final Environmental Assessment
Vermont Route 9 Whetstone Brook Flood Mitigation Project*

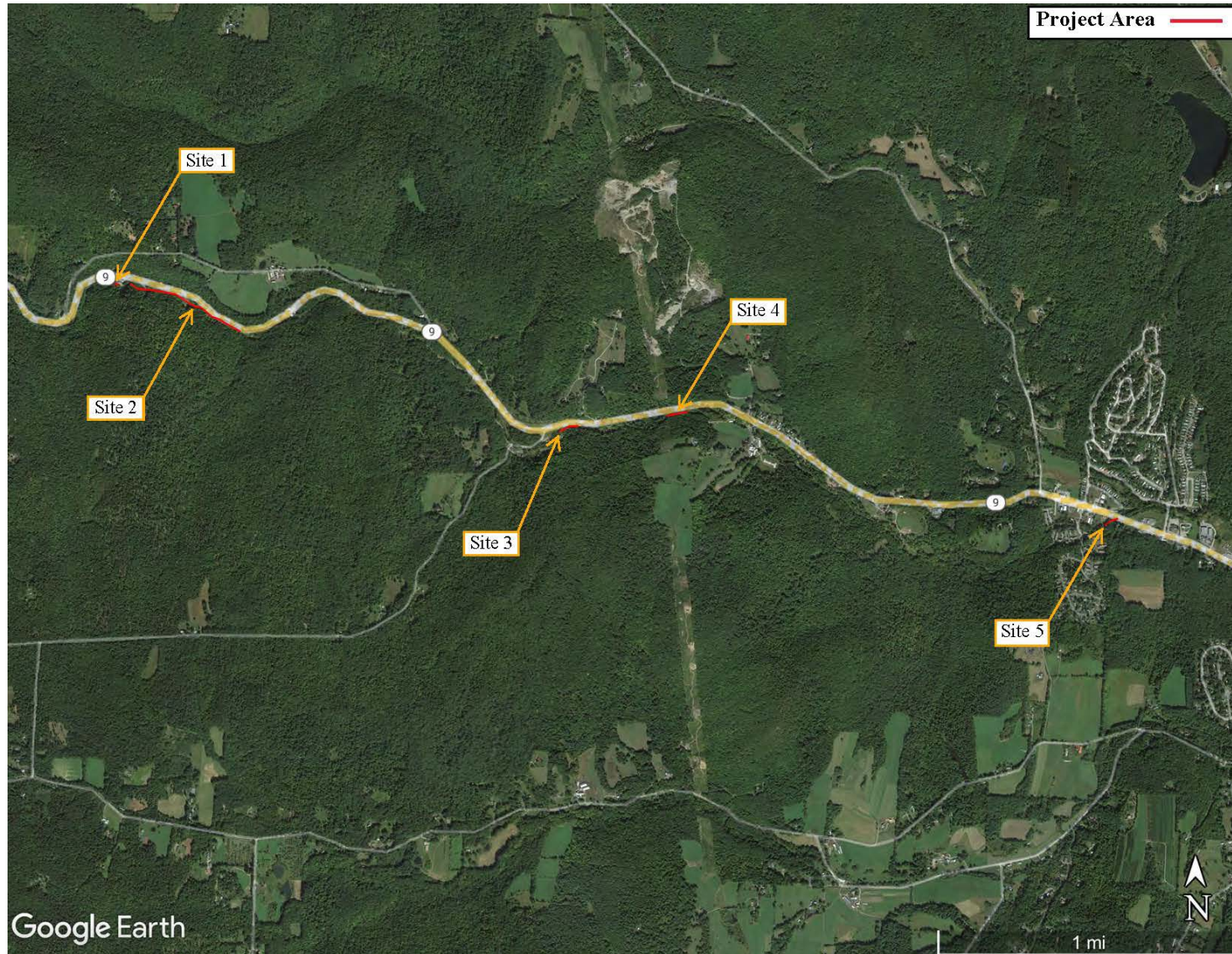


Figure 1: Project Vicinity Map



FEMA
 Region I

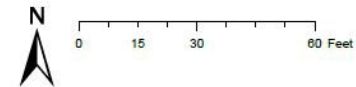
Whetstone Brook Project

Site 1 of 5

- Begin and End Points
- Construction Limits
- ▭ Construction Easement Areas
- ▨ Tree Removal Areas
- ▭ Potential Access Areas



Site	ConstructionEasementAcres	AccessAreaAcres	TreeRemovalAcres
1	0.455848	0.240197	0.026813
2	3.145642	0.135017	1.048475
3	0.349807	0.042184	0.039119
4	0.284449	0.064995	0.085189
5	0.687891	0.192066	0.439489



Project data provided by State of Vermont

Figure 2: Site 1 Area Map



FEMA
 Region I

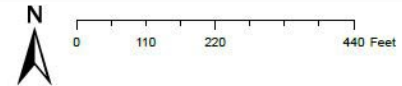
Whetstone Brook Project

Site 2 of 5

- Begin and End Points
- Construction Limits
- ▭ Construction Easement Areas
- ▨ Tree Removal Areas
- ▭ Potential Access Areas



Site	ConstructionEasementAcres	AccessAreaAcres	TreeRemovalAcres
1	0.455848	0.240197	0.026813
2	3.145642	0.135017	1.048475
3	0.349807	0.042184	0.039119
4	0.284449	0.064995	0.085189
5	0.687891	0.192066	0.439489



Project data provided by State of Vermont

Figure 2: Site 2 Area Map



FEMA
 Region I

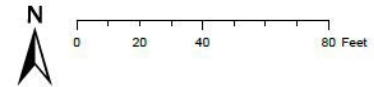
Whetstone Brook Project

Site 3 of 5

- Begin and End Points
- Construction Limits
- ▭ Construction Easement Areas
- ▨ Tree Removal Areas
- ▭ Potential Access Areas



Site	ConstructionEasementAcres	AccessAreaAcres	TreeRemovalAcres
1	0.455848	0.240197	0.026813
2	3.145642	0.135017	1.048475
3	0.349807	0.042184	0.039119
4	0.284449	0.064995	0.085189
5	0.687891	0.192066	0.439489



Project data provided by State of Vermont

Figure 2: Site 3 Area Map



FEMA
 Region I

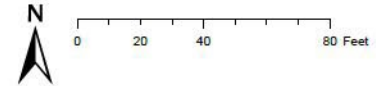
Whetstone Brook Project

Site 4 of 5

- Begin and End Points
- Construction Limits
- ▭ Construction Easement Areas
- ▨ Tree Removal Areas
- ▭ Potential Access Areas



Site	ConstructionEasementAcres	AccessAreaAcres	TreeRemovalAcres
1	0.455848	0.240197	0.026813
2	3.145642	0.135017	1.048475
3	0.349807	0.042184	0.039119
4	0.284449	0.064995	0.085189
5	0.687891	0.192066	0.439489



Project data provided by State of Vermont

Figure 2: Site 4 Area Map



FEMA
 Region I

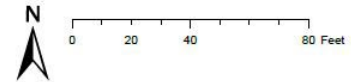
Whetstone Brook Project

Site 5 of 5

- Begin and End Points
- Construction Limits
- ▭ Construction Easement Areas
- ▨ Tree Removal Areas
- ▭ Potential Access Areas



Site	ConstructionEasementAcres	AccessAreaAcres	TreeRemovalAcres
1	0.455848	0.240197	0.026813
2	3.145642	0.135017	1.048475
3	0.349807	0.042184	0.039119
4	0.284449	0.064995	0.085189
5	0.687891	0.192066	0.439489



Project data provided by State of Vermont

Figure 2: Site 5 Area Map

APPENDIX B:

8-Step Analysis

REGION 1

EXECUTIVE ORDER 11988 Floodplain Management

EXECUTIVE ORDER 11990 Protection of Wetlands

8-Step Analysis (44 C.F.R. Part 9)

TITLE: Vermont Route 9 Whetstone Brook Flood Mitigation Project: PDMC-PJ-01-VT-2018-002

LOCATION: VT Route 9 from mile marker 8.03 in Marlboro, VT to mile marker 3.44 in Brattleboro, Vermont

BACKGROUND:

The Vermont Route 9 Whetstone Brook Flood Mitigation project is located along a segment of Route 9 in Brattleboro and Marlboro, VT. The project area starts in Marlboro approximately 0.25 miles west of the Marlboro/Brattleboro town line and extends easterly into Brattleboro for 3.45 miles. The Whetstone Brook Watershed spans the towns of Brattleboro and Marlboro with a small portion of the northern watershed being in Dummerston. The watershed is 27.4 square miles (17,566 acres) and Whetstone Brook is 13 miles long.

Vermont Route 9 is included on the federally designated National Highway System because it provides a major east-west link through southern Vermont that supports long distance trips for people and freight travelling through New England and New York State. It also provides direct access to numerous businesses and homes within Brattleboro and Marlboro and is an essential connection to I-91 for tourism travel to the ski areas and other attractions to the west in Wilmington and Dover, VT.

In 2018, the Vermont Transportation Resiliency Planning Tool (TRPT) was used to identify infrastructure vulnerable to damage from inundation, erosion, and deposition, and to prioritize locations based on the extent of the vulnerability and transportation criticality (TRPT 2020). The TRPT identified five vulnerable and high priority sites along the Route 9 - Whetstone Brook corridor, which are the subject of this mitigation project. All five sites have suffered damage in past events, and all remain vulnerable.

DESCRIPTION OF PROJECT:

A combination of standard flood and erosion mitigation practices across five sites would be employed to protect Vermont Route 9 and adjacent properties including: construction of flood benches to increase flood storage and reduce flood velocities, repair and reinforcement of road embankments where past armoring is failing, removal of berms that currently channel flood waters towards the road and increase the risk of road failure from erosion, restoration of connectivity to the floodplain by removing sediment bars that prevent flood waters from accessing the floodplain, restoration of flood chutes to divert flood waters away from Vermont Route 9 and minor road grade adjustments to raise Vermont Route 9 slightly above floodplain elevation. Incidental activities that would be common at all five project sites would also include approximately 4 acres of clearing and grubbing, to include the removal of individual trees, temporary utility relocation, temporary traffic barriers and traffic control.

STEP 1: Determine whether the proposed action is in the 100-year floodplain, which includes the Coastal High Hazard Area (500-year floodplain for critical actions) and/or within a designated wetland.

Per the FEMA Flood Insurance Rate Maps (FIRM Panels: 50025C0370E - Effective Date: 09/28/2007 & 50025C0501E - Effective Date: 09/28/2007), portions of the proposed project are in the Special Flood Hazard Area (100-year floodplain – Zone AE). Sites 1, 2 and 5 are in the mapped floodplain. The mapped 100-year floodplain ends at the Marlboro town line (limit of the study area), but it extends into Brattleboro.

Is the action a functional dependent use (cannot perform its intended purpose unless it is located or carried out in proximity to water) or a facility or structure that facilitates open space use?

Yes, the proposed work is to mitigate against flood and erosion damage using a variety of measures along VT Route 9, which is an established route that provides a major east-west link through southern Vermont, provides direct access to numerous businesses and homes, and is an essential connection to I-91.

Determine whether the proposed action is within a designated wetland.

Wetlands along the Route 9 - Whetstone Brook corridor were reviewed by VTrans Biologists and their consulting partners (Bear Creek Environmental) using remote sensing and by completing a wetland delineation. The wetland delineation included a 50-foot buffer on each side of Vermont Route 9. Based on the assessment, no wetlands were identified at any of the project sites. Wetlands have been identified on the north side of Route 9 at Site 3, but the project area and all construction related activities would be on the south side of Route 9. Additionally, the U.S. Fish and Wildlife Service National Wetland Inventory identifies Whetstone Brook as a riverine wetland (Cowardin classification code R3UBH - riverine, upper perennial, unconsolidated bottom and permanently flooded), but this classification does not require the wetland 8-step process under EO 11990, because it is not classified as a wetland per Section 7(c) of the Executive Order (USFWS 2021). The National Wetland Inventory did not identify any additional wetlands at any of the five project sites.

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

Early Public Notice notifying the public of FEMA's decision to prepare an Environmental Assessment and work affecting the floodplain was published in the Brattleboro Reformer (print) on February 12, 2020. No comments were received.

Additionally, FEMA's NEPA Scoping Document was distributed to state and federal partner agencies on February 04, 2020. No comments were received regarding work in the floodplain, but Vermont Wetlands Program commented that any potential wetlands would need to be field delineated during the growing season.

STEP 3: Identify and evaluate practicable alternatives to locating the proposed action in a floodplain and wetland (including alternatives sites, actions and the "no action" option).

ALTERNATIVES CONSIDERED:

There are no practicable alternatives to locating the proposed action within the floodplain because the Proposed Action is designed to protect an established transportation route (VT Route 9) from flood and erosion damage.

Alternative 1: No Action Alternative

Under the No Action Alternative, FEMA would not provide any federal funding for repairs and measures to mitigate against future flood damage. During storm events, the Whetstone Brook corridor would continue to experience erosion of the stream banks, the stream bottom, and Vermont Route 9 and remain vulnerable to flood damage.

Alternative 2: Proposed Alternative

A combination of standard flood and erosion mitigation practices would be employed to protect Vermont Route 9 and adjacent properties including: construction of flood benches to increase flood storage and reduce flood velocities, repair and reinforcement of road embankments where past armoring is failing, removal of berms that currently channel flood waters towards the road and increase the risk of road failure from erosion, restoration of connectivity to the floodplain by removing sediment bars that prevent flood waters from accessing the floodplain, restoration of flood chutes to divert flood waters away from Vermont Route 9 and minor road grade adjustments to raise portions of Vermont Route 9 slightly above floodplain elevation. Incidental activities that would be common at all five project sites would also include approximately 4 acres of clearing and grubbing, to include the removal of individual trees, temporary utility relocation, temporary traffic barriers and traffic control.

- **Site #1:** This location is near an automotive garage where the river bends around a parking lot built on historic fill placed in the floodplain and then heads directly toward the Route 9 road embankment. Erosion in this area could lead the river to overflow the riverbanks, flow across the parking lot and flow down Route 9. Work at this location would include constructing a combination of stacked stone toe walls (Riprap, Heavy Type¹)

¹ Riprap, Heavy Type is defined by VTrans specification as stones where the largest dimension shall be greater than 5 feet with the least dimension at least 1/3 the largest dimension.

along the river's edge and a stone fill/riprap (Type IV²) sloping embankment. The riprap wall is appropriate at narrower sections where a sloping embankment would constrict the channel or encroach on the available space of the existing park lot. The sloping embankment of stone fill/riprap is appropriate for sections where adequate space exists, and this approach would not encroach on the bankfull channel. For both the wall and slope sections, vegetation would be planted in between the stone joints to resist erosion and add riparian vegetation.

- **Site #2:** This location is near the Marlboro-Brattleboro town line where the waterway is currently in a confined condition from past actions and events. Berms were built up that reduce flood conveyance and have created erosion issues along the edge of the road embankment. An area of floodplain was filled following past flood recovery directing high-velocity flood flows through a narrow channel located along the road embankment leading to ongoing erosion and repetitive damages to the road. Work at this location would include the removal of the berms and historic fill from the floodplain, construction of four sections of stacked stone toe wall (1,075 LF), repair and reinforcement of road embankment with riprap where existing armoring is failing, creation of flood benches at several locations to match elevations on nearby bars, removal and resetting of guardrails, replacement of existing 18-inch corrugated polyethylene pipe (CPEP) cross-drain with 24-inch CPEP, and minor roadway grade adjustments to raise Vermont Route 9 slightly above floodplain elevation. This site will require some tree removal. Like Site 1, the riprap wall is appropriate at narrower sections where a sloping embankment would constrict the channel or encroach on the available space of the existing park lot. The sloping embankment of stone fill/riprap is appropriate for sections where adequate space exists, and this approach would not encroach on the bankfull channel. For both the wall and slope sections, vegetation would be planted in between the stone joints to resist erosion and add riparian vegetation.
- **Site #3:** This location is immediately downstream of Stark Road; previous repairs at this site are failing where a repair was performed following past flood damages. Work at this location would remove and replace the existing failed stacked stone toe wall but would pull back the newly constructed wall to restore bank full width of the river channel. Traditional sloping riprap is not proposed at this location because space does not exist without filling in the channel. Vegetation would be planted in between the stone joints of the wall to resist erosion and add riparian vegetation. The guardrail at this location would also be replaced.
- **Site #4:** This location is across from a used car dealer where the river is very narrow, and the banks are eroding. Work at this location would construct a stacked stone toe wall. Traditional sloping riprap is not proposed at this location because space does not exist without filling in the channel. Vegetation would be planted in between the stone joints of the wall to resist erosion and add riparian vegetation. Work at this location would also include installing a guardrail and placing fallen trees in the stream (parallel to stream flow) to add roughness and provide habitat.
- **Site #5:** This location is upstream of and under Bridge 51 where the Whetstone Brook passes under Route 9. Work at this location would include repairing voids in the bridge abutment armor, removing the accumulated sediment upstream of the bridge, reforming a flood chute and creation of a flood bench. Work would also include installing a section of riprap with vegetation in the joints of the stone to protect a house as flows approach the bridge.

Alternative 3: Considered and Dismissed

Relocation of Vermont Route 9: Relocation of VT Route 9 to a new alignment beyond the floodplain and river corridor of Whetstone Brook is the ideal alternative to reduce risk; however, this is not feasible given the narrow and steep valley topography and existing developed land use along the corridor. Additionally, the relocation of an existing federally designated highway would be economically infeasible.

² Stone fill, Type IV, is defined by VTrans specification where the longest dimension of the stone shall vary from 3-60 inches, and at least 50% of the volume of the stone in-place shall have a minimum dimension of 20 inches.

Alternative 4: Considered and Dismissed

Vegetative-only solution: At all sites, the erosive forces are too strong in this area of the Whetstone Brook for vegetative practices alone to reduce erosion and protect public infrastructure. A vegetative-only solution is technically infeasible and would not meet the purpose and need.

STEP 4: Identify the potential direct and indirect impacts associated with the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the proposed action.

The Proposed Action would not induce future growth and development, as it is designed to increase the resiliency of an existing roadway. It is a flood mitigation project including floodplain restoration and does not include the expansion or an increased capacity of VT Route 9. The project would reduce the risk of future flood damage by creating additional flood storage in the river channel and preventing erosion within the river corridor and outside of the river channel. Gravel and sediment bars and chutes selected for removal of sediment are scoured by high river flows frequently as evidenced by the lack of mature trees on them. All proposed sediment excavation would be below ordinary high water but outside of the wetted channel due to the use of cofferdams and work during low flow conditions. The project would reduce erosion potential, as flood flows would be able to spread out more, slow down, and flow directly at the bridge opening at Site #5. The bridge would become more hydraulically efficient and be less susceptible to future erosion.

Short-term adverse impacts are expected due to heavy equipment accessing the river to perform the proposed excavation work. This would require the removal of mature trees in the river corridor. Access to the river would also involve adding temporary fill in the river corridor to allow for equipment access to each location proposed for work; however, since all fill for construction access would be removed upon completion of the project, any potential effects of this fill would be short-term.

Long-term, the proposed project restores some of the beneficial floodplain functions with the opening of the flood-chute entrances, but all other aspects of the proposed project repair existing infrastructure and substantially maintain the status quo of the Whetstone Brook. A hydrologic and hydraulic (H&H) analysis was completed for the 5 ½ mile segment of the Whetstone Brook encompassing the five proposed project sites. The analysis compares current flood conditions with anticipated post construction conditions of the proposed action. Results of the study indicate the proposed action would result in no rise in flood levels at Sites 1 through 4 and a flood level drop in portions of Site 2. At Site 5, there would be either no rise or a drop in flood levels in all areas except the downstream area of the proposed flood bench where there would be a 0.1-ft rise in flood levels. The anticipated flood level rise would dissipate prior to the VT Route 9 bridge, and no flood rise would be expected for the remainder of the downstream study area. No rise would occur in the designated floodway located downstream of the bridge.

The proposed project is a flood mitigation measure that will reduce the adverse impacts associated with occupancy of the floodplain. The proposed project will reduce the risk of flood loss by increasing long-term resiliency of VT Route 9 and reduce the need for significant repairs in the future to maintain east-west passage in the region. The Proposed Action would lead to moderate beneficial effects to the floodplain.

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

Potential short- and long-term adverse impacts would be avoided and minimized through design measures and permitting conditions. The project is designed to restore beneficial values of the floodplain by removing sediment bars that prevent flood waters from accessing the floodplain. At the same time, the project would avoid the adverse impacts associated with floodplain occupancy by diverting flood waters away from Vermont Route 9. FEMA would require authorization from the local floodplain manager and Vermont ANR Flood Hazard Area and River Corridor Program for work occurring within the Special Flood Hazard area.

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 purpose of the project is to employ several flood and erosion mitigation practices across five project sites to protect VT Route 9 and adjacent properties. No other alternatives provide the same level of flood protection to the community. The proposed project provides flood mitigation along Whetstone Brook; flood hazards would be reduced, and there would be a decrease in flood risk.

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

Public notice was provided by FEMA and VTrans in the Brattleboro Reformer on January 14, 2022, and on the VTrans website, 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 project grant will be conditioned for the Applicant to secure federal, state and local permitting for work in the floodplain: including a permit from the Regional Floodplain Administrator, a Vermont DEC Stormwater Construction Permit, a U.S. Army Corps of Engineers Section 404 Permit, a Vermont ANR River Management Program Permit, and a Vermont ANR Flood Hazard Area and River Corridor Permit. Compliance with all federal, state and local permits will be determined as part of the grant close-out process.

Prepared by:

This 8-Step Analysis Document was prepared by Lora Barlow, Environmental Protection Specialist; Karen Vale-Vasilev, Environmental Protection Specialist, Christian Paske, Environmental Protection Specialist; and Eric Kuns, Senior Environmental Protection Specialist, FEMA Region I.