Nashua

NH Route 101A
Road Widening and Improvements

DRAFT Environmental Study
(*Categorical Exclusion*)

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1.0 Introduction

1.1 Scope of Report

The City of Nashua is widening and improving a section of NH Route 101A within the City limits. The purpose of this report is to identify existing resources within the project corridor including air and noise quality, water resources, fish and wildlife, historical and archeological resources and potential hazardous waste issues.

In accordance with the National Environmental Policy Act of 1969 (42 USC 4332(2)(c)) as implemented at 23 CFR 771.117(d)(3), this Environmental Study has been prepared using a systematic, interdisciplinary approach to assess the engineering considerations and environmental effects of this Categorical Exclusion project.

1.2 Existing Conditions

The project area is approximately 2.0 miles in length beginning just west of the intersection with Celina Avenue and continuing easterly to the intersection with Somerset Parkway (shown in Figures 1.2-1 through 1.2-3). Currently, the roadway consists of four approximately 12-foot wide through lanes - two lanes in each direction - with a left-turn median lane throughout. There are multiple driveway access points, inconsistent signage, and somewhat conflicting land uses. The existing corridor is a mix of mostly commercial, industrial, and retail facilities, with two residences along NH Route 101A and many residential neighborhoods in the area. Some of the properties generate traffic throughout the day, while others generate more traffic during normal commuting hours. The corridor has “big box” retail establishments along with small privately owned businesses. New Hampshire Community Technical College (NHCTC), located about midway along the project corridor, is attended only by commuters and generates substantial traffic volumes. Future development will almost certainly replace the two remaining directly abutting single-family residences, and even some of the bigger retail concerns, such as Building 19, may be replaced by even bigger retailers (such as Wal-Mart). Most of the businesses are located back from the existing roadway but some are closer and are impacted, at least to some degree, by the widening of the road.

Because of the mixed use along the roadway, traffic types vary. Due to the development west of Nashua in Amherst and Milford, many people use NH Route 101A to commute to and from their jobs. The retail services along the corridor generate a large amount of traffic (AADT) and existing manufacturing or commercial service businesses generate the remainder of the traffic within the corridor. Traffic volumes along the roadway have been steadily increasing, more than doubling since 1980. The current roadway was constructed in 1981 and, since traffic volumes have continued to grow, it has become increasingly congested.

2.0 Purpose and Need

2.1 Purpose of the Project

The purpose of this project is to provide an efficient roadway with an acceptable level of service and improved safety for NH Route 101A and the intersections along the corridor from Celina Avenue to Somerset Parkway with a reasonable cost to the public while improving the pedestrian and bicycle facilities and esthetics, and without adversely affecting environmental, cultural, economic, and social resources.

2.2 Need for the Project

NH Route 101A within Nashua provides a transportation link to Amherst, Milford, and other areas to the west while also providing access to several intersecting roadways along the corridor. The roadway provides a route for commuters to access the F.E. Everett Turnpike and downtown Nashua. It also provides access to retail establishments, as well as residential, commercial, and industrial properties and developments. The roadway is City-maintained and is classified as an urban arterial. This project is identified in the state's Ten Year Transportation Improvement Plan.

The need for the project is due to the road's position as a vital east-west regional traffic corridor connecting Nashua, Amherst, and Milford. The absence of other east-west arterials in southern New Hampshire magnifies the roadway's deficiencies. The study area, located between Celina Avenue and Somerset Parkway also provides access to numerous retail, commercial, and industrial businesses, as well as residential developments. The performance of NH Route 101A is considered deficient based on insufficient highway capacity and poor levels of service along the roadway and at intersections, limited bus transit accessibility, inadequate pedestrian and bicycle access and safety, and insufficient access management. These deficiencies are described in more detail below.

<u>Highway Capacity</u>

NH Route 101A from Celina Avenue to Somerset Parkway currently operates at level of service (LOS) F at the intersection of Thornton/Deerwood Street during the PM peak hour and LOS D at the intersection of Sunapee/Townsend West Street during the AM Peak hour. In addition, the unsignalized intersections at Capitol and State Streets currently operate at LOS F during the AM, PM and Saturday peaks. By the year 2027, LOS E and F are expected to be common at many intersections along the corridor if no changes are made. The City of Nashua would like to maintain a minimum LOS D on this portion of roadway through the year 2027 due to the many important functions that the roadway provides. The current configuration of the roadway consists of two lanes in each direction with left turn lanes provided at many of the intersections. The current roadway layout does not provide LOS D in the design year along the roadway or at the intersections, making modifications necessary.

Bus Transit Accessibility

The Nashua Transit System currently travels along NH Route 101A with twelve bus stops located within the study area and provides twelve round trips per day. Currently, stopping buses either use the shoulder to exit the traffic stream or, if the shoulder does not exist, disrupt the flow of traffic during stops. As traffic volume increases along the roadway, proper bus pullouts and the proper location of bus stops in reference to intersections will be needed to ensure that the transit system does not disrupt the flow of other vehicular traffic.

Pedestrian/ Bicycle Access

Pedestrian and bicycle access along NH Route 101A within the study area is hindered by the lack of sidewalks in some areas, very few protected crossings at signalized intersections, and inconsistent shoulder widths. In some areas, where sidewalks do not exist, pedestrians have worn paths in the grassed areas. Existing sidewalks also have limited width and are not adequate for safe multi-modal use by both pedestrians and bicycles. In most areas where sidewalks are provided, they are located adjacent to the roadway. A lack of clearly delineated crosswalks and pedestrian phases at some of the signalized intersections is unsafe and not conducive to pedestrian use. This section of NH Route 101A is not currently designated as a bicycle route by NHDOT, but in some areas width is more than adequate.

Access Management

Some access points along NH Route 101A within the study area are currently located within the functional area of the intersections, leading to vehicular conflict, decreased safety, and increased congestion. There are also inadequate transition areas between the higher speed arterial and the local driveway locations. Wherever possible, the access points along the roadway should be eliminated, consolidated, or modified to maximize safety and efficiency throughout the corridor. Providing a wider median and closing unsignalized median openings would provide a safer, more efficient roadway.

No parallel roadways exist within close proximity to NH Route 101A. This contributes to the traffic congestion along the corridor as vehicles are forced to access all properties along the corridor from the driveways along NH Route 101A. As vehicles utilize driveways along the corridor they cause other vehicles to slow to allow them to enter or leave the traffic flow. Vehicles with multiple destinations along the corridor are forced to enter the traffic stream more than once on NH Route 101A causing additional degradation of traffic movements. The addition of a parallel roadway, or at the very least, cross connections between adjacent parcels, would help improve traffic flow along the corridor.

3.0 Proposed Action

The project includes widening to three lanes in each direction, adding medians, adding sidewalks in places, minor approach work on the intersecting side roads and modifications to the seven existing signalized intersections. (The project layout is shown on Figures 1.2-1 through 1.2-3 and typical sections in Figure 1.4-1).

The project generally follows the existing NH 101A alignment and widens equally on either side of the existing roadway. Below are locations where the preferred alignment differs from the existing alignment to minimize the overall impact of the project.

- *Round Pond*: In order to avoid impacts to this important environmental resource, the proposed alignment was located approximately 8 feet north of the existing alignment. This resulted in the proposed southern curb line being in almost the same location as the existing curb line. This alignment shift allowed for the addition of proposed sidewalk on the south side of the roadway without directly impacting Round Pond or the adjacent wetlands.
- *547 Amherst Street and Southern NH University:* The proposed alignment here was shifted to the north to attempt to "split the difference" between two buildings on either side of the road and provide enough room for the wider roadway. It should be noted that the alignment through this area is also affected indirectly by the need to avoid impacts to Round Pond.
- *Other Locations*: The alignment location, lane configuration, and other design elements were modified at several other locations along the corridor. These modifications typically were made to minimize property impacts, improve intersection functioning, or for other reasons, and did not involve environmental impacts. These will not be addressed here but are described in detail in the *Engineering Report*.

The preferred alternative consists of three lanes in each direction and provides at least Level of Service D at all intersections. It provides an additional eastbound left turn lane on NH 101A at the Thornton/Deerwood Drive intersection, while maintaining the two left turn lanes eastbound on NH 101A at Somerset Parkway. All other intersections will have single left turn lanes. All of the signals will have protected left turn phases for NH 101A. These improvements along with coordination of the signals, provides for an efficient roadway with an acceptable Level of Service.

The preferred alternative also provides clearly delineated crosswalks with dedicated pedestrian phases at the traffic signals to enhance pedestrian safety along the corridor. Sidewalks are also provided on both sides of the roadway for the entire length of the corridor to improve pedestrian access. The proposed shoulder is five (5) feet wide to act as a bicycle lane to provide for bicycle access.

The addition of the third lane in each direction will reduce the impact of the bus stops on vehicular traffic flow. Bus pullouts are not provided per the direction of the Transit Authority because it is difficult for buses to re-enter the traffic stream once they have

exited. Further discussions with the Transit Authority are ongoing to determine the optimal location for the bus stops.

Due to the developed nature of the land adjacent to the corridor, it is not feasible to construct a parallel roadway to NH 101A to provide for better access management. Interconnections between adjacent properties could be provided to reduce congestion and improve safety along NH 101A. However, these interconnects would require the individual property owners to agree. While none of these interconnections are included in the proposed action, a plan showing the possible locations has been included in the *Engineering Report.* It is hoped that the City can use the plan as a guide for implementing changes in the future.

4.0 Alternatives to the Proposal

4.1 No Build Alternative

The No Build Alternative would not make any improvements to the existing NH Route 101A facility. This alternative is not considered feasible and prudent, as it does not address the existing safety deficiencies throughout the corridor. In addition, the impacts associated with the proposed action are not of a magnitude to warrant the selection of this alternative.

4.2 Traffic Signal Improvements

Traffic signal improvements were studied, and it was found they would not result in LOS D or better at some intersections. Therefore signal improvements were rejected as a standalone alternative.

4.3 Build Alternatives

In order to provide an acceptable level of service as well as to improve bicycle and pedestrian mobility, there is no viable alternative to the proposed widening. The existing roadway has a curb-to-curb distance of 78 feet while the proposed typical has a proposed curb-to-curb distance of 92 feet.

The principal build alternative considered was to hold the existing alignment and widen equally on either side of the existing roadway. However, in many locations, this approach resulted in excessive impacts to properties or resources which are currently located in close proximity to the existing roadway. Wherever practical, the proposed alignment was shifted to minimize these excessive impacts. Specific locations where the proposed action deviates from the initial “equal-widening” build alternative are described in Section 3.0 above.

5.0 Resource Summary

5.1 Air Quality Analysis

Introduction

In order to determine the air quality impacts associated with the proposed project, a micro-scale or dispersion modeling analysis was conducted. Impacts were modeled using the standard EPA models Mobile6.2 and CAL3QHC. The input and output files for the analysis are available upon request.

For Federal Type I highway projects, a micro-scale air quality analysis is normally carried out for the three intersections with the worst Levels of Service (LOS), if the LOS is worse than Level C. The intersection at Deerwood/Thornton and NH Route 101A is the only major intersection within the study area to fall under this category, therefore it was the only intersection analyzed. If the analysis shows that the Deerwood/Thornton and NH Route 101A intersection does not exceed National Ambient Air Quality Standards (NAAQS), then it can be assumed that all other intersections with a Level of Service C and better will meet the NAAQS, and no further analysis would be necessary.

The years modeled for this analysis included:

Current Year	(2007)	Existing
Opening Year	(2010)	Build
Opening Year	(2010)	No-Build
Design Year	(2027)	Build
Design Year	(2027)	No-Build

Methodology

The analysis identified those locations at the study intersection (sensitive receptors) that would experience the most substantial air quality impacts from motor vehicle emissions. Then, using air quality dispersion modeling, the average one-hour carbon monoxide (CO) concentrations were estimated at these sensitive receptors for the existing conditions, and for selected future years for each alternative being studied. Comparison of predicted CO concentrations with the NAAQS standards (adopted in New Hampshire's Administrative Rules at Env-A 305) allowed an evaluation of whether or not motor vehicle emissions related to the project posed a threat to the public health or welfare.

The first part of a micro-scale air quality analysis is to determine the emission rates of the vehicles within the study area. The emission factors that were used to compute the emission rates were generated from EPA's approved emissions factor program Mobile6.2. Input data was prepared to reflect New Hampshire-specific conditions such as the State-specific vehicle mix distribution, State-specific Reid Vapor Pressure (RVP), a temperature representation of New Hampshire's winter season [-1.1^{o} C (30^{o} F)], fuel

parameters, anti-tampering programs, and inspection/maintenance programs. Output data presents the CO concentrations for speeds of 2.5 (idling) through 65 mph. The input parameters may be found in the Mobile6.2 input files (available upon request).

The second part of the analysis was to determine how the emissions are dispersed and the resulting CO concentrations. A computer-aided design (CADD) program was used to determine the roadway geometry and receptor locations for both the build and no-build conditions. Maximum CO concentrations are most likely to occur near intersections where vehicles are forced to slow down, stop, idle, and then accelerate. Receptors are any locations near the intersection that are likely to be frequented by people, such as sidewalks and parking lots. Representative receptor locations were identified in these areas, including sidewalks and other areas within all four quadrants of the intersection.

The dispersion modeling program CAL3QHC was then used, with the emissions factors derived from Mobile6.2, to estimate the average one-hour CO concentrations at the subject traffic intersection. The CO concentration was then compared to the NAAQS standards for CO, which have been adopted by the State of New Hampshire. The one-hour primary ambient air quality standard for CO is 35 ppm, average concentration.

The traffic analysis (*Traffic Engineering Report*, 2007) completed for this project provided PM peak hour traffic volumes, turning movements, and signal-cycle times for 2007 existing conditions. Growth factors were used to determine the traffic volumes for the 2017 and the 2027 design years. Vehicle speeds for “free-flow” conditions were based on the design speeds determined using the Highway Capacity Manual. Current geometrics were used for the existing and no-build conditions and proposed geometrics for the future build alternative.

The traffic, geometry, and emission data were then input into EPA’s CAL3QHC modeling program to estimate the average one-hour CO concentrations. The meteorology information included a Stability Class of D, a wind speed of 1 m/sec, a variable wind direction (determined by analyzing all directions from 0 to 360 degrees in 10-degree increments), a mixing height of 1,000 m (3,280 ft), and a surface roughness value of 321 cm (126 in), corresponding to a central business district land use.

Results

Below is a list of the years that were modeled and the single highest average one-hour CO concentration calculated for each year and alternative. Only the results for the receptor with the highest concentration are shown; the results for all receptors may be found in a separate report.

YEAR AND ALTERNATIVE			HIGHEST CONCENTRATION
Current Year	(2007)	Existing	4.9 (ppm)
Opening Year	(2010)	Build	3.9 (ppm)
Opening Year	(2010)	No-Build	3.8 (ppm)
Design Year	(2027)	Build	2.9 (ppm)
Design Year	(2027)	No-Build	2.8 (ppm)

The analysis shows that all modeled concentrations are well below the 35 ppm one-hour average concentration standard, and there will be little difference between the Build and No-Build alternatives. CO concentrations are predicted to fall in future years, due largely to expected improvements in vehicle emissions controls. Since the modeled intersection has the worst level of service in the project corridor, and the predicted concentrations are well below air quality standards, no other intersections are likely to exceed air quality standards, and no further analysis is necessary. It should be noted that minor modifications to the intersection geometry would be expected to result in negligible, if any, changes in the results.

5.2 Noise Impacts

A noise impact assessment (Appendix A) was completed in accordance with the Federal noise regulations contained in *Procedures for Abatement of Highway Traffic and Construction Noise*, 23 CFR 772, and NHDOT noise assessment policy (*Policy and Procedural Guidelines for the Assessment and Abatement of Highway Traffic Noise for Type I Highway Projects, 1996*). Using the Federal Highway Administration (FHWA) traffic noise prediction model TNM 2.5, none of the existing, Year 2006 modeled, or Design Year (2027) noise levels approached or exceeded Noise Abatement Criteria. Therefore, it has been concluded that no noise impacts currently occur, nor are predicted to occur, as a result of the project, and an abatement analysis is not required.

However, construction noise on the project may result in short-term impacts of varying duration and magnitude depending upon the phase of construction, the condition of equipment and its operating cycles, and the number of pieces of equipment operating concurrently. Appropriate noise abatement measures during the construction phase will be evaluated during the final design process and included in the plans and specifications.

5.3 Surface Waters

The Pennichuck watershed contains 352 acres of surface waters within its entire 17,984 acres (28.1 square miles) and spans five southern New Hampshire communities. Urban development throughout the watershed has resulted in hundreds of acres of impervious area, mostly in the form of roads and parking lots, resulting in increased stormwater runoff within the watershed. Pennichuck Brook itself bypasses the study area but most of the study area drains north into the brook, which serves as a water

supply for the City of Nashua. Surface waters are shown on the attached resource map (Figures 2.3-1 and 2.3-2).

Round Pond, near the northern end of the study area is a naturally occurring kettle hole pond. (A kettle hole pond is an isolated depression in the landscape, often with no inlet or outlet, which was formed when large chunks of ice broke off from retreating glaciers, and material was deposited around the ice while it melted.) Although the upland area around the pond is highly developed, portions of the shoreline of Round Pond support a unique type of habitat, known as a "Sandy Pond Shore," that is unusual in the state and that may provide habitat for state-listed rare plants. Sandy pond shores are found along ponds with porous (sandy or gravelly) soils and fluctuating water levels, and have plants adapted to low nutrient conditions and acidic soils. Vegetation in and around the pond includes high-bush blueberry, buttonbush, gray birch, white oak, pitch pine, scrub oak, white pine and lily pads on the northwest shore. Vegetation in the buffer between the pond and the existing road includes bittersweet, high-bush cranberry, arrowwood, pitch pine, butter & eggs, goldenrod, ragweed, silky dogwood, deer tongue and other grasses. The proposed Build Alternative has been located to minimize impacts to the pond. The southerly curb line of the proposed roadway has been placed in approximately the same location as the existing southerly curb line. The proposed 5' sidewalk will result in minimal impacts to the upland areas adjacent to the pond. Placement of a small viewing area will be considered in the final design phase.

Round Pond is over 10 acres and therefore a public water body and subject to the Comprehensive Shoreland Protection Act (CSPA). The CSPA has "Minimum Standards" that provide restrictions on tree clearing within 150 feet of the shoreline. It appears that the only shoreland zone the project passes through is along Round Pond, where there may be a small amount of tree removal to construct a new sidewalk. Although the project is likely to meet the CSPA criteria, it will be necessary to coordinate with the Shoreland Coordinator. Currently there is no formal application, and approvals are usually incorporated into related permits (site specific or wetlands), but starting July 2008 there will be a permit requirement.

There is a small pond just east of Blackstone Drive, across NH Route 101A from Round Pond. This pond is separated from the roadway by a large office building and parking lot. This pond drains into a stream and wetland area, and ultimately into Pennichuck Brook, which is well north of the project limits. There may be minor alterations to this pond from the project in order to accommodate stormwater treatment and discharge. Because detention basins are jurisdictional resources under the state wetlands laws if they exhibit hydrology, hydric soils, and hydrophytic vegetation, alterations to the pond or its banks beyond maintenance dredging may require a NH DES wetlands dredge and fill permit.

Other surface water resources include a series of ponds, known locally as the Birch Ponds, which begin in front of Building 19. The first two ponds in this wetland complex are separated by the access road into the Building 19 parking lot and connected by a culvert. These ponds are surrounded by scrub/brush and aquatic emergent vegetation.

The second and third ponds are divided by a pedestrian land bridge and apparently connected only by an overflow pipe. The third and largest of the ponds is primarily landscaped, surrounded by mowed grass within an office park. A perennial stream flows into the pond from the southwestern end. The last pond drains through a culvert that eventually crosses under NH Route 101A (described above) and ultimately drains to Pennichuck Brook. There are no direct impacts to this pond from the project.

5.4 Water Quality

The Federal Water Pollution Control Act (PL92-500, commonly called the Clean Water Act [CWA]), as last reauthorized by the Water Quality Act of 1987, requires each state to submit two surface water quality documents to the U.S. Environmental Protection Agency (EPA) every two years. Section 305(b) of the CWA requires submittal of a report (commonly called the "305(b) Report"), that describes the quality of its surface waters and an analysis of the extent to which all such waters provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water. The second document is typically called the "303(d) list" which is so named because it is a requirement of Section 303(d) of the CWA. The 303(d) list includes surface waters that are:

1. Impaired or threatened by a pollutant or pollutant(s);
2. Not expected to meet water quality standards within a reasonable time even after application of best available technology standards for point sources or best management practices for nonpoint sources; and
3. Require development and implementation of a comprehensive water quality study (called a Total Maximum Daily Load or TMDL study) that is designed to meet water quality standards.

The NH Department of Environmental Services (DES) has listed Pennichuck Brook in the 2006 draft 303(d) list for high levels of bacteria. The proposed project is not expected to contribute measurably to bacteria levels in Pennichuck Brook.

Runoff from highways may contain elevated levels of metals, sodium and chloride, suspended solids, sediments, and phosphorus. These pollutants can degrade water quality and adversely affect aquatic life in streams, rivers, and ponds. Runoff can also infiltrate into groundwater. The potential effects of the proposed project on surface water quality are addressed below.

Stormwater runoff from NH Route 101A and adjacent land currently drains to a variety of ditches, swales, streams, detention basins, and ponds before ultimately reaching Pennichuck Brook. These waterways, water bodies, and stormwater treatment facilities provide varying levels of water quality treatment of the runoff. The proposed project will add a relatively small amount of pavement to NH Route 101A, increasing roadway pavement in this segment from the existing approximately 19.2 acres to 22.5 acres. (Note that this figure includes medians, not all of which will be paved, and does not include non-traffic areas such as sidewalks.) Water quality treatment measures will be

implemented that will treat runoff from both new and existing pavement, such that more runoff will be treated post-construction than is currently treated, as discussed further below.

The City of Nashua operates under the National Pollutant Discharge Elimination System (NPDES) Phase II General Permit governing stormwater discharges from small municipal separate storm sewer systems ("MS4s"). This permit requires the City to implement a range of stormwater management measures and to prepare an annual report describing its progress. In the 2007 annual report, the City commits to incorporating stormwater treatment in the NH Route 101A project.

Best management practices (BMPs), such as detention basins and hydrodynamic separators (catch basins with pollutant removal technology such as Vortech units) can reduce the concentration and loading of pollutants in receiving waters. Typically, hydrodynamic separators remove up to 80 percent of metals and total suspended solids in runoff. The pollutant removal rates of detention basins vary widely, depending on design, but may be in the range of 70% removal of sediments and lead and 40 to 50% of phosphorus, copper, and zinc[1]. Combinations of BMPs can result in greater pollutant removal.

Much of the stormwater runoff from NH Route 101A in the project area is currently treated by a variety of ponds, detention basins, and swales. Because the project will involve a modest change in impervious surface area (adding approximately 3.3 acres of new pavement along two miles of roadway), the project is not expected to have a great impact on water quality. Nevertheless, the City has committed to incorporating BMPs into the project design and to improve stormwater treatment and therefore water quality in receiving waters.

Because of space limitations, the principal stormwater treatment measures under consideration are hydrodynamic separators and modifications to existing BMPs. Treatment measures currently under consideration are described below. These BMPs are in the concept stage and may be modified or relocated as project design proceeds.

The pond adjacent to Blackstone Drive (water quality sampling Site 2, shown with other sampling sites on Figure 2.4-1) has potentially high phosphorus loading but is an excavated pond and appears to function as a detention or retention basin. Phosphorus is typically treated by vegetated basins or infiltration BMPs, but space is not available for such structures at this location. Phosphorus could be partially treated by constructing a hydrodynamic separator to treat stormwater runoff before it reaches the pond, which should remove most of the sediments associated with phosphorus. Another option, if allowed by regulatory authorities, is to modify the existing pond to improve retention and treatment of stormwater runoff. Research of permit documents and plans (dated 1984) associated with the adjacent condominium development

[1] Rockingham County Conservation District. 1992. Stormwater management and erosion and sediment control handbook for urban and developing areas in New Hampshire. NH Dept. of Environmental Services, Rockingham County Cons. District, and USDA Soil Conservation Service. Exeter, NH.

indicates that the pond was constructed as a detention basin, and that a wetland permit was required for its construction. It appears that road runoff was previously directed to this area, and that wetlands existed here before the detention basin was constructed.

The stream at sampling Site 1 is downstream of Site 2 and also downstream of a series of interconnected detention basins, which collectively treat runoff from a large portion of NH Route 101A. The adequacy of these basins in providing treatment for the existing and proposed roadway areas they drain is being studied. Modifications of the basins may be implemented to improve treatment or increase their capacity.

A hydrodynamic separator is also under consideration for an area of untreated road runoff west of Townsend West Street, on the south side of NH Route 101A.

The series of ponds (called "Birch Ponds") in the vicinity of Building 19 appear to receive and provide treatment of stormwater runoff from roads and parking lots. Addition of a hydrodynamic separator is also under consideration there.

In addition, there are a variety of ditches and swales within the project area that also treat pavement runoff. Improved treatment of both existing and proposed runoff should result in a reduction in pollutant loading compared to existing conditions.

The project must comply with the NPDES Construction General Permit. A Notice of Intent must be filed prior to construction and a Stormwater Pollution Prevention Plan (SWPPP) must be prepared and implemented. This relates to standard erosion control measures and the plan preparation and NOI filing is usually handled by the contractor.

5.5 Wetlands

The study area has relatively little topographical variation. The area is primarily commercially developed and wetlands and water bodies within the study area have been historically altered, as well as altered by more recent permitted dredge and fill projects approved by the Department of Environmental Services (DES). Jurisdictional wetlands in the study area include wetlands associated with Pennichuck Brook and drainage ditches that flow along property lines between retail establishments. Wetlands were delineated within the corridor on August 30, 2006, at two locations: Round Pond, and at a wetland complex in front of the Building 19 property on the south side of the corridor.

The wetland complex that begins in front of Building 19 extends south along the west side of the parking lot and beyond the study area. The section is classified under the Cowardin Wetland and Deepwater Habitat Classification System as PFO1/4C (palustrine, forested with broad-leaved deciduous and needle-leaved evergreen trees, and seasonally flooded). Vegetation includes white pine, elm, green ash, gray birch, bittersweet, grapes, rose, black cherry, sorrel, sensitive fern, and grasses. This wetland drains into a series of three ponds, which flow toward the east end of the study area. The ponds ultimately outlet to a drainage channel and to a culvert that extends several

hundred feet beneath parking lots and the roadway, crosses NH Route 101A, and drains into a ditch to the east of Somerset Parkway at the eastern end of the study area. This ditch drains to the north and into Pennichuck Brook. There will be no direct impacts to these wetlands, ponds, or ditches. Possible stormwater runoff effects are addressed in Section 5.4 above.

Another drainageway, located approximately 400 feet west of Townsend Way on the south side of NH Route 101A, is fed by three stormwater culverts south of the roadway. The culverts and channel are currently clogged with sand from stormwater runoff and vegetated almost entirely with Japanese knotweed. The ditch feeds into a jurisdictional wetland beyond the limits of the study area. The wetland area is vegetated with silky dogwood, purple loosestrife and cattails. No direct or indirect impacts to this wetland are expected.

There may be minimal impacts to existing water bodies, including detention basins, or their banks where discharge outlets are to be constructed, and where the project extends up to the edge of the jurisdictional bank of Round Pond. A NH DES wetlands dredge and fill permit may be needed for these impacts. No mitigation other than construction best management practices are expected to be required for these impacts.

The City of Nashua regulates activities in or near wetlands in their Revised Land Use Code, although state transportation projects are not subject to local regulation. Round Pond is listed in the Nashua Land Use Regulations as a “Critical Wetland”, which has a 40-foot regulated buffer. Other wetlands over 9,000 square feet also have a 40-foot regulated buffer, and wetlands over 3,000 square feet have a 20-foot buffer. Work is proposed within 40 feet of the wetland edge of Round Pond, which would normally require a Special Exception from the Zoning Board of Adjustment. Work around other wetlands within the project limits may also be within City-designated wetland buffers. No permits or approvals are expected to be needed or required for these areas of proposed work.

5.6 Floodplains

The entire study area lies outside the 100 and 500-year floodplains as identified on the Federal Emergency Management Agency’s Flood Insurance Rate Maps (FIRM panel 3300970020 C) (Appendix B).

5.7 Fish and Wildlife

Round Pond is a perennial waterbody and warm water fishery. A belted kingfisher, Canada geese, and a chipmunk were observed there, and a “duck crossing” sign was present on the roadway between Round Pond and the pond near Blackstone Drive. Painted turtles, bullfrogs, snails and a blue heron were observed in the three ponds near Building 19, and the largest pond supported habitat (mowed lawn) for tame, hand-fed Canada geese and mallard ducks. These ponds may support other urban wildlife such as skunks, raccoons, muskrats, and even water snakes, but the entire project area

is highly developed, retaining little to no riparian buffer and virtually no wildlife habitat other than the areas described above. Further, it does not support any wildlife corridors allowing wildlife to move safely between the small areas of intact habitat.

The project will affect a very small amount of intact wildlife habitat, and affected habitat is relatively low value. The most notable habitat impact is along Round Pond, where a narrow fringe of vegetated land will be affected. Because of the limited nature of the impact, no mitigation is needed.

5.8 Threatened and Endangered Species

Threatened and Endangered species reviews were requested from both the US Fish and Wildlife Service (USFWS) and the NH Natural Heritage Bureau (NHB). USFWS responded that "no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) are known to occur within the project area," and "preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required" (Appendix C).

The NHB identified the plant species, *Lupinus perennis* (wild lupine) as the only species listed as threatened or endangered in proximity to the project site. However, as in the case of three other rare species NHB identified as present (the plant species *Bidens laevis*, smooth bidens; and vertebrate species' *Enneacanthus obesus*, banded sunfish and *Emydoidea blandingii*, Blanding's turtle), the wild lupine is greater than 1,000 feet away from the edge of the 300-foot corridor identified as the project area (Appendix C). A letter from NHB dated January 25, 2008, cleared the project of impacts to rare plants (Appendix C). Additional communication with the New Hampshire Fish and Game Department indicated that because there were no federally listed animal species found within the study area, no additional coordination with their agency would be necessary for the purposes of NEPA documentation.

Round Pond is not identified by USFWS or NHB as a rare or critical habitat. As mentioned above, portions of the shoreline of Round Pond support a type of habitat, known as a "Sandy Pond Shore" that is unusual in the state and that may provide habitat for state-listed rare plants, although none have been documented.

5.9 Historic and Archaeological Resources

A Phase IA archaeological sensitivity assessment was completed for the NH Route 101A study area. Results were described in "Phase 1A Archaeological Sensitivity Assessment NH 101A Corridor Widening & Improvements NHDOT Project 10136 Nashua", prepared by Independent Archaeological Consulting, L.L.C., dated April 30, 2007. The study identified two areas sensitive for Native American archaeological resources and seven areas sensitive for Euroamerican resources. The State Historic Preservation Officer (SHPO) recommends Phase 1B testing for Native American resources near Round Pond and for Euroamerican Resources on a vacant lot between

455 and 471 Amherst Street, since these areas may be impacted by the Build Alternative and could contain archaeological resources. Additional details may be found in the full report. The Phase 1B testing will be completed prior to construction. The importance of resources, if any, cannot be determined until the Phase 1B testing is completed. It is unlikely, considering the history of land use in the corridor, that resources will be found which must be preserved in place, in which case Section 4(f) could apply.

The corridor was evaluated for extant historic resources. Two properties were identified as eligible for listing in the National Register of Historic Places. These were the Fab-Braze property located at 476 Amherst Street (expected to be eligible in 2009) and the Bank of America property (former Blood/Chase house) located at 500 Amherst Street (currently eligible). At a Cultural Resources meeting at NHDOT on February 14, 2008, a Memorandum of Effect was signed that stated that there would be no effect to historic properties, and that archaeological Phase 1B survey would be conducted as described in the archaeology report.

5.10 Hazardous Waste/Contaminated Properties

A regulatory database search was completed to identify hazardous or contaminated properties in the study area. The following databases were reviewed:

1. Environmental Protection Agency (EPA)

    a. The National Priority List (NPL); EPA's list of Superfund sites. These sites represent the worst of all identified uncontrolled and/or abandoned hazardous waste sites.
    b. The Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS); EPA's list of potential Superfund sites currently or previously investigated for release or threatened release of hazardous waste materials.
    c. The Resource Conservation and Recovery Act Treatment Storage and Disposal (RCRA TSD); EPA's list of all registered hazardous waste generators that are classified as TSD facilities. These firms are licensed to respond and deal with emergency situations involving hazardous and toxic materials.
    d. The Resource Conservation and Recovery Act Corrective Actions (RCRA COR); EPA's list of all registered hazardous waste generators that are subject to corrective actions imposed by the EPA for non-compliance with RCRA laws and guidelines.
    e. The Resource Conservation and Recovery Act Generators (RCRA GEN); EPA's list of all registered hazardous waste generators regardless of size or quantity of hazardous material handled.
    f. Emergency Response Notification System (ERNS); EPA's spills database showing all EPA response action to emergency spill incidents.

2. State Lists

    a. State Sites List; each state has its own list for known or potential hazardous waste sites.
    b. State Spills List; each state has its own listing of spills and hazardous leaking incidents which were responded to by the state's environmental agency.
    c. Underground/Aboveground Storage Tanks (UST/AST); each state's list of registered underground and aboveground storage tanks.
    d. Leaking Underground Storage Tanks (LUST); each state's list of underground storage tanks which have been reported as leaking.
    e. Solid Waste Landfills (SWL); each state's list of ACTIVE permitted solid waste landfills. INACTIVE landfills may be included if available.

Files meriting further research along with the files available for the City of Nashua were reviewed at DES. One location, 449 Amherst Street (DES # 200107005), has been marked for potentially hazardous materials. This site was identified in a note from the city files dated 2001 as having potentially high levels of arsenic, two to fourteen feet below the surface due to pesticide and herbicide application in the 1940's when the site was actively being used for agriculture. This site may be associated with a farm identified as sensitive for archaeological resources and for which Phase 1B testing was recommended (currently a vacant lot between 455 and 471 Amherst Street). Additional verification of the location of any hazardous materials will be necessary before commencing any Phase 1B archaeological testing.

For approximately 70 years, a local manufacturing plant (Johns-Manville Corporation) sold fill contaminated with asbestos (Asbestos Contaminated Materials [ACM]) throughout the greater Nashua and Hudson area. As such, there is increased potential of encountering ACMs when conducting roadway work in these towns. A review of DES's map of known asbestos contamination sites indicated that there is at least one known disposal site in the study area (between State Street and Dumaine Avenue). As a precautionary measure, and in accordance with DES policy, the City of Nashua must be notified upon the commencement of any project-related excavation activities.

5.11 Land Acquisition/Land Use/Public Lands

Based on coordination with the City of Nashua and information available on the National Park System's website, no public parks, recreational lands, or Section 6(f) lands (lands receiving Land and Water Conservation Fund [LWCF] assistance) will be affected by the project. The NH Department of Resources and Economic Development (DRED) was contacted for confirmation regarding Section 6(f) property occurrence and impacts, and cleared the project of Section 6(f) impacts in a letter dated March 3, 2008 (in Appendix C). Both the Land Conservation Investment Program (LCIP) and the Land and Community Heritage Investment Program (LCHIP) cleared the project of any impacts to resources that have received funding under these programs. (See email dated January 18, 2008, and letter dated January 15, 2008, in Appendix C.) In addition,

the project was cleared of Section 4(f) impacts in the Cultural Resources Memorandum of Effect dated February 14, 2008 (see Appendix C).

5.12 Utilities

Most overhead utilities, including phone, power, and cable lines, will need to be relocated to accommodate the widening. There may be limited impacts to underground utilities, including telephone, water, sewer, and gas. Most likely, only the surface components (hydrants, manholes, etc.) will need resetting or relocating.

5.13 Environmental Justice

The project corridor is primarily in commercial and industrial land use, with approximately two residences on Route 101A. U.S. Census data indicates that the study area does not lie within an economically disadvantaged area, and therefore the project complies with Executive Order 12898 (See Appendix D).

6.0 Coordination/Public Participation

All abutting landowners were invited to meetings at the project site in late February 2007. Landowners were provided with project information and impacts, and landowner input was encouraged. A Public Informational Meeting was also held on April 10, 2007. Additionally, the design consultant has held monthly meetings with the City, has been in frequent contact with the Nashua Regional Planning Commission, and has coordinated with individual landowners as needed. Minutes of the public informational meeting are included in the Engineering Report.

A meeting was held with regulatory and resource agencies on October 18, 2006, during one of NHDOT's regularly scheduled Natural Resource Agency Coordination Meetings. Agency staff were given an overview of the project followed by questions and answers. Minutes of this meeting are in Appendix C. The project was presented at a DOT Cultural Resource meeting on February 7, 2008. Minutes from that meeting are in Appendix C.

7.0 Environmental Commitments

All phases of archaeological study shall be completed as described in the Phase 1A Archaeological Sensitivity Assessment report cited above. Additional verification of the location of any hazardous materials shall be necessary before commencing any Phase 1B archaeological testing.

Best management practices, such as detention basins and hydrodynamic separators (catch basins with pollutant removal technology such as Vortech units), shall be implemented to improve stormwater treatment compared to existing conditions. Additional measures such as sediment forebays shall also be considered.