Merrimack Daniel Webster Highway Bicycle-Pedestrian Corridor Plan

2019



Prepared by the:

💥 Nashua Regional Planning Commission

With the assistance of:

Town of Merrimack

&

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A. INTRODUCTION

The purpose of this project is to develop a bicycle and pedestrian corridor plan for the US Route 3 (Daniel Webster Highway) corridor in Merrimack. This Plan builds on previous efforts to incorporate pedestrian and bicycle travel as vital modes of transportation and recreation in Merrimack.

In November 2009 the Nashua Regional Planning Commission (NRPC) completed a Town Center Pedestrian and Trail Master Plan for the Town of Merrimack. This plan looked at creating a safe and pedestrian – friendly sidewalk and trail network for the



so-called Town Center. The Town Center was defined as the area east of the FEET Turnpike, south of Front Street and north of the Rite-Aid plaza. The Plan established 9 priority items for sidewalk construction within the Town Center. Six of the recommendations are along Route 3 and three are elsewhere in the Town Center area. The Merrimack Town Center Committee was established by the Merrimack Town Council to implement the plan. Most of the recommendations in the Town Center plan have not been implemented due to funding constraints.

The Town of Merrimack Master Plan was last updated in 2013 and was adopted by the Merrimack Planning Board in January 2014. This plan made several recommendations regarding sidewalk and bicycle paths. Specifically, the Master Plan recommends developing a town-wide pedestrian and bicycle plan that considers design and location standards so that incremental sidewalk construction projects can be integrated into a single uniform network.

In November 2013 the New Hampshire Department of Transportation (NHDOT), which maintains jurisdiction over Route 3, met with the Merrimack Community Development Department to discuss the Town's plans for sidewalks along Route 3 (see Appendix C).

Roadway	Responsible Party
US Route 3 from Bedford Town Line to	State
Bedford Road & from Greeley Street to	
Nashua Town Line	
US Route 3 from Bedford Road to	State Road/Local Maintained
Greeley Street	(Urban Compact)

While supportive of the Town's desire to create a sidewalk system along the US 3 corridor, NHDOT expressed a desire that decisions related to the installation sidewalk segments be consistent with a comprehensive corridor sidewalk plan endorsed by the Town. NHDOT suggested that the Town contact NRPC regarding the possibility of assisting with the development of such a comprehensive Plan. NRPC then worked with the Town to create a scope of work to guide the planning process and this plan and an associated map of the corridor was developed.

B. GOALS OF THIS CORRIDOR PLAN

The goals of this plan are as follows:

- To identify and map existing bicycle and pedestrian infrastructure in the Route 3 Corridor in Merrimack.
- To identify gaps in the infrastructure.
- To identify land use regulations that accommodate future needs of all users of this major travel corridor.
- To develop a corridor plan to meet current and future bicycle and pedestrian infrastructure needs in the Route 3 corridor in Merrimack.

C. STUDY PROCESS

A scope of work was developed by NRPC that guided the planning process through two distinct phases. In Phase 1, a map of existing bicycle and pedestrian infrastructure – and gaps in that infrastructure – was developed. In Phase 2, a corridor plan was developed that summarizes data analysis, key issues and barriers, recommendations and action steps.





• Phase 1: Map Existing Bicycle and Pedestrian Infrastructure

Task 1: Develop Base Map

NRPC developed a base map of the corridor in Merrimack using orthophoto (aerial photography) information and existing geographic information system (GIS) data layers to show sidewalks, crosswalks, bicycle lanes, paths, trails, and other significant information to plan for future needs in the corridor.

• Task 2: Survey of Corridor

NRPC conducted a physical survey of the corridor in Merrimack. The purpose of the survey was to verify existing conditions that may not be evident from orthophoto information or existing GIS data layers.

• Task 3: Level of Traffic Stress Analysis

NRPC developed a Level of Traffic Stress (LTS) analysis for the corridor. LTS is intended to analyze the comfort of bicyclists with varying experience levels depending on the physical characteristics of a street. The scores range from 1 (suitable for all bicyclists, including children) to 4 (suitable for only the most fearless and experienced rider), and are determined by a formula that incorporates bike lanes, shoulders, lane width, traffic speed, on-street parking, and more. A similar analysis was developed for pedestrian travel.

The analysis identified an LTS score for each segment of the corridor. The results are explained later in this document. Maps that show the results can be seen in Appendix A and B

• Task 4: Participate in a workshop with the Merrimack Planning Board

NRPC participated in a workshop with the Planning Board using the map and LTS analysis produced in Steps 1-3. The purpose of the workshop was to review the map, review the gaps in bicycle and pedestrian infrastructure, and identify priority connections and areas of need. Such areas of need could include gaps in the infrastructure, safety issues, repairing existing sidewalks that are in poor condition and other needs.

The Merrimack Planning Board organized a workshop that took place on December 5th, 2017.

• Task 5: Produce a Final Map

Using data and analysis collected in steps 1-4, NRPC produced a final map and spreadsheet that lists infrastructure needs in order of priority and details of those needs including length of sidewalk and/or bicycle path segments, existing ROW, existing drainage in that area and other pertinent information that will aid in planning for those future needs. The final map is similar to the Merrimack Town Center map that was produced by NRPC. The map can be found at this link:

https://www.nashuarpc.org/files/6615/3132/8033/DW_Hwy_Bikeped_July2018.pdf

• Phase 2: Develop Corridor Plan

- Task 1: Review Existing Plans, Documents and Maps NRPC staff reviewed and summarized local and regional plans, documents and maps to confirm bicycle and pedestrian infrastructure data (such as sidewalks, bicycle lanes, paths, trails, drainage, ROW, etc.) and goals stated in previously drafted local plans for portions of the corridor.
- Task 2: Develop Corridor Plan Document
 NRPC developed a corridor plan that summarizes all data analysis, key issues and barriers. The corridor plan includes recommendations, priorities and action steps.

D. STUDY METHODOLOGY

Sidewalk Inventory

NRPC staff conducted a field survey of all sidewalks within the study area. Sidewalk conditions were noted and entered into Geographic information system (GIS) mapping software. The results are included on the Phase 1 map.





Measuring the Level of Walkability and Bikeability

To conduct the analysis that shows potential areas of improvement, the corridor was assigned a Level of Traffic Stress (LTS) for bicycling and a Level of Walkability (LoW) for pedestrian travel.

The methodology for Level of Traffic Stress has been used in a handful of larger metropolitan areas across the U.S and recently, several communities in New Hampshire, including Nashua, have developed a network of LTS scores through a NHDOT pilot project. LTS is intended to analyze the comfort of bicyclists with varying experience levels depending on the physical characteristics of a street. The scores range from 1 (suitable for all bicyclists, including children) to 4 (suitable for only the most fearless and experienced rider), and are determined by a formula that incorporates bike lanes, shoulders, lane width, traffic speed, on-street parking, and other attributes.

For pedestrians, a separate formula is used that has some similarities to LTS, using attributes such as the presence of sidewalks, any buffer area between a sidewalk and the street, shoulder width, and traffic speed. Walkability scores also range from 1 to 4 but are meant to be more of a relative index than representative of specific levels of ability like the bicycle LTS system.

Appendix's A and B provide maps that show Level of Traffic Stress for walking and biking, respectively.

E. PUBLIC INPUT

Planning Board Meetings

A project workshop was held as a part of the regular Planning Board Meeting on December 5th, 2017. The purpose of the workshop was for NRPC to present the results of Phase 1 of the project and for the Planning Board to provide guidance to the NRPC regarding overall long-range goals for bicycle and pedestrian accommodations along the corridor.

NRPC staff presented and explained the corridor map that had been developed during Phase 1 of the project. This map shows the existing conditions for bicycle and pedestrian infrastructure along the corridor in Merrimack between the Nashua and Bedford borders. The process for developing the map was explained including how an analysis of walkability and bikeability had been completed for the entire corridor. Gaps in bicycle and pedestrian conditions were discussed.

Various issues were discussed during the workshop including location of crosswalks, sidewalk connections and bike lanes along the paved shoulders. There was discussion about holding a public forum to gather public input. The Board decided to poll voters at Town Meeting Election Day (April 10, 2018) to get a sense of the public perception of priorities.

The Board also discussed the importance of consulting NHDOT during Phase 2 of the planning process. It was decided that NHDOT would be given the opportunity to review and provide feeding of the draft corridor plan before it is finalized.

A progress report and discussion about Phase 2 of the corridor planning process was presented to the Board by NRPC staff on July 17th, 2018.

Voter Surveys

An election day polling-place questionnaire was developed, and a copy of the corridor map was presented to the voters at each of the three Merrimack polling places on April 10, 2018. Participation by the voters was optional and many voters did not participate. A total of 3,010 citizens of Merrimack voted in the April 10th election. 239 questionnaires were completed among the three polling stations.

- 195 voters said they believe sidewalks and/or bike lanes should be constructed along D W Highway.
- 23 voters said sidewalks and bike lanes are not important and should not be considered along D W Highway.
- 21 voters did not answer the question.

To help the Town prioritize sidewalk construction voters were asked to indicate the three (3) segments of Route 3 sidewalk that they feel should be constructed first. The following table lists a description of the segments, the number of votes each segment received and the resultant ranking.





	Results of Voter Survey - April 10, 2018			
<u>Rank</u>	# of Votes	Corridor Segment		
1	132	Town Hall to the Post Office		
2	117	Town Hall to Merrimack Commons (Tractor Supply)		
3	109	Watson Park to Twin Bridge Park		
4	69	Reeds Ferry Village to the Post Office		
5	54	Watson Park to Rite Aid Plaza		
6	39	Both sides of Route 3 in Reeds Ferry Village		
7	32	Merrimack Hotels (Residence $lnn/Comfort lnn$) to Greeley Street		

Review of Public Documents

The following town documents have been reviewed during the planning process to incorporate poilicies and recommendations from those older plans into the corridor plan:

- Merrimack Master Plan,
- Town Center Pedestrian and Trail Master Plan
- James Mastricola Elementary & Upper Elementary Schools Safe Routes to School Travel Plan

NHDOT Feedback

It was noted earlier in this document the New Hampshire Department of Transportation (NHDOT) met with Merrimack Community Development Department to discuss the Town's plans for sidewalks along Route 3 several years ago (Appendix C). While supportive of the Town's desire to create a sidewalk system along the US 3 corridor, NHDOT expressed a desire that decisions related to the installation of sidewalk segments be consistent with a comprehensive corridor sidewalk plan endorsed by the Town.

NRPC staff had conversations with NHDOT District 5 Engineer on two separate occasions at the beginning of this planning process. The purpose of those conversations was to develop a clear understanding of the level of detail NHDOT expected of this document. This document reflects those expectations.



Town of Merrimack Feedback

The Department of Public Works, Office of Community Development and the Planning Board provided feedback that was incorporated into this document.

F. KEY ISSUES

Discontinuous sidewalks and lack of crosswalks along the corridor leave potentially meaningful destinations marooned from safe and convenient pedestrian access. There are 5 miles of highway between the Nashua line and the Lobster Boat restaurant, for example, with only a single crosswalk. Much of this section of the highway is a "modern" expansive 5-lane section with no way to safely cross the street. The entire DW Highway corridor in Merrimack is urbanized and developed to the level and context where comprehensive pedestrian facilities along and across the highway are appropriate. Based on this study and interpretation of various sets of design guidelines and best practices, sidewalks or side paths on both sides of the street are ideally needed for a majority of the length of the corridor with new crosswalk locations, pedestrian signalization and geometric changes at many locations. Additionally, minimal shoulder widths, high vehicle operating speeds and generally nonexistent bicycle accommodations results in intimidating conditions for all but the more experienced bicyclists.

With potential destinations on both sides and along its entire length in Merrimack, the corridor is no longer rural so there's no objective or engineering justification to consider mixed or merely visually separated traffic facilities (shoulders serving as the sidewalk space for example) in lieu of pedestrian facilities. Even if you consider the highway in a "rural context," the traffic volumes and speeds are





beyond what FHWA's Rural Multimodal Networks Guide would tolerate for the shared pedestrian/motor vehicle use since the shoulders don't meet the recommended minimum paved shoulder widths.

Level of Pedestrian Traffic Stress

Level of pedestrian traffic stress analysis that was done for this study has shown the most walkable segments along the corridor to be where sidewalks and crosswalks exist (Appendix A). Creating a more continuous network of sidewalks along the corridor and to streets within the surrounding neighborhoods will strengthen the overall walkability of the corridor. In addition to sidewalks or side paths along the corridor this would include sidewalks on Woodbury Street, Baboosic Lake Road Wire Road and Bedford Road. These would connect the corridor to James Mastricola Elementary & Upper Elementary Schools and the Merrimack Middle School and surrounding neighborhoods.

Level of Bicycle Traffic Stress

Level of bicycle traffic stress analysis shows that conditions along the corridor support only the more experienced riders (Appendix B). This is due to narrow shoulder width, number of travel lanes, posted speed limit and lack of bicycle lanes. Speeding traffic most likely discourages bicyclists, but speed studies would need to be done to verify this.

Operating Speed of Traffic

There is a maximum safe speed for every type of conflict on a roadway. For vulnerable road users (i.e. bicyclists and pedestrians) various data show a similar pattern in fatality risk. The risk increases slowly until impact speeds of around 30 mph. Above this speed, risk increases rapidly – the increase is between 3.5 and 5.5 times from 30 mph to 40 mph.

Where vulnerable road users are more commonly found and may cross the street anywhere or act in an unpredictable manner, the target speed achieved by the road design should be 20 mph (or at least below 30 mph) as at higher speeds, the chance of surviving a collision falls rapidly.

The posted speed limit along the DW Highway corridor varies from 30-45mph. The actual operating speed is most likely in excess of the posted speed limit, although speed studies would be needed to verify this assertion. Regardless of the actual motor vehicle operating speed the posted speed limit assures that vulnerable users will be seriously or fatally injured in a collision with a motor vehicle.

This means that bicycle and pedestrian accommodations along the DW Highway corridor should be designed either to separate users so that conflicts do not occur, or else to limit traffic speed based on the conflicts that will occur. Lack of additional right-of-way along the corridor limits the likelihood that separated bicycle facilities could be incorporated in any



significant way. Instead, travel lanes could be narrowed using pavement markings to allow for wider paved shoulders between the outside fog line and curbing (or the road edge). Sidewalks should continue to be used to separate pedestrians from motor vehicles. Side paths should be incorporated in the future when segments of the roadway are rehabbed or rebuilt.

Crash Data





NRPC reviewed motor vehicle crash data within the onequarter-mile buffer of the corridor. The table to the right provides information about each reported crash. The map in Appendix D shows where these crashes are located along the corridor.

The table indicates 22 crashes involving bicycles or pedestrians were reported over the 15-year period (approx. 1.5 per year). There were 20 injuries and no fatalities. Crashes were evenly split between bikers and walkers.

Five (25%) of the crashes occurred at intersections where one might expect a greater number of conflicting movements between motor vehicles. pedestrians and bicycles conflicts. Eleven (50%) of the crashes occurred along the roadway, suggesting the need for

Motor Vehicle - Bicycle - Pedestrian Crashes (2002-2017)					
Accident Street	Near	Accident Type	Location	# Fatal	<u># Injuries</u>
D W HWY	Childrens World Driveway	Pedestrian	Off Roadway	0	1
D W HWY	Baboosic Lake Rd	Pedestrian	Along the road	0	0
D W HWY	Crosswoods Path BLIvd	Bicyclist	Along the road	0	1
D W HWY	Bowers Landing	Bicyclist	Intersection	0	1
D W HWY	Williams St	Pedestrian	Along the road	0	1
D W HWY	Church St	Bicyclist	Along the road	0	1
D W HWY	Railroad Ave	Pedestrian	Along the road	0	1
D W HWY	Robert Milligen Way	Pedestrian	Along the road	0	1
D W HWY	Railroad Ave	Pedestrian	Off Roadway	0	1
D W HWY	Manchester St	Bicyclist	Intersection	0	1
D W HWY	Depot St	Pedestrian	In parking lot	0	1
D W HWY	Aroma Joes	Bicyclist	Off Roadway	0	1
D W HWY	Church st	Pedestrian	Intersection	0	1
D W HWY	North of Greeley St	Pedestrian	in parking lot	0	1
D W HWY	Herrick St	Moped	Along the road	0	1
D W HWY	Church St	Bicyclist	Along the road	0	1
GREELEYST	F.E.E. TRPKE off ramp	Pedestrian	Intersection	0	1
HENRY CLAY DR	Al Paul Ln	Bicyclist	Along the road	0	1
MCGAW BRIDGE RD	Belair Ave	Pedestrian	Along the road	0	0
WHITNEYST	Greeley St	Bicyclist	Intersection	0	1
WHITNEYST	Greeley St	Bicyclist	In parking lot	0	1
WOODBURY ST	D W HWY	Bicyclist	Along the road	0	1
			Total C	rashes:	22
			Total Ped	estrian:	11
			Total	Bicycle:	11
Crash data courtesy of N	IH DOT and represents		Total I	njuries:	20
reported crashes from 20	002-17		Total Fatal I	njuries:	0

greater separation between motor vehicles and vulnerable users.

G. PLANNING AND POLICY TOOLS

Many communities around the United States have established pedestrian and bicycle programs. The most successful programs have developed plans and policies that support improved mobility, health and safety for pedestrians and bicyclists.

The principal tools for community planning in New Hampshire are master plans, subdivision regulations, zoning laws and site plan review. Master plans outline a community's qualities and express a community vision, goals and action steps. The master plan, in turn, supports the use of zoning laws and the site plan review process.

In Merrimack, the planning and policy tools that support bicycle, pedestrian and intermodal transportation are the 2013 Master Plan as well as subdivision and site plan regulations. The Master Plan addresses Land Use and Community Design, Economic Development, Natural Resources, Community Facilities, Transportation and other characteristics of the community. The plan expresses a Community Vision that seeks to preserve the Town's character and the great quality of life experienced by its residents. Walking, bicycling and physical activity are central to achieving this purpose which is why these activities are addressed in the Master Plan.

Bicycle and pedestrian amenities are referenced in the Towns subdivision and site plan regulations. One of the issues that Town officials hope to address is the blanket requirement for sidewalks in every site plan regardless of location and existing pedestrian facilities. Officials would like to tie the regulatory requirements to bicycle-pedestrian plans, so that sidewalks, paved ways and other amenities are not required everywhere, particularly in areas that are not priority or close to making reasonable connections.





H. DESIGN GUIDELINES

Most of the DW Highway corridor in Merrimack is urbanized and developed to the level and context where comprehensive pedestrian and bicycle facilities along and across the highway are appropriate. The corridor is generally characterized by traffic speeds above 30 mph which as noted earlier presents a high risk of death or serious injury in a collision between a vehicle and a vulnerable road user. Additionally, high traffic volumes factor into a high level of bicycle and pedestrian traffic stress.

For this type of roadway, mixing of motorized traffic with vulnerable road users is not the safest solution and therefore segregation of vulnerable users away from motorized traffic is the preferred of means protection. Ideally, the recommended roadway treatment for this type of road would be a side path-a paved, eight foot-wide, bidirectional, multiuse space beside the street. A side path is simply a wider-than-normal



sidewalk. The images on the right (top) show a typical cross section of 12-foot travel lanes and 4-foot sidewalk. Notice that if travel lanes are narrowed to 10-feet, an 8-foot side path can be incorporated into a narrower right of way. The image to the right (bottom) shows how a side path can be incorporated into a center turn lane cross section using less right of way than is typical of existing conditions on the DW Highway. Appendix E shows these cross sections as well as a 5-lane cross section.

A side path may still be possible in certain areas along the corridor where land use has not fully encroached into the right-of-way or where redevelopment may occur in the future. In these cases, a side path should be considered. In areas where a side path is not realistic, sidewalks should continue to be required and travel lanes should be narrowed to allow the widest possible for shoulder, thus allowing more room for bicycles.



Space occupied by non-motorized multimodal users should be defined from traditional road space in a distinctive way. It is therefore recommended that when asphalt sidewalks are installed, hot mix asphalt colorant be utilized as it tends to color the surface for the life of the asphalt, as opposed to surface-applied paints, which tend to require regular maintenance. FHWA-approved color should be used universally in these spaces. Additionally, the same color should be used on shoulders where bike lanes are defined.

The engineering of specific improvements along the corridor is beyond the scope of this corridor plan. Best practices for design guidelines and road treatments that accommodate all modes of transportation continue to evolve and this document strongly recommends that best practices always be followed. The





following resources provide clear and up-to-date guidance. Additional resources are provided in Appendix F.

- NATCO Urban Bikeway Design Guide (2011) <u>HTTPS://NACTO.ORG/PUBLICATION/URBAN-BIKEWAY-DESIGN-GUIDE/</u>
- FHWA, SMALL TOWN & RURAL MULTIMODAL NETWORKS (2016) <u>HTTPS://WWW.FHWA.DOT.GOV/ENVIRONMENT/BICYCLE_PEDESTRIAN/PUBLICATIONS/SMALL_TOWNS/F</u> <u>HWAHEP17024_LG.PDF</u>
- AASHTO, Guide for the Development of Bicycle Facilities (2012) <u>HTTPS://NACTO.ORG/REFERENCES/AASHTO-GUIDE-FOR-THE-DEVELOPMENT-OF-BICYCLE-FACILITIES-</u> 2012/
- FHWA, Bicycle Facilities and the Manual on Uniform Traffic Control Devices (2011) http://www.fhwa.dot.gov/environment/bikeped/mutcd_bike.htm

I. RECOMMENDATIONS AND PRIORITIES

The following recommendations and priorities for encouraging pedestrian and bicycle travel along the corridor resulted from surveys of voters and input from Merrimack Planning Board, Department of Public Works and NHDOT*. Recommendations from various planning documents were also reviewed and incorporated as appropriate. Documents reviewed included the Merrimack Master Plan, the Merrimack Town Center Pedestrian and Trail Master Plan and the James Mastricola Elementary & Upper Elementary Schools Safe Routes to School Travel Plan.

* Meeting with NHDOT has yet to be held.

General Recommendations

- The Town should adopt a consistent roadway cross section along the corridor like those described in the design guidelines section of this document and later in Appendix F. This cross section should be considered whenever maintenance, rehabilitation or new construction occurs within the corridor right of way. This will allow multimodal accommodations to be implemented on a gradual basis over time as part of the road maintenance and/or town capital improvement program.
- The Planning Board should review subdivision and site plan regulations and tie these regulatory requirements to the recommendations in this and other bicycle-pedestrian related planning documents. Sections 4-20 and 7-05-D-19 currently address sidewalks and paved ways.
- Sidewalks and side paths
 - Sidewalks should continue to be required in most areas of the corridor (see priorities below); where right of way allows, 8-foot wide, bidirectional side paths should be considered.
- Travel lanes and shoulders:
 - Use pavement markings to define 10-foot-wide travel lanes wherever possible.
 - Use the additional shoulder width to accommodate bicycles.
 - Use FHWA-approved color to define shoulders.
- Crosswalks
 - Existing crosswalks should be maintained or upgraded as noted in the following priorities section.
 - \circ New crosswalks should be installed as noted in the following priorities.
- Right turn pockets:
 - Provide bicycle sharrows between the outside (right) travel lane and the turn pocket.
- Traffic Calming (for example, speed tables, raised crosswalks, sidewalk bump outs):
 - Traffic calming treatments should be considered where motor vehicle operating speeds exceed posted speed by @ least 5 MPH
 - Speed studies along the corridor should be undertaken to identify where traffic calming is needed.





<u>PRIORITY 1: Develop key portions of the 2009 Town Center Plan, linking schools, library, Town Hall and parks. Elements include:</u>

- Sidewalks or side paths:
 - \circ Merrimack Public Library to Wire Road on west side of Route 3.
 - \circ $\:$ Library to O'Gara Drive on north side of Baboosic Lake Road.
 - McElwain Street to Route 3 on Woodbury Street
 - D&W Auto Center & Loop Road to Twin Bridge Park on east side of Route 3.
 - FEET to Merrimack Middle School on Baboosic Lake Road.
 - Railroad Avenue to Rite Aid on east side of Route 3.
- Crosswalks on Route 3
 - @ Baboosic Lake Road continue to maintain signalized pedestrian crossing.
 - o @ Connell's Shopping Center continue to maintain signalized pedestrian crossing.
 - O @ Rite Aid Plaza/Merrimack Village Mall upgrade existing signal to pedestrian activated.
 - Install non-signalized pedestrian crosswalk on Railroad Avenue.
- Travel lanes and shoulders:
 - Use pavement markings to define 10-foot-wide travel lanes wherever possible.
 - Use the additional shoulder width to accommodate bicycles.
- Right turn pockets:
 - Provide bicycle sharrows between the outside (right) travel lane and the turn pocket.
 - Traffic Calming (for example, speed tables, raised crosswalks, sidewalk bump outs):
 - Traffic calming treatments should be considered where motor vehicle operating speeds exceed posted speed by @ least 5 MPH
 - \circ $\;$ Speed studies along the corridor to support traffic calming

<u>PRIORITY 2 Incorporate bicycle and pedestrian amenities into future improvements on Route 3 at the intersection of Wire Road and the new Baboosic Brook Bridge:</u>

- Sidewalks or side paths:
 - Baboosic Brook Bridge on both sides of the new bridge.
 - Wire Road to Front Street on west side of Route 3.
 - Twin Bridge Park to Front Street on east side of Route 3 by way of Tractor Supply Shopping Center cut through.
- Crosswalks on Route 3
 - @ Wire Road incorporate into intersection re-design.
 - o @ Front Street maintain signalized pedestrian phase
- Crosswalk on Wire Road
 - Incorporate crosswalk onto Wire Road during intersection redesign.
- Minimum 4-foot shoulders on both sides of new bridge to accommodate bicycles.

PRIORITY 3

Integrate Town Center with Reed's Ferry Village

- Sidewalks or side paths:
 - \circ Fill gaps between Bedford Road to the Post office on west side of Route 3.
- Crosswalks:
 - @ Bedford Road continue to maintain signalized pedestrian crossing.
 - @ Rainbow Avenue upgrade existing signal to accommodate pedestrian phase.
- Travel lanes and shoulders:
 - Use pavement markings to define 10-foot-wide travel lanes wherever possible.
 - Use the additional shoulder width to accommodate bicycles.
- Right turn pockets:
 - Provide bicycle sharrows between the outside (right) travel lane and the turn pocket.

PRIORITY 4

Non-Urban Compact north of Bedford Road

• Sidewalks or side paths:





- Bedford Road to Flatley development (Glibert Ave)- on east side of Route 3.
- Flatley development north to Society Hill via Flatley property on east side of Route 3.
- Fill gaps between Bedford Road and Merrimack Ten Pin Center on west side of Route 3.
- Crosswalks:
 - o @ Society Hill
 - @ Merrimack ten Pin Center/St. Gobain
- Travel lanes and shoulders:
 - Use pavement markings to define 10-foot-wide travel lanes wherever possible.
 - \circ Use the additional shoulder width to accommodate bicycles.
- Right turn pockets:
 - Provide bicycle sharrows between the outside (right) travel lane and the turn pocket.

PRIORITY 5

Integrate South part of Urban Compact with Town Center

- Sidewalks or side paths:
 - Rite Aid to Greeley Street on west side of Route 3
 - Rite Aid to Wright Avenue on east side of Route 3
 - 360 DWH to Greeley Street on east side of Route 3
- Crosswalks:
 - @ Greeley Street upgrade existing signal to accommodate pedestrian phase.
 - @ 360 DWH upgrade existing signal to accommodate pedestrian phase.
- Travel lanes and shoulders:
 - Use pavement markings to define 10-foot-wide travel lanes wherever possible.
 - Use the additional shoulder width to accommodate bicycles.
- Right turn pockets:
 - Provide bicycle sharrows between the outside (right) travel lane and the turn pocket.

PRIORITY 6

Non-Urban Compact South of Greeley Street

- Sidewalks or side paths:
 - Greeley Street south to hotels west side of Route 3
 - Gap between BAE and Bon Bon Mobil west side of Route 3
 - Manchester Street to Harris Pond Road west side of Route 3
 - Greeley Street to Meineke Muffler shop east side of Route 3
- Crosswalks:
 - o @ BAE Systems
 - @ Harris Pond Road
 - @ 57/59 DW Highway entrance intersection
- Travel lanes and shoulders:
 - Use pavement markings to define 10-foot-wide travel lanes wherever possible.
 - Use the additional shoulder width to accommodate bicycles.
- Right turn pockets:
 - Provide bicycle sharrows between the outside (right) travel lane and the turn pocket.

<u>PRIORITY 7</u>

Gaps to be addressed at a future date

- Sidewalks or side paths:
 - Route 3, East Side, Meineke Muffler Shop to BAE Crossing Light
 - Route 3, East Side Front Street to Twin Bridge Road
 - Route 3 West Side 10 Pin North to Bedford Town Line
 - o Route 3, East Side Society Hill to Crosswoods Path
 - Route 3 East Side Crosswoods Path north to Bedford Line
 - Route 3, West Side South of Harris Pond to Nashua Line
 - o Route 3, East Side South of Harris Pond to Nashua Line





- Route 3, East Side along Flately and Merrimack Tractor Supply Developments to be handled by sidewalks internal to the Developments
- Chamberlain Bridge, West Side

IMPLEMENTATION

It will be necessary to develop a designated and on-going financial plan if the recommended infrastructure improvements along the corridor are to be funded. The following is a list of potential options for revenue sources.

- While traditional funding methods such as state and federal grants and warrant articles should remain options for supplemental funds, it is recommended that general funding for the implementation of multimodal roadway treatments be provided through traditional road construction budgeting of all future roads in town. If this recommendation is embraced, there would be less need for special funding to implement these treatments. This will allow implementation on a gradual basis over time as part of the road maintenance and/or town capital improvement program.
- Support the funding of a Road Infrastructure Capital Reserve Fund and incorporate projects into the Capital Improvement Plan.
- Explore grant opportunities, such as the Transportation Alternatives Program, (NH DOT) and private foundations for fitness grants.



- Explore the feasibility of adopting a \$5 vehicle registration fee to create a local transportation fund. (allowable under RSA 261:153 VI)
- Continue to work with developers to make on-site and off-site improvements as new development opportunities present themselves. Developers should continue to be made aware of the Daniel Webster Highway Corridor Plan, the Town Center Pedestrian and Trail Master Plan and the James Mastricola Elementary & Upper Elementary Safe Routes to School Travel Plan. These plans support additional bicycle and pedestrian facilities along or provide connections to neighborhoods and other destinations near the corridor.





Table 1: Action Plan for Priority 1 Projects

Priority 1: Develop key	<i>r</i> portions of the 2009 Town Center Plan	Lead Partners	Timeline
	Merrimack Public Library to Wire Road - on west side of Route 3. (1,000 LF)	Town of Merrimack	1-3 years
	McElwain Street to Route 3 – on Woodbury Street. (1,300 LF)		1-3 years
<u>Sidewalks</u>	Library to O'Gara Drive - on north side of Baboosic Lake Road. (1,700 LF)		1-3 years
	Railroad Avenue to Rite Aid - on east side of Route 3 (1,000 LF)		3-5 years
	Loop Road to Twin Bridge Park - on east side of Route 3 (3,000 LF)		3-5 years
	FEET to Merrimack Middle School – on Baboosic Lake Road (9,000 LF)		3-5 years
	Maintain signalized pedestrian phase Baboosic Lake Road		ongoing
	Maintain signalized pedesrian phase at Connell's Shopping Center	NHDOT Town of Merrimack -	ongoing
<u>Crosswalks</u>	Upgrade existing signal to include pedesrian phase at CVS Shopping Center		1-3 years
	on Railroad Avenue - non signalized	Town of Merrimack NHDOT	3-5 years
<u>Travel Lanes &</u> <u>Shoulders</u>	Use pavement markings to define 10 foot-wide travel lanes wherever possible.	Town of Merrimack NHDOT	1-3 years
	accommodate bicycles		
Right Turn Pockets	Provide bicycle sharrows between the outside (right) travel lane and the turn pocket.	Town of Merrimack NHDOT	1-3 years
<u>Traffic Calming</u>	Traffic calming treatments should be considered where motor vehicle operating speeds exceed posted speed by @ least 5 MPH	Town of Merrimack NHDOT	3-5 years
	Speed studies along the corridor to support traffic calming	Town of Merrimack	< 1 year





Table 2: Action Plan for Priority 2 Projects

Priority 2: Incorporate bicycle and pedestrian amenities into future improvements on Route 3 at the intersection of Wire Road and the new Baboosic Brook Bridge		Lead Partners	Timeline
<u>Sidewalks</u>	Baboosic Brook Bridge – on both sides of the new bridge		1-3 years
	Wire Road to Front Street – on west side of Route 3.	Town of Merrimack NHDOT	3-5 years
	Twin Bridge Park to Front Street on east side of Route 3 – by way of Tractor Supply Shopping Center cut through		3-5 years
	On Route 3 @ Wire Road – incorporate into intersection re-design	Tourn of Mouning of	1-3 years
<u>Crosswalks</u>	On Route 3 @ Front St - maintain signalized Pedestrian phase	NHDOT	ongoing
	On Wire Rd - incorporate crosswalk during intersection re-design		1-3 years
	Incorporate 4-foot bike lanes on new bridge over Baboosic Brook		1-3 years
<u>Travel Lanes &</u> <u>Shoulders</u>	Use pavement markings to define 10 foot-wide travel lanes wherever possible. Use the additional shoulder width to	Town of Merrimack NHDOT	1-3 years
	accommodate bicycles		

Table 3: Action Plan for Priority 3 Projects

Priority 3: Integrate Tov Village	wn Center with Reed's Ferry	Lead Partners	Timeline
Sidewalks or Sidepaths	Fill gaps between Bedford Road to the Post office – on west side of Route 3.	Town of Merrimack NHDOT	3-5 years
<u>Crosswalks</u>	On Route 3 @ Bedford Road – continue to maintain signalized pedestrian crossing.	Town of Merrimack NHDOT	ongoing
	On Route 3 @ Rainbow Avenue – upgrade existing signal to accommodate pedestrian phase.		3-5 years
<u>Travel Lanes &</u> <u>Shoulders</u>	Use pavement markings to define 10 foot-wide travel lanes wherever possible. Use the additional shoulder width to accommodate bicycles	Town of Merrimack NHDOT	1-3 years





Table 4: Action Plan for Priority 4 Projects

Priority 4: Non-Urban Compact north of Bedford Road		Lead Partners	Timeline
Sidewalks or Sidepaths	Bedford Road to Flatley development (Glibert Ave)– on east side of Route 3	NHDOT Town of Merrimack	3-5 years
	Flatley development north to Society Hill – via Flatley property on east side of Route 3		1-3 years
	Fill gaps between Bedford Road and Merrimack Ten Pin Center – on west side of Route 3.		3-5 years
	On Route 3 @ Society Hill	NHDOT Town of Merrimack	3-5 years
<u>Crosswalks</u>	On Route 3 @Merrimack ten Pin Center/St. Gobain		3-5 years
<u>Travel Lanes &</u> <u>Shoulders</u>	Use pavement markings to define 10 foot-wide travel lanes wherever possible. Use the additional shoulder width to accommodate bicycles	NHDOT Town of Merrimack	1-3 years

Table 5: Action Plan for Priority 5 Projects

Priority 5: Integrate South part of Urban Compact with Town Center		Lead Partners	Timeline
	Rite Aid to Greeley Street – on west side of Route 3		5+ years
Sidewalks or Sidepaths	Rite Aid to Wright Avenue – on east side of Route 3	Town of Merrimack NHDOT	5+ years
	360 DWH to Greeley Street – on east side of Route 3		5+ years
<u>Crosswalks</u>	On Route 3 @ Greeley Street – upgrade existing signal to accommodate pedestrian phase.	Town of Merrimack NHDOT	3-5 years
	On Route 3 @ 360 DWH – upgrade existing signal to accommodate pedestrian phase		3-5 years
<u>Travel Lanes &</u> <u>Shoulders</u>	Use pavement markings to define 10 foot-wide travel lanes wherever possible. Use the additional shoulder width to accommodate bicycles	Town of Merrimack NHDOT	1-3 years





Table 6: Action Plan for Priority 6 Projects

Priority 6: Non-Urban Compact South of Greeley Street		Lead Partners	Timeline
	Greeley Street south to hotels – west side of Route 3		5+ years
Sidewalks or	Gap between BAE and Bon Bon Mobil – west side of Route 3	NHDOT	5+ years
Sidepaths	Manchester Street to Harris Pond Road – west side of Route 3	Town of Merrimack	5+ years
	Greeley Street to Meineke Muffler shop – east side of Route 3		5+ years
	On Route 3 @ BAE Systems	NHDOT Town of Merrimack	3-5 years
Crosswalks	On Route 3 @ Harris Pond Road		3-5 years
<u>Crosswaiks</u>	On Route 3 @ 57/59 DW Highway entrance intersection		3-5 years
<u>Travel Lanes &</u> <u>Shoulders</u>	Use pavement markings to define 10 foot-wide travel lanes wherever possible. Use the additional shoulder width to accommodate bicycles	NHDOT Town of Merrimack	1-3 years





Priority 7: Gaps to be addressed at a future date		Lead Partners	Timeline
Sidewalks or Sidepaths	Route 3, East Side, Meineke Muffler Shop to BAE Crossing Light	NHDOT Town of Merrimack	5+ years
	Route 3, East Side Front Street to Twin Bridge Road	Town of Merrimack NHDOT	
	Route 3 West Side 10 Pin North to Bedford Town Line	NHDOT Town of Merrimack	
	Route 3, East Side Society Hill to Crosswoods Path	NHDOT Town of Merrimack	
	Route 3 East Side Crosswoods Path north to Bedford Line	NHDOT Town of Merrimack	
	Route 3, West Side South of Harris Pond to Nashua Line	NHDOT Town of Merrimack	
	Route 3, East Side South of Harris Pond to Nashua Line	NHDOT Town of Merrimack	

Table 7: Action Plan for Priority 7 Projects





APPENDIX A – LEVEL OF WALKABILITY







APPENDIX B – LEVEL OF BIKEABILITY







APPENDIX C – NHDOT CORRESPONDENCE



CHRISTOPHER D. CLEMENT, SR. COMMISSIONER

THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION



JEFF BRILLHART, P.E. ASSISTANT COMMISSIONER

Mr. Timothy J. Thompson, AICP Community Development Director Town of Merrimack 6 Baboosic Lake Road Merrimack, NH, 03054 November 22, 2013



COMMUNITY DEVELOPMENT DEPT

TOWN OF MERRIMACK

Subj: Sidewalks along US Route 3 within Merrimack

Dear Mr. Thompson:

Thank you for taking the time to meet with Bill O"Donnell and myself yesterday to discuss the Town's plans for sidewalks along Daniel Webster Highway (US Route 3). We also appreciate you sharing your minutes from the meeting. Recent requests from the Town to construct short sidewalk segments within NHDOT's right-of-way have raised concerns about the lack of functional viability. These segments often have simply crossed along the frontage of properties that are being proposed for redevelopment, rather than connect with existing sidewalks or extend to a desired destination.

While we are supportive of the Town's desire to create a sidewalk system along US 3, we feel that the decisions related to the installation of sidewalk segments should be consistent with a comprehensive corridor sidewalk plan endorsed by the Town. With such a plan, you could hopefully combine sidewalk construction projects generated at sites proposing redevelopment with other projects funded through the Town to provide pedestrian connections over substantial lengths and having logical termini. Absent such a plan, we are not comfortable with the practice of constructing short sections of sidewalk within the NHDOT's right-of-way.

Sidewalk projects located adjacent to US 3 would require a vertical granite curb for the protection of the pedestrians and thus require that some thought be given to the treatment of runoff from the US 3 pavement flowing along the curbed gutter. These concentrated flows could not be left to enter randomly upon abutting properties, but rather should be picked up by a designed drainage system carrying them to a logical outlet.

The short unexpected sidewalk segments within the highway right-of-way can present a hazard to bypassing motorists and also complicate our efforts to remove snow during the winter season.

HIGHWAY MAINTENANCE DISTRICT 5 • 16 EAST POINT DRIVE • BEDFORD, NEW HAMPSHIRE, 03110 TELEPHONE: 603-666-3336 • FAX: 603-485-9825 • INTERNET: WWW.NHDOT.COM





We would suggest that the Town contact the Nashua Regional Planning Commission (NRPC) regarding the possibility of assisting with such a comprehensive study. While our Planning Bureau does have funds available for sidewalk studies and construction, they are limited to those that specifically serve routes to schools. Whereas, the NRPC may have more options regarding pedestrian transportation activities.

We appreciate your suggestion of a "paved pedestrian way", located outside of NHDOT right-of-way, across the Canis Property as an option acceptable to the Town. We have discussed that concept with the design consultant working on that project and suspect that they will develop a concept along their frontage and present it to you for consideration.

With respect to the future cross section of the US 3 corridor in this particular area, just north of Bedford Rd, we would realistically expect that a three-lane highway concept (likely 46' +/- in width between curbs), with one lane in each direction and a center turn lane, plus 5' shoulder offset to the curb, rather than a five-lane concept, would be a reasonable goal. It would be in the Town's interest to try to position future sidewalk sections at 23' where practical, to avoid the need for future relocation costs.

Sincerely

Richard C. Radwanski, PE District Engineer

WFO'D/dlp File in Merrimack







APPENDIX D – MOTOR VEHICLE/PEDESTRIAN/BICYCLE CRASH MAP

Crash data courtesy of NHDOT and represents reported crashes from 2002-2017. Some locations are estimated.





APPENDIX E – SIDEPATH CROSS SECTIONS













APPENDIX F - SOURCES OF INFORMATION

DESIGN GUIDELINES FOR BICYCLE & PEDESTRIAN FACILITIES:

PACTS Portland Area Comprehensive Transportation System

Update to Bicycle and Pedestrian Facility Design Guidelines –Region of Portland, Maine (October, 2013)

http://www.pactsplan.org/plans-studies/2013-plans-studies-completed/

Washington County Bicycle Facility Design Toolkit (2012) http://www.co.washington.or.us/LUT/Divisions/CPM/upload/WaCo_Toolkit_Dec2012.pdf

Oregon Bicycle and Pedestrian Guide (2011)

http://www.oregon.gov/ODOT/HWY/BIKEPED/Pages/index.aspx

NATCO Urban Bikeway Design Guide (2011)

http://nacto.org/cities-for-cycling/design-guide/

Portland Bicycle Master Plan for 2030, Appendix D (2011)

http://www.portlandoregon.gov/transportation/article/289122

FHWA, Bicycle Facilities and the Manual on Uniform Traffic Control Devices (2011) http://www.fhwa.dot.gov/environment/bikeped/mutcd_bike.htm

Urban, Rural and Suburban Complete Streets Design Manual For the City of Northampton and Communities in Hampshire County January 2017

HTTPS://WWW.NORTHAMPTONMA.GOV/DOCUMENTCENTER/VIEW/6668/HAMPSHIRE-COUNTY-COMPLETE-STREETS-DESIGN-MANUAL 1-4-2017-FINAL?BIDID=

ORGANIZATIONS, COALITIONS & PARTNERSHIPS:

The National Center for Bicycling and Walking. The NCBW mission is to create bicycle-friendly and walkable communities http://www.bikewalk.org/

http://www.bikewalk.org/

League of American Bicyclists. The League of American Bicyclists is the oldest bicycling organization in the US. It works through its members to promote better education and better facilities for bicyclists. http://www.bikeleague.org/

Association of Pedestrian and Bicycle Professionals (APBP) is a membership organization that offers frequent webinars on bike/ped design, and hosts an active listserv. http://www.apbp.org/

Rails to Trails Conservancy. The purpose of Rails-to-Trails Conservancy (RTC) is to enrich America's communities and countryside by creating a nationwide network of public trails from former rail lines and connecting corridors.

http://www.railstotrails.org/

National Complete Streets Coalition is a coalition of organizations that advocates that streets should be designed to serve all users, of all abilities, of all ages. The National Center for Bicycling & Walking is a long-standing member.

http://www.smartgrowthamerica.org/complete-streets/

Safe Routes to School National Partnership is an extensive resource for everything from International Walk to School Day, to research and reports on topics relating to school travel, to curricula for bicycle and pedestrian education in elementary school. http://saferoutespartnership.org/

Context Sensitive Solutions Clearinghouse is a resource for citizens and professionals who want to ensure better outcomes from the transportation planning process. <u>http://contextsensitivesolutions.org/</u>





Cities for Cycling is a project of the National Association of City Transportation Officials (NACTO). The Urban Bikeway Design Guide features innovative design treatments for accommodating cyclists in congested urban areas where competition for pavement is high. <u>http://nacto.org/cities-for-cycling/design-guide/</u>

ACTIVE LIVING PROGRAMS AND PUBLIC HEALTH RESOURCES:

Active Living Resource Center (ALRC) is a major program of the National Center for Bicycling & Walking. ALRC works with community advocates, stakeholders, elected officials and professionals to remove barriers to physical activity in their communities. ALRC's work focuses on low income, low resource communities where health disparities exist and barriers to physical activity proliferate. http://www.activelivingresources.org/

Centers for Disease Control and Prevention (CDC) is the authoritative source for data on the obesity and physical inactivity epidemic that the United States has been experiencing since 1980. <u>http://www.cdc.gov/obesity/index.html</u>

Health Kids, Healthy Communities is a national program of the Robert Wood Johnson Foundation whose primary goal is to implement healthy eating and active living policy and environmental change initiatives that can support healthier communities. http://www.healthykidshealthycommunities.org/

Active Living Research is a national program of the Robert Wood Johnson Foundation that supports research that examines how environments and policies influence active living for children and their families.

<u>http://activelivingresearch.org/</u>

PolicyLink is a think tank that focuses on advancing economic and social equity by promoting and propagating promising policy practices developed at the local level in areas of transportation, food access, and physical activity.

<u>http://www.policylink.org/</u>

USDOT & OFFICIAL CLEARINGHOUSES FOR FEDERAL TRANSPORTATION PROGRAMS:

USDOT Office of Livability coordinates the efforts of its many agencies to ensure that transportation investments help build communities and improve quality-of-life. The website includes links to grants, research, case studies, and the Partnership for Sustainable Communities (DOT, HUD, EPA). http://www.dot.gov/livability

FHWA Bicycle and Pedestrian Program. Includes: information on the amount of Federal bike/ped funding apportioned to each state since 1992; FHWA guidance on the accommodation of bicyclists and pedestrians on Federally funded transportation projects http://www.fhwa.dot.gov/environment/bicycle_pedestrian/

National Center for Safe Routes to School is the official information and technical assistance clearinghouse for FHWA's Safe Routes to School Program. http://www.saferoutesinfo.org/

FHWA Recreational Trails Program. Includes: guidance on technical design; reports; a directory of state RTP administrators

http://www.fhwa.dot.gov/environment/recreational_trails/

FHWA Transportation Enhancements Program. Includes: guidance on the 12 permitted uses of Transportation Enhancement funds http://www.fhwa.dot.gov/environment/transportation_enhancements/

NHSTA Bicycle and Pedestrian Safety Program. Includes: statistical reports on safety, and curricula for teaching bicycle and pedestrian safety. http://www.nhtsa.gov/Pedestrians

TRANSPORTATION AND LAND USE PLANNING:





Smart Growth America is a national coalition of state and local organizations working for smart growth.

http://www.smartgrowthamerica.org/

Transportation for America is a broad coalition of housing, business, environmental, public health, transportation, and other organizations formed to influence Federal transportation legislation and policy. The National Center for Bicycling & Walking is a long-standing member. Website resources include Federal Transportation 101; developing performance measures for Federal transportation investments; case studies on livability and transit in small communities; and more. http://t4america.org/about/

Planetizen focuses on urban planning issues relating to transportation and land use. A very good resource for planners.

http://www.planetizen.com/

Planning and Policy Models For Pedestrian and Bicycle Friendly Communities in New York State https://www.albany.edu/ihi/files/NY_Planning_And_Policy_Models_iHi.pdf