



Advance Transit in Downtown Hanover. Credit: VHB

Advancing Multi-Modal Transportation

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We will better connect persons living, working, studying, and recreating in Hanover and throughout the Upper Valley by designing, developing, and managing a transportation system that prioritizes safety, accessibility, affordability, and zero-emission modes, and connects persons to key regional resources.

GOALS:

- 6-1. Town-wide walking and biking accessibility and safety will be improved.
- 6-2. Partners will be engaged in enhancing local and regional transit and carpooling options.
- 6-3. Sustainable living and safe zero-emission modes of travel will be reinforced with complementary land use patterns and transportation infrastructure.
- 6-4. The transportation network will be updated to address emerging transportation and community needs.

Introduction

This Sustainability Master Plan comes at a time when there are rapidly emerging social, environmental, and economic issues that are shaping the way we look at transportation locally and globally. Transportation-related decisions have an impact on environmental and public health, equitable access to goods and services, housing and settlement patterns, economic vibrancy, community character, and quality of life. Public sentiment in Hanover advocates for public transit, bike, pedestrian, and clean vehicle transportation options, such as e-bikes and electric vehicles (EVs), which support the 2017 clean energy pledge to transition to 100 percent renewable energy within the transportation sector by 2050.

While our Public Works’ maintenance projects continue to implement improvements to the existing roadway network, Hanover’s community members have communicated a desire to spend transportation infrastructure dollars on [active transportation](#) and transit. Expanding roadway capacity to handle peak hour traffic is not in the best interest of the community, nor is encouraging additional parking. Added parking is a disincentive to alternative modes of transportation and encourages more traffic. It can crowd out wider sidewalks, bike lanes, or streetscape amenities.

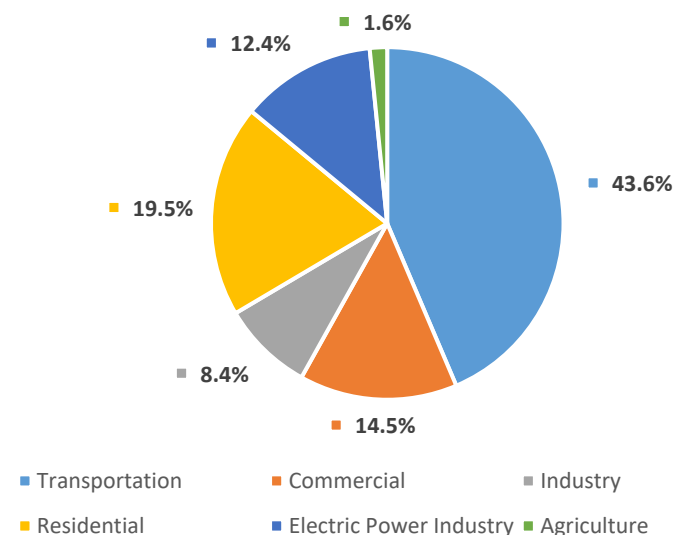
This chapter examines multi-modal conditions in Hanover and explores opportunities for making lasting and sustainable improvements that will provide a safe and efficient system for all users while preserving and enhancing the character and quality of life within Hanover and moving the community toward freedom from fossil fuels for transportation by 2050.

Goal 6-1. Town-wide walking and biking accessibility and safety will be improved.

There is strong support within the community for improving bike and pedestrian accommodations. A robust bike and pedestrian network that reduces dependency on motor vehicles for errands and commuting, encourages [active transportation](#), and bolsters many other community initiatives, such as equitable access to housing and employment, preserving community character, promoting downtown vibrancy, improving health and well-being, and addressing climate change.

According to the United States Environmental Protection Agency (EPA), transportation accounted for nearly 44 percent of greenhouse gas (GHG) emissions in New Hampshire in 2020 (see [Figure 6-1](#)). Across the United States, passenger cars, medium- and heavy-duty trucks, and light-duty trucks, including sport utility vehicles, pick-up trucks, and minivans account for over half of the emissions from the transportation sector.

Figure 6-1: New Hampshire Greenhouse Gas Emissions by Economic Sector, 2020



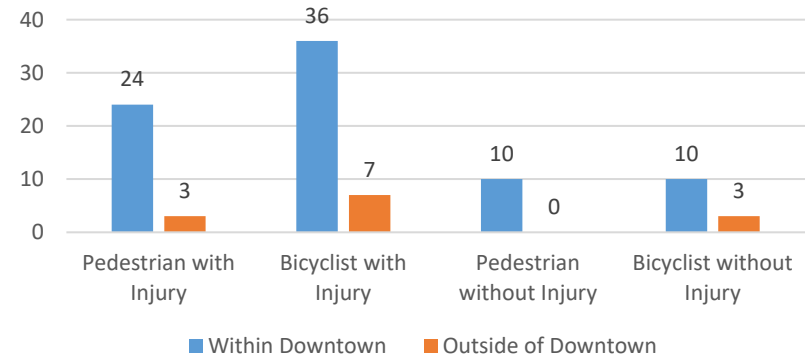
Source: US EPA Inventory of US Greenhouse Gas Emissions and Sinks by State

Hanover Bike Walk is dedicated to influencing public policy, the design and operation of an inclusive walk bike network, and the routine and ongoing maintenance of this network for the safe, comfortable, and convenient accommodation of walking, bicycling, and the use of other active mobility devices by people of all ages and abilities for transportation, commuting, recreation, individual, and environmental health. The Committee’s 2022 *Hanover Walk Bike Plan*¹ offers a simple vision: **to make Hanover a safe and inviting place to walk and bike.**

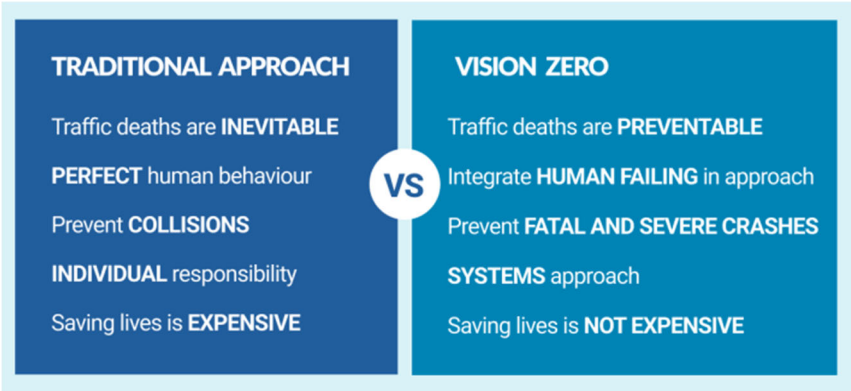
This plan supports a mode shift from the automobile to enable comfortable and convenient everyday travel around Hanover for people of all ages and abilities and sets forth targets for commuting to jobs and school, crash rates, travel-way improvements, and funding. The travel way improvements include multi-use paths, sidewalks, bike lanes, shoulders, and on-road bike routes. The *Hanover Walk Bike Plan* details ideas for eight regions within town, and focuses on biking and walking as sustainable, health-promoting, and community-building activities.

As shown in **Figure 6-2**, most vehicle crashes involving pedestrians or bicyclists occur in the downtown area. Intersections, crosswalks, driveways, and on-street parking must be evaluated to improve safety. It is expected that improving bike safety through education and infrastructure improvements would increase the number of bicyclists since those people that fall within the large “interested but concerned” cohort of potential riders would be more likely to choose biking for some of their trips. Similarly, improving paths, sidewalks and crosswalk treatments and closing any remaining gaps in the sidewalk network should encourage more people to walk.

Figure 6-2: Bike and Pedestrian Crashes Downtown and Outside Downtown, 2001 – 2020



Source: *Hanover Bike Walk*, 2022.
Note: Data attributed to ‘Outside of Downtown’ reflects 2010-2020 data. An additional 12 crashes were recorded between 2001 and 2010, though a breakdown of these crashes is unavailable.



Hanover Vision Zero – Traditional Approach versus Vision Zero

¹ Hanover Bike Walk. (2022). Hanover Walk Bike Plan Update. Retrieved from, <https://sites.google.com/view/hanover-walk-bike-plan-2022/home>

Hanover has also adopted a Vision Zero Policy approach to safety with the goals of eliminating all traffic fatalities and severe injuries, while increasing safe, healthy, and equitable mobility for the whole community (see [Appendix E](#) for the complete overview of Hanover’s Vision Zero plan). To create systemic change, Vision Zero involves roadway design, speeds, human behavior, technology, and policy. Streetlight replacement with [dynamic LED](#) lights has both safety and energy-saving benefits.

Micro-mobility gives people an alternative to using their own means of getting around. Lightweight vehicles, such as bicycles and scooters, but especially electric ones, may be borrowed or rented as part of a self-service program. Dartmouth College has experimented with bike-share in this way. The program was sunset in 2020 during the COVID-19 pandemic.



E-bike use at Hypertherm. Credit: Upper Valley E-Bike Initiative

Working with Dartmouth and Dartmouth Health to make the rental program available again would be a way to reduce emissions and encourage the health benefits that come with riding. Even without a micro-mobility rental system, e-bike use has become much more common in recent years. E-bike lending events and local vendors have made e-bikes readily available. By providing parking and charging facilities, the town can promote e-bike use.

Goal 6-1: Supporting Strategies²



- **Strategy 6-1.1:** Implement the detailed recommendations and action plans contained in the 2022 *Hanover Walk Bike Plan*. The contents of this plan are very comprehensive and are not repeated here. Performance over time can be measured against the detailed list of action items, policies and recommendations contained in the plan.



- **Strategy 6-1.2:** Commit to implementing Hanover’s Vision Zero Policy with supporting policies and programming.



- **Strategy 6-1.3:** Replace existing streetlights with [dynamic LEDs](#), which could improve safety for bike and pedestrian modes. This would also provide a great energy-saving tool.



- **Strategy 6-1.4:** Expand the availability of e-bikes. Increase education around use cases and benefits.



- **Strategy 6-1.5:** Engage partners, including Dartmouth College and Dartmouth Health, in establishing a shared micro-mobility network (e.g., bike-share, scooter-share).

² Strategies accompanied by an icon are those that enable greenhouse gas emissions reduction.

Goal 6-1: Performance Metrics

- ▶ Number of *Walk Bike Plan* recommendations implemented
- ▶ Achieve zero fatal or serious bike/ped crashes
- ▶ Percent of streetlights and cross walk lighting converted to [dynamic LEDs](#)
- ▶ Number and types of new micro-mobility services
- ▶ Assessment of multi-modal network connectivity



Advance Transit buses. Credit: Advance Transit

Goal 6-2. Partners will be engaged in enhancing local and regional transit and carpooling options.

Transit offers an alternative to automobile use within set routes for those who choose not to drive or who do not have access to cars. Hanover is served by school buses, Advance Transit, Dartmouth College shuttles, Dartmouth Coach, Greyhound, Tri-Valley Transit, and Moover.

Transit provides sustainability benefits as well as social benefits because of its ability to connect disadvantaged populations to work, goods, and services.

Carpooling and vanpooling are other travel options, popular amongst employees traveling to the same work location. Once coordinated regionally under the auspices of Upper Valley Ride Share, it is a great way to reduce vehicle miles traveled. Ridesharing can be individually initiated, but having a clearing house to match willing drivers and passengers boosts the efficacy of this mode of travel. Employers can offer meaningful financial incentives to employees who carpool.

Transit and ridesharing also offset parking demand and are consistent with the community's desire to rely less on automobiles.

Goal 6-2: Supporting Strategies



- ▶ **Strategy 6-2.1:** Work with Advance Transit to identify opportunities to expand their service with respect to duration and frequency. Align service availability with local employment patterns by engaging local and regional employers and their employees.



- ▶ **Strategy 6-2.2:** Encourage transit providers to offer connecting service to the park and ride lots on NH 10 in Lyme and in Grantham and the WRJ AMTRAK station. Ensure expanded service connects to downtown Hanover.



- ▶ **Strategy 6-2.3:** Advance an educational campaign that promotes local and regional transit options. Highlight service routes, stops/stations along with nearby assets and attractions, and available resources to obtain additional information (e.g., the Advance Transit mobile app).



- **Strategy 6-2.4:** Revive a ride-sharing program within the region coordinated by Advance Transit, Hanover’s downtown merchants, or larger employers.
- **Strategy 6-2.5:** Encourage students to use school buses, public transit, carpools, or [active transportation](#).

Goal 6-2: Performance Metrics

- Number of transit users
- Transit service duration/frequency
- Expansion of transit routes to underserved areas
- Percent of commuters who use transit
- Number of jobs accessible from Hanover via a 30-minute transit ride
- Number of children riding the school bus or getting to school using [active transportation](#)
- Number of cars per household

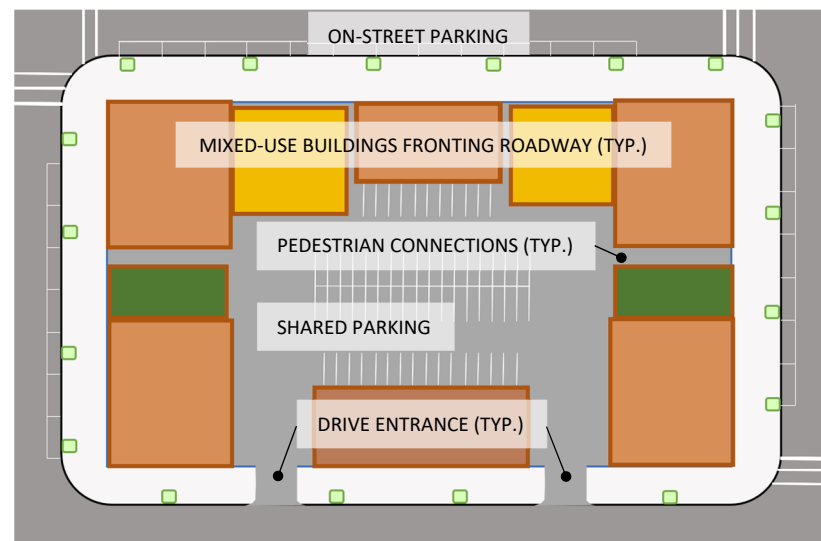
Goal 6-3. Sustainable living and safe zero-emission modes of travel will be reinforced with complementary land use patterns and transportation infrastructure.

To reduce reliance on cars and shift towards multi-modal transportation, it is important to consider the land use and zoning relationships with transportation. Locating areas of higher residential density and mixed-use development with both sidewalks and bike lanes

and near transit routes helps leverage the mode shift away from the automobile. To this end, the town could use the current sidewalk district and Advance Transit bus routes within Hanover as criteria for prioritizing development locations. Micro-mobility services can also be used to support the desired denser land use where current transit routes do not exist.

Reducing or removing parking minimums, introducing parking maximums, and encouraging shared parking can help encourage mode-shift. Design guidelines that shift parking to the back of buildings and reduce curb cuts - as shown in [Figure 6-3](#) - as well as requiring a consistent building front wall where possible and encouraging ground floor commercial spaces can improve the quality of the walking experience.

Figure 6-3: Recommended Parking/Streetscape Design Principles Illustrated



Source: VHB

Where parking is necessary, innovative systems can be incorporated to economize on space and leave surface areas for green space and/or pedestrian amenities.

The Main Wheelock Zoning District is the first district where sheltered bicycle parking is required as part of new development. In addition to continuing efforts to install bicycle racks downtown and plan bike paths in the right of way, covered bike parking facilities should be integrated where appropriate. Likewise, the infrastructure to support micro-mobility charging stations needs to be integrated into the downtown and new developments.

Figure 6-4: Rendering of a Complete Street








This Complete Street incorporates parking, two lanes of traffic, bicycles, and pedestrians along with tree lawn for stormwater collection Credit: Dutch Village Road Complete Street, Halifax, Nova Scotia

Another approach to reduce commuting is by enabling every household with the ability to commute virtually. Following the COVID-19 pandemic, for many businesses remote work is now routine. However, due to lack of reliable, high-speed internet in the less densely settled parts of Hanover, remote work from home is not always possible.

Except for during the past decade, most recent roadway management has focused on accommodating the automobile. Now, public ways are used to enable safe, convenient, and comfortable travel for users of all ages regardless of their mode of travel and to integrate stormwater control to ensure safe access during and after storm events. This concept of a complete street is taking hold in Hanover with not only pedestrian and biking features but also using green spaces to collect and treat stormwater.

Goal 6-3: Supporting Strategies

-  ▶ **Strategy 6-3.1:** Increase residential density and enable multi-use development in areas where non-automotive travel options are available or planned.
-  ▶ **Strategy 6-3.2:** Reduce or eliminate parking minimums and more easily allow shared parking.
-  ▶ **Strategy 6-3.3:** Incorporate bike shelters and micro-mobility charging stations into the downtown streetscape and in all new multi-family and commercial development.
-  ▶ **Strategy 6-3.4:** Improve access and reliability of high-speed internet to support at-home work and education in all areas of Town and the reduction in commuting miles and emissions.
-  ▶ **Strategy 6-3.5:** Guide improvements undertaken during the planning, design, resurfacing and routine maintenance of

existing roads using our Complete Streets Guidelines:
<https://hanovernh.org/DocumentCenter/View/1358/Complete-Streets-Guidelines-PDF>.

Goal 6-3: Performance Metrics

- ▶ Number of zoning changes to increase residential density and enable more mixed-use development near transit and/or in sidewalk districts
- ▶ Changed zoning to eliminate parking requirements or to address parking minimums, parking maximums, shared parking and/or innovative parking systems
- ▶ Number of bicycle and micro-mobility shelter and charging infrastructure installations
- ▶ Areas of Town served by reliable, high-speed internet
- ▶ Percent of Hanover residents working from home
- ▶ Linear feet of complete street installed

Goal 6-4. The transportation network will be updated to address emerging transportation and community needs.

Electric Vehicles

As reported in the *State of New Hampshire Plan for Electric Vehicle Infrastructure Deployment* (2022), New Hampshire lags behind the national adoption rate for EVs (1.2 percent in 2021 versus 2.1 percent). However, the State is making a concerted effort to increase EV adoption by expanding charging infrastructure. EV adoption is expected to grow

in the coming years, particularly in light of external factors such as favorable federal policies and incentives, affordability due to technology maturation, and a larger selection and greater availability of EV makes and models.

This transition to electric vehicles will provide continued environmental benefits in the form of reduced GHG emissions. The rapid adoption of EVs will require an expansion of the number of convenient, reliable and appropriate charging stations, including at [dwell locations](#) for buses and shuttles. These may be provided by the town in strategically located parking areas, or private businesses may install them on their own as an amenity for its workforce or to attract business. The town must also consider requiring charging stations as part of new developments, and should encourage existing building retrofits, particularly for multi-family buildings.

Intelligent Transportation Systems (ITS) and Connected and Autonomous Vehicles (CAVs)

According to the U.S. Department of Transportation, Intelligent Transportation Systems technologies will advance transportation safety and mobility and enhance American productivity by integrating advanced communications technologies into transportation infrastructure and into vehicles. ITS encompasses a broad range of wireless and traditional communications-based information and electronic technologies. CAVs offer the potential to provide transportation to new groups of people, such as the young and elderly, and to improve overall system efficiency.

Some ITS applications, such as ramp metering and electronic toll collection, are mostly intended for metropolitan and/or freeway applications. But some applications may be employed in small towns

like Hanover to improve safety or system efficiency. Examples may include traffic signal coordination or transit signal priority.

From a sustainability perspective, the chief benefit derived from ITS technologies will be improved transportation system optimization and efficiency. The immediate benefits should be seen in reduced fuel consumption and emissions.

A secondary benefit may be that the increased efficiency will reduce the need to expand roadways to add capacity due to increased growth and demand.

Curb Management

The streets in downtown Hanover have either parallel or diagonal parking along the curb wherever space allows. The parking spaces are marked with paint and there are parking meters or parking kiosks. Gaps in the parking spaces along the curb are currently only where required for crosswalks, hydrants, or designated or reserved parking. In the future it may be advisable to manage the space along the curb to accommodate evolving needs of rideshare services, such as Uber and Lyft, or the proliferation of package delivery services such as Amazon and UPS. With the growth in EVs, it may also be prudent to designate specific spaces for curbside EV charging, perhaps through the installation of pole-mounted EV charging stations. There may also be a desire to create on-street dining areas or corrals for bike or scooter rentals, so a plan for curb management is needed.

Satellite Parking

Downtown Hanover has been designated as the place for growth and commerce to occur and will continue to provide jobs, services, and goods. Being the center of activity brings with it a concentration of vehicle traffic. To reduce vehicle trips and emissions in this part of town

and serve the needs of shoppers, employees, and other residents, a system of peripheral parking lots with regular and convenient shuttle service should be designed and implemented. Locations need to be established on each of the major arteries serving downtown: Route 10 (both on Lyme Road and south of downtown), Route 120, and West Wheelock Street. Shuttle stops should include the Hanover Coop, Hanover High School and Senior Center, and Main Street. Parking in peripheral lots should be free or much less expensive than parking downtown.

Goal 6-4: Supporting Strategies



- **Strategy 6-4.1:** Incorporate appropriate EV charging stations into the downtown streetscape and in all new multi-family and commercial development and include other appropriate charging stations in all new multi-family development.



- **Strategy 6-4.2:** Implement ITS technology to coordinate all signalized intersections and to provide transit signal prioritization.

- **Strategy 6-4.3:** After giving priority to active downtown commercial uses, designate spaces for rideshare and small truck delivery use.



- **Strategy 6-4.4:** Establish peripheral parking and supporting shuttle service to locations in the downtown area.
- **Strategy 6-4.5:** Incentivize commercial landowners to install high-speed EV charging stations for public use.

Goal 6-4: Performance Metrics

- Number of Level 1, Level 2, or fast charging EV charging stations in the downtown
- Number of signalized intersections using ITS technology

- ▶ Plan for rideshare and small truck delivery spaces in the downtown
- ▶ Number of peripheral lots and ridership on servicing shuttles

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