



**REGIONAL  
BICYCLE,  
PEDESTRIAN, &  
ACTIVE  
TRANSPORTATION  
PLAN**  
*For the Greater Nashua  
Region*

September 2021

Prepared by:

The Nashua Regional Planning Commission

Adopted: 9.22.2021




# Table of Contents

<b>ACKNOWLEDGEMENTS</b> .....	Page 1-3
<b>SECTION 1: INTRODUCTION</b> .....	Page 1-7
Map 1-1: The Nashua Regional Planning Commission (NRPC) Region.....	Page 1-5
<b>SECTION 2: EXISTING CONDITIONS</b> .....	Page 2-1
Table 2.1: Existing Active Transportation Facilities by Centerline Mile.....	Page 2-2
Table 2.2: Bicycle Level of Traffic Stress (BLTS).....	Page 2-3
Figure 2.1: 2010-2019 Pedestrian Victims from Fatal Motor Vehicle Accidents in New Hampshire.....	Page 2-4
Figure 2.2: Bicycle & Pedestrian Fatalities in the United States by Year.....	Page 2-4
Map 2.1: Bicycle and Pedestrian-Involved Crashes.....	Page 2-5
Table 2.3: National “Usual” Commute Mode.....	Page 2-6
Table 2.4: Ranking by Mode Share.....	Page 2-6
Table 2.5: Commute Mode.....	Page 2-6
Table 2.6: New Hampshire Bicycle Friendliness.....	Page 2-7
Table 2.7: Bike Friendliness Comparison.....	Page 2-7
Figure 2.3: Bicycle Strava Data.....	Page 2-7
Figure 2.4: Walk, Hike, Run Strava Data.....	Page 2-7
Map 2.2: Existing Projects & Success Stories.....	Page 2-10
<b>SECTION 3: CREATING A BICYCLE, PEDESTRIAN &amp; ACTIVE TRANSPORTATION - FRIENDLY REGION</b>	Page 3-1
Figure 3.1: Pedestrian Fatality vs. Motor Vehicle Speed.....	Page 3-3
Figure 3.2: Risk of Pedestrian Fatality by Head-on Collision Speed.....	Page 3-3
Table 3.1: Roadway Design Categories.....	Page 3-4
<b>SECTION 4: IMPROVING THE NETWORK</b> .....	Page 4-1
Map 4-1: Proposed Regional Network.....	Page 4-4
Map 4-2: Potential Projects.....	Page 4-5
<b>SECTION 5: IMPLEMENTATION</b> .....	Page 5-1
<b>APPENDIX A: ADDITIONAL RESOURCES</b>	
<b>APPENDIX B: BIKE-PED RELATED PROJECTS INCLUDED IN FEDERAL &amp; STATE-APPROVED DOCUMENTS</b>	
<b>APPENDIX C: BICYCLE LEVEL OF STRESS CORRIDOR ANALYSIS</b>	
<b>APPENDIX D: BICYCLE/PEDESTRIAN COUNTING PROGRAM MAPS &amp; SAMPLE DATA</b>	





The background image shows the exterior of a building with large windows and a brick base. A semi-transparent white box is overlaid on the image, containing text. On the left, a street sign for 'TEMPLE STREET' is visible. On the right, a vertical sign for 'MCZARZYM' is attached to the building. In the foreground, there are black metal bike racks on a sidewalk.

## Acknowledgements

### Complete Streets Advisory Committee

Rick Katzenberg—Town of Amherst Resident

Chris Shenk—Town of Amherst Resident

Judy Shenk—Town of Amherst Resident

Chris Costentino—Town of Milford Resident

Nelson Disco—Town of Merrimack Resident

Betsy Gamrat, City of Nashua Resident

Chris Buchanan, Town of Amherst Resident

Julie Chizmas, City of Nashua—Transportation Analyst & Long  
Range Planner

Brian Groth, Town of Hudson Community Development

Natasha Kypfer, Town of Amherst Community Development

Tom Christensen, NH Rail Trails Coalition

Bill Schwartz, City of Nashua Resident



**SECTION 1**  
***Introduction***





## INTRODUCTION

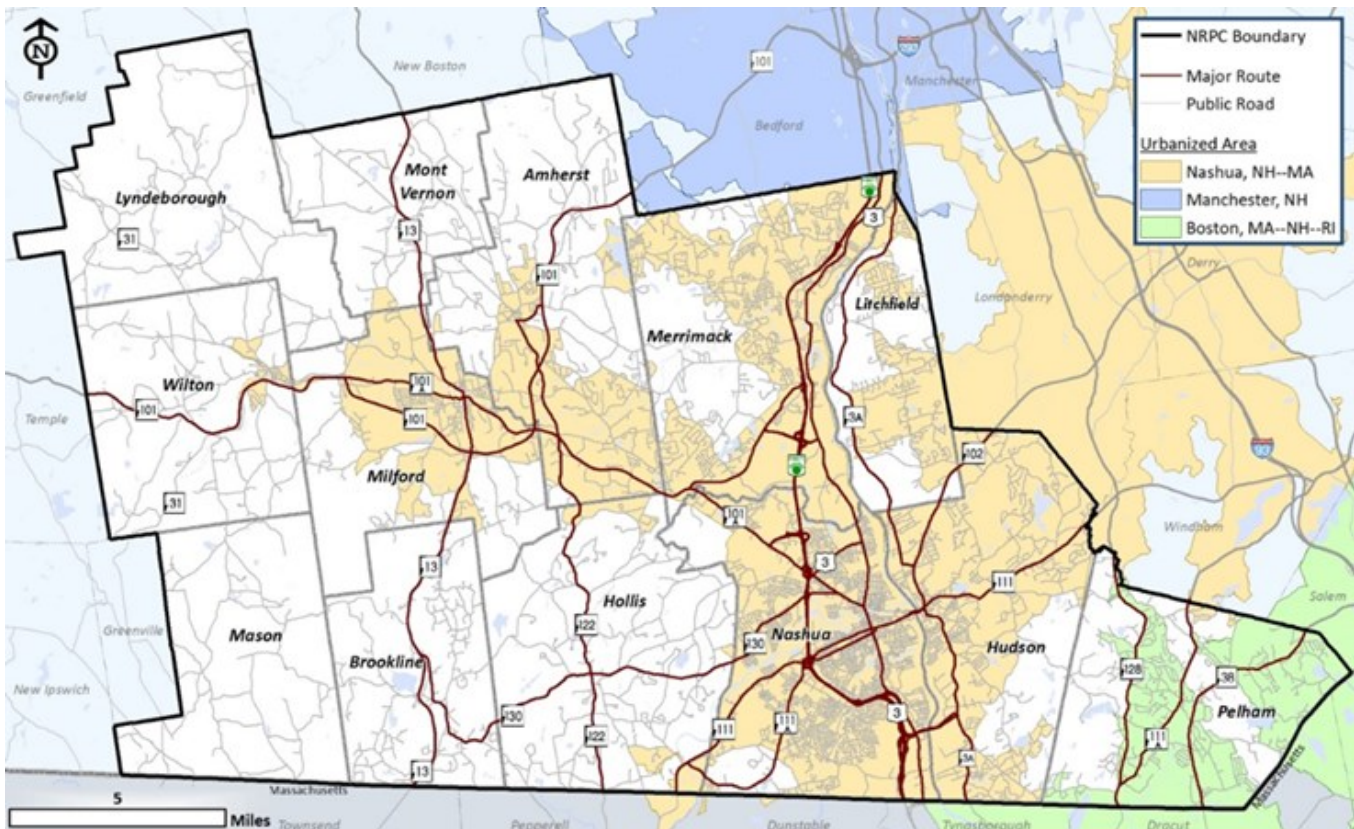
The Nashua Region is home to more than 200,000 residents and is a dynamic and thriving part of the Southern New Hampshire landscape. Situated in the rolling foothills of the Merrimack River Valley and located just 50 miles from Downtown Boston and the Atlantic Seacoast, the region enjoys an enviable location that provides residents urban amenities while retaining quality of life benefits common to rural areas. The region includes both the second largest city in New Hampshire as well as rural communities and is perhaps best characterized by a diversity of landscapes.

Several communities are working hard to improve walking and biking conditions but pedestrian and bicycle infrastructure are not well developed in the region, and motorized travel continues to dominate the transportation network. There are, for example, only a handful of designated bike lanes in the entire region, all in the City of Nashua, totaling only ½ mile in length. In fact, 12 of the 13 Nashua Regional Planning Commission (NRPC) communities do not have a single designated bike lane. The perception

among individuals who are willing to ride a bicycle is that it is generally not safe to ride a bicycle on anything but quiet neighborhood streets in the region. These individuals make up a significant percentage of the population and would be more willing to bicycle if high-quality bicycle infrastructure were to be in place. While motor vehicles provide an indispensable component of our transportation system, travel by foot, bicycle, and other forms of active transportation are also essential elements. These modes of travel are efficient, affordable, healthy, and environmentally sound, and their increased usage will provide more transportation choices, a more complete local and regional transportation system, and contribute to more

*The terms walking, biking, and Active Transportation are used interchangeably throughout this document and are meant to include walkers, bicyclists, other self-powered modes, users of rolling motorized devices for the disabled, as well as E-bikes and E-scooters.*

**Map 1.1: The Nashua Regional Planning Commission (NRPC) Region**



vibrant and attractive communities.

A priority of the Nashua Metropolitan Planning Organization (MPO) is to encourage a shift from motorized to human-powered travel. The idea is to substitute walking, bicycling, and other forms of active transportation for driving an automobile for personal errands, as well as for visiting friends, other social activities, and the commute to work, whenever possible. Research has shown that where investment in pedestrian and bicycle facilities has occurred, rates of non-motorized travel are significantly higher than the national average<sup>1</sup>. It is therefore reasonable to assume that some percentage of personal trips now being conducted via motor vehicle in the region could be shifted to active transportation modes if proper facilities and encouragement were provided. Nation-wide, public agencies, municipalities, and the public are increasingly willing to fund active transportation infrastructure because there is increasing awareness of its benefits. It is understood that getting more people to bike, walk or roll can help reduce obesity and heart disease, thereby reducing long-term medical costs for the public. Providing a safe and protected transportation system for all modes of transportation helps to save lives and reduce the frequency and severity of crashes. Investing in active transportation infrastructure can help increase nearby property values and can be a key factor in attracting jobs, retaining young workers and families, and allowing the elderly to age in place for longer. These investments can also lead to reduced pollution and congestion on the region's roadways. The NRPC understands the value of planning for and investing in active transportation infrastructure and has adopted this Plan to advance these principals.

Additionally, the Covid-19 pandemic has most likely increased the willingness to invest in active transportation infrastructure. While the full impact of the coronavirus on biking and walking is not yet known, we do know that vehicle miles driven was down in 2020 and walking, biking, running, and hiking rates were up. Whereas vehicle miles driven will likely rebound, it is unclear whether active transportation rates will revert to pre-Covid levels.

## PURPOSE OF THIS PLAN

The intent of this Plan is to provide guidance for the

planning, development, and implementation of safe, usable facilities for active transportation in the Nashua region. This Plan will help integrate bicycle and pedestrian travel into the regional transportation system. This integrated system will benefit drivers by encouraging alternative transportation modes, which will result in less competition for limited roadway and parking space. Pedestrians, bicyclists, and other active transportation users will benefit from a safer and more enjoyable travelling environment. Additionally, all users of this integrated system will benefit from increased transportation options for both local and regional travel.

This Plan builds off goals from previous regional bicycle and pedestrian plans and the 2021-2045 Nashua Metropolitan Transportation Plan (MTP). These plans explained the benefits of a shift to bicycling and walking and they identified a regional strategy for increasing self-powered travel in the Nashua region. This Plan also incorporates ideas from various local plans and the draft 2021 NHDOT Statewide Pedestrian/Bicycle plan. The guiding principles of the Nashua MPO active transportation planning efforts are:

- Consider all modes of active transportation, including walkers, bicyclists, other self-powered modes, users of rolling devices for the disabled, as well as E-bikes and E-scooter.
- Focus on local, short-distance trips which are the trips most likely to be conducted on foot or on a bike,
- Engineer systematic safety into roadway design,
- Provide municipal policymakers and community advocates with the tools for improving their local active transportation environments,
- Provide the framework for a regional bicycle network that includes major travel corridors through the region and sub-regional connections to local non-motorized networks, and,
- Provide pedestrian and bicycle connections to public transit networks where possible.

## SUMMARY OF PUBLIC ENGAGEMENT

Public participation is an important component of



every NRPC planning effort, and for this plan NRPC staff continued to build off a growing body of public input gathered from various statewide, regional, and local planning projects, including the following:

- The 2021-2045 Nashua Region Metropolitan Transportation Plan (MTP) provides a basic blueprint for long-term transportation investment in the Nashua Region to the horizon year 2045. The MTP is a component of the Nasua Regional Plan, which was drafted after an extensive public outreach effort. This effort included a telephone poll of residents, public workshops, outreach at community events, focus groups, individual interviews, and the regional TTAC. The outreach effort revealed that a significant percentage of residents agree that safe places to walk and bicycle should be expanded in their communities. At the various public forums, open houses and community events associated with the regional plan, residents repeatedly noted the need for more walkable developments and investments in active transportation infrastructure.
- The NHDOT State Pedestrian & Bicycle Transportation Plan process included significant public engagement in the region. The consultant for the project attended separate meetings with the TTAC and the regional Complete Streets Advisory Committee (CSAC). The meetings included discussions of goals & objectives, existing conditions maps, and input about regional needs. There was a project web site that was accessible to the public and included an online 16-question survey and an interactive input map. The map allowed individuals to zoom in anywhere in the state to flag difficult intersections, challenging corridors for walking and bicycling, and places where individuals would like to see new or improved facilities. Additionally, there was a kiosk at a Nashua farmers market at which 285 people provided input on bicycle routes and Bicycle Level of Traffic Stress (BLTS).
- The City of Nashua Bicycle and Pedestrian Project (2020) involved extensive data compilations activities, which were conducted to characterize existing conditions and public sentiment on the future of bicycle and pedestrian improvements in the City. NRPC

administered an online survey for this project that resulted 300 completed surveys. A virtual webinar attracted an additional 30 participants. In both cases public sentiment to improve bicycling and walking conditions was significant.

- The Amherst Multimodal Master Plan public engagement effort included surveys, newsletter articles, information tables at town-wide events, and public meetings that attracted 130 attendees. There was significant support for active transportation infrastructure.
- The regional Complete Streets Advisory Committee helped oversee the development of this plan. A series of meetings was held at which the workgroup reviewed the goals and objectives from the 2015 Bicycle and Pedestrian Plan. The purpose of the review was to determine if the goals and objectives were still relevant, why some may have not been implemented, and how implementation could be improved moving forward.

## KEY TAKEAWAYS FROM PUBLIC ENGAGEMENT

The following key takeaways summarize active transportation-related attitudes in the Greater Nashua Region:

- A significant percentage of residents agree that safe places to walk and bicycle should be expanded in their communities.
- Residents are concerned about safety based primarily on volume and speed of motor vehicle traffic and walking or riding near that traffic.
- Residents voiced support for investments in active transportation infrastructure.
- Residents would ride or walk more often if there were more rail-trails, paths, and marked bicycle lanes.



# Goals & Objectives



## **Goal 1: Network Connectivity**

### Objectives

- Develop a continuous, coordinated regional bicycle, pedestrian, & active transportation network.

## **Goal 2: Safety**

### Objectives

- Encourage communities to adopt roadway safety design guidelines, land use regulations, complete streets, & other bicycle and pedestrian-related policies & programs.
- Routinely incorporate safety design treatments whenever maintenance, rehabilitation, or new construction occurs within the right of way of any roadway in the region.

## **Goal 3: Education, Encouragement, and Enforcement**

### Objectives

- Educate and encourage community members, enforcement agencies, and municipalities to enhance their knowledge of active transportation as a viable means of transportation.

## **Goal 4: Health & Fitness**

### Objectives

- Improve overall public health and reduce health care costs by making it easier, safer, and more convenient for citizens to be physically active.

## **Goal 5: Economic Vitality**

### Objectives

- Create walkable and bikeable communities that draw people in, which in turn will attract new businesses, events, development, and a growing tax base.

## **Goal 6: Social Equity**

### Objectives

- Enhance active transportation options in the region so that all individuals can choose a seamless, convenient, and comfortable mode of transportation that fits their needs, particularly those individuals from underserved, vulnerable & disabled populations.

## **Goal 7: Environmental Quality**

### Objectives

- Improve air quality, increase energy conservation, and shrink greenhouse gas emissions by reducing motor vehicle miles traveled.

## **Goal 8: Data Collection & Monitoring**

### Objectives

- Use data to better understand how people choose to interact with the network of roads, bike paths, and intersections.
- Increase NRPC efforts to collect, store and analyze bicycle, pedestrian, & active transportation-related data.

## **Goal 9: Implementation & Sustainability**

### Objectives

- Develop an implementation plan and use it to monitor progress.
- Identify sustained funding of active transportation infrastructure and programs.
- Use robust pop-up, temporary infrastructure to evaluate improvements in high risk areas.



# The Benefits of Investing in BICYCLING, WALKING, & ACTIVE TRANSPORTATION

## Safety

- ⇒ Improved active transportation facilities can lead to increased number of walkers, bicyclists & active transportation users and decreased number of crashes, injuries, and fatalities.<sup>2</sup>
- ⇒ Roads with appropriate pedestrian facilities<sup>3</sup> can reduce crashes involving pedestrians up to 50%.<sup>4</sup>
- ⇒ Improving the walking and bicycling environment increases safety for all users of the transportation system, including those in motor vehicles.

## Economic

- ⇒ The cost to operate an average automobile for one year is \$9,600, approximately 13% of median household income in New Hampshire<sup>5</sup>. The cost to operate an average bicycle for one year is approximately \$300.<sup>6</sup>
- ⇒ More people, regardless of generation, are looking to live and work in areas that support outdoor recreation opportunities and commuting by bike or foot. This creates an economic development opportunity for the Nashua region.
- ⇒ People who walk or ride a bike as transport are more likely to use local businesses for their shopping.

## Transportation Efficiency

- ⇒ Cycling is often the fastest mode of transportation from door to door for distances up to about 3 miles.<sup>7</sup>
- ⇒ Reduced traffic congestion.
- ⇒ Almost every public transport trip starts or ends with a short walk. The Nashua Transit System capture area has been extended significantly by making walking to and from the transit center and bus stops easier and less prone to barriers.

## Environmental

- ⇒ Reduced greenhouse gas emissions.
- ⇒ Reduced noise pollution.
- ⇒ Less pavement and therefore more space for green development.

## Public Health

- ⇒ Active transportation provides an opportunity to integrate the recommended 150 minutes of weekly aerobic activity recommended in 2018 by the Centers for Disease Control for improved health.

## Social Equity

- ⇒ Bicycles, and active transportation options in general, offer increased mobility to many groups of the population with low rates of car ownership, such as low-income earners, the unemployed, seniors, and those under 18 years of age.
- ⇒ Increased transportation options contribute to increased mobility, thereby increasing individual choice and equality of opportunity.
- ⇒ Active transportation facilities benefit people with disabilities by providing an increased network of accessible paths and improved road crossings.

## Community Wellness

- ⇒ Cycling and walking enables people to interact socially and feel more connected with their local community.
- ⇒ The availability of nonmotorized transportation options can increase social capital and improve mental health by reducing the stress associated with car commuting while stimulating economic development and ensuring access for all people.

## THE “5E’S”

The Federal Highway Administration emphasizes that the process for increasing bicycling and walking must be multi-disciplinary. Comprehensive efforts to increase the use of active transportation, for example, need to include public education efforts that promote bicycling and walking as viable modes of travel, as well as ways to make the transportation system itself safer and more convenient. This plan is more than a proposed network of bicycle and pedestrian facilities because it is structured with the following “5Es” in mind:

- Equity, Diversity, and Inclusion: A bicycle, pedestrian & active transportation—friendly America for everyone.
- Engineering: Creating safe places to ride and walk.
- Education: Giving people of all ages and abilities the skills and confidence to ride.
- Encouragement: Creating a strong bike culture that welcomes and celebrates bicycling.
- Evaluation and Planning: Assessing the implementation of the Plan to measure progress.

## CONCLUSION AND CALL TO ACTION

For many of us, walking and biking have been an important part of our lives since we were children, and it is easy to take their pleasures and practicality for granted. They are a great way to get around our neighborhoods, breath the air, explore, and maybe even get to work. But for many people in the Greater Nashua Region, access to safe places to walk, ride, or roll isn’t so simple. Without well-connected sidewalks and paths, our daily decision to use these transportation modes is not that easy.

Realizing the goal of an active transportation-friendly region will not occur in short order, the NRPC is hopeful this planning effort provides municipal officials and community leaders with a basic framework for implementing active transportation-friendly improvements over time and improving regional connections. Accomplishing these goals will improve the desirability of individual communities and the region and expand mobility opportunities to many more residents.

The following pages describe the existing conditions for active transportation in our region, design strategies and policies for improving those conditions, recommendations for how to implement those strategies, and an action plan that can be used to guide the process.

We hope this document is seen as a call to action and NRPC staff looks forward to partnering with our member communities, individuals, state and federal agencies, and others in making the Greater Nashua Region a more active transportation-friendly region in the months and years to come.

## SOURCES

<sup>1</sup>Trails & Greenways: Commute Rates from the 2000 Census; Hugh Morris, Rails-to-Trails Conservancy, June, 2003.

<sup>2</sup>Jacobsen, P.L. (2003) “Safety in numbers: More Pedestrians and Bicyclists, Safer Biking and Walking.

<sup>3</sup>Injury Prevention Journal #9.

Pe AASHTO Guide for the Planning, Design, and Operation of Pedestrian facilities manual: Sidewalks should connect to street systems and destinations in a safe and convenient manner. Where sidewalks are provided on only one side of the roadway, the overall connectivity of the sidewalk is weakened, as well as pedestrian safety and accessibility. Sidewalks provided on only one side of the street often require pedestrians to cross streets unnecessarily to meet their travel needs. As a result, the level of exposure of pedestrians to potential conflicts is increased. Therefore, sidewalks on one side of the street are generally not recommended. However, a sidewalk on one side of the street may be appropriate where only one side of the street is developed. A sidewalk on one side of the street may also be adequate on local streets on an interim basis, especially when this improves a condition where there were no sidewalks previously.

<sup>4</sup>Campbell, B, et al (2004) “A Review of Pedestrian Safety Research in the U.S. and Abroad.” Federal Highway Administration Publication #FHWA-RD-03-042.

<sup>5</sup>American Automobile Association Year 2020, based on 15,000 annual miles, includes insurance, license, registration, taxes, depreciation, and finance charge. <https://newsroom.aaa.com/wp-content/uploads/2020/12/Your-Driving-Costs-2020-Fact-Sheet-FINAL-12-9-20-2.pdf>

<sup>6</sup>Pedestrian and Bicycle information Center [https://www.pedbikeinfo.org/factsfigures/facts\\_economy.cfm](https://www.pedbikeinfo.org/factsfigures/facts_economy.cfm)

<sup>7</sup>Better By Bicycle. <http://www.betterbybicycle.com/2013/12/bikes-are-faster-door-to-door-than-cars.html>





**SECTION 2**  
***Existing Conditions***



Understanding the condition of the active transportation network already in place is key to being able to form useful and appropriate recommendations for the future. This chapter describes existing conditions for active transportation in the region, including existing infrastructure, Bicycle Level of Traffic Stress, safety, bicycling and walking trends, bicycle friendliness, and the impacts of the Covid pandemic on bicycling and walking. Additionally, even though active transportation infrastructure is minimal in the region, there are examples of progress that is being made towards a more walkable and bikeable environment. Examples of that progress are provided in this chapter.

## EXISTING SIDEWALKS, BIKE LANES & TRAILS

Except for where specifically prohibited by regulation, which in New Hampshire includes interstates and turnpikes, pedestrians may travel along all public roads and highways. Where sidewalks do not exist, pedestrians may travel along roadway shoulders. Existing sidewalk networks are best developed in the City of Nashua and in the town centers of some communities in the region. Sidewalks can also be found in the region on local roads as well as some numbered state highways. In various locations sidewalk features include curb ramps, cross walks, median refuge islands, rapid flashing beacons, traffic signals, and traffic calming measures. There are approximately 320 miles of sidewalks in the region.

Bicyclists may also travel along all public roads and highways and are also prohibited from interstates and turnpikes. Additionally, New Hampshire state law says that bicycles are required to follow the same rules of the road as motor vehicles (RSA 265:143). This means that every person riding a bike has the same rights and privileges as persons driving cars and that bicyclists has the same responsibilities as other drivers. There are only a handful of marked bike lanes in the region, all of which occur in the City of Nashua. Shoulders that may be wide enough to accommodate a bicycle are not considered bike lanes if no pavement markings or signage are present. The only road shoulders that meet this bike lane criteria occur in the City of Nashua, for a total of barely one-half mile. Pedestrians and bicyclists may also use various trails, paths, and rail trails for recreation and transportation throughout the region. There are many off-road trail networks in various recreation areas and conservation areas throughout the region.

**Table 2.1: Existing Active Transportation Facilities by Centerline Mile  
(approximate)**

	Sidewalks	Shared Use Paths	Painted Bicycle Lanes	State & Urban Compact Roads with Paved Shoulders
<b>Total Facilities in the NRPC Region</b>	320	30	0.5	164



## BICYCLE LEVEL OF TRAFFIC STRESS

Bicyclists choose their routes based on their perceived level of traffic stress. For a bicycling network to attract the widest possible segment of the population, its most fundamental attribute should be low-stress connectivity, which means providing routes between people’s origins and destinations that do not require cyclists to use links that exceed their tolerance for traffic stress and that do not involve an undue level of detour.<sup>1</sup>

Bicycle Level of Traffic Stress (BLTS) is a planning tool that rates a road segment or crossing based on the traffic stress it imposes on bicyclists.<sup>2</sup> By looking at elements such as shoulder width and traffic speeds, BLTS identifies the areas where bicyclists are likely to feel more or less safe in relation to vehicle traffic. The goal is to make the network more accessible to more people by lowering the level of traffic stress.

The following table provides an explanation of the four levels of traffic stress as well as a summary of the BLTS for the proposed regional bicycle network that is described on pages 4-2 through 4-6:

**Table 2.2: Bicycle Level of Traffic Stress (BLTS)**

	LTS 1 (Lowest Stress)	LTS 2	LTS 3	LTS 4 (Highest Stress)
<b>Total Miles in Proposed Network</b>	37 Miles	77 Miles	146 Miles	53 Miles
<b>Percent of Network</b>	12%	24%	47%	17%
	Low traffic stress; suitable for all cyclists, including children.	<b>Little traffic stress; requires more attention, suitable for teens and adult bicyclists with adequate bike handling skills. This is the level that most adults can tolerate. Increasing the miles of BLTS 2 roadways is an objective of this plan.</b>	Moderate traffic stress; suitable for confident and experienced adults. Typical locations include low speed arterials or moderate speed single lane roadways.	High traffic stress; suitable for only the most traffic tolerant. Traffic speeds are moderate to high.

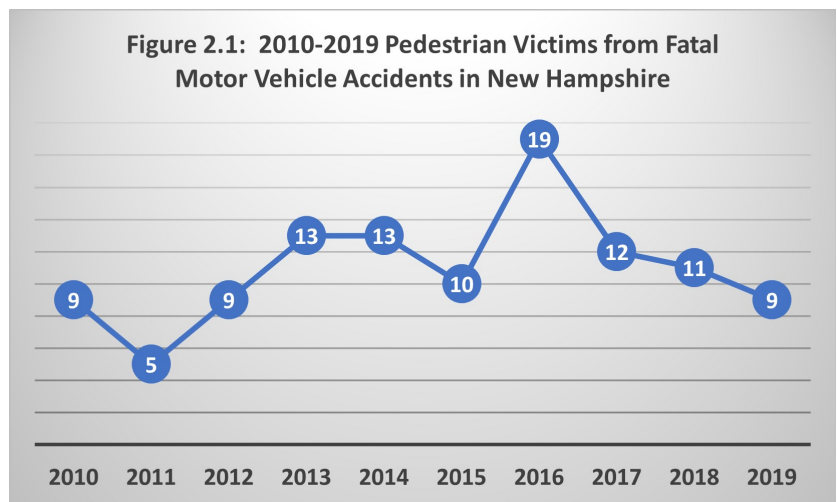
## MOTOR VEHICLE, PEDESTRIAN, AND BICYCLE-RELATED CRASHES

To fully understand if there is a pedestrian or bicycle safety problem in the region, it is important to review historical bicycle and pedestrian crash data and identify crash patterns. The availability of motor vehicle/pedestrian/bicycle crash data, unfortunately, is limited in New Hampshire. The demanding nature of data acquisition, data linking, data cleaning, and data analysis, combined with the random and often widely distributed nature of collisions with pedestrians (and bicyclists), creates challenges to adequately accounting for pedestrian and bicycle safety. Simply put, the demand for data is high, although the availability of data itself is limited.

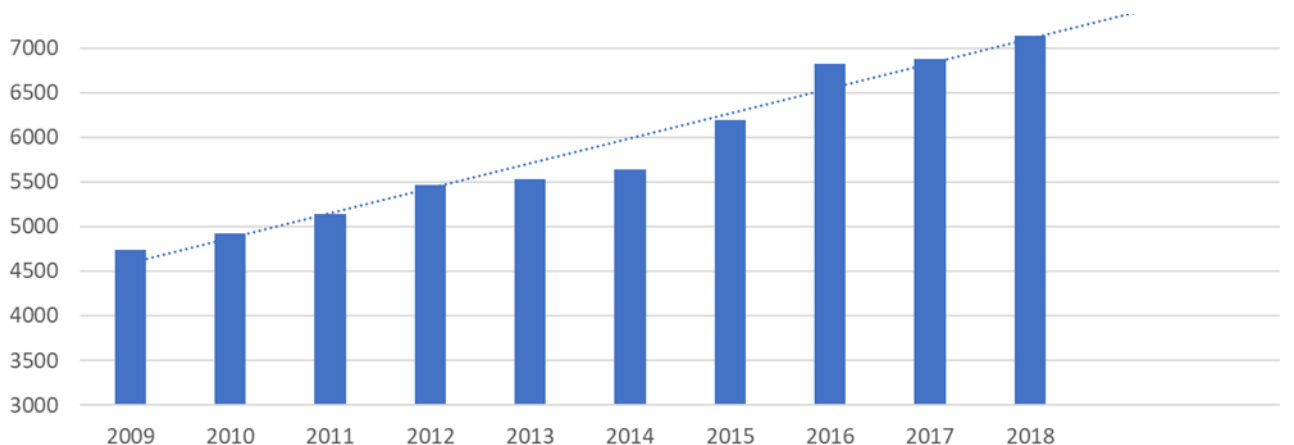
The map on the following page shows bicycle and pedestrian-involved crashes with motor vehicles for the years spanning 2017-19. The map is helpful, but a specific action plan should be developed that spells out steps to identify unsafe bicycle and pedestrian conditions and recommendations and countermeasures to improve those conditions.

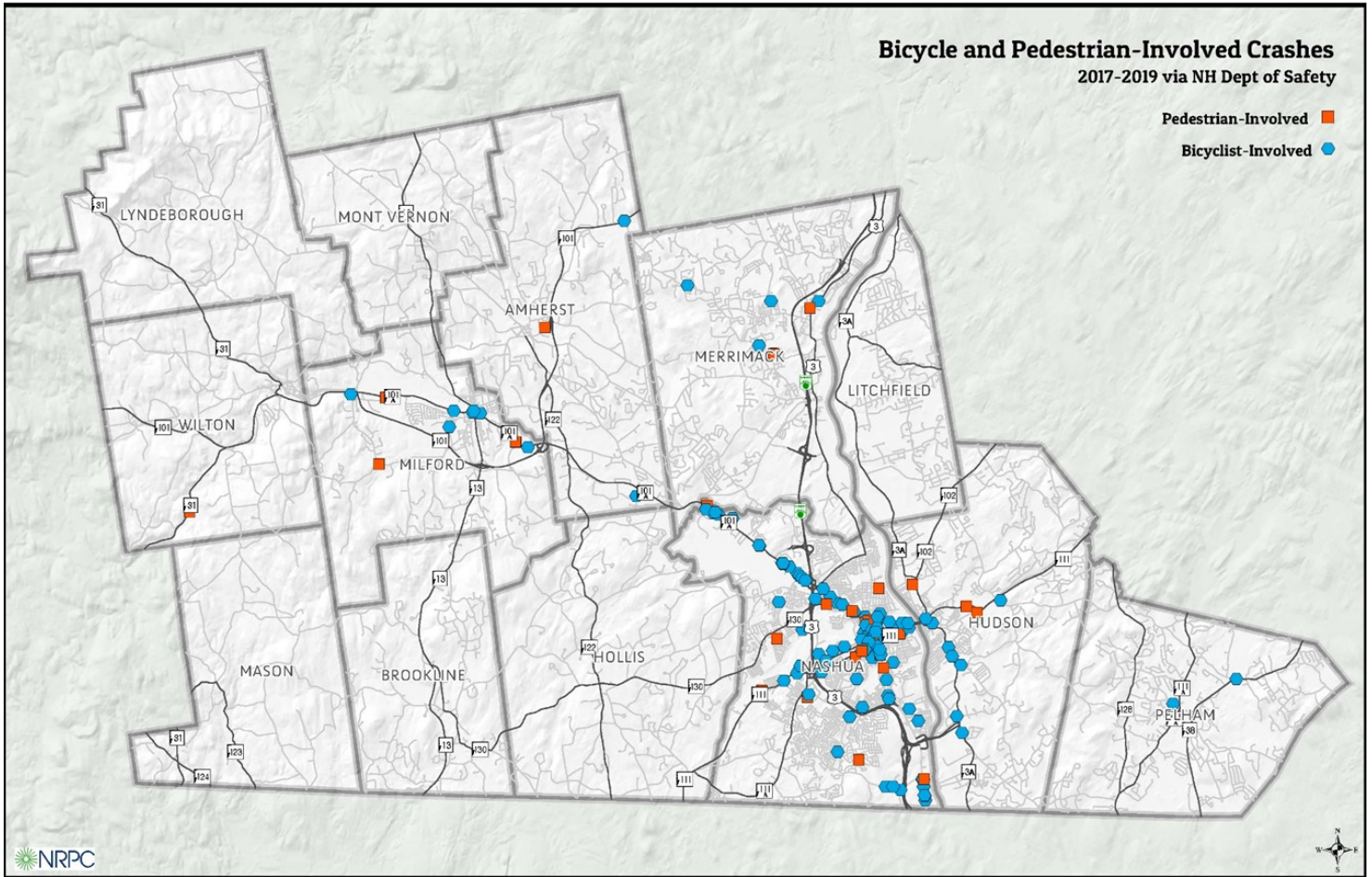
- There were 134 crashes involving pedestrians in the region between 2017-2019. This includes 1 that was fatal and 9 that were considered serious.
- There were 36 crashes involving bicyclists in the region between 2017-2019. There was 1 fatal bike crash and 1 additional reported serious injury.

Additionally, the Governors' Highway Safety Association reported that during the 10-year period 2010-2019, the number of U.S. pedestrian fatalities increased by 46%, from 4,302 in 2010 to an estimated 6,301 deaths in 2019 (see graphic below). This translates to approximately 2,000 additional pedestrian deaths in 2019 compared to 2010. This increase in pedestrian deaths is even more concerning considering that all other traffic deaths increased by just 5% during this same period. Safety experts blame distracted drivers and larger vehicles for this disturbing trend. Fortunately, the State of New Hampshire has fared better than the nation at large (see graphic on the right).



**Figure 2.2: Bicycle & Pedestrian Fatalities in the United States by Year**







## BICYCLING AND WALKING TRENDS

The U. S. Department of Transportation (USDOT) initiated an effort in 1969 to collect detailed data on personal travel. The 1969 survey was the first Nationwide Personal Transportation Survey (NPTS). The survey was conducted again in 1977, 1983, 1990, and 1995. In 2001, the survey was expanded by integrating the Federal Highway Administration (FHWA) managed NPTS and the Bureau of Transportation Statistics-sponsored American Travel Survey (ATS), and the survey was re-named the National Household Travel Survey (NHTS).

Table 2.3: National "Usual" Commute Mode	On Travel Day Commuted by:					
	Drove Alone	Shared Ride	Transit	Walk	Bike	Usual Mode
Drove Alone	86.2%	12.8%	0.2%	0.6%	0.1%	76.2%
Shared Ride	37.2%	60.2%	1.0%	1.2%	0.2%	11.0%
Transit	4.8%	14.4%	70.8%	7.0%	0.8%	6.9%
Walk	7.3%	18.2%	2.6%	69.8%	0.9%	2.9%
Bike	8.1%	11.9%	3.4%	4.6%	70.3%	1.1%
Actual Mode Share	71.0%	18.8%	5.2%	3.3%	1.0%	

The 2017 NHTS asked respondents how they 'usually' commute to work. It can be seen in the table that nationally around 4% of the population walk or bike to work<sup>3</sup>. The American Community Survey (2008-2013) suggests the combined rate of biking and walking to work

Source: 2017 Nationwide Personal Transportation Survey

in the Nashua region is about 2% (half the national rate).

The League of American Bicyclists (LAB) published *Where We Ride: Analysis of Bicycle Commuting in American cities*, which is a report of 2016 American Community Survey data<sup>4</sup>. The document provides a more detailed breakdown of bicycle commuting by state which allows for a comparison of how New Hampshire compares with other states. The table on the right shows that while New Hampshire is the lowest ranked New England state for bicycle commuters (rounded), we did see a slight increase in the percentage of bicycle commuters in 2016.

**Table 2.4: Ranking by Mode Share**

State	Rank	Total Commute by Bike 2006	Total Commute by Bike 2016
Massachusetts	8	0.5	0.9
Vermont	17	0.5	0.6
Maine	27	0.4	0.4
Rhode Island	33	0.2	0.3
Connecticut	35	0.3	0.3
<b>New Hampshire</b>	<b>38</b>	<b>0.2</b>	<b>0.3</b>

Table 2.5 shows that walking and biking commute rates in Hillsborough County lag behind both national and

**Table 2.5: Commute Mode**

	United States	State of NH	Hillsborough County	City of Nashua
<b>Drove Alone</b>	75.9%	80.4%	89.7%	81.2%
<b>Carpooled</b>	8.9%	7.8%	7.6%	7.2%
<b>Public Transportation</b>	5.0%	0.9%	1.0%	1.0%
<b>Walked</b>	2.6%	2.4%	1.7%	1.4%
<b>Bicycle</b>	0.5%	0.3%	0.2%	0.4%
<b>Taxicab, Motorcycle, or Other Means</b>	1.4%	0.9%	0.6%	0.8%
<b>Worked from Home</b>	5.7%	7.3%	6.8%	8.0%

Source: 2019 American Community Survey, Table S0801

## BICYCLE FRIENDLINESS

The League of American Bicyclists also published its *Bicycle Friendly Report Card*, in 2017<sup>5</sup>. The document uses data from the League’s 2016 Bicycling & Walking in the U.S Benchmarking Project. The report uses various categories to rank the level of bicycle friendliness in each state. Tables 2.6 and 2.7 show the ranking categories, how each state ranked in each of the categories, the overall ranking for each state and finally, how states compared to each other. It can be seen that New Hampshire ranks 34th nationally and last in the northeastern region in bicycle friendliness.

## IMPACT OF COVID PANDEMIC ON BICYCLING TRENDS

The Covid-19 pandemic impacted bicycle and pedestrian travel in the Nashua region and the images below use Strava<sup>6</sup> data for Hillsborough County give an idea to what extent. Figure 2.3 shows the total number of bike trips recorded during the years 2017 – 2020. The number of bicycle trips by users of the Strava App increased significantly in 2020 (Covid year) over the previous three non-Covid years. Figure 2.4 shows a similar relationship for combined walk, hike and run trips during the same time period

While the full impact of the coronavirus on biking and walking is not yet known, we do know that vehicle miles driven was down in 2020 and walking and biking rates were up. Whereas vehicle miles driven will likely rebound, it is unclear to what level, and how that will impact other modes of travel.

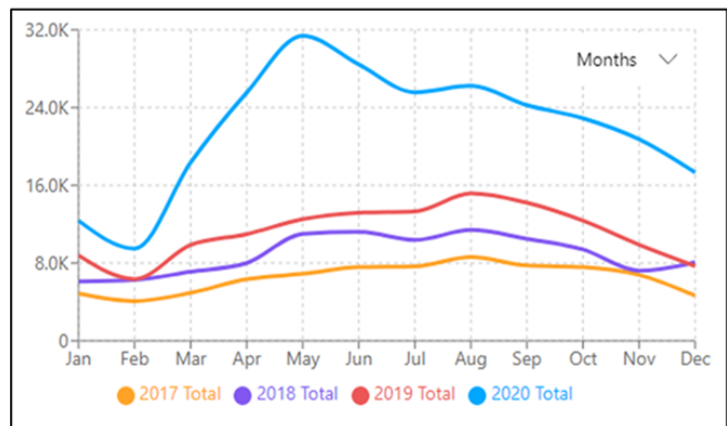
**Table 2.6: New Hampshire Bicycle Friendliness**

Categories - Bike Friendliness	Rank out of 50
Infrastructure & Funding	46
Policies and Programs	46
Education & Encouragement	45
Evaluation & Planning	38
Legislation & Information	30

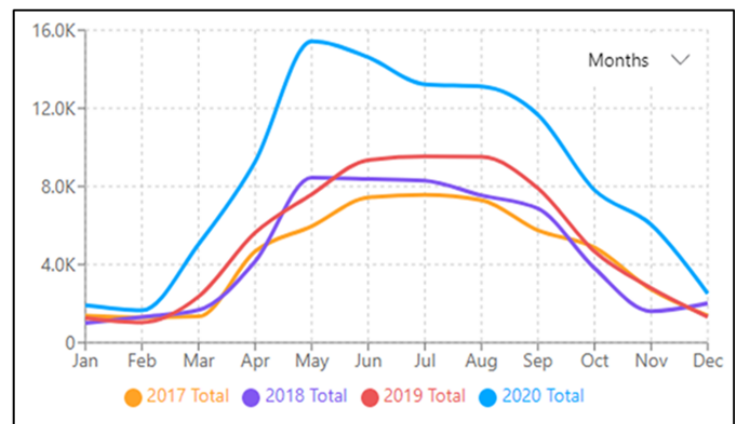
**Table 2.7: Bike Friendliness Comparison**

National (overall)	Eastern Region (out of 11)
32. Missouri	7. Maine
33. South Dakota	8. Rhode Island
34. <b>New Hampshire</b>	9. New York
35. Arkansas	10. Connecticut
36. Alaska	11. <b>New Hampshire</b>

**Figure 2.3: Bicycle Strava Data**



**Figure 2.4: Walk, Hike, Run Strava Data**



## BICYCLE AND PEDESTRIAN COUNTING

The purpose of the NRPC bicycle and pedestrian counting program is to gather data that can be used to inform how people are cycling and walking in the communities in our region. The data is useful for monitoring travel patterns, measuring the usage of bicycle and pedestrian facilities, understanding safety trends, evaluating the impact of projects, prioritizing infrastructure, and developing multi-modal transportation models.

It can be difficult to measure walking and cycling activities due to the impact of inclement weather, seasonal variations, as well as a limited number of automatic bike-ped counting machines, and limited time that staff can dedicate to this effort. NRPC is working to improve upon our bicycle and pedestrian counting program. In 2020-21, staff used input from the regional Complete Streets Advisory Committee to identify locations in the region that are now being counted on a consistent basis using portable automatic counters. The intention is to gather information at each location at regular intervals and to use the data to develop a useful and robust database. A map of the counting locations and examples the data that is being gathered can be found in Appendix D. Additionally, NRPC maintains a permanently installed automatic counter on the

Nashua River Rail Trail in Nashua, near the Massachusetts border. Data was gathered consistently from early 2017 through late 2019. Technical issues with the counter unfortunately occurred during 2020 which limited data collection during the Covid year. The machine was repaired in late 2020 and is gathering data at this time.

## EXISTING PROJECTS AND SUCCESS STORIES

While there remain significant gaps and stress points in the local and regional active transportation network, municipalities in the region continue to make efforts to improve bicycle and pedestrian amenities.

The City of Nashua continues to improve downtown sidewalks and to expand its Riverwalk along the Nashua River. The Heritage Rail Trail connects neighborhoods to Main Street and Mine Falls Park and a planned eastward extension (2022) of the trail will lead to the site of a future commuter rail station. There is a new (2019) pedestrian bridge over the Nashua Canal into Mine Falls Park and a related bicycle-pedestrian connection to the Heritage Rail Trail via Everett Street. Improvements on Main Street include a Rectangular Rapid Flashing Beacon (picture), mid-block crossings (picture), and temporary bike lanes. Bike racks on city buses



*Pictured Left: A bicycle and pedestrian counter installed at an entrance to Mine Falls Park in Nashua.*



continue to expand the range of the Nashua Transit System and increase access for people who depend on the combination of walking, biking, and public transit to get to their destinations.

Additionally, the City of Nashua welcomed bike share to the community by launching 200 dockless bikes in June 2018 with partner Veoride (now Veo). Bikes were available to rent throughout the year, including winter, and there were over 16,500 rides taken in 2018. The following spring, the City allowed Veo to introduce dockless e-scooters to the fleet and the demand for the 100 or so scooters was very high. There was a corresponding dip in bike ridership, however, as the very popular scooters became the preferred way to get around. By the end of the 2019 season, the City saw about 11,000 bike rides and over 23,800 e-scooter rides. Due to low winter bike ridership the previous year and weather-related battery limitation on the scooters, Veo stored all devices over the winter. Veo did not return to Nashua in 2020, but in 2021, a different company brought e-scooters back (but not bikes). There are currently about 75 scooters active in a geofenced area that encompasses the downtown, several densely populated neighborhoods, employment centers and recreational areas, including Mine Falls Park. Demand and ridership are both high as of July 2021.

The Town of Brookline Sidewalk and Trails Connectivity Plan (updated in 2017) continues to guide additions to its expanding sidewalk and trail system in Brookline.

The Amherst Multimodal Master Plan (2019) was developed to promote safe access to the town's transportation network for all users, by incorporating systematic safety principles into the design of the town's on and off-road (trail) system. The adoption of this document demonstrates the town's commitment to a sustainable, connected, and accessible transportation network. The Amherst Street side path that will connect Amherst Village and the Milford Oval will be constructed (2021) because of this planning effort. The side path will be paved, 8-feet wide, and will be separated from Amherst Street by a grassy buffer.

The Town of Milford is a walkable community with many sidewalks and two bike/pedestrian bridges spanning the Souhegan River. The Swinging Bridge is

one of those bridges and rehabilitation of the bridge will occur in 2025 and be funded through a combination of federal and local funds.

The Town of Merrimack has a sidewalk and trail plan for its town center, as well as a Safe Routes to School travel plan for its elementary school. A Transportation Alternatives Program (TAP) grant will help fund a path under the Daniel Webster Highway that will provide a connection between Watson Park on the east side with a trail system on the west side. The town is also actively seeking funding to complete sidewalks that will connect the town center with nearby neighborhoods. Additionally, NRPC developed a bicycle and pedestrian plan for the Daniel Webster Highway corridor in 2018 which is being used to apply for additional infrastructure funding to expand non-motorized infrastructure southward along the corridor.

The Town of Wilton continues to expand its downtown sidewalk system through a combination of planning efforts and grant funding. The Wilton Riverwalk Project began in 2017 with the Phase 1 opening of a walkway along the Stony Brook River near the Police Station downtown. Since then, a design charrette with Plan NH, a comprehensive Riverwalk study with NRPC, numerous public input workshops and an online survey to gather residents' feedback have informed future Riverwalk design features.

Litchfield's Albuquerque Avenue gently winds on a north-south axis through the center of Town. An eight-foot-wide separated use pedestrian path/bikeway follows along this two-mile corridor. Since its completion, the Albuquerque Avenue Bike-Pedestrian Path has become a valuable and heavily utilized community asset. The Town is planning and actively pursuing funding to extend sidewalk connections along Paige Road that will expand this multimodal network.

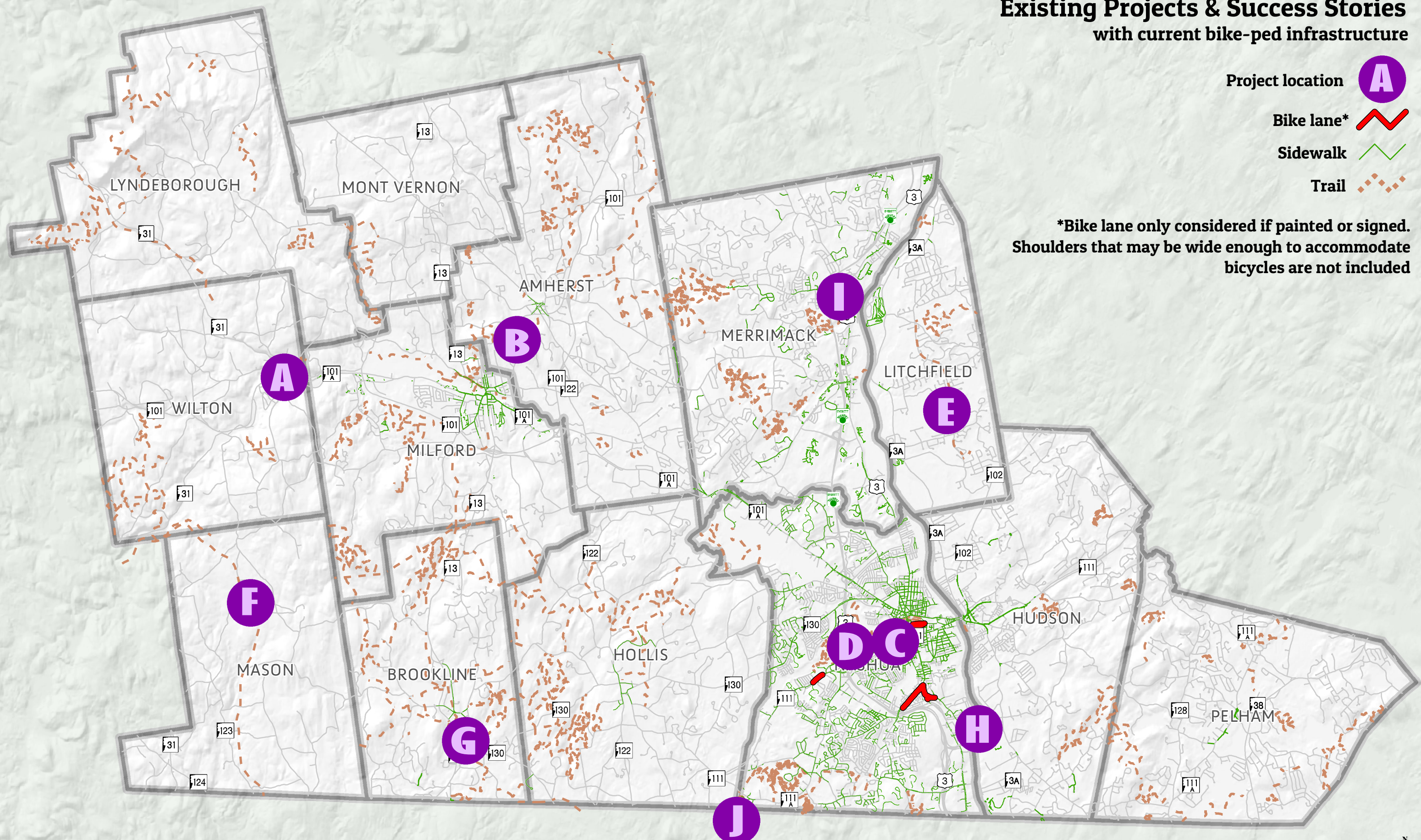
The following map shows known active transportation infrastructure in the region, including bike lanes, sidewalks, and off-road trails. The map also includes examples of high-quality active transportation infrastructure that exist in the region. Each example is labeled with a letter inside of a circle, and those examples are described in the pages following the map.



# Existing Projects & Success Stories with current bike-ped infrastructure

- Project location 
- Bike lane\* 
- Sidewalk 
- Trail 

\*Bike lane only considered if painted or signed.  
Shoulders that may be wide enough to accommodate bicycles are not included





# Success Stories



## Wilton Riverwalk—Downtown Wilton

The Wilton Riverwalk Project began in 2017 with the Phase 1 opening of a walkway along the Stony Brook River near the Police Station downtown. Since then, a design charrette with Plan NH, a comprehensive Riverwalk study with NRPC, numerous public input workshops and an online survey to gather residents' feedback have informed future Riverwalk design features.





# Success Stories

## Amherst Street Side Path— Amherst

The intent of this project is to provide residents of the Town of Amherst with a safe and convenient connection for multimodal users between Amherst Village and the Milford Oval.



C



## Everett Street Pedestrian Bridge—Nashua

The Everett Street pedestrian bridge increased the size of the non-motorized transportation network by connecting the Heritage Rail Trail and the Tree Streets Neighborhood to Mine Falls Park via a crossing of the Nashua River Canal. A cross walk with flashing beacons on Ledge Street provides a safe connection to Everett Street.

This project was funded partially (80%) through the Federal Transportation Alternatives Program and partially (20%) with local matching funds.

## Success Stories



D

### Heritage Rail Trail—Nashua

The Heritage Rail Trail project was started in the 1990s to reduce congestion along East and West Hollis Streets by providing an alternative bicycle and pedestrian transportation route through the heart of the City's most densely populated neighborhoods. The Heritage Rail Trail **West** was completed in 1999 and extends from City Hall to Simon Street.

Federal Transportation Enhancement grants were again awarded in 2005 and 2009 for the purchase of the rail trail parcels east of Main Street and in 2017, the City was awarded a federal Congestion Mitigation and Air Quality Improvement (CMAQ) grant to design and construct the Heritage Rail Trail East. This new section of rail trail will pick up where the Heritage Rail Trail West ends and extend along East Hollis Street from Main Street to Denton Street, near the future rail station at 25 Crown Street. It is anticipated that construction on this section will be completed in 2022.

### Albuquerque Avenue Side Path—Litchfield

Litchfield's Albuquerque Avenue gently winds on a north-south axis through the center of town. Nearly 70% of the Litchfield's 8,200 residents live within a five-to-ten-minute walk of Albuquerque. In 2007, Litchfield secured funding to construct an eight-foot wide sidepath along this two-mile corridor. This path leveraged available American Recovery and Reinvestment Act (ARRA) funds of approximately \$470,000 and \$18,500 of local money for design and construction.

This sidepath has become a valuable community asset. Throughout the day, this path sees a wide range of early morning joggers, dog walkers, students walking to Campbell High School and evening strollers. In addition to the high school, the path connects two larger recreational facilities. Since the path's construction, additional connections have been made to Town Hall, and the Town has continued to plan for sidewalk projects that will connect more neighborhoods to Albuquerque Avenue, and increase the size of the bicycle and pedestrian network.

E



## Success Stories

### Mason Rail Trail—Mason to Greenville

The Mason Rail Trail runs for nearly 7 miles from Townsend, MA to Greenville, NH. The trail follows a heavily wooded corridor through Russell State Forest and Coyne Wildlife Sanctuary.



F



G



### Potanipo Rail Trail—Brookline

Brookline is an excellent example of a community where long-range planning, funding commitments, and an aggressive pursuit of grant funds have dramatically improved walkability over time.

The town has made a commitment to long-term planning related to walkability by setting goals and objectives for sidewalk and trail construction in a series of town plans dating to at least 2006. In 2014, over 3,000 feet of trail was completed between South Main Street and Bohannon Bridge Road, including construction of a bridge over Stickney Brook.



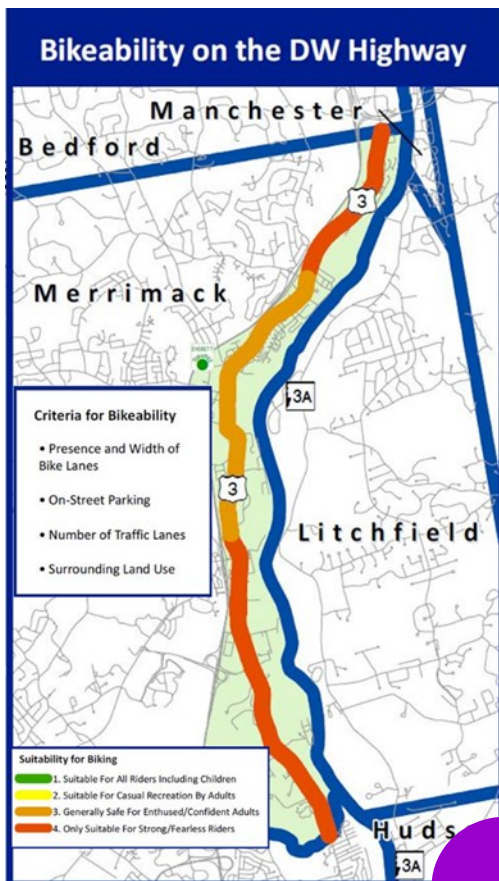
## Success Stories

### Sagamore Bridge Crossing—Hudson

This protected pedestrian-bicycle path provides a safe space for nonmotorized users to travel on the Sagamore Bridge and over the Merrimack River which is a major barrier between Hudson and Nashua.



H



I

### D.W. Highway Corridor Bike-Ped Plan—Merrimack

This Plan built on previous efforts to incorporate pedestrian and bicycle travel as vital modes of transportation and recreation along US Route 3 (Daniel Webster Highway) corridor in Merrimack. The Plan accomplished the following goals:

- Identified and mapped existing bicycle and pedestrian infrastructure in the corridor.
- Identified gaps in the infrastructure.
- Identified land use regulations that accommodate future needs of all users of this major travel corridor.
- Identified current and future bicycle and pedestrian infrastructure needs in the corridor.

*Map at left displays the bicycle level of traffic stress (BLTS), completed by NRPC.*

## Success Stories

### Nashua River Rail Trail—Nashua to Ayer, MA

The Nashua River Rail Trail is a 12.5-mile paved multi-use rail trail that roughly follows the course of the Nashua River, passing through the towns of Ayer, Groton, Pepperell, and Dunstable, Massachusetts and ends about a mile across the NH border in Nashua. The trail is used by walkers, cyclists, inline skaters, equestrians, and cross-country skiers.



J

### SOURCES

<sup>1</sup>Mineta Transportation Institute

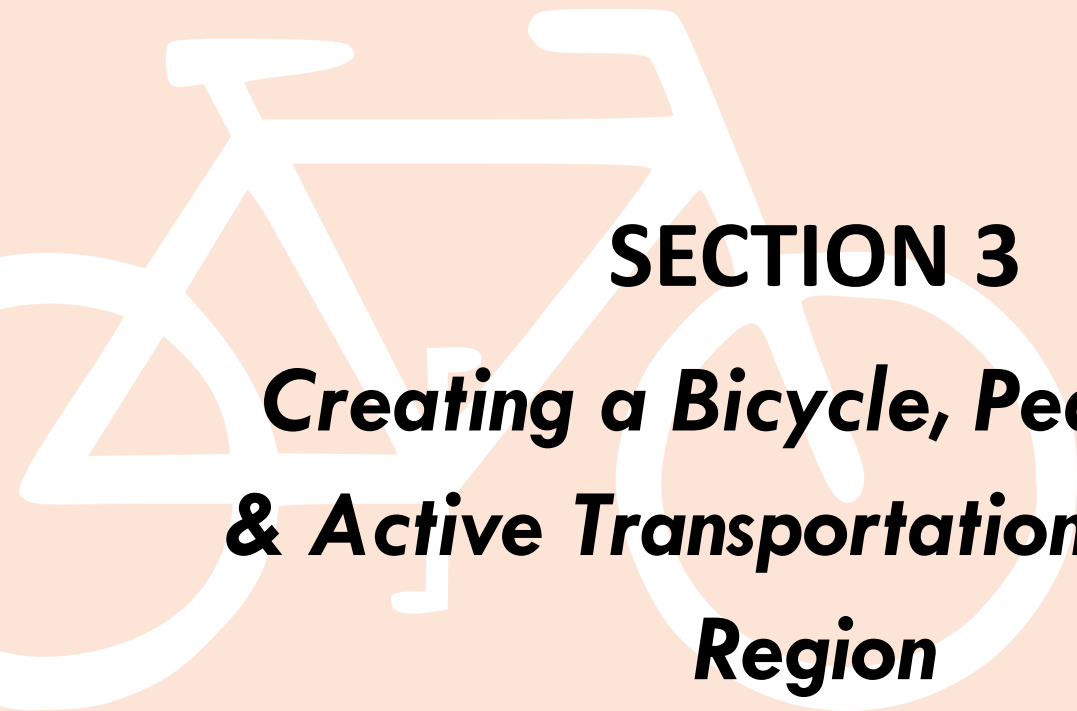
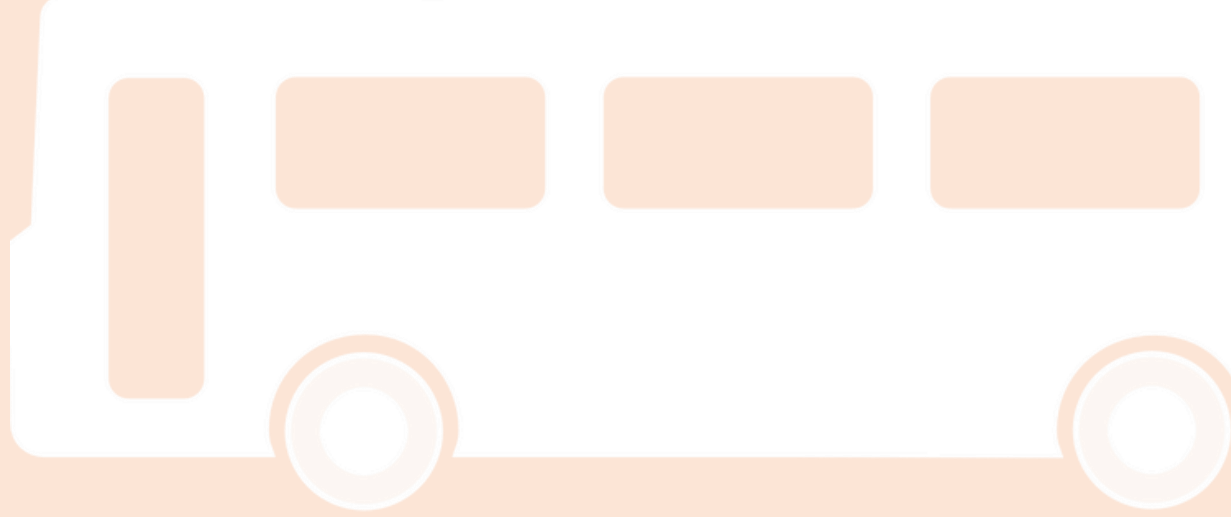
<sup>2</sup>Peter G. Furth, Northeastern University College of Engineering.

<sup>3</sup>National Household Transportation Survey, 2017.

<sup>4</sup>League of American Bicyclists: Where we Ride; analysis of bicycle commuting in American cities, 2016.

<sup>5</sup>Ibid.

<sup>6</sup>Starva is an App that is used by some individuals to record their active transportation trips. The aggregated data is made available to NH agencies for planning purposes.



## **SECTION 3**

# ***Creating a Bicycle, Pedestrian, & Active Transportation-Friendly Region***





## DRIVER BEHAVIOR & ROADWAY DESIGN

With the exception of the Fredrick E Everett Turnpike (FEET), bicyclists, and to a lesser extent pedestrians, use most of the roadways in the region, including arterial, collector and local roads. This doesn't mean that every roadway in the region should be part of the designated active transportation network that will be described later in this chapter. It makes sense, though, to enhance the perception that the Greater Nashua region is a comfortable and safe place to ride a bicycle or walk. Municipalities in the region should therefore make every effort to provide all active transportation users the same consideration as operators of motor vehicles on the region's street system. This section provides strategies for creating the perception that the region is bicycle and pedestrian friendly.

Bicycles are unique vehicles because their small size makes them and their operators vulnerable to road conditions that would not affect motor vehicles. Drainage grates, potholes, cracks, crumbled shoulders, and other imperfections in the road surface are significant hazards to bicyclists. Roadside parking spaces and the width of the outside curb lane are also of concern. In order to encourage increased bicycling, it will be necessary to minimize these hazards and increase the perception that the region is a safe and comfortable place to operate a bicycle. Roadways in the Greater Nashua region, as in many American communities, have for decades been designed with the primary mission of optimizing the flow of motorized vehicles efficiently, with little (if any) consideration of how to safely accommodate other modes of transportation.

It is important to recognize that roadways which are designed solely for motor vehicles fail to adequately accommodate the needs of self-powered modes of transportation. To have roadways that effectively incorporate multimodal users, we should re-consider the idea that all roadways are exclusive to motor vehicles and instead embrace the idea that roadways should be designed to accommodate a variety of transportation modes. A safe systems approach offers the best chance to improve traffic safety.



Transportation engineers now acknowledge that motor vehicle driver behavior is mostly influenced by how a road is designed.<sup>1</sup> Drivers feel safe when there are long sight distances, wide painted lanes, and no visible obstructions, and when they feel safe, they by nature drive faster. If a road in a downtown business district or neighborhood is designed the same way as a highway, drivers feel safe and will therefore tend to drive fast, regardless of the speed limit, signage, or if pedestrians or bicyclists are present. If a roadway is engineered exclusively for motor vehicles, other attempts to influence driver behavior (for example, posted speed limits) will probably have a minor or temporary impact. Roadway treatments that provide clearly defined spaces for all modes will provide more incentive for non-motorized users and should therefore be encouraged.

If we want to improve walkability and bikeability in our communities, future roadway improvements need to be designed with the intention of providing visual cues that automatically encourage drivers to slow down. Examples include physically narrowing travel lanes, using different colors or materials on roadway shoulders, incorporating trees or other objects into the driver's peripheral vision along the roadway edge, and other design treatments. Additionally, traffic calming features such as speed tables, raised lane markings, bollards, and other features which will cue drivers to alter their path and slow down.

The goal is to make the driver feel less comfortable and therefore encourage slower speeds. If an intersection feels unsafe to a driver, for example, the driver will approach and enter the intersection with more caution and at slower speed.

## INCORPORATING SYSTEMATIC SAFETY INTO ROADWAY DESIGN

The relationship between motor vehicle speed and severity of crashes with other vehicles or with vulnerable users is key to safe roadway design.

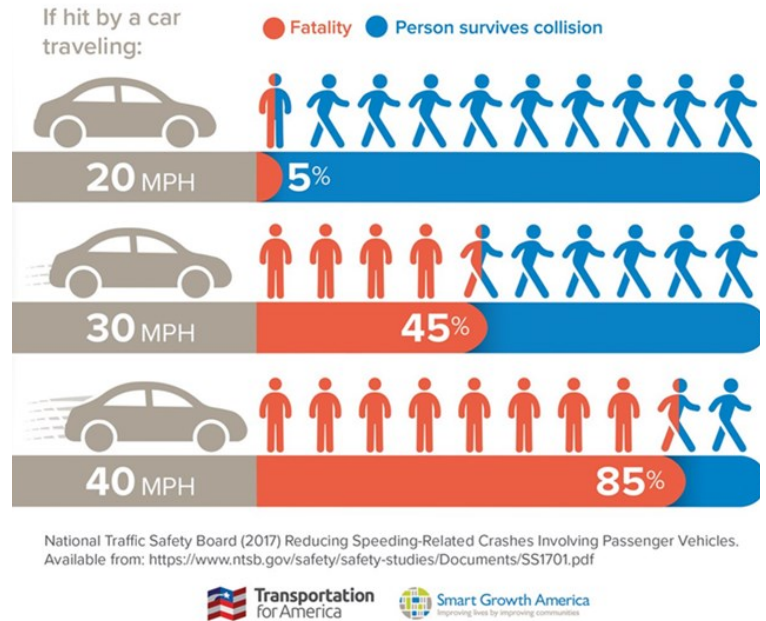
There is a maximum safe speed for every type of conflict on a roadway.<sup>2</sup> For crashes between motor vehicles and vulnerable road users, various data show a similar pattern in the risk of fatality for a vulnerable user. The risk increases slowly until impact speeds of around 25 mph. Above this speed, risk increases rapidly – the increase is between 3.5 and 5.5 times from 30 mph to 40 mph. For passengers in motor vehicles, fatality rates increase dramatically at approximately 50 mph. This information helps define general categories of roadways, each with

their own design characteristics that help to minimize safety risks to all users of the road.

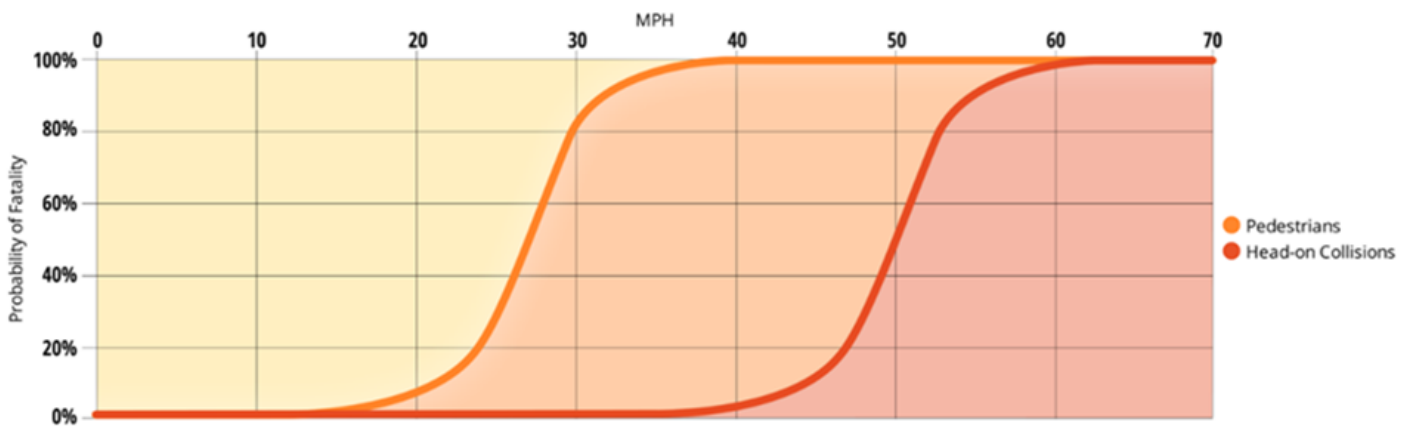
Where vulnerable road users are more commonly found and may cross the street anywhere or act in an unpredictable manner, the target speed achieved by the road design should be 25 mph or less because at higher speeds, the chance of a pedestrian surviving a collision falls rapidly. At the highest speeds, road design should separate vehicles from other vehicles by direction, based on the physical limitations of vehicles to absorb energy from head-on collisions without resulting in fatality.

The following graph shows the relationship between speed of motor vehicles (horizontal axis) and the probability of a fatality (vertical axis) from collisions involving vehicles/pedestrians and collisions involving vehicles/vehicles. The graph suggests that when considering the relationship between speed and safety risk, and how to incorporate vulnerable users into the road network, there are three types of roads:

**Figure 3.1: Pedestrian Fatality vs. Motor Vehicle Speed**



**Figure 3.2: Risk of Pedestrian Fatality by Head-on Collision Speed**



- Design Level 1 - Low-speed/low-volume roads (< 25mph) in which motor vehicles and vulnerable users may safely mix.
- Design Level 2 - Medium speed/ higher volume roads (25-50mph) in which motor vehicles and vulnerable users should be separated from each other due to risk of serious injury/death in the event of a collision.
- Design Level 3 - High speed roads (> 50mph) in which motor vehicles should be separated from vulnerable users and motor vehicles (by direction) due to risk of serious injury/death in the event of a head-on collision.

Each of these roadway categories has unique needs and requires appropriate designs to maximize safety for all users. These categories are arranged in the table below to illustrate their corresponding recommended designs and the rationale that informs their selection.

Each of these roadway categories has unique needs and requires appropriate designs to maximize safety for all users. These categories are arranged in the Table 3.1 below to illustrate their corresponding recommended designs and the rationale that informs their selection.

**Table 3.1: Roadway Design Categories**

		DESIGN CATEGORY		
		Design Level 1 - Low Speed & Volume	Design Level 2 - Medium Speed & Volume	Design Level 3 - High Speed
Roadway Characteristics	Speed	< 25 mph OR	25- 50 mph OR	> 50 mph
	Volume	<10,000 vpd	>10,000 vpd	
	Practical Use	Local/neighborhood access	Local access & through traffic	Highways
Relationship to vulnerable Road users	Method of Protection	Permanent speed limitation through roadway design (traffic calming, etc.)	Permanent speed limitation through roadway design, additional measures at intersections & crossings	Wide margins and/or physical barriers
	Placement of Users	Mixing of pedestrians/bikes/ motor vehicles	No mixing of pedestrians/bikes with motor vehicles except at crossings	Motor vehicles completely separated from pedestrians/bikes
	Types of Improvements	No improvements needed when motor vehicle speed is very low. At higher speeds, shared streets, advisory shoulders, paved shoulders	Sidepaths, separated by at least 5' and/or curb	Sidepath, separated by at least 16.5'



## DESIGN GUIDELINES

The Nashua region has a mixture of local streets that are fine for walkers and bicyclists of all abilities, as well as road corridors that are urbanized and developed to the level and extent where comprehensive pedestrian and bicycle facilities are appropriate.

The following design guidelines should be considered whenever maintenance, rehabilitation or new construction occurs within the right of way of any roadway in the region. This will allow multimodal accommodations to be implemented on a gradual basis over time as part of road maintenance, upgrades, and new construction of state and local roadways. This will also minimize the cost of active transportation infrastructure improvements.

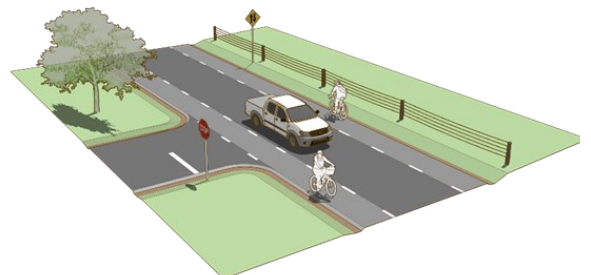
The engineering of specific roadway improvements is beyond the scope of this Plan. Best practices for design guidelines and road treatments that accommodate all modes of transportation continue to evolve and this document strongly recommends that best practices always be followed. Appendix A lists resources that provide clear and up-to-date guidance for active transportation engineers and planners.



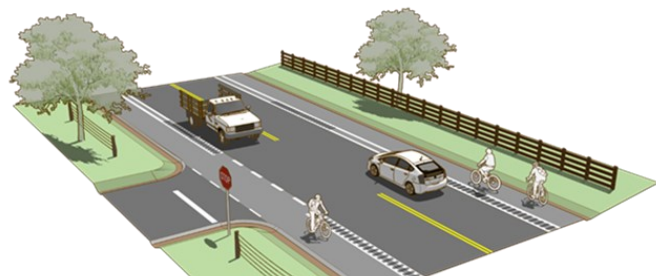
### **Design Level 1—Mixing of Pedestrians/Bikes/Motor Vehicles**

*Design Level 1* roads are defined by their ability to safely mix motorized and non-motorized traffic at low speeds. These roads are generally neighborhood streets characterized by their lower vehicular traffic volumes and (comparatively) higher volumes of multimodal users. The upper limit of this category is defined by exponentially higher risk of death in a collision between a vehicle and a vulnerable road user at ~25 mph. Design Level 1 roads are specifically defined by vehicular traffic speeds of ~25 mph and below and volumes of ~10,000 Vehicle Per Day (vpd) and below.

On these roads it is unnecessary and impractical to physically segregate motor vehicles from vulnerable road users. In many cases, such as on typical cul-de-sacs, nothing at all needs to be done to encourage pedestrians, bicyclists, and other self-powered users to travel on the road. In other cases, when motor vehicle speed and volume approach the upper level of this category, visual separation of road users is appropriate. The Federal Highway Administration (FHWA) provides guidance for visually separating motor vehicles from pedestrians and bicyclists<sup>3</sup>.



Paved shoulders along the edge of roadways can improve bicycle safety in areas where traffic speed and volume begin to approach the upper end of what could be considered a local road. The enhanced shoulder design takes existing road design and uses visual traffic calming techniques that create roadways where motorists feel the need to drive slower, thereby providing a more comfortable space for active transportation modes. Space occupied by vulnerable users should be defined from traditional road space in a distinctive way. It is therefore recommended that when paved shoulders are installed, hot mix asphalt colorant should be utilized as it tends to color the surface for the life of the asphalt, as opposed to surface-applied paints, which require regular maintenance. FHWA-approved color should be used universally in these spaces and in most cases terra cotta is the recommended color. This design can be used on some rural road segments as well as more urban areas, as shown in the figures above. The road treatment can in some cases (low traffic volume) include just a painted shoulder, but in other cases (higher traffic volume) it may be more appropriate to

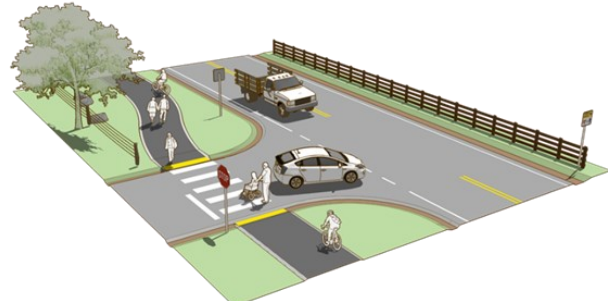


include painted striping and rumble strips to further distinguish between the motor vehicle travel lane and the shoulder.

Technically, none of these design elements are FHWA—Manual on Uniform Traffic Control Devices (MUTCD) traffic control devices, therefore the regulatory perspective and use of these roadways is completely identical to conventional roadways.

## Design Level 2—No Mixing of Pedestrians/Bikes with Motor Vehicles Except at Crossings

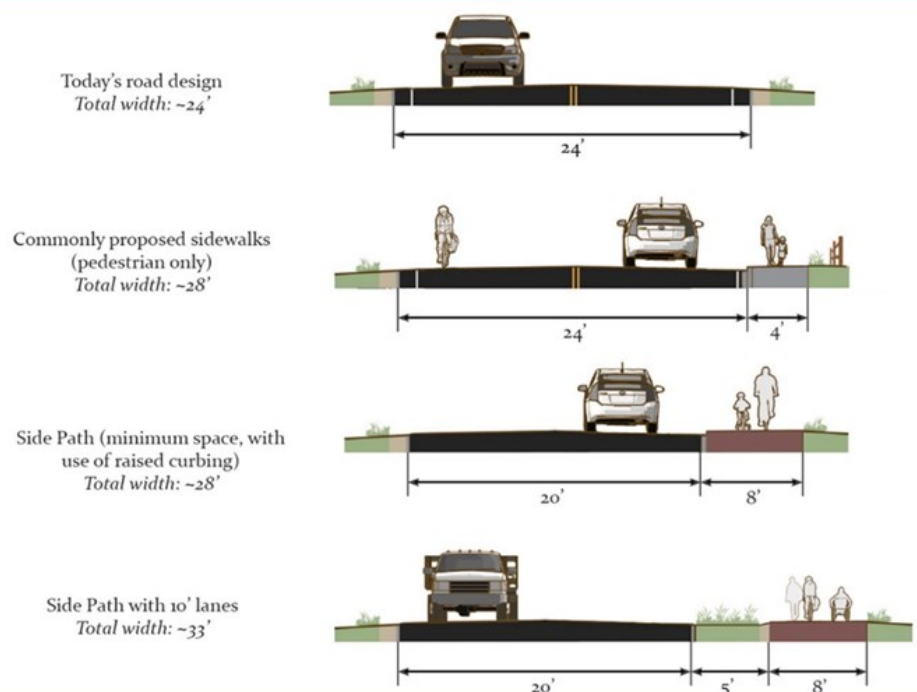
Design Level 2 roads are generally characterized by traffic speeds between approximately 25- 50 mph which, as noted earlier (p. 3-3), presents a high risk of death or serious injury in a collision between a vehicle and a vulnerable road user. Additionally, high traffic volumes (> ~ 10,000vpd) factor into a high level of bicycle and pedestrian traffic stress which discourages bicycle and pedestrian usage of this type of roadway. These roads connect local traffic from neighborhoods to towns, city centers, and the larger highway network. These roads include the more rural numbered state routes in the region such as NH122 and NH130, as well as the more urbanized corridors such as NH101A (Milford to Nashua) and Daniel Webster Highway in Merrimack.



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 means of 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 image below shows a typical cross section of 12-foot travel lanes and 4-foot sidewalk (ADA allows a minimum 4' sidewalk width under certain conditions and these are common). 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 below also 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 many streets in the region. It is also possible to incorporate a side path into a center turn lane cross section as well as a 5-lane cross section, using less right of way than is typical.

A side path may still be possible in certain areas along various corridors in the region 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 for the widest possible shoulder, thus allowing more room for bicycles, enhanced shoulders, or in more urban areas, cycle tracks.

As explained earlier (p. 3-2), space occupied by self-powered users should be defined from traditional road space in a distinctive way. It is therefore recommended that when asphalt sidewalks and side paths are installed, the same hot mix asphalt



colorant be used that was used for paving enhanced shoulders.

### Design Level 3—Motor Vehicles Completely Separated from Pedestrians/Bikes

Design Level 3 roads are generally characterized by traffic speeds above 50 mph (NH101, for example) which presents a near certain risk of death or serious injury in a collision between a vehicle and a vulnerable road user. Bicyclists and pedestrians must be completely separated from motor vehicle traffic.

### Downtown Main Street Design Considerations

Busy downtown Main Streets that operate 2-way are often the most difficult streets for cities to reconfigure and retrofit. Many of these streets suffer from double parking and loading conflicts, have heavy turn volumes, and offer insufficient accommodations for bicyclists and pedestrians. These streets are often the nexus of neighborhood life, with high pedestrian volumes, frequent parking turnover, key transit routes, and bicyclists all vying for limited space. Four-lane configurations (such as Main Street in downtown Nashua) have been shown to increase rear-end and sideswipe vehicle crashes and pose a higher pedestrian crash risk, and a risk of bicyclists getting “doored.”

Main street design should limit traffic speeds and create a narrower cross section with frequent, well-designed pedestrian crossings. In recent years, many main streets have been significantly improved through road diets and the conversion from 4 to 3 lanes of travel with bike lanes and a center turning lane or median. The National Association of City Transportation Officials (NACTO) [Urban Street Design Guide](#) offers a thorough discussion as well as design guidelines for addressing busy Main Streets.

### Crosswalks at Uncontrolled Pedestrian Crossings and Signalized Intersections

FHWA guidance states that pedestrians are especially vulnerable at non-intersection locations, where 72% of pedestrian fatalities occur. The guidance addresses safety issues at uncontrolled pedestrian crossing locations, which occur where sidewalks or designated walkways intersect a roadway at a location where no traffic control (for example, traffic signal or STOP sign) is present. These common crossing types occur at intersections (where they may be marked or unmarked) and at non-intersection or midblock locations (where

they must be marked as crossings). Overall, uncontrolled pedestrian crossing locations correspond to higher pedestrian crash rates than controlled locations, often due to inadequate pedestrian crossing accommodations.

Improvements could include crosswalk visibility enhancements, Pedestrian Hybrid beacons, raised or textured crosswalks, and rectangular rapid flashing beacons.

Many of these design treatments can also be incorporated at signalized intersections as described in the NACTO Urban Street Design Guide.



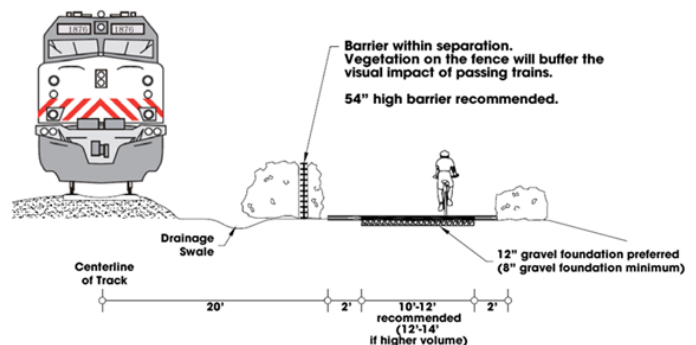
### Rail Trails

There are active and abandoned railroad corridors in the region that provide the potential opportunity to greatly improve opportunities for safe active transportation in the region.

Rail-trails are multipurpose public paths created from former (and sometimes still active) railroad corridors. They are ideal for self-powered transportation and recreational activities.

The development of rail trails should be considered whenever possible to separate vulnerable users from motor vehicles.

Rail-with-Trail Sample X-Section





# BICYCLE, PEDESTRIAN & ACTIVE TRANSPORTATION - RELATED POLICIES & PROGRAMS

The phrase “bicycle, pedestrian, & active transportation-friendly” suggests a region where it is easy and pleasant to ride a bicycle, walk or engage in other forms of active transportation. Bicycle these transportation modes are impacted in a significant way by transportation policies and programs. Every roadway on which bicycles and pedestrians are permitted to operate should be designed and maintained to accommodate shared use by bicycles, pedestrians, other vulnerable users, and motorists. The policies and programs that are described in these pages will support this plan’s mission goals of creating a region that encourages increased bicycling, walking, and other forms of active transportation for everyday travel.

## Implementation Policies

Implementation of active transportation infrastructure improvements should be considered whenever maintenance, rehabilitation or new construction occurs within the right of way of any roadway in the region. This will allow multimodal accommodations to be implemented on a gradual basis over time as part of road maintenance, upgrades, and new construction of state and local roadways. This will also minimize the cost of active transportation infrastructure improvements.

## Complete Streets Policies

Policies and programs that compliment these design guidelines should be considered for adoption by individual municipalities. These include but are not limited to the suggestions that follow. Complete Streets is a term that defines a growing national movement to amend transportation policy to emphasize the importance of safe access on the roadways for all users. Instituting a Complete Streets policy formalizes a community’s intent to plan, design, operate and maintain streets so they are safe not just for vehicles, but also for active transportation and public transit users, regardless of age or ability.



There is no singular design prescription for a Complete Street; each one is unique and responds to its community context. A complete street may include sidewalks, bike

lanes (or wide paved shoulders), special bus lanes, comfortable and accessible public transportation stops, frequent and safe crossing opportunities, median islands, accessible pedestrian signals, curb extensions, narrower travel lanes, roundabouts, and more.

A Complete Street in a rural area will look quite different from a Complete Street in a highly urban area, but both are designed to balance safety and convenience for everyone using the road. The following are examples of Complete Streets policies:

### Traffic Calming for Local Roads

Traffic calming is an important element of safety and speed management on a Complete Street. The overall objective of traffic calming is to reduce the negative effects of motor vehicles while improving conditions for other modes.



Traffic calming projects can enhance safety and maintain access for vulnerable users. Bicyclist and pedestrian safety are enhanced because the goal of these projects is to slow motor vehicles down. This decreases the speed differential between cars, bicycles, and pedestrians, which enhances the comfort level of these vulnerable users. Access for all users of the road is maintained and the neighborhood environment is improved when roadways are restored to their intended function. On the other hand, traffic calming measures such as road narrowing can place bicycles and motor vehicles in closer proximity than is comfortable. Therefore, traffic calming policy should be sensitive to the needs of cyclists and walkers.



Traffic calming techniques include, but are not limited to, the following intentions:

- Reduce the speed at which motor vehicles travel by altering roadway design. These techniques include speed bumps and speed tables, rumble strips or changes in the roadway surface, center medians, diagonal diverters, dead-end streets or cul-de-sacs, neck downs, chicanes, chokers and protected parking, narrower streets, and roundabouts.

- Change the psychological feel of the street through design or redesign. The use of traffic control devices, signs, pavement markings and landscaping should enhance the image of the residential street as a place that is safe for pedestrians.
- Discourage the use of private motor vehicles. Encourage the use of alternative transportation.
- Create strong viable local neighborhoods. Create compact neighborhoods with a range of facilities on hand so that people can drive shorter distances to where they want to go and make more trips by foot, bicycle or public transportation.

**Living (Not Dead) End Streets**

Bicycling and walking tend to be short distance modes of travel which

means barriers that force a one- or two-mile detour can discourage many non-motorized trips. Barriers include the lack of road connections



between housing developments or cul-de-sacs. This can be remedied by requiring connections between these land uses that are reserved for non-motorized travel only.

**Bridge & Underpass Improvements**

Bridges and underpasses are important because they provide crossing points of major barriers such as rivers and highways. Underpasses are not particularly bicycle or pedestrian friendly because of abutment walls that are close to the travel lanes, as well as poor lighting and drainage and other factors. Overpasses and bridges can be narrow, with no accommodation for non-motorized travel. The general policy should be to provide enhanced shoulders and sidewalks on bridges and in underpasses even if they are not part of the designated bicycle network. Improved lighting should be included in any underpass reconstruction project.

**Street Sweeping**

Debris that ends up on roads tends to accumulate on the shoulders, where bicycles are typically operated. Roadway shoulders should be kept free



of debris through regular street sweeping.

**Shoulder Repair**

The roadway shoulder is where bicycles are generally ridden, and it is also where roadway pavement typically begins to deteriorate first. Hazards such as cracks, potholes and crumbling pavement, that a motorist might not even notice, can have a devastating impact on cyclists. By the time a roadway is



resurfaced, the shoulders may have long since become dangerous to cyclists. It is therefore critical that roadway shoulders be repaired more frequently than travel lanes.

**Provide Bicycle Transit Links**

Use of public transit is limited by the potential capture area of each route and its stations or stops. By making it easier for bicyclists (bike racks on busses) and pedestrians to get to and use transit, it is possible to increase the capture area and, as a result, to benefit both. The Nashua Transit System should continue to encourage the combined use of transit and bicycles to increase its transit capture area.

**Provide End-of-Trip Facilities**

People will be more willing to ride a bike to work if there is secure bicycle parking, locker facilities, and changing rooms at their destination.



## LOCAL REGULATIONS

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.

The planning and policy tools that support bicycle, pedestrian, and intermodal transportation in communities the Greater Nashua region are generally in master plans as well as subdivision and site plan regulations. Master plans address Land Use and Community Design, Economic Development, Natural Resources, Community Facilities, Transportation, and other characteristics of those communities. They typically express a Community Vision that seeks to preserve community character and the quality of life experienced by its residents. Walking, bicycling, and rolling are central to achieving this purpose which is why these activities are addressed in Master Plans in the region. The actual regulations that support Bicycle, pedestrian, and other non-motorized amenities are then referenced in various town subdivision and site plan regulations.

Revising regulations that have been in place for many years can be a daunting task – either for planners who are trying to re-model a development ordinance or for engineers who are trying to change street design standards to accommodate active transportation modes.

Active transportation is often an afterthought in the development process. The results are impassable barriers to pedestrian travel, both within and between developments. It is beyond the scope of this plan to identify the specific land use policies and regulations that currently exist in the 13 communities of the Greater Nashua region. However, the following examples show how local zoning ordinances can be amended to require more attention to the needs of active transportation users.

- *Subdivision Layout* - Residential subdivision layout should provide safe, convenient, and direct bicycle and pedestrian access to nearby (within ¼ mile for

walking and 2 miles for bicycling) and adjacent residential areas; bus stops; and neighborhood activity centers, such as schools, parks, commercial and industrial areas, and office parks. Low-density single-use zoning creates trip distances that are too far to make walking a viable transportation option.

- *Cul-de-Sacs* - Cul-de-sacs have proven to be effective in restricting automobile through-traffic; however, they can also have the effect of restricting bicycle and pedestrian mobility unless public accessways are provided to connect the cul-de-sac with adjacent streets. Trail connections between cul-de-sacs and adjacent streets should be provided wherever possible to improve access for active transportation users.
- *Future Extension of Streets* - During subdivisions of properties, streets, bicycle paths, and sidewalks should be designed to connect to adjacent properties that are also likely to be subdivided in the future, so that a secondary system of roads and sidewalks develops over time. When subdivisions are built with only one outlet to a main thoroughfare, the result is heavy traffic congestion and difficult intersections for both motorists and pedestrians

## STATEWIDE REGULATIONS

Bicycles are considered to be vehicles under New Hampshire statute and therefore bicyclists have the same rights and duties as drivers of motor vehicles (RSA 265:143 – 144-a). For example, bicyclists must stop at stop signs and red lights, yield to pedestrians, and drive with traffic. The NH DOT has developed a helpful factsheet that can be found here: [20200202RulesSafety.pdf \(nh.gov\)](#)

Except for where specifically prohibited by regulation, which in New Hampshire includes interstates and turnpikes, pedestrians may travel along all public roads and highways. Pedestrian rules and duties under New Hampshire state statute are described in RSA 265:35.

E-bike legislation is covered by RSA 265:144-a

Where E-scooter's can be ridden is a local decision.

## SOURCES

<sup>1</sup> Amherst (NH) Multimodal Master Plan

<sup>2</sup> Ibid

<sup>3</sup> [Small Town and Rural Multimodal Networks](#), U.S. Department of Transportation FHWA

<sup>4</sup> Federal Highway Administration, 2018.



**SECTION 4**  
***Improving the Network***





There is currently a modest and scattered active transportation network in the Greater Nashua Region, and developing a comprehensive, interconnected network of active transportation facilities is going to be a challenge that will require creative thinking. A connected network is not shaped by a single trail, sidewalk, or bike lane, but is comprised of many facilities that support walking and bicycling throughout the region. All roadway types and independent connections must be considered to create access to key locations.

The Federal Highway Administration (FHWA)<sup>1</sup> emphasizes the following attributes of a successful bicycle and pedestrian network and these were considered during the planning process:

### COHESION

- How connected is the network in terms of its concentration of destinations and routes?

### DIRECTNESS

- Does the network provide direct and convenient access to destinations?

### ACCESSIBILITY

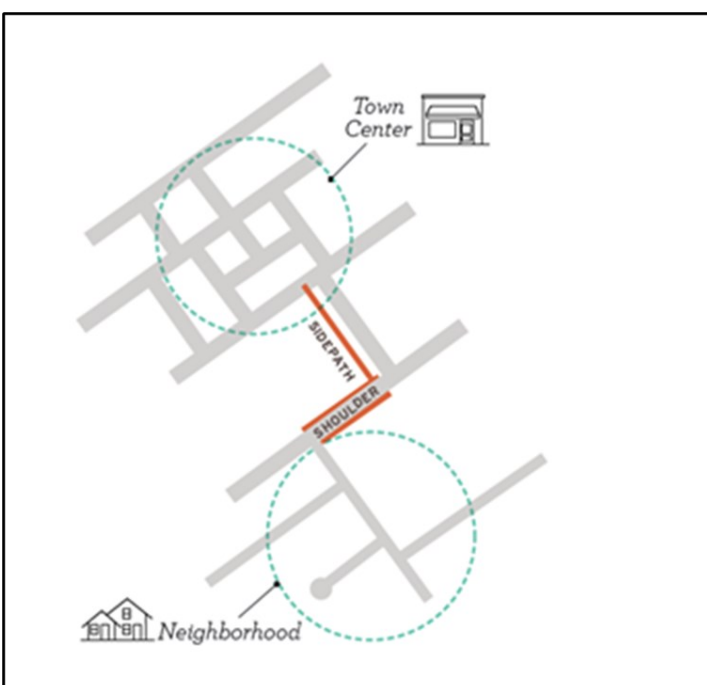
- How well does the network accommodate travel for all users, regardless of age, income level, or ability?

### ALTERNATIVES

- Are there different route choices available within the network?

### SAFETY & SECURITY

- Does the network provide routes that minimize risk



of injury, danger, and crime?

### COMFORT

- Does the network appeal to a broad range of age and ability levels and is consideration given to amenities?

## REGIONAL ACTIVE TRANSPORTATION NETWORK

A proposed regional active transportation network was identified through the planning process and mapped. The process for developing the network involved the following steps:

- Reviewed and incorporated components of the (2015) NRPC Bicycle and Pedestrian Plan network.
- Reviewed and incorporated components of the Draft NHDOT Statewide Bicycle and Pedestrian Plan network. This network was created during 2019-20 through various opportunities for public engagement including a project website with interactive map, public outreach events, and a series of meetings with the Regional Complete Streets Advisory Committee.
- NRPC staff used these previous plans as well as information from other planning processes and public input to develop a new regional network, which was then reviewed over a series of Regional Complete Streets Committee meetings in the winter/spring of 2021.

### Regional Network Map

The following proposed regional network map (p. 4-4) suggests a route hierarchy that characterizes regional corridors, regional connectors, and local connectors. The route hierarchy is a generalized attempt to acknowledge where people are, and where they want to go. However, the character of a road segment is not defined by whether it is part of a regional corridor, regional connector, or a local connector. Instead, it is quite possible that any segment of roadway, regardless of its placement in this hierarchy, could be suitable for all skill levels of bicyclists. It is also possible that any segment could be suitable for only the most skilled bicyclists. It is the goal of this plan to encourage as much of the regional network as possible be Bicycle Level of Traffic Stress 2 (suitable for most riders, including children) or better.

**Regional Corridors** enable bicyclists to travel north-south or east-west through the region. These routes can be used for commuting the somewhat longer distances between municipalities, as well as for longer recreational rides. Segments of these corridors will also be used for shorter, utilitarian trips.

**Regional Connectors** function as sub-regional travel corridors that connect areas of high trip production to desired destinations throughout the region.

**Local Connectors** are generally located within municipalities and provide connections between regional corridors and connectors to areas of high trip production (generally residential areas) within municipalities. Local Connectors will eventually provide connections to local bike routes between residential areas and desired locations within municipalities, including the Central Business District, commercial and retail areas, schools and parks. Individual municipalities are responsible for developing their own local active transportation routes. NRPC will offer guidance and technical assistance.

## Design Categories and Sample Projects Map

The map on page 4-5 incorporates into the regional network map the three design categories that were explained in Chapter 3. Each road segment in the network has been assigned a design category. This map is intended to provide guidance regarding improvements that could be made to the regional network, based on the design category of the road segment, as discussed below.

Additionally, the map provides examples of planned and aspirational projects that would create a more usable and connected network. They are highlighted here because they serve as examples of the types of projects that are needed in many communities to address challenging, and often unsafe conditions. In many cases, the projects have the potential to have a major regional impact by addressing critical gaps in the active transportation network or connecting multiple communities. The network map is intended as both a snapshot of where we are now and where we intend to go. The projects on pages 4-6 through 4-9 are examples only, and not to be interpreted as priority projects. Appendix B includes a list of all pedestrian & bicycle-related projects that are currently included in Federal and State-approved documents.

**Design Level 1** roads are generally characterized by their ability to safely mix motorized and non-motorized traffic at low speeds (<25mph). On these roads it is unnecessary and impractical to physically segregate motor vehicles from vulnerable road users. In many cases, such as on typical cul-de-sacs, nothing at all needs to be done to encourage pedestrians, bicyclists, and other self-powered users to travel on the road. In other cases, when motor vehicle speed and volume approach the upper level of this category, visual separation of road

users is appropriate. The design treatments for these roads, in general, will vary from no improvements at all to enhanced paved shoulders.

The reality is that, with some local exceptions, the minimum posted speed limit on most roadways in the region is 30 mph. Additionally, it is generally true that most drivers exceed the posted speed limit on a regular basis. The practical assumption, therefore, is that there are no Design Level 1 roads in the proposed regional network. Roads in this category would be more likely be found on neighborhood roads and be part of the local active transportation network.

**Design Level 2** roads are generally characterized by traffic speeds between approximately 25 - 50 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. 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 is the preferred means of protection. The design treatments for these roads, in general, will include a combination of side paths, crosswalks, roundabouts where appropriate, and various complete streets policies and traffic calming measures.

**Design Level 3** roads are generally characterized by traffic speeds above 50 mph which presents a near certain risk of death or serious injury in a collision between a vehicle and a vulnerable road user. Vulnerable users must be completely separated from motor vehicle traffic, including at intersections.

**Table 4.1: Mileage of Each Design Categories in Proposed Active Transportation Network**


	Design Level 1	Design Level 2	Design Level 3	Off Road	Total
<b>Mileage</b>	7	248	23	71.5	349.5
<b>% of Network</b>	2%	71%	7%	20%	100%




# Proposed Regional Network

by hierarchy

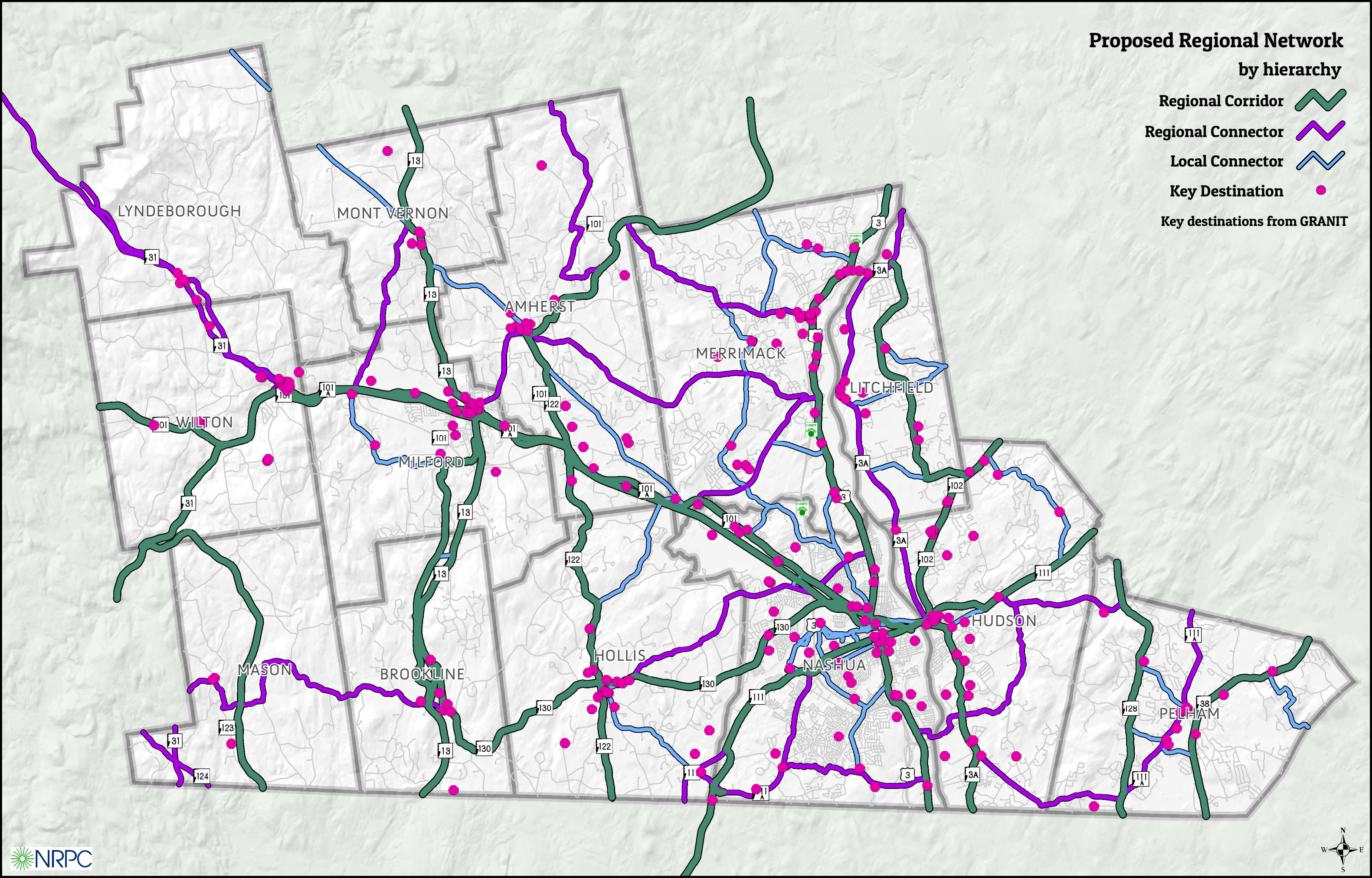
Regional Corridor 

Regional Connector 

Local Connector 

Key Destination 

Key destinations from GRANIT





# Potential Projects

with proposed network by treatment level

Project location



Design Level 1 - 25 mph or lower & less than 10,000 vpd



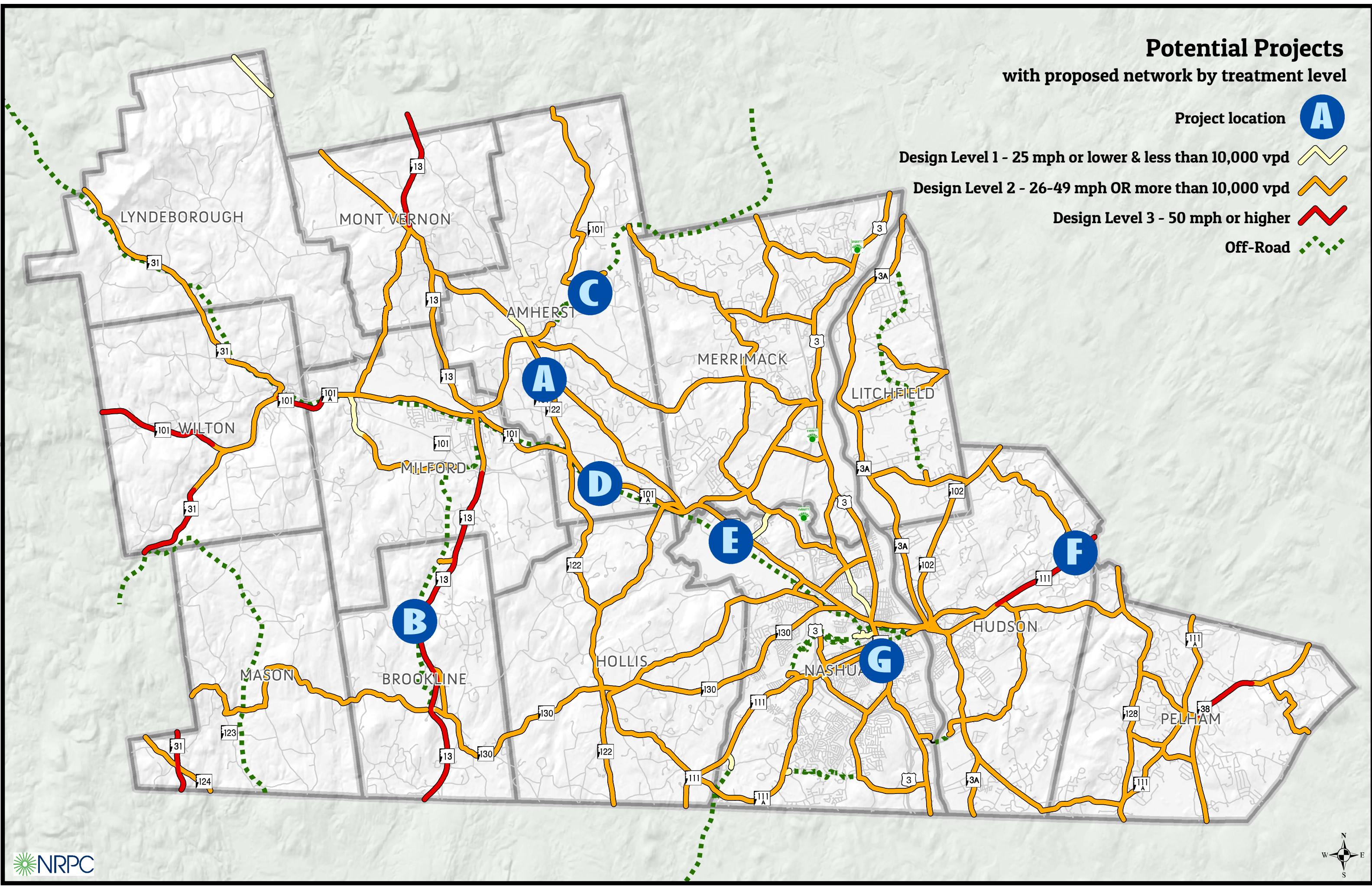
Design Level 2 - 26-49 mph OR more than 10,000 vpd



Design Level 3 - 50 mph or higher

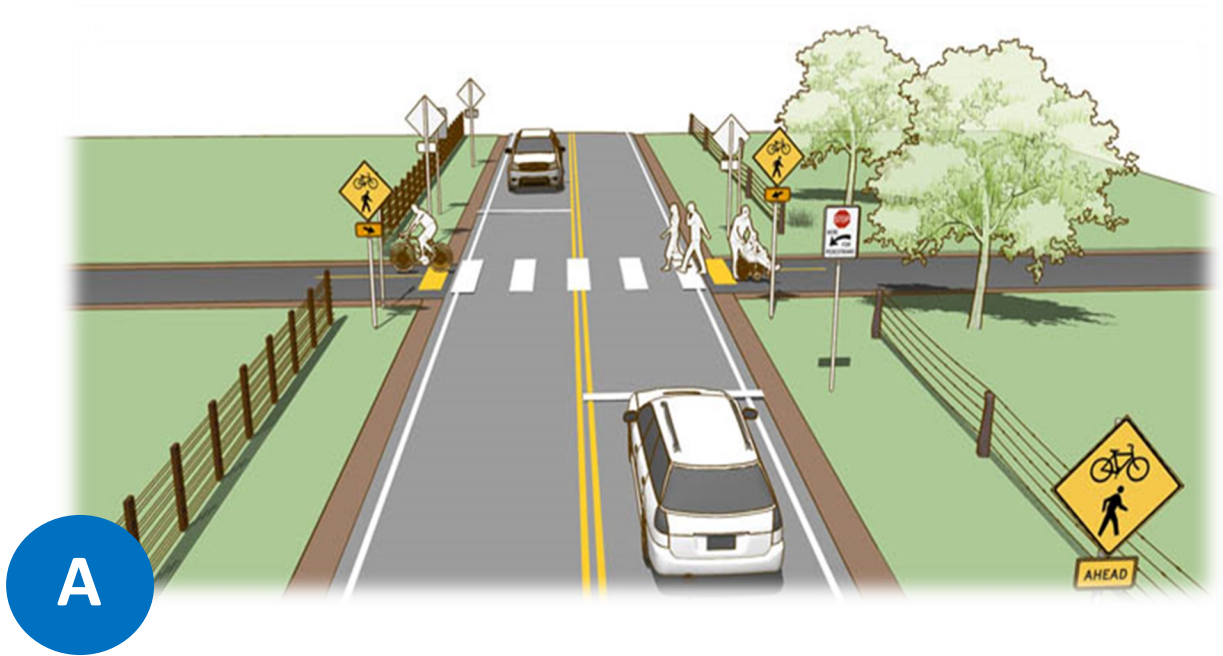


Off-Road





# Potential Projects



## NH 122—Amherst to Hollis

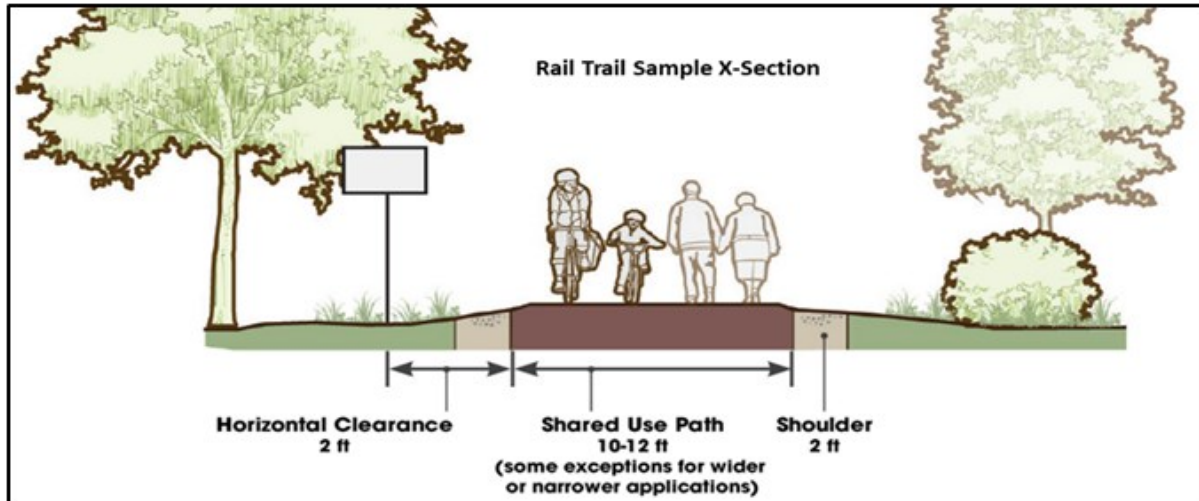
**Regional Significance:** NH 122 is a 12.6-mile-long rural highway that passes through Amherst and Hollis. Like others in the region, it offers a vital corridor for the communities through which it spans.

The highway connects the downtowns of two communities, hosts a high school, a state park, and a popular outdoor market area. Simultaneously, it carries thousands of vehicles per day and intersects major routes such as NH 101 and NH 101a. Some parts of this road are distinctly rural, while others are quite the opposite.

**Design Category:** Design Level 2 - medium speed/higher volume road where motor vehicles and multimodal users should be separated from each other due to risk of serious injury/death in the event of a collision.

**Proposed Improvements:** Provide a dedicated multimodal transportation corridor by separating motor vehicles from vulnerable road users by constructing a side path, limiting speeds, and reducing conflict-potential at intersections, defining multimodal space by color, and distinguishing the open roadway from public spaces.

# Potential Projects



## Granite Town Rail Trail—Milford to Brookline

**Regional Significance:** This trail would provide a nonmotorized alternative along the NH31 between the towns of Milford and Brookline. It would also provide connections to the proposed Souhegan Valley Rail Trail.

B

**Design Category:** This is an already existing rail trail that parallels a Design Level 2 - medium speed/higher volume road in which motor vehicles and multimodal users should be separated from each other due to risk of serious injury/death in the event of a collision.

**Proposed Improvement:** improve an already existing multiuse trail in the corridor.

## Baboosic Greenway—Amherst to Bedford

**Regional Significance:** This trail would provide a nonmotorized trail in Amherst that would provide connections to Bedford and to other non-motorized facilities in Amherst.

C

**Design Category:** This rail trail would provide an alternative to a Design Level 3 – high-speed road (NH101) from which motor vehicles and multimodal users should be completely separated from each other due to risk of serious injury/death in the event of a collision.

**Proposed Improvement:** Develop a multiuse rail trail in the existing railroad corridor.

# Potential Projects



## NH101A—Milford to Nashua

**Regional Significance:** NH 101A serves as the principal east-west travel and retail corridor for the Greater Nashua region. It provides direct access for five municipalities by extending east from Milford to downtown Nashua where it terminates at the intersection of Main Street. Unfortunately, there are limited sidewalks and virtually no dedicated bicycle facilities along NH 101A today, and where sidewalks do exist, they are rarely used.

**Design Category: Design Level 2 -** Medium speed/higher volume road where motor vehicles and multimodal users should be separated from each other due to risk of serious injury/death in the event of a collision.

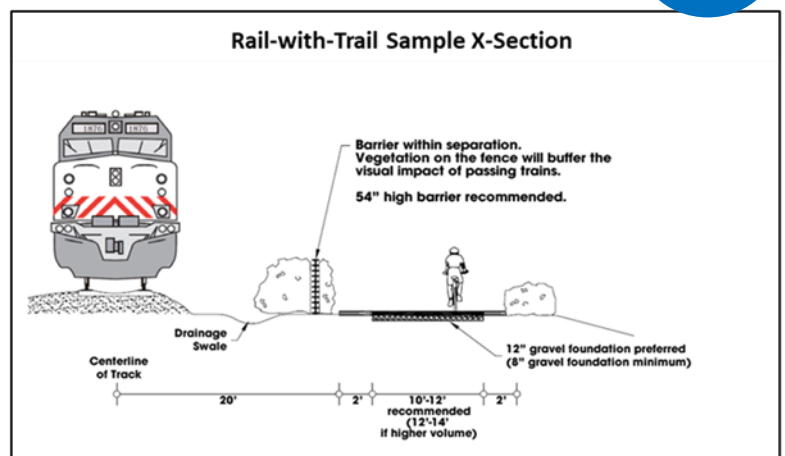
**Proposed Improvements:** develop a separated, eight-foot-wide, multiuse side path that would run parallel to NH Route 101A.

## Souhegan Valley Rail Trail—Nashua to Lyndeborough

**Regional Significance:** This trail would provide a nonmotorized alternative along the Hillsborough Branch Rail line, which parallels the NH101A corridor in its entirety and extends westerly from Nashua through Wilton and on to Lyndeborough. This rail corridor provides an exceptionally unique opportunity to pursue a separated, multimodal path. The corridor is a prime location for alternative transportation, with over 150,000 residents, and over 68,000 jobs located near the corridor.

**Design Category:** This trail would provide an alternative to a Design Level 2 - medium speed/higher volume road in which motor vehicles and multimodal users should be separated from each other due to risk of serious injury/death in the event of a collision.

**Proposed Improvement:** Develop a multiuse trail in the corridor.





# Potential Projects

F

## Side Path—Hudson NH111

**Regional Significance:** This project would provide a nonmotorized connection a side path along NH111 between the downtown area of Hudson and Kimble Hill Road. this will connect Benson Park, which is a popular recreation destination, to the downtown area of Hudson.

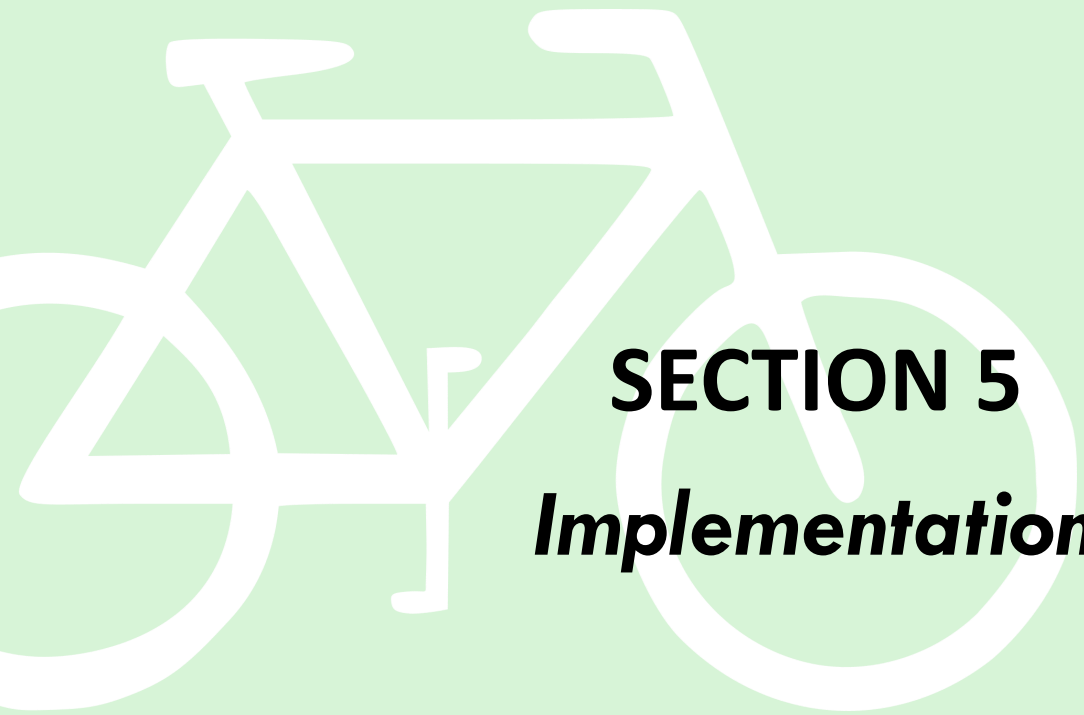
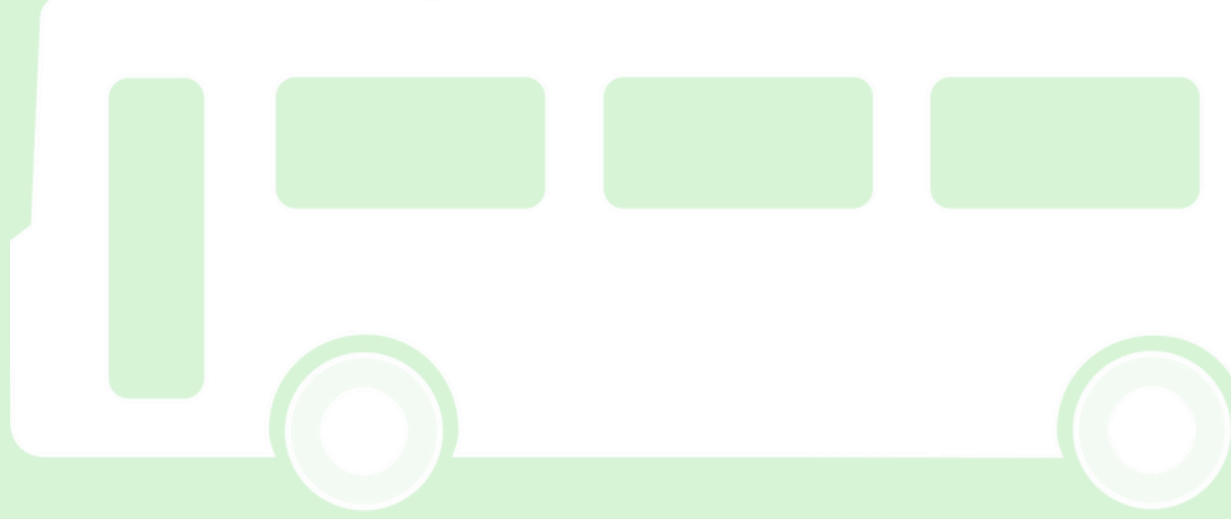
**Design Category:** Design Level 2—Medium speed/higher volume road where motor vehicles and multimodal users should be separated from each other due to risk of serious injury/death in the event of a collision.

**Proposed Improvement:** Develop a a paved, eight foot-wide, bidirectional, multiuse space along NH111.



## END NOTES (SOURCES)

<sup>1</sup>Small Town and Rural Multi-modal Networks (December 2016) U.S. Department of Transportation – Federal High-



**SECTION 5**  
***Implementation***



Several steps will be needed to achieve the goals and objectives of this plan. These include ensuring that pedestrians, bicyclists, and other active transportation users are routinely accommodated on all transportation projects, supporting local and regional bike-ped networks, increasing awareness of bicycling, walking, and other forms of active transportation as viable modes of transportation, improving safety, recognizing economic development opportunities, and providing funding support for active transportation infrastructure and related programs. Recognizing the opportunities that will make implementation easier, as well as the constraints that may hinder progress, will also factor into meeting the goals and objectives of this plan.

The following table organizes the Goals, Objectives, and Recommendations into time frame that assumes the proposed recommendations can be achieved in three phases, short-term (<=4 years), mid-term (6-10 years) and long-term (10+ years). The order and timing of the implementation strategy are intended as a guide, and it is understood that as time passes priorities will evolve and the order and timing of implementation will change. Proposed leading roles are shown in bold type in the *lead role & partners* column. Coordinating roles are shown in italics in the same column.

This document proposes that the regional Complete Streets Advisory Committee (CSAC) will guide the implementation of the recommendations in this plan (see “next steps” on page 5-5). An early task of the CSAC will be to refine the recommendations and develop performance measures.

GOAL	Objective	Recommendation	Timeframe*			Responsibility & Partners
			Short	Medium	Long	
<b>1. Network connectivity</b>	Develop a continuous, coordinated regional bicycle, pedestrian, & active transportation network.	<i>Encourage municipalities to use the proposed regional network as a guide for developing local active transportation plans</i>				<b>NRPC</b> , <i>Advocates</i>
		<i>Identify &amp; prioritize needed improvements</i>				<b>Towns</b> , <i>NRPC</i>
		<i>Build easiest &amp; most cost-effective segments first &amp; then complete the network over time.</i>				<b>Towns</b> , <i>NHDOT</i>
		<i>Require Businesses with occupancy &gt; 25 to provide secure bike &amp; scooter parking</i>				<b>Towns</b> , <i>NRPC</i>
<b>Goal 2: Safety</b>	Encourage communities to adopt roadway safety design guidelines, land use regulations, complete streets, & other active transportation -related policies & programs.	<i>Communities draft &amp; incorporate policies into appropriate land use, planning &amp; regulatory documents</i>				<b>Towns</b> , <i>NRPC</i>
	Routinely incorporate safety design treatments whenever maintenance, rehabilitation, or new construction occurs within the right of way of any roadway in the region	<i>Municipalities implement these design treatments during planning, preliminary engineering, &amp; construction phases.</i>				<b>Towns</b> , <i>NRPC</i>



GOAL	Objective	Recommendation	Timeframe*			Responsibility & Partners
			Short	Medium	Long	
<b>Goal 3. Education, Encouragement &amp; Enforcement</b>	Educate and encourage community members, enforcement agencies, and municipalities to enhance their knowledge of active transportation as a viable means of transportation.	<i>Teach important bicycling &amp; walking skills to youngsters.</i>				<b><i>Bike Walk Alliance NH (BWANH), schools, NRPC</i></b>
		<i>Require a written &amp; practical bicycle riding exam in order to obtain a drivers license.</i>				<b><i>State Legislature, BWANH, NRPC</i></b>
		<i>Develop and disseminate a limited set of simple, but important, pro-bicycling and pro-walking messages.</i>				<b><i>NRPC</i></b>
		<i>Review laws that affect bicyclists and pedestrians.</i>				<b><i>BWANH, NRPC</i></b>
		<i>Improve laws if necessary.</i>				<b><i>State Legislature, BWANH</i></b>
		<i>Enforce the laws</i>				<b><i>Enforcement agencies</i></b>
<b>Goal 4: Health &amp; Fitness</b>	Improve overall public health and reduce health care costs by making it easier, safer, and more convenient for citizens to be physically active.	<i>Partner with health care professionals to develop educational materials and events that promote public health benefits of walking and biking.</i>				<b><i>NRPC, health care entities</i></b>
<b>Goal 5: Economic Vitality</b>	Create a walkable and bikeable community that draws people in, which in turn will attract new businesses, events, development, and a growing tax base	<i>Enhance walking and biking conditions in local business districts.</i>				<b><i>Towns, NRPC</i></b>
		<i>Increase the number of households that are within ½ mile of a Rail Trail or other separated use trail.</i>				<b><i>Towns, NRPC</i></b>
<b>Goal 6: Social Equity</b>	Enhance active transportation options in the region so that all individuals can choose a seamless, convenient, and comfortable mode of transportation that fits their needs, particularly those individuals from underserved, vulnerable & disabled populations.	<i>Include disadvantaged areas and communities in bike-pedestrian planning efforts.</i>				<b><i>NRPC, Social service agencies, advocates</i></b>

GOAL	Objective	Recommendation	Timeframe*			Responsibility & Partners
			Short	Medium	Long	
<b>Goal 7: Environmental Quality</b>	Improve air quality, increase energy conservation, and shrink greenhouse gas emissions by reducing motor vehicle miles traveled	<i>Increase overall levels of bikeing &amp; walking by implementing the improvements identified in this plan</i>				NRPC, Towns, NHDOT, advocates
<b>Goal 8: Data Collection &amp; Monitoring</b>	Use data to better understand how people choose to interact with the network of roads, bike paths, and intersections	<i>Continue NRPC efforts to collect, store and analyze bicycle and pedestrian-related data.</i>				NRPC, Towns, advocates
		<i>Continue to improve the robustness of the NRPC bike-ped counting program.</i>				NRPC, Towns, advocates
		<i>Improve the bicycle level of traffic stress methodology.</i>				NHDOT, NRPC Advocates
		<i>Identify new and innovative sources of data.</i>				NRPC, FHWA, NHDOT, other agencies, advocates
<b>Goal 9: Implementation &amp; Sustainability</b>	Develop an implementation plan and use it to monitor progress.	<i>Develop an implementation plan that identifies priorities and performance measures.</i>				NRPC
		<i>Monitor progress being made towards implementation</i>				NRPC
	Identify sustained funding of active transportation infrastructure and programs	<i>Diversify the sources and increase the amount of funding dedicated to Active Transportation</i>				NRPC, NHDOT, Towns
		<i>Encourage communities to do temporary pop-up demonstration projects</i>				Towns, NRPC

Short-term = 0-4 years

\* Mid-term = 4-10 years

Long-term = 10+ years

## NEXT STEPS

### Step 1: Complete Streets Advisory Committee (CSAC)

- The CSAC will continue to meet regularly (quarterly or as needed).
- The Committee will guide the implementation of the recommendations of the regional plan.

### Step 2: Develop an Implementation Plan

- The goals, objectives, and recommendations will inform the implementation plan.
- The Implementation plan will include performance measures.

### Step 3: Use the Implementation Plan to Measure Progress.

- The performance measures will help quantify progress.
- Provide annual reports of progress being made.

## OPPORTUNITIES FOR PLAN IMPLEMENTATION

### Understanding of land use/Transportation Relationship

- The benefits of transit-oriented, mixed-use, and infill development are well understood. This type of development is naturally inclusive of bicycling and walking, and other modes of active transportation.

### Increased Public Awareness and Support

- The public is increasingly supportive of increased opportunities for access to non-motorized transportation infrastructure.

### Synergies With Public Health Issues

- There is increasing awareness of the public health benefits of an active lifestyle. Partnerships between bicycle and pedestrian planners and public health officials are occurring in the region, which is resulting in greater public acceptance of investment in bike-ped infrastructure and increased funding opportunities.

### Bikeable Destinations

- Several towns in the region have improved and added to their sidewalk networks in recent years. There is also increasing network of recreational trails throughout the region. The increasing number of

bikeable destinations presents an opportunity for further non-motorized connections.

### Political Will

- The recent Ten-Year Transportation Plan and Transportation Alternatives Program application process indicated a strong political support for increased investment in bicycle and pedestrian infrastructure.

## CONSTRAINTS TO PLAN IMPLEMENTATION

### Scale of the Region

- The NRPC region comprises 13 towns and shares common borders with many other New Hampshire municipalities, as well as the State of Massachusetts. The various jurisdictions have varying levels of commitment to regional bicycle and pedestrian travel.

### Dominance of Motor Vehicles

- Motor vehicles continue to dominate regional travel and transportation infrastructure projects are planned, engineered, and prioritized to accommodate motor vehicles.

### Limited Staff Resources

- Staff at municipalities and NRPC have many priorities and have limited time to shepherd bicycle and pedestrian projects through the planning, engineering, and construction phases.

### Limited Funding

- Most transportation funding in New Hampshire goes to maintaining roads and bridges. Funding for bicycle and pedestrian infrastructure is therefore limited and competition for that funding is stiff.



## APPENDIX A – BEST PRACTICES, ORGANIZATIONS & SOURCES OF INFORMATION

### DESIGN GUIDELINES FOR BICYCLE & PEDESTRIAN FACILITIES:

- **FHWA, SMALL TOWN & RURAL MULTIMODAL NETWORKS (2016):** [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/small\\_towns/fhwahep17024\\_lg.pdf](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf)
- **NATCO Urban Bikeway Design Guide (2011):** [Urban Bikeway Design Guide | National Association of City Transportation Officials \(nacto.org\)](http://www.nacto.org/urban-bikeway-design-guide/)
- **CROW Design Manual for Bicycle Traffic (2016):** [Design manual for bicycle traffic – CROW Platform](http://www.crowplatform.com/design-manual-for-bicycle-traffic/)
- **AASHTO, Guide for the Development of Bicycle Facilities (2012)** <https://nacto.org/references/aashto-guide-for-the-development-of-bicycle-facilities-2012/>
- **FHWA, Bicycle Facilities and the Manual on Uniform Traffic Control:** [http://www.fhwa.dot.gov/environment/bikeped/mutcd\\_bike.htm](http://www.fhwa.dot.gov/environment/bikeped/mutcd_bike.htm) MUTCD - Guidance - Bicycle and Pedestrian Program - Environment - FHWA (dot.gov)
- **Context Sensitive Solutions Federal Highway Administration** <https://www.fhwa.dot.gov/planning/css/>
- **Massachusetts DOT Separated Bike Lane Planning & Design Guide:** [https://coloradosprings.gov/sites/default/files/massdot-separated-bike-lane-design-guidelines\\_full-report-small.pdf](https://coloradosprings.gov/sites/default/files/massdot-separated-bike-lane-design-guidelines_full-report-small.pdf)
- **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=](https://www.northamptonma.gov/DocumentCenter/View/6668/Hampshire-County-Complete-Streets-Design-Manual_1-4-2017-FINAL?bidId=)
- **Manual on Uniform Traffic Control Devices** <https://mutcd.fhwa.dot.gov/>
- **Pursuing Equity in Pedestrian and Bicycle Planning** [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/resources/equity\\_paper/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/resources/equity_paper/)
- **Guidebook for Developing Pedestrian and Bicycle Performance Measures** [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/performance\\_measures\\_guidebook/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/performance_measures_guidebook/)
- **Pedestrian and Bicycle Funding Opportunities** [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/funding/funding\\_opportunities.cfm](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.cfm)

### ORGANIZATIONS, COALITIONS & PARTNERSHIPS:

- **The National Center for Bicycling and Walking** mission is to create bicycle-friendly and walkable communities. <http://www.bikewalk.org/>
- **The Partnership for Active Transportation** <https://www.railstotrails.org/partnership-for-active-transportation/>
- **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** mission 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. <https://smartgrowthamerica.org/program/national-complete-streets-coalition/>
- **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/>

## APPENDIX A – BEST PRACTICES, ORGANIZATIONS & SOURCES OF INFORMATION

### ACTIVE LIVING PROGRAMS AND PUBLIC HEALTH RESOURCES:

**Active Living Resource Center (ALRC)** 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. The program provides information, resources, and technical assistance to help individuals, neighborhood groups and local partnerships create communities that promote physical activity. The resource center focuses on communities at highest risk of inactivity and childhood obesity, based on race/ethnicity, income, and geographic location.

<https://www.rwjf.org/en/library/research/2011/02/active-living-resource-center.html>

- **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. <http://www.cdc.gov/obesity/index.html>
- **Healthy 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. <https://www.rwjf.org/en/how-we-work/grants-explorer/featured-programs/healthy-kids--healthy-communities.html>
- **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. <https://www.policylink.org/>

### USDOT & OFFICIAL CLEARINGHOUSES FOR FEDERAL TRANSPORTATION PROGRAMS:

- **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/](http://www.fhwa.dot.gov/environment/bicycle_pedestrian/)
- **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>
- **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/](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/](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/>

**APPENDIX B – PEDESTRIAN & BICYCLE-RELATED PROJECTS THAT ARE INCLUDED IN TIP,  
TYP, OR MTP**

Municipality	Project #	Project Description	Year of Construction	Funding Source
Amherst	42593	Amherst Rail Trail (Baboosic Greenway) between Baboosic Lake Rd & Walnut Hill Rd along abandoned B & M RR	2029	TAP, Town
Amherst	MTP 2018	Amherst Rail Trail (Baboosic Greenway) Phase 3: Thornton Ferry Rd to Mulberry Lane along abandoned B & M RR	2034	STBG/TAP, Town
Amherst	MTP 2019	Amherst Rail Trail (Baboosic Greenway) Phase 4: Mulberry Lane to Merrimack Rd along abandoned B & M RR	2036	STBG/TAP, Town
Amherst	MTP 2020	Amherst Rail Trail (Baboosic Greenway) Phase 5: Merrimack Rd to River Rd along town ROW	2038	STBG/TAP, Town
Amherst	MTP 2020	Amherst Rail Trail (Baboosic Greenway) Phase 6: River Rd to Amherst Middle School along town ROW	2038	STBG/TAP, Town
Hudson	MTP 2015	Continue Pedestrian/Bike Lane on NH102 from Towhee Dr to Megan Dr	2035	STBG/TAP, Town
Hudson	MTP 2015	Continue sidewalk on NH 3A/Lowell Rd from Birch St to Pelham Rd	2039	STBG/TAP, Town
Hudson	MTP 2015	Continue sidewalk on NH 3A/Lowell Rd from Nottingham Sq to Executive Dr	2041	STBG/TAP, Town
Milford	41587	Rehabilitation of Swinging Bridge	2025	STBG
Milford	42883	Construct 5' sidewalk and bike lane on Osgood Rd & Armory Rd	2023	CMAQ/Town
Milford	42887	Construct sidewalk on Nashua St	2023	STBG
Milford	MTP 2018	Construct 200' pedestrian bridge over Souhegan River from 135 Elm St to 34 N. River Rd & 3000' trail connecting Keyes Memorial Park & MCAA fields	2034	STBG/TAP, Town
Merrimack	40300	Construct pedestrian trail	2021	TAP, Town
Merrimack	MTP 2018	Continue sidewalk on Baboosic Lake Rd from Dw Highway to O'Gara Dr, & on Woodbury Rd from DW Highway to McElwain St	2034	STBG/TAP, Town
Merrimack	MTP 2020	Replace pedestrian bridge over Souhegan River #112/115	2032	STBG
Nashua	41585	DW Highway pedestrian safety improvements	2027	STBG
Nashua	41486	Safety, capacity, & multimodal improvements to the Walnut St Oval intersections	2027	STBG
Nashua	41742	Construct the Heritage Rail Trail East	2022	CMAQ/City
Nashua	42516	Upgrade sidewalks & create bicycle lanes on Lock & Whitney Streets	2025	TAP, City
Nashua	42595	Pedestrian & bicycle accessibility improvements	2030	STBG, City
Nashua	MTP 2015	NH130 reconstruction from Coburn Ave to Coliseum Ave including Dublin Ave to provide shoulders & safety improvements	2034	STBG, City
Nashua	MTP 2018	Bridge & Canal Streets Complete Streets project entailing curb adjustments, bike lanes, sidewalks, & handicapped ramps.	2034	STBG, City
Wilton	MTP 2020	Construct pedestrian bridge over Stony Brook	2032	STBG
Wilton-Milford-Amherst-Merrimack-Nashua	MTP 2021	Souhegan Valley Rail Trail - 16 mile paved nonmotorized path along NH 101A rail line corridor	2042	STBG, Towns





## APPENDIX C – BICYCLE LEVEL OF TRAFFIC STRESS – CORRIDOR LEVEL

NRPC staff calculated the average Bicycle Level of Traffic Stress for key regional corridors. The following tables allow analysts to look at the data and identify the BLTS on specific road segments.

### US Route 3, Nashua-Merrimack

Roadway Segment	AWDT	Miles	LTS
Bedford Rd - Merr/Bedford TL	17,150	2.000	2.02
Baboosic Lk Rd - Bedford Rd	14,850	1.670	2.22
Greeley St - Baboosic Lk Rd	16,250	1.970	2.68
Industrial Dr - Greeley St	15,450	1.280	2.39
Nashua CL - Industrial Dr	17,600	2.180	2.41
H Burque Hwy - Merrimack TL	13,500	0.475	1.99
H Burque Hwy	12,950	0.857	2.17

### Concord St/Main St, Nashua

Roadway Segment	AWDT	Miles	LTS
H Burque Hwy - Swart St.	12,050	0.623	2.80
Swart St - Courtland St	12,050	0.411	1.64
Courtland St - Amherst St	12,050	0.472	2.41
Amherst St - Canal St	22,100	0.095	3.00
Canal St - Temple St	24,150	0.189	3.00
Temple St - Kinsley St	14,950	0.336	3.00
Kinsley St - Allds St	16,850	0.522	3.00
Allds St = E. Dunstable Rd	23,150	0.537	3.00
E Dunst Rd - DWH Rotary	10,900	0.395	2.93

### Daniel Webster Highway, Nashua

Roadway Segment	AWDT	Miles	LTS
Main St Rotary - Pike St Rotary	12,600	0.400	2.97
Rotary - Sagamore Br N Ramp	17,300	0.836	2.15
Sag Br N Ramp - Autumn Leaf	21,700	0.352	2.92
Autumn Leaf - Royal Crest Dr	21,700	0.272	2.00
Royal Crest Dr - Spit Brook Rd	21,700	0.358	3.48
Spit Brook Rd - Mass SL	19,400	0.708	3.56

### NH 3A, Litchfield-Hudson

Roadway Segment	AWDT	Miles	LTS
Manch CL - Litch/Hud south TL	11,950	8.360	4.00
Litch TL - NH 3A/102 Derry St	6,000	1.560	3.00
NH 3A/102 Derry St - Chase/Central Sts	36,700	1.197	2.81
Chase/Central - Executive Dr.	22,950	1.558	3.00
Executive Dr. - Sagamore Bridge Rd.	25,600	0.828	2.15
Sagamore Bridge Rd (NH 3Ato DW Hwy)	49,600	0.961	3.41

Sagamore Bridge Rd - Friel Golf Rd	24,300	0.963	2.30
Friel Golf Rd - Mass SL	7,800	1.207	3.99

#### **NH 101A, Milford - Nashua**

<b>Roadway Segment</b>	<b>AWDT</b>	<b>Miles</b>	<b>LTS</b>
N River Rd/NH 101 - Westchester Dr, Mil	13,070	1.188	3.43
Westchester Dr - NH 13	14,900	1.673	2.53
NH 13 - Medlyn St	13,150	1.203	3.01
Medlyn St - NH 101 On-Ramp	18,900	0.581	2.00
NH 101 W Ramps - NH 101 E Ramps	18,900	0.316	2.44
NH 101 East Ramps - NH 122, Amherst	18,900	0.482	2.22
NH 122 - Boston Post Rd, Merrimack	35,200	2.995	2.00
Boston Post Rd - Cellu Dr, Nashua	39,600	1.340	2.94
Cellu Dr - Deerwood Dr	44,730	0.657	2.00
Deerwood Dr. - Somerset Pkwy.	44,730	0.801	3.86
Somerset Pkwy - Tnpk/H Burque Hwy	22,550	1.255	3.11
H Burque Hwy - NH 130 Broad St	24,370	0.719	3.00
NH 130 - Main St.	18,550	0.661	3.00
Lowell Street, Main St. - Canal St.	3,870	0.205	3.00
Canal Street, Lowell St. - Amory St.	18,550	0.697	2.97
Bridge Street, Canal St - Tay Falls Bridge	18,550	0.577	3.50

#### **NH 101, Wilton-Milford-Amherst**

<b>Roadway Segment</b>	<b>AWDT</b>	<b>Miles</b>	<b>LTS</b>
Temple TL - Ring Rd, Wilton	16,500	0.835	3.00
Ring Rd - NH 31	16,500	2.354	3.77
NH 31 - Abbott Hill Rd	16,500	1.994	3.00
Abbott Hill Rd - Wilton Rd, Milford	17,300	1.266	3.00
Wilton Rd - N River Rd/NH 101A	24,900	0.792	2.00
Milford Byp, NH 101A West – Amhrst TL	28,950	5.316	3.00
Milford TL - Bedford TL	22,450	6.852	2.98

#### **NH 111, Hollis-Nashua-Hudson**

<b>Roadway Segment</b>	<b>AWDT</b>	<b>Miles</b>	<b>LTS</b>
Mass/Hollis SL - Countryside Dr, Nashua	11,700	1.582	3.00
Countryside Dr - River Pines Blvd	16,450	0.719	2.19
River Pines Blvd - Settlement Way	16,450	0.877	2.51
Settlement Way - Riverside Dr.	18,000	0.927	2.04
Riverside Dr - Tnpk NB onramp from W.	19,450	0.484	3.00
Turnpike Ramp - New Dunstable Rd	20,950	0.219	4.00
Kinsley St EB, New Dunst Rd - St Joes Dr	11,550	0.396	2.00
Kinsley St EB, St. Joseph Dr. - Main St.	11,550	1.004	4.00



W Hollis St WB, Main St - Pine St	12,450	0.397	3.68
W Hollis St WB, Pine St - 12th St	12,450	0.652	3.93
W Hollis St WB 12th St - FEET NB Ramp	20,950	0.421	3.39
E Hollis St, Main St - Taylor Falls Bridge	14,400	0.907	3.00
Taylor Falls Bridge - Chase St, Hudson	37,150	0.324	4.00
Ferry St, Chase St. - State St.	13,300	1.076	3.00
Burnham Rd, State St - Central St	12,650	0.343	2.52
Central St, Burnham Rd - Hamblett Ave	22,900	0.486	2.00
Central St, Hamblett Ave - Windham TL	16,600	2.661	3.00

### NH 122, Amherst-Hollis

Roadway Segment	AWDT	Miles	LTS
NH 101 Int -Bost Post Rd @ Amhr Center		0.769	2.00
Bost Post Rd - Amherst Country Club Rd		1.592	3.94
Amherst Country Club - Old Nashua Rd		0.807	2.83
Old Nashua Rd - Hayden Rd, Hollis		2.604	4.00
Laurel Hill Rd - South of Colburn Ln		2.017	3.16
S. of Colburn Ln - NH 130		3.101	3.00
NH 130 - Ridge Rd		0.933	3.00
Ridge Rd - Mass State Line		1.832	4.00

### NH 13, Mont Vernon-Amherst-Milford

Roadway Segment	AWDT	Miles	LTS
New Boston TL - Beech Hill Rd, Mt Vern		2.268	4.00
Beech Hill Rd - Hillcrest Ave		0.617	2.90
Hillcrest Ave - .65 mi. S of Secomb Rd		1.873	2.66
.65 mi S of Secomb Rd - N River Rd, Mil		1.863	4.00
N River Rd - NH 101A		0.610	3.01
NH 101A - NH 101 WB Ramps		1.210	2.32
NH 101 WB Ramp - .3 mi S of Emerson Rd		0.477	2.24
S of Emerson Rd - Brookline TL		1.900	3.07
Milford TL - Quimby Rd, Brookline		3.352	3.04
Quimby Rd - Mass State Line		3.431	3.03

### NH 38, Pelham

Roadway Segment	AWDT	Miles	LTS
Salem TL - Rita Ave	13,550	2.952	4.00
Rita Ave - Willow Ave/Highland St	14,350	1.350	2.66
Willow Ave/Highland St - Mass SL	13,950	1.452	2.12

### NH 130, Hollis - Nashua

<b>Roadway Segment</b>	<b>AWDT</b>	<b>Miles</b>	<b>LTS</b>
NH 122 Hollis - Nashua City Line	8,900	3.455	2.99
Hollis TL - Piermont St	10,000	0.509	2.00
Piermont St - Coburn Ave	15,000	0.463	2.64
Coburn Ave - Beaver St	18,750	0.509	2.34
Beaver St - Horse Pond Ave	18,750	0.444	2.47
Horse Pond Ave - FEE Tnpk NB Ramps	28,200	0.513	3.00
FEE Tpk NB Ramps - NH 101A Amhrst St	12,700	0.699	2.83

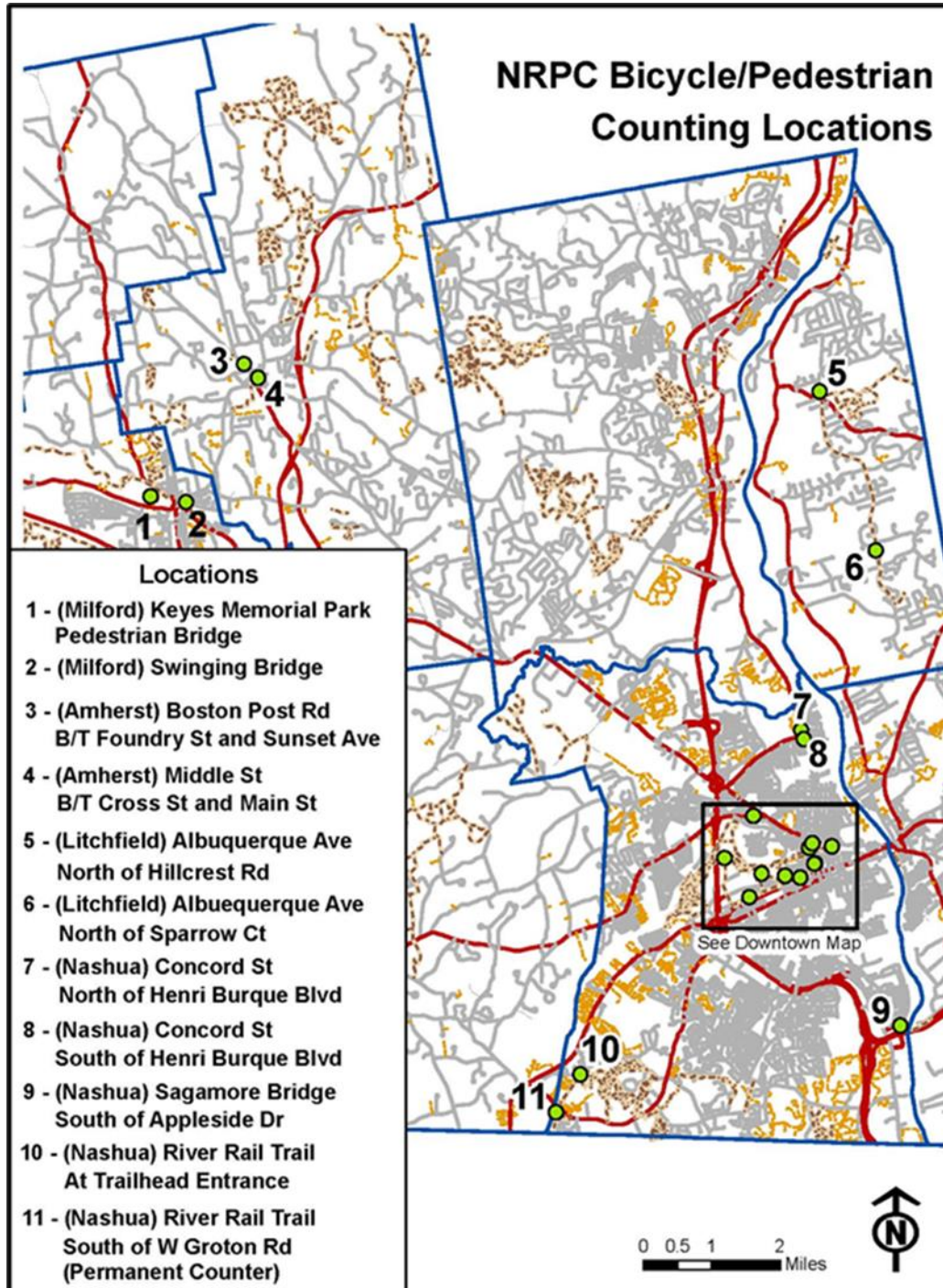
**NH 102, Litchfield-Hudson**

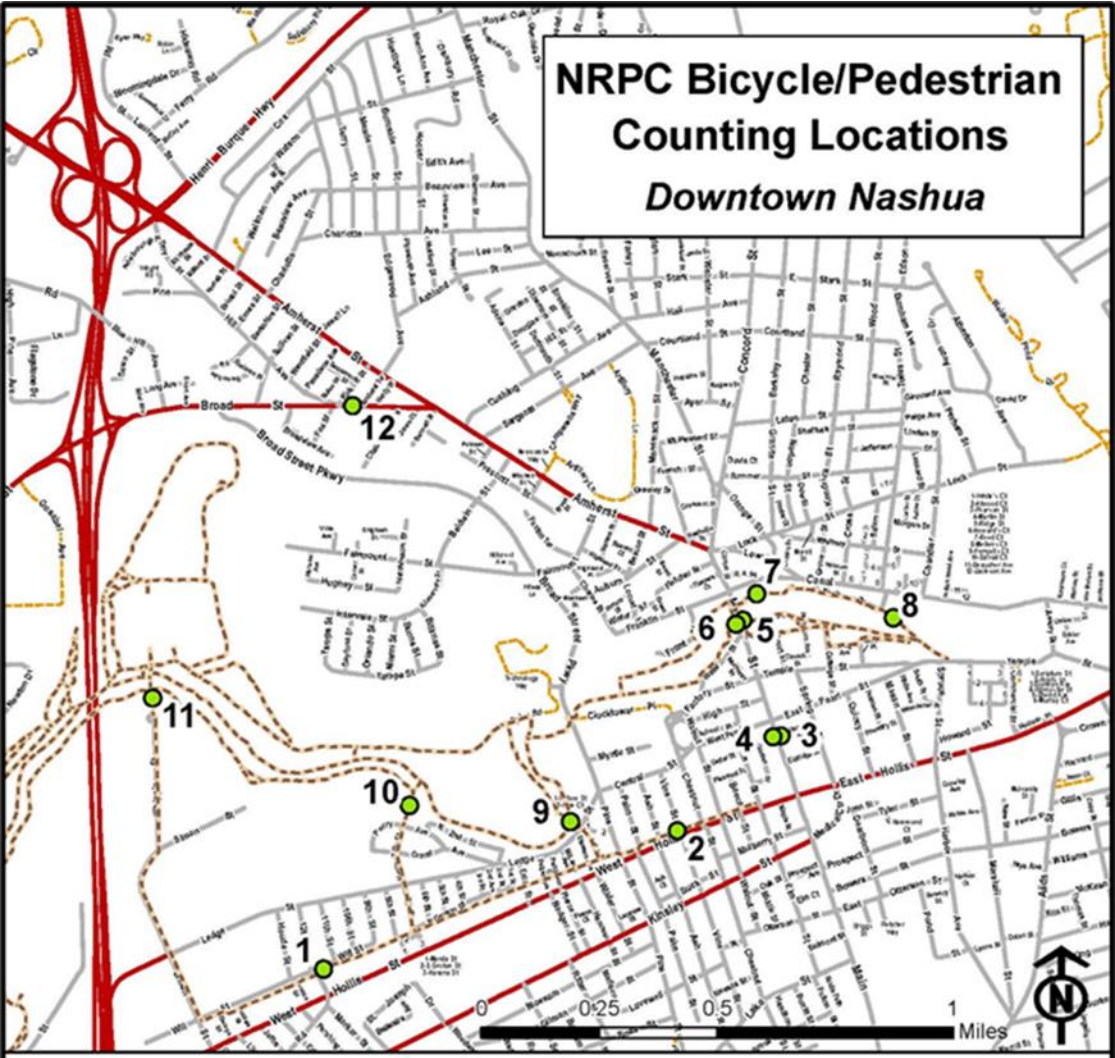
<b>Roadway Segment</b>	<b>AWDT</b>	<b>Miles</b>	<b>LTS</b>
Londonderry TL - Litchfield TL, Hudson	17,750	1.192	3.00
Hudson TL, Litchfield - Derry Ln, Hudson	17,050	1.912	3.00
Derry Ln - NH 3A Elm Ave	16,800	1.272	3.00

**Greeley St/Continental Blvd,  
Merrimack**

<b>Roadway Segment</b>	<b>AWDT</b>	<b>Miles</b>	<b>LTS</b>
Greeley St, US 3 - Amherst Rd	16,900	0.277	3.00
Continental Blv, Amherst Rd - Tallant Rd	13,950	0.837	3.00
Tallant Rd - Camp Sargent Rd	18,150	1.021	2.00
Camp Sargent Rd - Naticook Rd	18,000	1.650	3.00
Naticook Rd - NH 101A	21,700	0.287	2.00

APPENDIX D – PEDESTRIAN & BICYCLE COUNTING PROGRAM





**Locations**

- |   |  |   |
|---|--|---|
| 1 - Heritage Rail Trail<br>B/T 11th and 12th St           | 5 - Main St (East Sidewalk)<br>B/T Canal St and Water St | 9 - Mine Falls Park<br>Everett St Entrance  |
| 2 - Heritage Rail Trail<br>B/T Vine St and Ash St         | 6 - Main St (West Sidewalk)<br>B/T Canal St and Water St | 10 - Mine Falls Park<br>7th St Entrance     |
| 3 - Main St (East Sidewalk)<br>B/T Pearl St and Hollis St | 7 - Riverwalk<br>Behind Peddler's Daughter               | 11 - Mine Falls Park<br>Whipple St Entrance |
| 4 - Main St (West Sidewalk)<br>B/T Pearl St and Hollis St | 8 - Riverwalk<br>North of Pedestrian Bridge              | 12 - Broad St<br>West of Amherst Ter        |





**Heritage Rail Trail**  
 Between Vine St and Ash St  
 City of Nashua

Period Analyzed: Friday 5/7/2021 – Wednesday 5/19/2021



**Key Statistics**

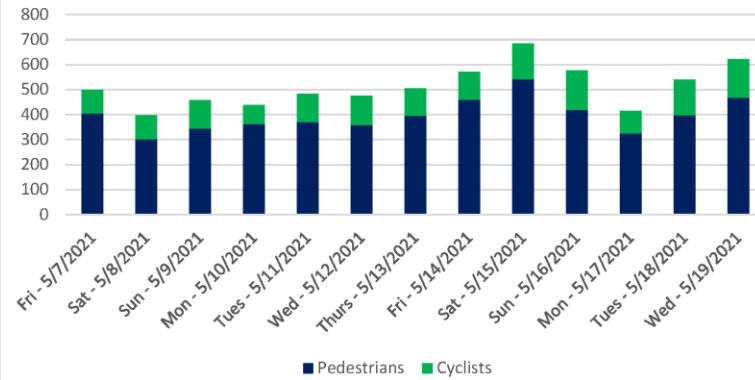
- **Total Traffic for the Period Analyzed:** 6,666
- **Daily Average:** 513 (Peds: 396 / Cyclists:117)
- **Weekday Daily Average:** 505 (Peds: 393 / Cyclists: 112)
- **Weekend Daily Average:** 529 (Peds: 402 / Cyclists: 128)

**Busiest Days of the Period Analyzed:**

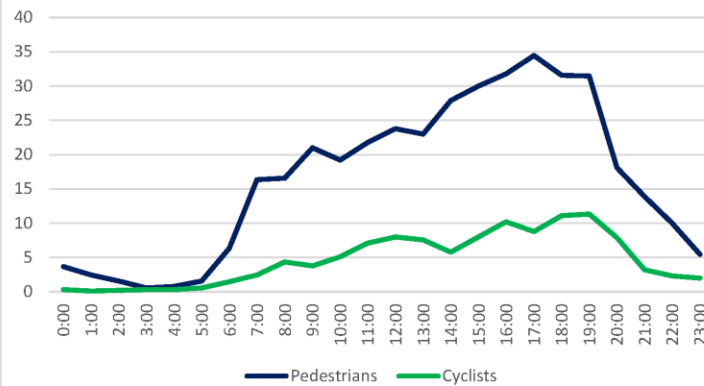
- 1) Saturday, 5/15/2021 (684)
- 2) Wednesday, 5/19/2021 (622)
- 3) Sunday, 5/16/2021 (578)

**Minimum Day:** Saturday, 5/8/2021 (398)

**Daily Totals - Heritage Rail Trail**  
 Between Vine St and Ash St

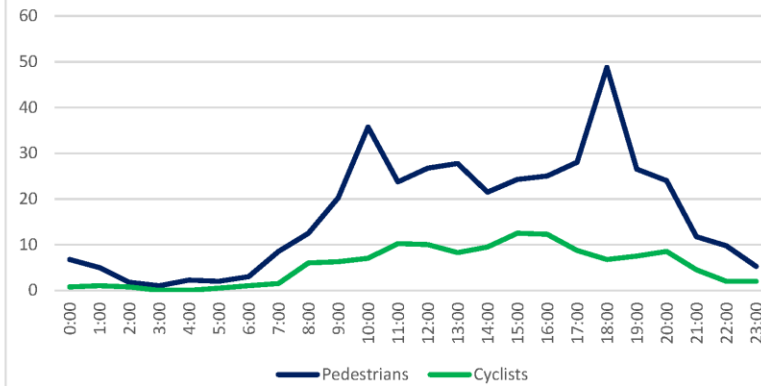


**Average Hourly Weekday Profile**



Average number of pedestrians per hour on weekdays only

**Average Hourly Weekend Profile**



Average number of pedestrians per hour on weekends only



## Swinging Bridge

Town of Milford

Period Analyzed: Wednesday 02/24/2021 – Monday 03/08/2021



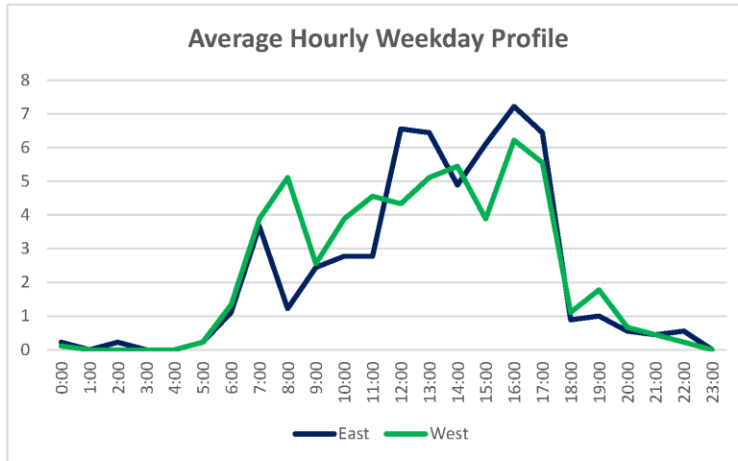
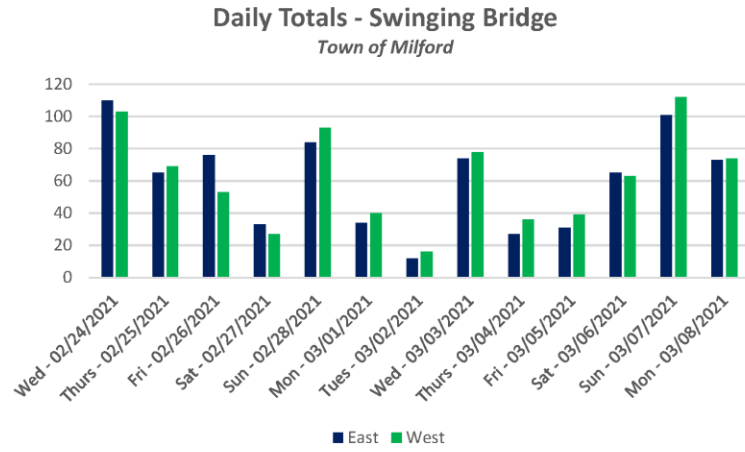
### Key Statistics

- Total Traffic for the Period Analyzed: 1,588
- Daily Average: 122
- Weekday Daily Average: 112
- Weekend Daily Average: 145

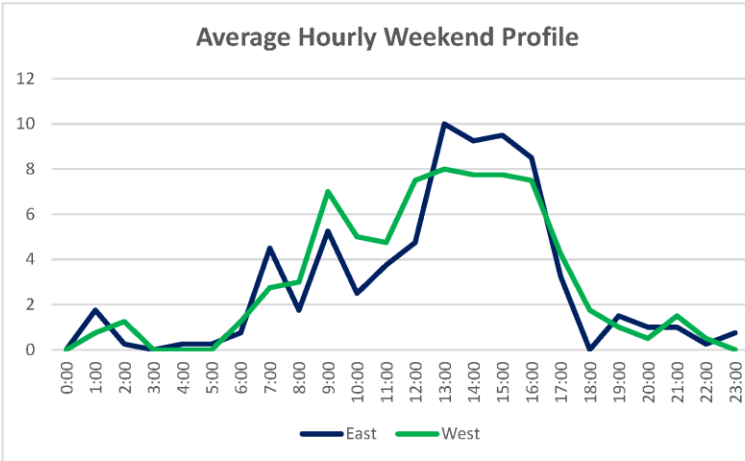
#### Busiest Days of the Period Analyzed:

- 1) Wednesday, 02/24/2021 (213)
- 2) Sunday, 03/07/2021 (213)
- 3) Sunday, 02/28/2021 (177)

Minimum Day: Tuesday, 03/02/2021 (28)



Average number of pedestrians per hour on weekdays only



Average number of pedestrians per hour on weekends only