NORTHFIELD RIDGE+RIVER ROUTES

Contents

Appendix

This project was funded through the VT Agency of Commerce and Community Development / Vermont Agency of Transportation's Better Connections Program.

Document Prepared By:

SE GROUP

Acknowledgments

All plans are the result of a collective effort. In the development of the Ridge + Rivers Master Plan many individuals provided considerable input and expertise to the outcome. The project team would like to thank them for their time and tremendous assistance.

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INTRODUCTION


Trombly's
Flowers & Gifts

Foreword

The Town of Northfield--nestled in the heart of the Dog River Valley, is home to a diverse, vibrant, and well-grounded community of Vermonters. Anchored by Norwich University, Northfield has a unique youthful and creative energy that many Vermont towns strive for. Northfield is a community that knows how to pick itself up and move ahead, even after challenges and struggles.

When this planning process began, we knew we had an exciting opportunity on our hands. In part, this was because Northfield clearly has a lot to be proud of; scenic covered bridges, well-preserved historic buildings, multiple community parks and playgrounds, and miles and miles of public trails.

The excitement surrounding this plan stemmed from the realization that Northfield is a community with an immense appetite for improving the quality of life for all those who work, live, and play there. This is evidenced by the breadth and depth of the community organizing and planning work that proceeded this effort and will undoubtedly be there in the years to come.

The steering committee which guided the NRRR project demonstrated time and time again their unyielding commitment to Northfield, to public engagement, and to move this plan forward. Rarely does a steering committee deal with scheduling conflicts such as global pandemics, but this group pivoted with ease and grace. This resilience in the face of reality will serve Northfield well into the future, as the community uses the guidance that this plan provides as a tool to make informed decisions about its future.

This plan contains several short-term, mid-term, and long-term recommendations that will benefit immensely from creativity, patience, and perseverance, qualities that Northfield displays in spades.

This plan will also benefit from recognizing that Northfield already has many of the resources it needs to create progress. Look to each other for help, guidance, and community wisdom. Amplify the public's voices, reach out to the business community, and continue to make decisions that are inclusive of the diverse needs of Northfield residents. Leverage your state partners at ACCD and Vtrans to keep your momentum. And most importantly, understand that the work of planning for tomorrow is never complete; it is a process and a commitment to renewal and adaptation. Northfield's past points to a fantastic future.

Introduction

The Northfield Ridge + River Routes Master Plan explores opportunities to better connect Northfield's population centers with each other and to outdoor activity centers within the community. The creation of a multimodal transportation network that improves connectivity between the community and its recreational assets contributes to community vitality and spurs economic growth. This plan identifies a variety of infrastructure improvements and additions that act in concert to enhance current access and create new connections to areas not easily accessible without a car. These improvements were identified through a robust public engagement process and a thorough evaluation of infrastructure and connectivity needs.

The Northfield Ridge + River Routes Master Plan was led by the Town of Northfield and funded through the VT Agency of Commerce and Community Development/Vermont Agency of Transportation's Better Connections Program. The Better Connections Program is a multi-agency partnership to align state and local investments with increasing transportation options and building resilience and economic vitality in Vermont's community centers. The professional services of SE Group of Burlington, Vermont were retained to lead the planning process. Camoin Associates, Stantec Engineering, and Watershed Consulting acted as subconsultants on the project to provide additional insights in their areas of expertise.

Project Team

SE Group | Planning

Camoin Associate | Economic Analysis

Stantec Engineering | Transportation and Infrastructure

Watershed Consulting | Stormwater Management Specialists

Project Timeline

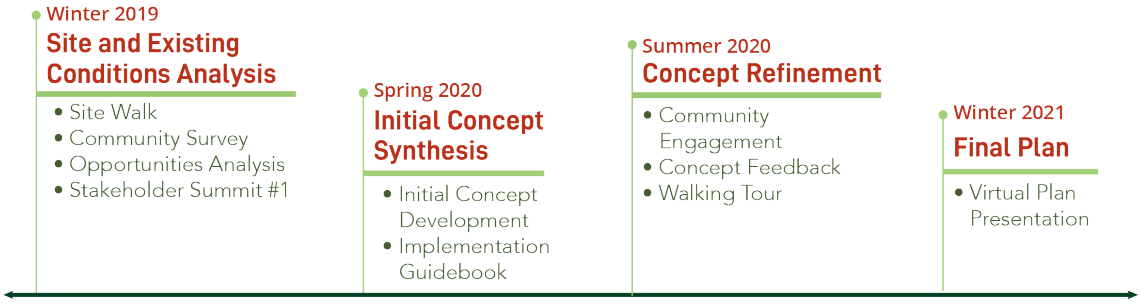
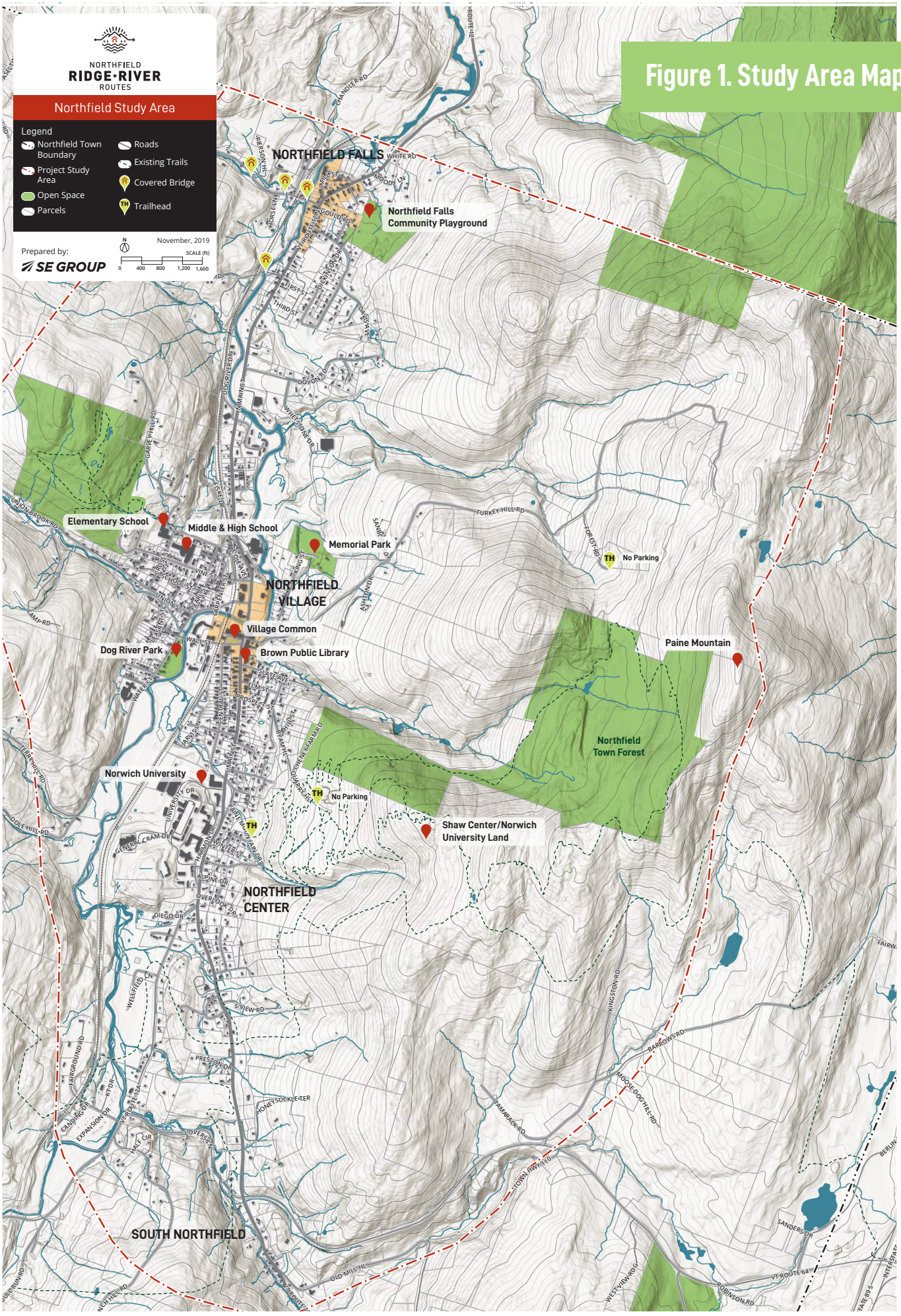


Figure 1. Study Area Map



Plan Organization

The Northfield Ridge + Rivers Routes Master Plan provides recommendations for future pedestrian and bike facilities and trail amenities and connections in Northfield (see study area in Figure 1). It contains information about where new facilities should be located, what new facilities should look like, and implementation strategies to get these facilities built.

The first chapter provides an introduction to the project and the study area. The second chapter describes existing conditions in Northfield that are relevant to this planning process. The third chapter contains a summary of the public engagement process, including the three community meetings and three surveys used to gather input. The fourth, fifth, and sixth chapters are dedicated to the opportunities that fall within each theme: Enhancing Local Connections (Chapter 4), Connecting Ridge to River (Chapter 5), and Bringing Northfield Together (Chapter 6). These chapters discuss the following facility types: sidewalks, bike facilities, intersections, wayfinding, placemaking, and trail connections. Each chapter includes an opportunity overview map and a description of the proposed developments. The final chapter (Chapter 7) includes the "Implementation Guidebook" and an implementation matrix.

The Implementation Guidebook includes more detailed information about connectivity and wayfinding opportunities, including a description of the recommended facility and additional information about siting and standards. The implementation matrix includes a prioritization scheme for all the recommendations listed throughout the plan, as well as implementation steps and potential funding opportunities.

C H A P T E R O N E

EXISTING CONDITIONS

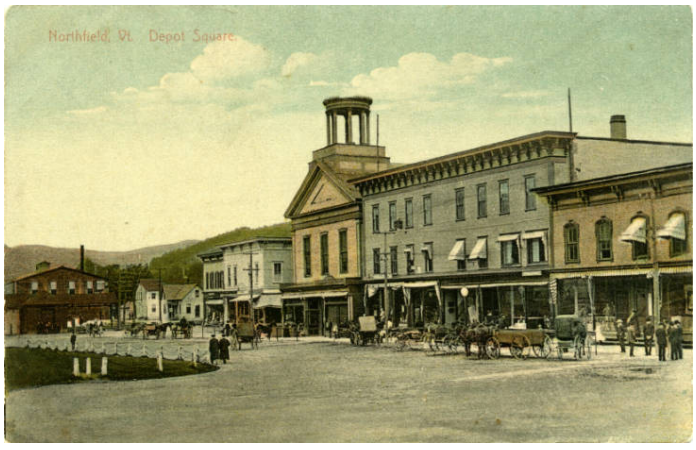
Demographic and Economic Characteristics

This chapter discusses existing conditions in Northfield that are relevant to this project. This includes the community's demographics, existing infrastructure, and recreational opportunities.

Northfield is a town of 6,522 people and is located within the Dog River Valley, about 10 miles south of Montpelier, Vermont. Northfield's population is declining by about 0.6% a year, a trend expected to continue for the foreseeable future. Historically, the major industries in Northfield included quarrying, farming, and light manufacturing. Now, Northfield is anchored by Norwich University, the oldest private military college in the United States and Darn Tough, a global manufacturer of socks. Most other small businesses in the community are concentrated in Northfield Village.

The Town of Northfield is home to over 3,500 jobs and has a job growth rate of 6.7%, much higher than the Vermont job growth rate of 0.8% but just slightly lower than the national rate of 7.3% in 2019. The U.S. Census "On the Map" tool indicates that about the same number of people commute to Northfield as commute out and that around 650 people both live and work in Northfield. For those who are commuting, the primary locations they commute in and out from are Montpelier, Barre, Burlington, and Randolph.

To better understand the variation in opportunities, assets, and challenges related to connectivity and economic development within the Town, the Town of Northfield was separated into four geographical zones: Northfield Falls, Northfield Village, Northfield Center, and South Northfield. The following is a brief summary of each zone.



Historical image of Depot Square

Depot Square today

South Northfield Zone

This section of Northfield is very rural with limited development. The development that does exist is primarily automobile-based, including a gas station and vehicle repair shop. There are also large areas of forested, vacant open land, and residential properties.

Northfield Center Zone

The rural landscape gradually becomes more developed as one travels further north. The Mt. Hope Cemetery marks the beginning of higher intensity development associated with Norwich University, the Vermont National Guard, and other supporting services. There is a large green space in the northern part of this zone, across from Norwich University, that is well maintained with a gazebo. Residential development is denser in this area with different neighborhoods and side streets; however, pedestrian facilities remain limited in most of this zone.

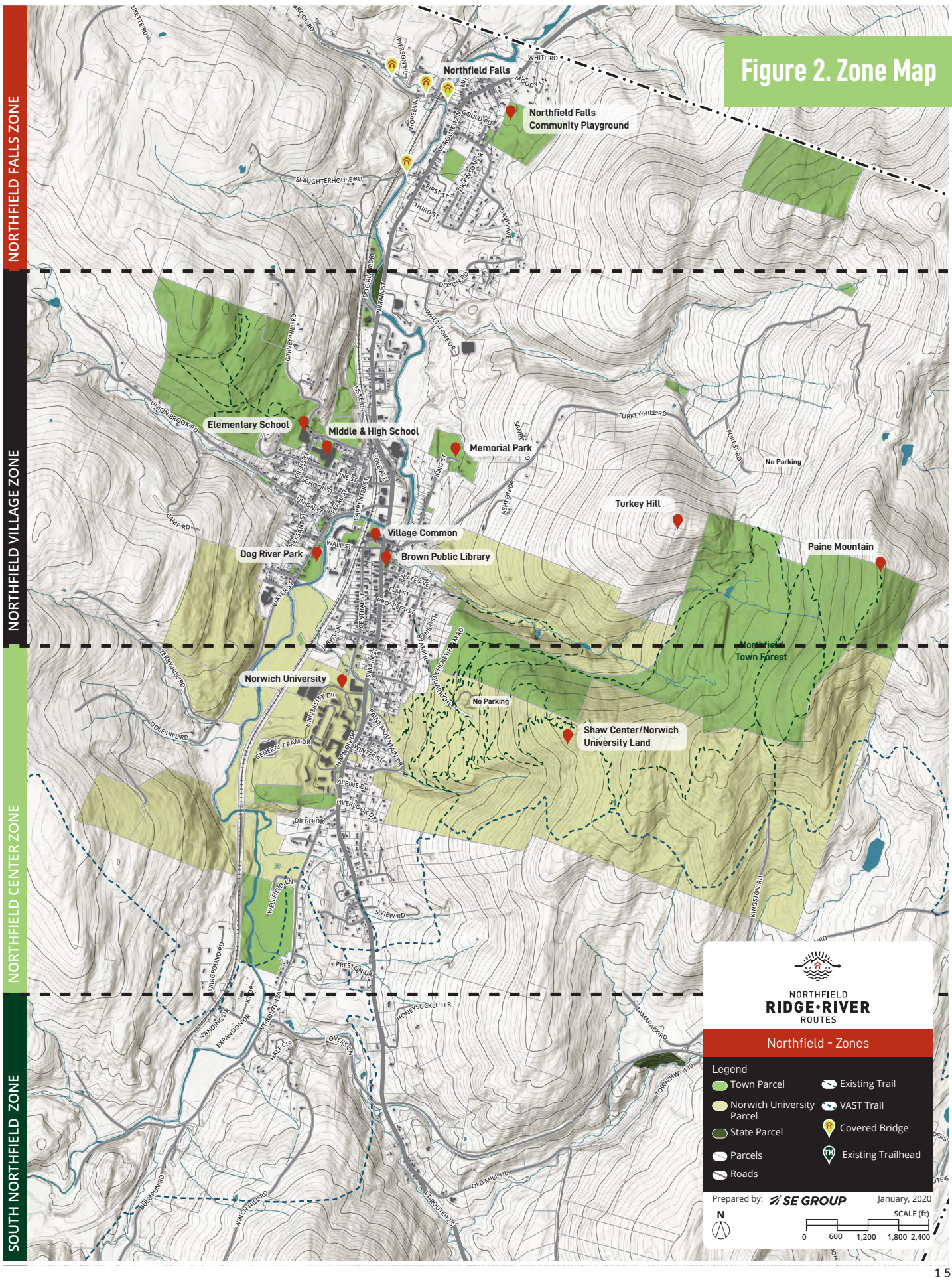
Northfield Village Zone

North of Norwich University, there is dense commercial and residential development. This is the town's area of highest density development, pedestrian activity, and economic activity. The Northfield Village zone provides the bulk of supporting services, such as restaurants, a coffee shop, medical practices, pharmacy, hardware stores, professional offices, banks, and other public and private sector establishments. Most of the commercial development is in one to three-story buildings close to the Main Street and East Street intersection near the Dog River. The development surrounds a quintessential Vermont village green with well-maintained open space, picnic tables, and a statue.

Northfield Falls Zone

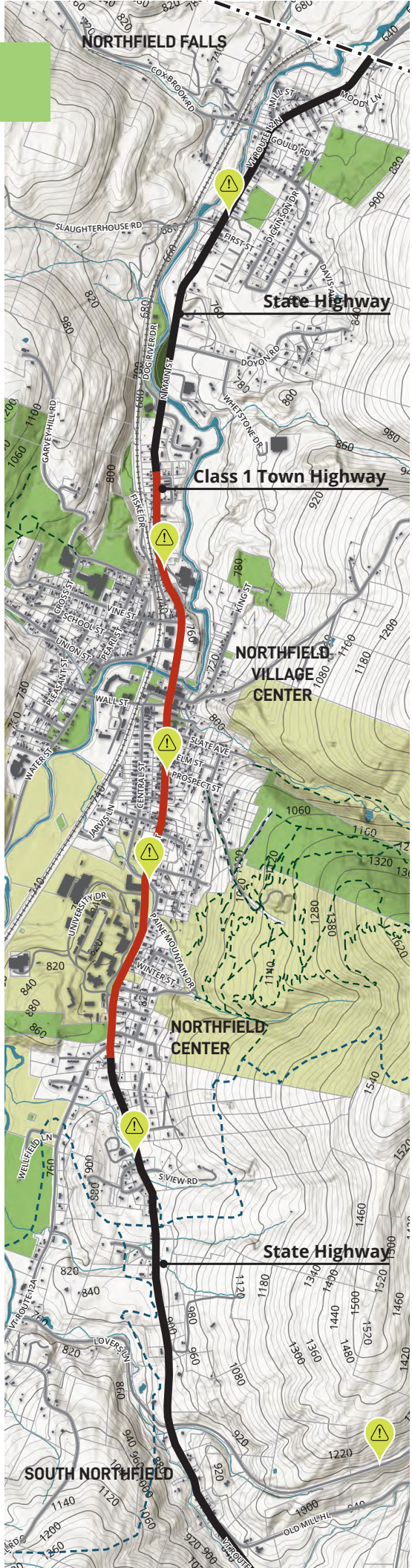
The Northfield Falls zone (see Zone Map in Figure 2) is a primarily rural corridor of VT Route 12 with some businesses and residential areas. The zone is home to the Falls General Store, a post office, covered bridges, the Northfield Falls Community Playground, and other small commercial developments.

Figure 2. Zone Map



VT Route 12 - Northfield Falls

Figure 3. VT Route 12 Map



Primary Roadway Analysis

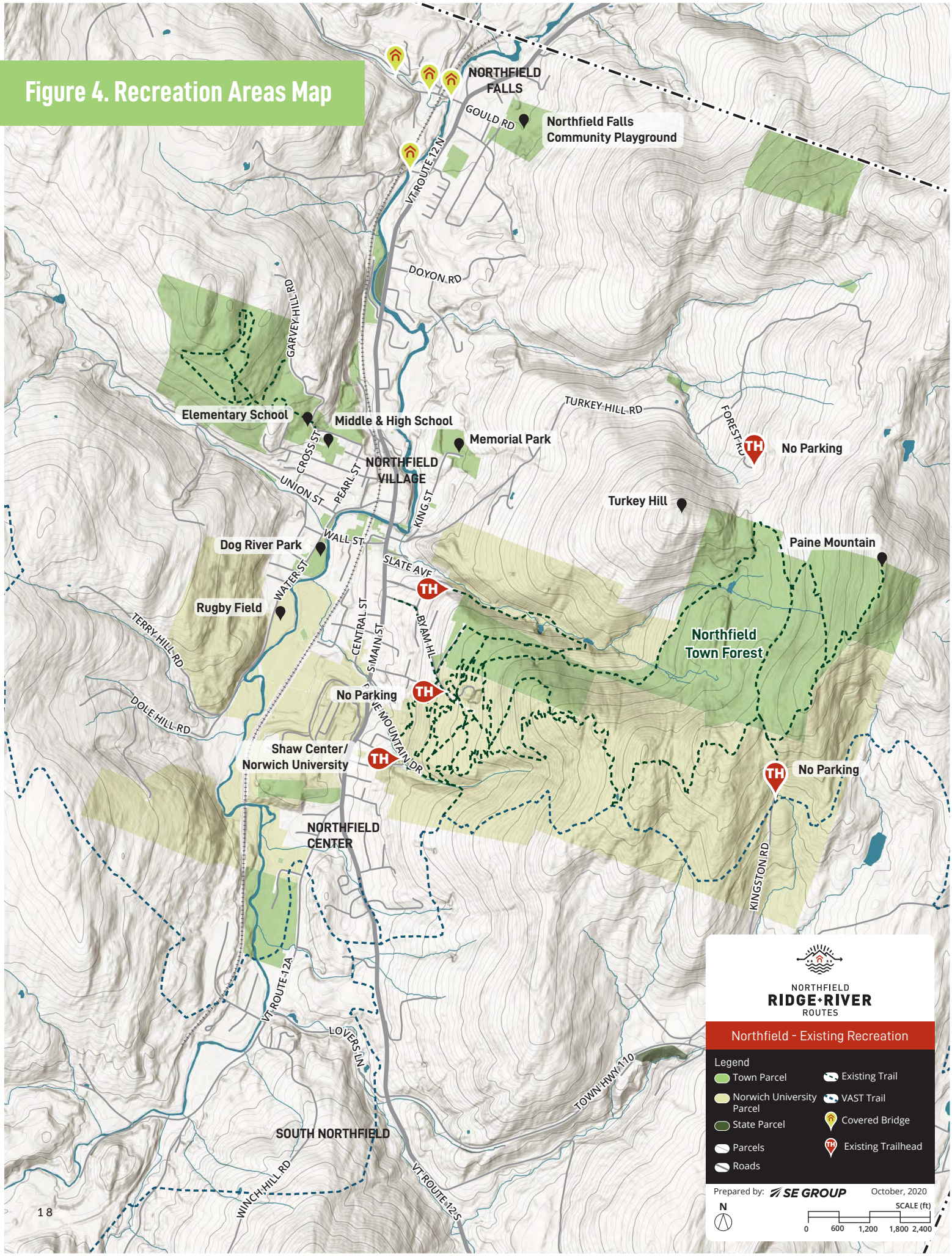
VT Route 12

VT Route 12 traverses the study area and is the only contiguous road that connects the population centers of Northfield. This road presents a variety of connectivity challenges that stem from vehicle speeds, roadway width, narrow shoulders, and numerous curb cuts. VT Route 12 is a two-lane state highway with 11 feet wide travel lanes (10-12 feet in some sections). The total road width varies from 26 feet to as wide as 49 feet in some areas (due to turn lanes). A portion of VT Route 12 in the study area is Class I Town Highway (C1TH—see below) and is indicated in red on the VT Route 12 Corridor map (Figure 3). The speed limit is 35 mph in Northfield Falls and drops to 30 mph in Northfield Village and on the Class I Town Highway portion. From 2012 to 2016, there were 52 crashes that resulted in injury across 6 high crash locations within the study area (of which two involved pedestrians). The complete VT Route 12 existing conditions review can be found in Appendix B.

CLASS 1 TOWN HIGHWAYS

The portion of VT Route 12 between the intersection with VT Route 12A and just north of Houston Street in Northfield Village is classified as a Class 1 Town Highway (C1TH). This classification establishes local control of the roadway within village centers, largely for maintenance purposes. This classification also supports greater municipal autonomy for design control, speed limits, crosswalks, surfaces, signage, travel lanes, shoulder widths, on-street parking, curb extensions, and roadside tree planting. Roadways classified as C1TH still must address standards for traffic control devices (Manual on Uniform Traffic Control Devices) and Vermont State Design Standards.

Figure 4. Recreation Areas Map



Recreation Areas

Northfield Falls Community Playground

The Northfield Falls Community Playground is located off of Burnham Road in Northfield Falls. This playground is geared towards ages 0-6 and includes recreation fields, a playhouse, swings, picnic table, and a variety of accessible and multi-sensory and experiential opportunities.

Shaw Outdoor Center

The Norwich University Shaw Outdoor Center offers use of outdoor recreational equipment for Norwich students, faculty, and staff and provides public access to the trail system.[i] Depending on the season, these trails can also be used for hiking, mountain biking, skiing, snowshoeing, and running. The Northfield Town Forest is often accessed from trails that originate at the Shaw Outdoor Center and on other Norwich University land, including access points at Slate Ave, Byam Hill Road, and Kingston Road.

Northfield Town Forest

Northfield Town Forest

The Northfield Town Forest is located east of Northfield Village and has approximately 5 miles of trail suitable for walking, hiking, skiing, snowshoeing, and biking. There are currently no designated Town Forest access points or trailheads. Existing access trails cross through Norwich University land, and many users park at the University's Shaw Outdoor Center and hike from there onto Town Forest trails.

Dog River Park

Dog River Park

Dog River Park was created in the aftermath of Tropical Storm Irene when severe flooding devastated the Water Street neighborhood. The community collectively decided to take part in state and federal buyout programs and worked to design and develop a new public park space and flood plain mitigation area. The park now has an accessible crushed gravel hardpack walking path, a gazebo, picnic tables, and a small children's play area.

Memorial Park & Pool

The Northfield Memorial Park and Pool is a municipal park that has a soccer field, baseball field, pool, picnic pavilion, playground, and picnic tables. Memorial Park hosts many after school and summer programs.

[i] In 2020, Norwich University restricted public access to the Shaw Outdoor Center due to COVID-19.

Bicycle and Pedestrian Facilities

Sidewalks

Sidewalks form the backbone of any pedestrian transportation network. The sidewalks in the study area are largely concentrated within Northfield Village and Northfield Center. Few sidewalks exist elsewhere in the study area. Many sidewalks within the study area are in poor condition and do not meet current Americans with Disabilities Act (ADA) standards.[1]

Vine Street Sidewalk

Crosswalks

Legal crosswalks exist at all intersections in Vermont, whether painted or not. Crosswalk markings establish a legal crosswalk at areas away from intersections and help improve visibility and safety at intersections. For improved visibility, the preferred crosswalk pattern is the high visibility "continental" crosswalk painting. If placed to avoid the wheel track, these markings may last significantly longer than standard transverse line crosswalks.

Painted crosswalks exist at a few intersections and mid-block crossings in Northfield Village and Northfield Center. Most marked crosswalks in Northfield are "continental crosswalks." Notably, there are no painted crosswalks in Northfield Falls.

East Street Crosswalk

Memorial Park Street Sign

Pedestrian Signage

Most signage and wayfinding in Northfield is at a "vehicular scale," intended to be viewed by travelers in motor vehicles traveling at relatively high rates of speed. Some of the existing crosswalks have crossing warning signs associated with them. A warning light is located at the crosswalk from Depot Square to East Street.

RRFB Crosswalk

[1] 2010 ADA Standards for Accessible Design: https://www.ada.gov/regs2010/2010ADAStandards/2010ADAstandards.htm

Walking and Hiking Trail Network

Trails within Northfield Town Forest and the Shaw Outdoor Center provide Northfield residents with approximately 10-15 miles of walking and hiking opportunities.

Closer to the Village Center-- Dog River Park provides a walking loop often used by seniors.

Although the trail network in Northfield is appreciated and well-used, there is no comprehensive trail map and on-trail signage lacks cohesion. The lack of available information online or at trailheads causes confusion related to property-ownership, management, and access.

Vine Street Crosswalk

Bicycle Facilities

Dedicated on-road bicycle facilities do not exist in Northfield. There are no on-road bicycle facilities along VT Route 12 within the study area, and the narrow road widths are mostly inadequate for bikers. Bicycle parking is also limited in Northfield.

New Bike Racks

Past Plans

Six recent plans and studies document downtown connectivity needs, pedestrian and bicycle facilities, and general infrastructure gaps. These documents provide recommendations towards reducing connectivity gaps in Northfield and are summarized briefly here.

Bicycle and Pedestrian Facility Conceptual Alignment Analysis (2005)

The primary function of this study was the evaluation for enhancing bicycle connectivity within the Route 12 corridor. The study considered several potential improvements to the corridor, considering some of them "feasible". This was a relatively high-elevation review and did not consider broad community input. The study did not address in any depth alternative routes for bicycle use beyond the Route 12 corridor. The analysis did highlight some of the constraints that will shape what is possible in Northfield; widths of right-of-way, utility relocation issues, costs, and engineering considerations.

Northfield Area-Wide Plan (2016)

Leveraging resources from Central Vermont Regional Planning and with financial assistance from the US EPA Brownfield Program (via VT Agency of Natural Resources, Department of Environmental Conservation Brownfield Response Program), an analysis of existing brownfield sites was undertaken. As a part of this work, conceptual redevelopment plans were established based on a market assessment process. The resulting documentation included specific ideas for block improvements (Gateway, East Street, Mayo Block). Underlying these more specific design ideas were five core pillars; reconnecting to the river, pedestrian orientation, mix of uses, enhanced streetscapes, and parking. While the conceptual ideas require significant private-sector interaction, the core pillars are valuable as guidance in consideration of potential connectivity improvements.

Vermont Downtown Action Team Report (2013)

In the wake of the devastating impact of Tropical Storm Irene on many Vermont communities, the State leveraged a wide variety of resources and formed a Downtown Action Team (VDAT) that assisted in evaluating the physical and market conditions within affected communities. Northfield saw tremendous damage when the Dog River peaked over nine feet above flood stage and ravaged more than eighty homes in the Water Street neighborhood. The market positioning described in the summary document emphasized retail; but retail focused more squarely on addressing the visitation that Northfield gets from being an economic center and having

an academic institution. The physical planning process introduced several ideas into the community conversation; establishing gateways, expanding access through ADA improvements, increasing connections between Norwich University and the downtown core, and placemaking improvements. Perhaps the most notable idea was the riverside park that eventually became Dog River Park. The establishment of this public facility created an open space node near the downtown core and opened new areas for connectivity.

Northfield Town Plan (2019)

The 2019 Northfield Town Plan identifies a need for better bicycle and pedestrian connectivity within and between Northfield Falls and Northfield Village. The plan states that the shoulder along VT Route 12 is variable and is not adequate for most bicyclists. To create a more pedestrian and bicyclist friendly environment, the plan recommends widening VT Route 12 shoulders or developing a shared-use path and complementary infrastructure such as benches and bike racks. Infrastructure improvements within the draft town plan also highlight the need to align capital with priorities for sidewalks, along with roads, bridges, and culverts. The implementation element of the plan identified several actions that support community connectivity, including a complete streets program, focusing on recreation and tourism.

Northfield Walk Audit & AARP Placemaking Demonstration Project Review (2019)

The Northfield Walk Audit captured a snapshot of the existing pedestrian infrastructure. The audit identified areas where sidewalks had recently been upgraded, sidewalks were in need of repair, and places where there is pedestrian activity but no sidewalks. The audit also analyzed existing crosswalks for their length, presence, and accessibility.

South Main Street Pedestrian Experience: Observations & Opportunities (2019)

The South Main Street Pedestrian Experience report provides insight into how pedestrian infrastructure in Northfield affects both vehicular and pedestrian comfort and behavior. A group of pedestrians recorded their experience as they traveled between Northfield Village and Northfield Center along Main Street.

Pedestrians reported new and updated sidewalks in some areas, while others had none or had narrow sidewalks with utility poles in the middle. Recorded observations included sidewalks with cracks, heaves, and trip hazards as well as areas where the sidewalk condition results in drainage issues, with large puddles and ice forcing pedestrians off the sidewalk.

Trail Usage

Trail access and usage were analyzed by conducting two separate trail counts—one in the winter and one in the late spring. The winter trail count was carefully scheduled to capture trail activity before and during Norwich University's holiday break. The results indicated that trail usage was highest in the early afternoon and that Saturdays were the busiest days overall. Trail count data from the Shaw Outdoor Center counter indicated a much higher average daily traffic (ADT) count in January (when students were back on campus and trails are being groomed) than in December (when students were taking final exams and leaving for winter break). The Shaw Outdoor Center – Red Trail saw a higher level of use than the other trails.

The spring trail counts were conducted between May 11 and May 23, 2020. These counts captured year-round residents only as Norwich University had closed their campus and sent students home due to COVID-19 pandemic. The higher level of recreational use captured in these counts may also be reflective the heightened use of recreation resources that stemmed from social distancing measures in place to combat the COVID-19 pandemic.

The springs counts show that use during warmer weather was less concentrated on a single trail than it was in the winter. The data also indicates that the trails see fairly consistent daily use, with only slight increases on the weekends. The most frequently used trails originated at the Shaw Outdoor Center, and the highest amount of trail activity occurred at around 11 am and 5 pm. All of the trail counters recorded much higher average daily traffic counts (ADT) during the May counting period than winter. For example, during winter, the Byam Hill counter recorded an average of 8.7 trail users per day, whereas in May, that number jumped to 22.7 trail users per day. While increases in trail use during warmer months is not unexpected, the overall volume of use suggests that the trails are an important recreation resource to the community.

Counter Location	Winter ADT	Spring ADT
1. Shaw Outdoor Center – Red Trail	25.1	48.1
2. Byam Hill Road	8.7	22.7
3. Slate Ave	6.5	28.2
4. Shaw Outdoor Center – Blue/Green Trail	N/A	53

Figure 5. Winter Trail Count Locations

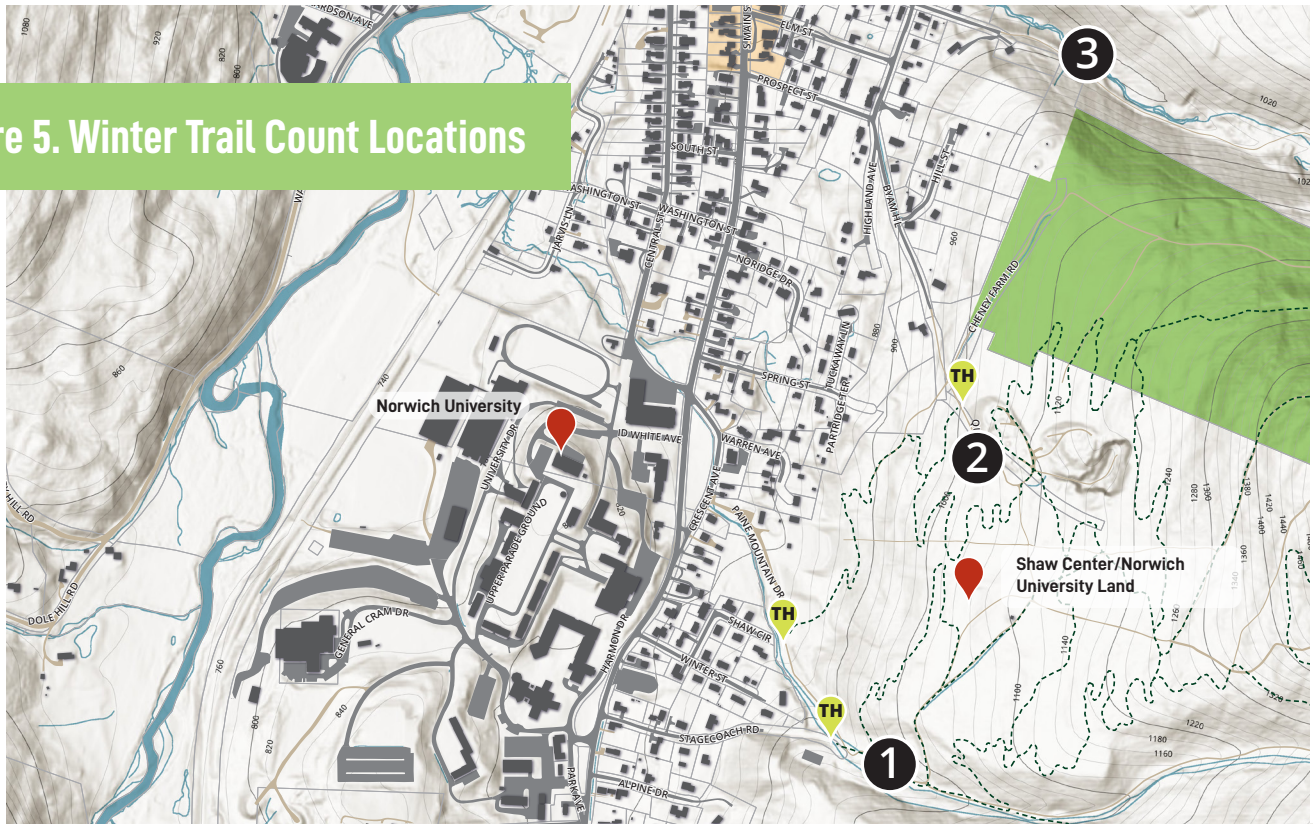
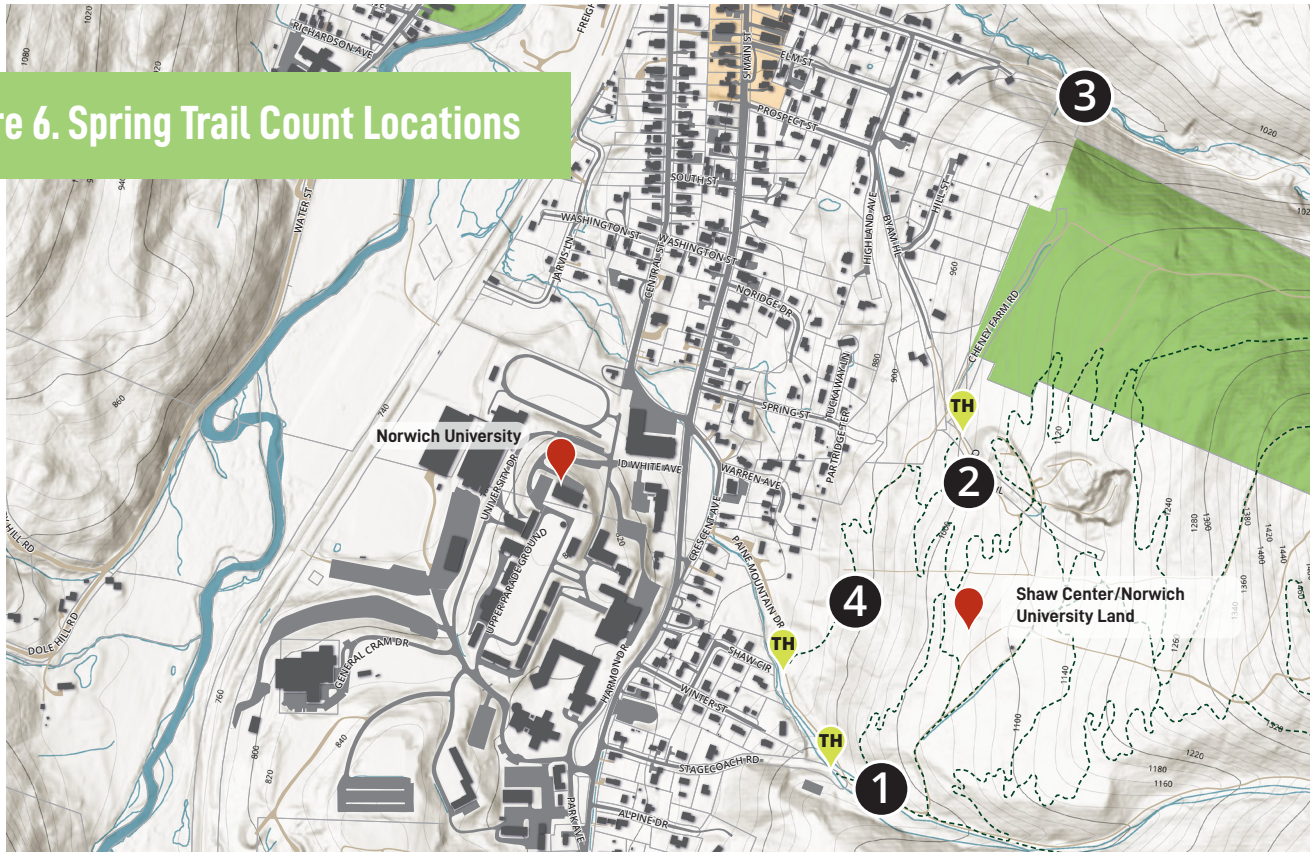


Figure 6. Spring Trail Count Locations



C H A P T E R T W O

COMMUNITY ENGAGEMENT


OPEN HOUSE
RIDGE&RIVER
ROUTES
JAN30 5-7
COMMUNITY
ROOM

Community Engagement

This project included a robust community engagement process, providing numerous opportunities for the public to offer their vision and provide feedback as the project evolved. Throughout the public engagement process, the steering committee volunteered time and expertise to ensure the success of community events. Their unyielding efforts demonstrated the strength of the community fabric found in Northfield.

Community Connectivity Walk

The project team met with community stakeholders and conducted a walking audit around Northfield Village on November 22, 2019. During this walk, the team explored connectivity needs and opportunities within the village, along the Dog River and at Norwich University, Shaw Outdoor Center, and the Town Forest. This audit looked at core issues within the project area and informed initial ideas for route alternatives.

Common Spirit Community Event

On December 6, 2019, the project team hosted two community engagement events in Northfield—one at Norwich University and another in conjunction with the annual Common Spirit holiday event. These events helped generate interest and awareness of the Northfield Ridge + River Routes project and allowed participants to provide their thoughts about various project elements. Participants were asked what safety and connectivity enhancements they would like to see, what recreation areas they frequent, and how they would describe their existing and desired Northfield experience. Feedback from over 100 Northfield and Norwich University community members was collected during these events.

Community Connectivity Walk and Talk

Common Spirit Community Event

Community & Youth Survey and Wikimap

A community survey went live on December 6, 2019, the same day as the Common Spirit Community Event. The survey touched on similar themes as the community event and allowed for broader participation and more in-depth feedback about connectivity, commuting, and pedestrian and bicyclist facility improvements. The survey asked respondents to provide location-specific feedback through a Wikimap—a web map that enabled respondents to pinpoint places of interest and problem areas and trace routes they take or would like to see. An abbreviated, youth-friendly version of the community survey was distributed through the Northfield Public School newsletter.

Both surveys were available through February 7, 2020. The community was made aware of the survey through various methods, including flyers distributed around town, an informational mailing, press releases, email blasts, and social media posts. The community survey received 470 responses, the youth survey received 27, and the Wikimap received 108 comments.

Community Summit January 30 and Stakeholder Meetings

A Community Summit was held on January 30, 2020, in the Brown Public Library Community Room. This meeting presented the analyses of the existing conditions of the economic, infrastructure, and stormwater elements of the project and initial connectivity and infrastructure improvement concepts. Participants were able to provide feedback about specific ideas the planning team had brought forward and indicate their Quick Build project preferences (see sidebar).

COVID-19

On March 24, 2020, Vermont issued a “Stay Home, Stay Safe” order in response to the COVID-19 virus. As Vermont adapted to new health and safety precautions, the project team worked to adapt the planning process accordingly. Steering committee meetings continued via conference call, and a socially-distant outdoor walking tour with an attached survey component replaced a large indoor community meeting.

Walking & Virtual Tour

The Ridge + River Routes self-guided walking tour showcased connectivity, placemaking opportunities, and design concepts through seven different stations strategically placed around Northfield. The stations presented information relevant to the locations they occupied: the station at the Falls General Store station displayed the Northfield Falls opportunities, and the Northfield Town Forest & Shaw Outdoor Center station presented trail, trailheads, and off-road path opportunities. A virtual walking tour was available online to share this same information with those who did not feel comfortable participating in the walking tour. Each station received about 12 survey responses for a total of 70 responses.

Walking Tour QR code survey links

East Street Walking Tour Station

Northfield Perseveres

May Pole COVID-19 Edition

Key Themes and Results

The public engagement relating to pedestrian infrastructure, active transportation, and access to trails in Northfield revealed the following takeaways and themes:

- There is strong support for the expansion of active transportation facilities.
- Most respondents do not feel safe from vehicular traffic walking or biking along roads around where they live.
- There is a need for a comprehensive trail map and trail wayfinding system.
- Significant distances between residences and destinations may prohibit increased walking and biking regardless of the facilities available.
- Residents would be more likely to use the trail systems (Northfield Town Forest and Shaw Outdoor Center) if more accessible and visible trail access points for vehicles, bicyclists, and pedestrians were provided.

Complete community engagement results can be found in Appendix C.

QUICK BUILD

The Vermont Department of Health provides Better Connections communities additional "quick build" grants to accelerate the implementation of projects that support public health, physical activity, and access to healthy food.

The Northfield Ridge + River Routes team was awarded a Quick Build grant to add bike racks and benches in two of Northfield's population centers. Benches and bike racks were added to the Common area in Northfield Village and other locations throughout Northfield.


53

CHAPTER THREE

STORMWATER & STEWARDSHIP OF THE DOG RIVER

Background

Northfield is a regional leader in stormwater mitigation, green infrastructure development, and managed retreat. Perhaps the best example of this leadership is demonstrated by Northfield's response to Tropical Storm Irene. During the massive inland flood, several homes along Water Street were damaged. Because these homes were in the 100-year flood zone, they were eligible for the Federal Emergency Management (FEMA) buyout program. Three houses, and the land on which they stood, was bought by FEMA and transferred to the Town of Northfield. This area is now widely known as Dog River Park—a public open space and natural area that effectively mitigates risk in this flood-prone zone.

Although Northfield has made strides towards stormwater mitigation and flood abatement, the town is required to take further action due to its status as a Combined Sewer Overflow (CSO) community. CSO communities are municipalities that have combined sewer and stormwater lines. These lines overflow during large rain events and exceed the wastewater treatment system's capacity, causing untreated sewage to flow into local waterways, including the Dog River. Northfield has tackled this problem head-on by working towards separating the sewer and stormwater lines while also reducing the stormwater that initially flows to the drains.

This report looked at Stormwater Management at two scales: broader stormwater opportunities within each zone and a more detailed stormwater plan within the Slate Avenue neighborhood. Each is briefly described below.

Overall Stormwater BMP's

Watershed Consulting reviewed existing conditions within the study area to identify potential best management practice (BMP) improvements within the four zones. These BMP's would likely be implemented in concert with other opportunities for future connectivity, access, or recreational upgrades. These opportunities, described in Appendix B and included within Chapter 7 (the Implementation Guidebook), consider a range of options. They are briefly summarized here.

Northfield Falls

Within this zone, stormwater treatments primarily seek to enhance potential connectivity or placemaking improvements or functions as a retrofit for noted deficiency in existing infrastructure. For example:

- Modifications to existing grass swales into bioretention areas or gravel wetlands along Moody Lane could enhance stormwater treatment and provide a visible educational opportunity, communicating the town's commitment to sustainability.
- The existing outfall at Mill Street and Route 12 shows erosion and could benefit from a stabilization project.
- The parking area at the Falls General Store could benefit from retrofit projects to stabilize the existing stream, install a sediment trap, and add planters to intercept roof runoff. These improvements would reduce the sediment load from the parking area.

Northfield Village

This zone has the most established stormwater management system within the town. In addition to a potential neighborhood combined sewer retrofit solution along Slate Avenue, described later, other options might help bolster existing stormwater improvements and add to placemaking in the zone.

- The North Main Street Bridge outfall shows evidence of considerable erosion and bank destabilization. Shoring up this area, potentially commensurate with the development of river-access improvements, helps improve the function of the outfall and reduces sediment erosion.
- Bioretention, rainwater collection and rain gardens might enhance streetscape improvements within this zone. Making stormwater treatments more visible can reinforce the message of its importance and value to the community.

Northfield Center

Norwich University is the dominant land use within this zone. This analysis does not address on-campus retrofits options, but broader options exist to expand the portfolio of stormwater features in the zone, some of which might benefit the University.

- The existing swale along South Main Street takes all the stormwater runoff from Norwich University. While structurally sound and reinforced, infiltration improvements in this area could enhance the swale's treatment.
- Natural soil conditions within this zone are potentially supportive of various retrofit options that increase treatment effectiveness.
- A large field between Diego Drive and Private Road 13 might enable developing a large infiltration basin, capturing stormwater from the University. A partnership with the University on the development of such an improvement might support longer-range campus planning options.

South Northfield

The less concentrated land use patterns within South Northfield do not support retrofit options currently. As new development is proposed, the inclusion of appropriate and compliance stormwater treatment should be prioritized.

Slate Avenue Neighborhood Stormwater Plan

Past Planning

The Main Street Stormwater Separation and CSO Abatement report (2019) prepared by Dufresne Group The Slate Avenue neighborhood identified Slate Avenue as a critical area for disconnecting stormwater from the combined sewer system to mitigate combined sewer overflows. This area includes Slate Avenue, Elm Street, and Prospect Street, along with uphill areas contributing to the stormwater. An initial concept was developed from this earlier analysis to install new separate stormwater drainage in the Slate Avenue neighborhood and green stormwater infrastructure to manage the newly disconnected runoff. A primary recommendation from this report was to finalize the conceptual green infrastructure proposed for the neighborhood.

Stormwater Analysis

Several necessary analyses were conducted by Watershed Consulting to evaluate the design of potential stormwater system improvements more fully. These analyses informed a hydrologic model that calculated the expected volume of surface water runoff under existing conditions. This baseline model was then used to evaluate the efficacy of alternative stormwater management treatment options for the State Avenue neighborhood. The information below summarizes the key findings of these efforts, the details provided in Appendix B.

Drainage Patterns: How stormwater moves within the relatively steep conditions observed within the Slate Avenue neighborhood is critical in determining the appropriate stormwater treatment regime. Watershed Consulting reviewed existing topographic conditions, evaluated the roadway and shoulders, and delineated seven subwatershed or drainage areas, contributing to the catchment. Overall, the catchment area comprises about 55 acres.

Soil Conditions: Watershed Consulting characterized underlying soil conditions and completed infiltration testing at numerous Slate Avenue neighborhood locations. This testing confirmed that soil conditions are generally favorable for infiltration. This conclusion enables a broader and more diverse variety of innovative and effective stormwater design features. Soil logs from this investigation are provided in the Appendix.

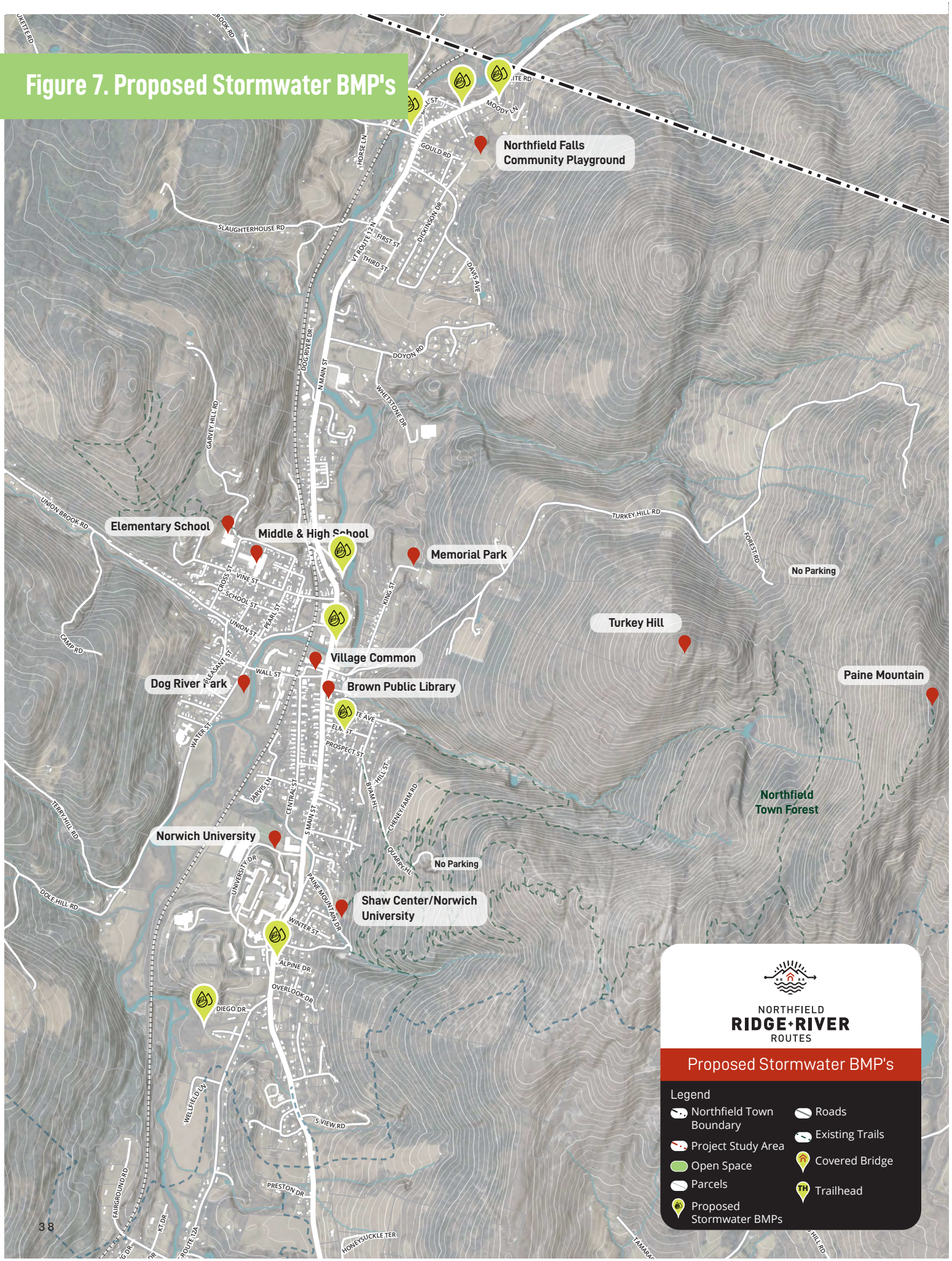
The evaluation of drainage patterns and soil conditions allowed Watershed Consulting to develop a hydrologic model to predict stormwater flow from the neighborhood into the Dog River. Under current conditions, the model indicates a maximum flow rate of 3.15 cfs (cubic feet per second), for a 1-year “design” storm event.

GREEN STORMWATER INFRASTRUCTURE

Watershed Consulting and Stantec advanced this framework into a concept design plan for the Slate Avenue Neighborhood. This concept plan identifies surface and subsurface treatments within and along the three principal streets (Slate, Elm, and Prospect). The treatment options reflect “steeper” and “flatter” site conditions, recognizing the neighborhood's topographic challenges. The plan also identifies drainage trunk lines within the rights-of-way and potential connections to future drainage lines within the VT Route 12 right-of-way.

This concept's effectiveness was modeled and showed a reduction of about 640,000 gallons of stormwater flow reaching the Dog River during a typical 1-year storm event. A full technical report on the Slate Avenue Neighborhood Stormwater Plan's analysis and design is found in Appendix B.

Figure 7. Proposed Stormwater BMP's



Aligning Objectives

Any stormwater improvements will require a collaborative partnership between the Town, State, and private interests. While options exist within the public right-of-way, most improvements will rely on a shared approach to the problem. Education and discussion with landowners on how stormwater systems work, how they are maintained, and how their operation interacts with properties are critical for successful implementation.

Identifying how these stormwater retrofits integrate into other potential infrastructure projects can improve their prospects for grants and funding. Many of the ideas explored in this plan can and likely should happen in conjunction with other infrastructure projects. For example, implementing the stormwater design for the Slate Avenue Neighborhood plan would require new subsurface infrastructure. Using this opportunity to improve the roadway and sidewalks would minimize disruption and potentially save costs.

C H A P T E R F O U R

ENHANCING LOCAL CONNECTIVITY


COFFEE
BEER
ONE WAY

THEME FOCUS:

Pedestrian mobility, sidewalks, placemaking at each population center, and neighborhood-scale improvements.

Context

The public engagement process and the analysis completed for this project identified a series of bike/pedestrian and placemaking opportunities that could improve connectedness within population centers (see Figure 8 Opportunity Map). These opportunities include potential streetscape upgrades with an emphasis on supporting local businesses and creating a destination. They also include more routine improvement recommendations, such as upgrading sidewalks and improving pedestrian crosswalks. A balance of aspirational and practical opportunities can allow Northfield to make short-term progress in advancing this theme and keep advancing to a more robust pedestrian-oriented future, particularly in those zones where commerce and people intersect.

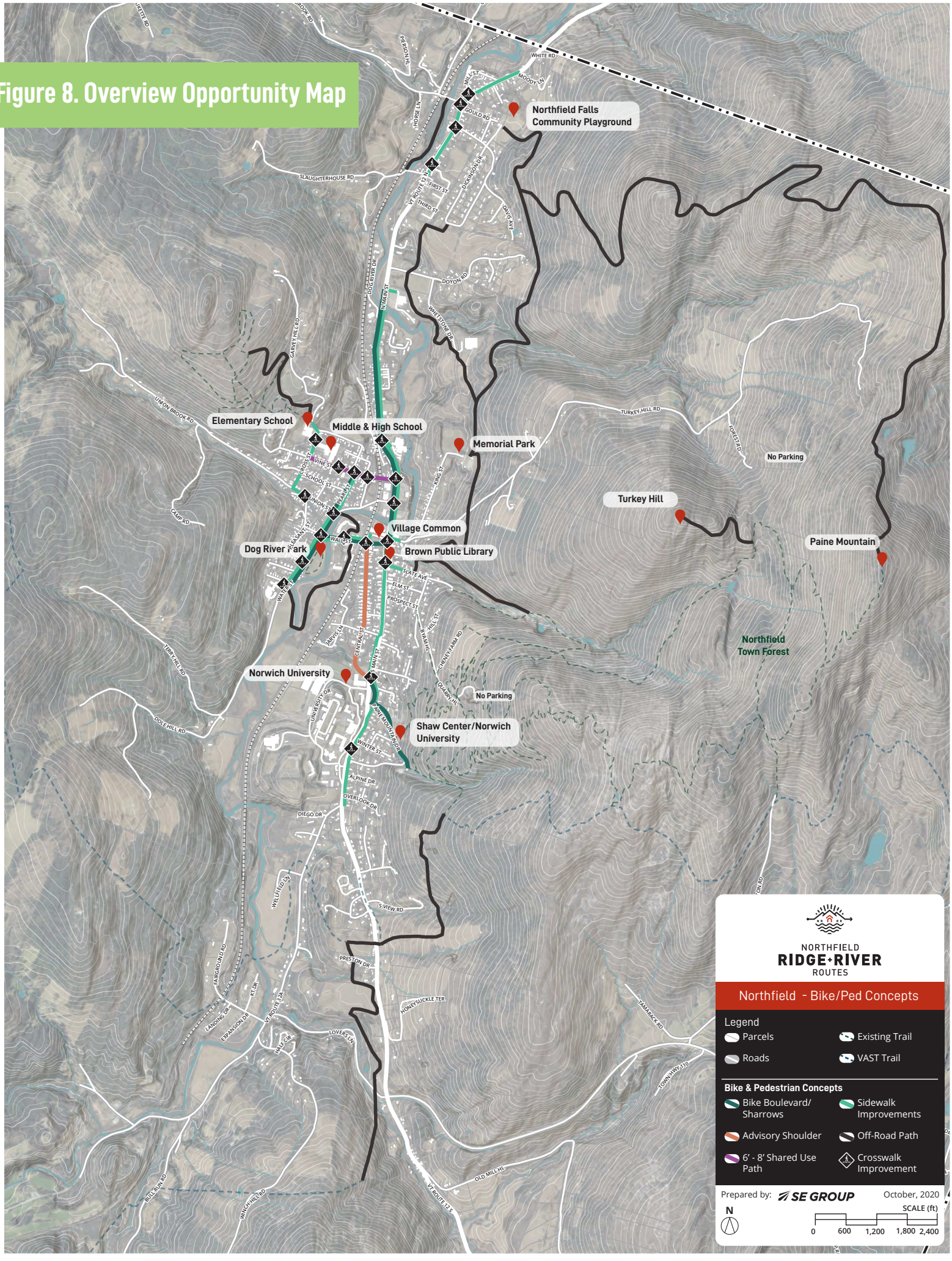
This chapter summarizes the opportunities and challenges to enhance local connectivity in each zone. Chapter 7, the Implementation Guidebook, provides more detail about them, including cost implications, permit issues, and process steps.

BENEFITS OF WALKING AND BIKING

Active transportation is modes of transportation that are powered by humans, such as biking and walking. Planning for active transportation considers the:

- Health and welfare of people: encouraging and supporting the ability of people to get outside, connect to recreation, and improve health outcomes.
- The health of the environment: supporting the reduction in traditional transit in favor of human-powered mobility.
- The local economy's health: improving local businesses' connectivity to their markets, supporting placemaking efforts to encourage visitation, and enhance aesthetics.
- Accessibility: enabling and supporting the safe movement of all members of the community, including children, older adults, and people with limited mobility.

Figure 8. Overview Opportunity Map



Opportunities and Challenges

Northfield Falls

Northfield Falls has no pedestrian infrastructure. The lack of sidewalks, walking paths, and crosswalks discourage pedestrian activity in the Falls. In the community survey, respondents who stated they lived in Northfield Falls were less likely to walk around their neighborhoods and more likely to feel unsafe due to vehicular traffic on local roads. Infrastructure investment in Northfield Falls should focus on creating sidewalks and crossings to local points of interest, such as the Falls General Store and the Post Office. The narrow travel corridor between the Dog River and the surrounding hillsides further a sense of disconnectedness in this area. See technical memorandum from Stantec for more detailed discussion of key opportunities and challenges (Appendix H).

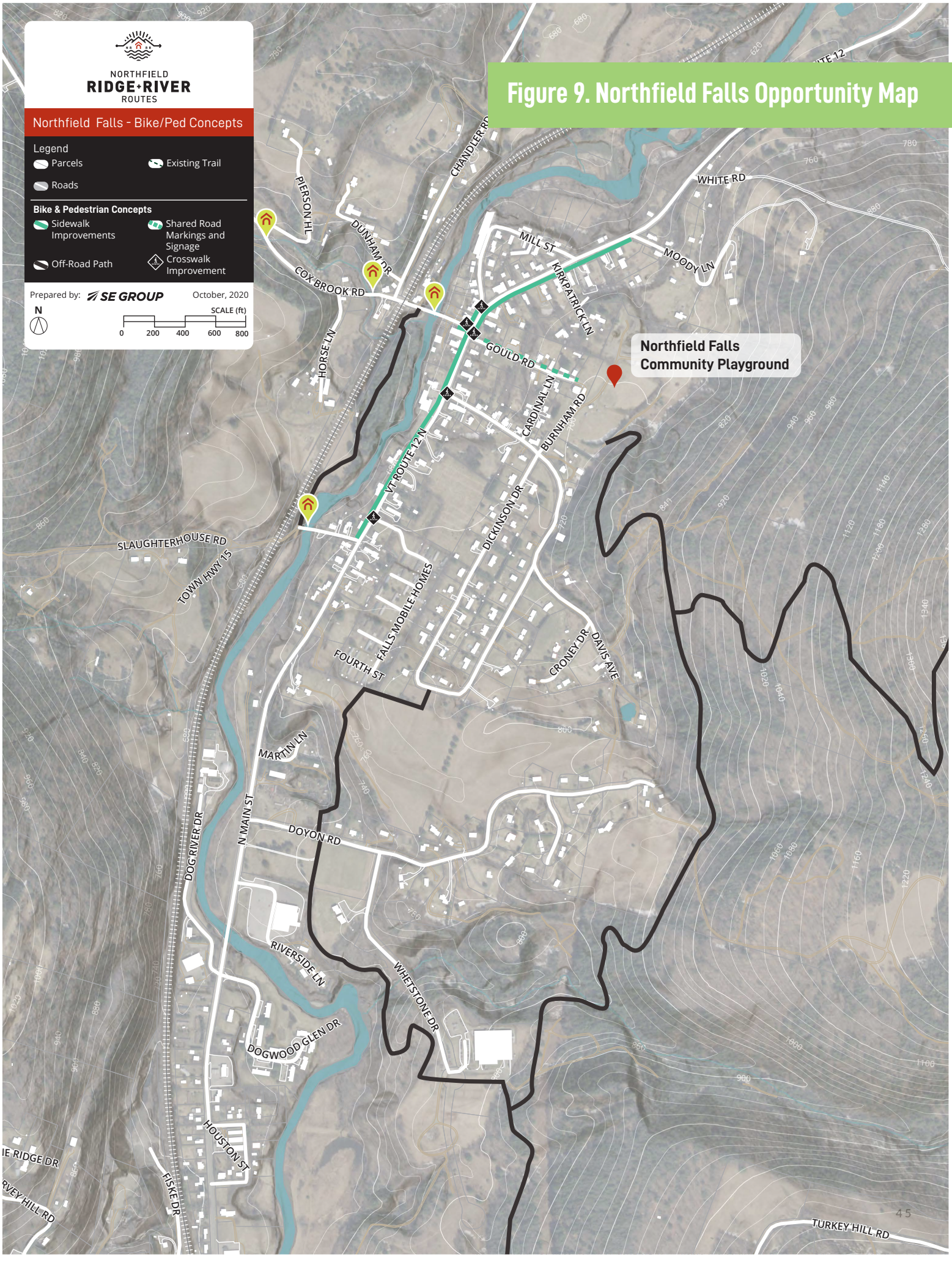
SURVEY SAYS:

"Walking is incredibly dangerous in the Falls. There's no room for pedestrians and drivers act like they don't need to share the road."

Key Opportunities:

- Consider new sidewalks with curb (and green belt if possible) from Moody Lane to Slaughterhouse Road
- Upgrade crosswalks at the Cox Brook Road and Gould Road intersection – more visible, better lighting
- An upgrade of the VT Route 12 crosswalk at the Falls General Store, Davis Avenue, and Slaughterhouse Road to an RRFB (Rectangular Rapid Flashing Beacon)
- Better manage access to excessively wide driveways. This will slow traffic and provide a more defined pedestrian route
- Local roads off VT Route 12 are likely walkable given low traffic volumes. Consider shared road markings for pedestrians/bicycles on Gould Road and Davis Avenue to provide more visible biking/walking option to access New Promise Community Playground
- Outdoor seating/wayfinding enhancements at the Falls General Store
- Kiosk at Northfield Falls Community Playground

Figure 9. Northfield Falls Opportunity Map



Key Constraints:

- Existing aerial utilities on north side of VT Route 12 from Moody Lane to Gould Road
- Existing aerial utilities on south side of VT Route 12 from Gould Road to Slaughterhouse Road
- Houses are located close to the road in some areas which may require sidewalk to be pushed closer to road. Rights-of-way issues may be problematic.
- About 2800 feet of new sidewalk may be needed in this zone. Assuming a cost of $350/foot (includes Admin, Engineering, Construction, and Construction Inspection costs), this segment might cost upwards of $1 million. Grants are available and usually require 20% local match

Northfield Village

Northfield Village is the economic hub of Northfield and has a high density of shops, restaurants, and businesses. The pedestrian infrastructure in this area reflects this activity; the sidewalks and crossings around Depot Square and East Street are well maintained. The RRFB at the crosswalk between Depot Square to East Street increases driver awareness that pedestrians are crossing. Infrastructure investment in Northfield Village should focus on closing sidewalk gaps, creating safe routes to school, developing a robust maintenance plan, and supporting placemaking activity amenities (signs, benches, outdoor dining, street art, etc.).

SURVEY SAYS:

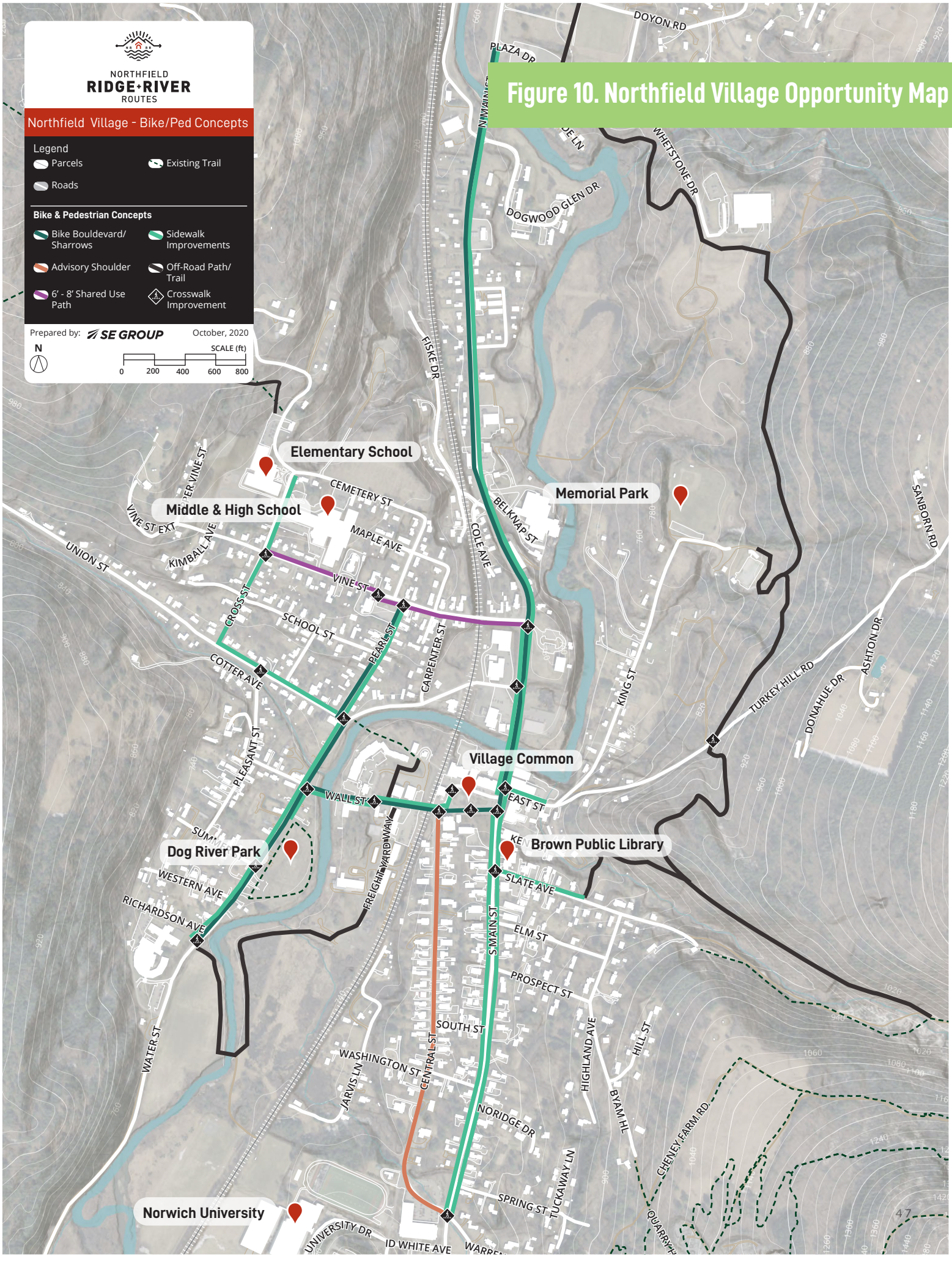
"I want to see more events in town parks and greenspaces"

"I want to see more dining and entertainment options!"

"Add public art on downtown buildings, on the bridge, or in the Common."

"Add playful features in the Common to include children"

Figure 10. Northfield Village Opportunity Map



Key Opportunities

- Sidewalk improvements along Main Street (VT Route 12) to comply with ADA standards and address noted deficiencies
- Slate Avenue neighborhood stormwater improvements (See Chapter 4) could dovetail with
- Enhanced or additional crosswalks in the Village to support a greater connection between businesses, outdoor green spaces, and parking – Including at Main Street/East Street, Slate Avenue/Main Street, and Wall Street/Main Street.
- Curb enhancements/bulb-outs, reduced curb radii to support traffic calming, and potential new crosswalks
- Add sharrows along Main Street. Consider sharrows or a bike boulevard along Pearl Street and Wall Street
- Add bike parking at places like the Common and in commercial areas
- Improvement to support Safe Routes to School including defined and dedicated bike routes or shared-use path, supportive signage, and off-road path connections, including along Vine Street
- Placemaking enhancement along East Street, including areas for outdoor dining and streetscape improvements
- A new advisory shoulder along Central Street
- Community garden or a parklet along Wall Street
- A new informational Kiosk and benches at the Common

Key Challenges

- Railroad rights-of-way pose significant challenges to project advancement and require extensive coordination
- Wide pavement areas at Depot Square make complicate pedestrian improvements
- Private land ownership poses challenges to establishing a public trail system
- Parking needs (including quantity and location) serving businesses in the Village could limit the ability to repurpose parking spaces as outdoor space within the public right-of-way
- Easements and access into existing buildings, stores, and shopfronts may require adjustments to pedestrian improvements, including considerations for ADA accessibility

SURVEY SAYS:

The most commonly cited reasons for not biking or walking more were “destinations too far apart,” “sidewalks and/or bike paths not connected or in poor condition,” and “traffic volume and speed"

Northfield Center

Northfield Center is comprised mostly of residential neighborhoods and Norwich University. Pedestrian amenities in this area respond mainly to the travel patterns of Norwich University students and staff. The focus in this area should be to create facilities conducive to pedestrian activity to and from Norwich University and nearby points of interest such as Depot Square, Dog River Park, and the Shaw Outdoor Center.

Key Opportunities

- Sidewalk improvements along South Main Street
- Sidewalk improvements on the east side of Crescent Avenue from Central Street to Stagecoach Road
- New or upgraded crossings at Central Street/Main Street, White Avenue/ Main Street, Main Street, and Paine Mountain Drive, and crosswalk along Main Street just south of Winter Street
- Continuation of advisory shoulder along Central Avenue to South Main Street

Key Challenges

- Railroad rights-of-way pose significant challenges to project advancement and require extensive coordination
- Multiple crossings along South Main Street (VT Route 12) may conflict with traffic movements and need additional analysis for design
- Steep embankments between South Main Street and the Norwich University Campus complicates access and connectivity
- Sidewalk updates might implicate private rights-of-way, subject to detail scoping level review and analysis

South Northfield

Given the diffuse nature of South Northfield, no specific local connectivity enhancement was identified.

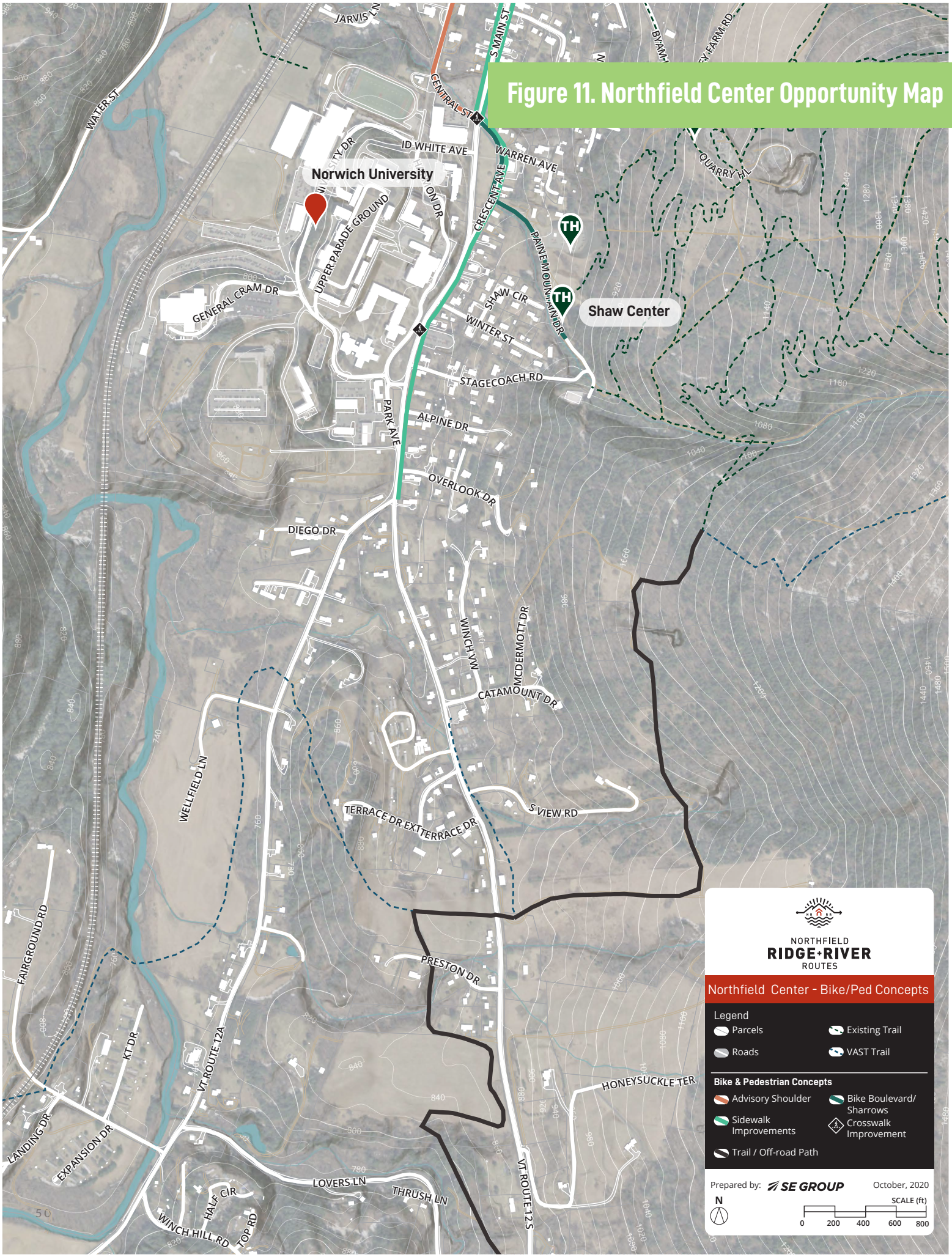


Figure 11. Northfield Center Opportunity Map
Norwich University
Shaw Center
TH
TH
JARVIS LN
S MAIN ST
CENTRAL ST
WATER ST
ID WHITE AVE
WARREN AVE
CRESCENT AVE
QUARRY HL
UPPER PARADE GROUND
ON DR
PAINE MOUNTAIN DR
SHAW CIR
WINTER ST
GENERAL CRAM DR
STAGECOACH RD
PARK AVE
ALPINE DR
OVERLOOK DR
DIEGO DR
WINCH VW
MCDERMOTT DR
CATAMOUNT DR
WELLFIELD LN
TERRACE DR EXT
TERRACE DR
S VIEW RD
FAIRGROUND RD
PRESTON DR
KT DR
VT ROUTE 12A
HONEYSUCKLE TER
LANDING DR
EXPANSION DR
LOVERS LN
THRUSH LN
HALF CIR
WINCH HILL RD
TOP RD
VT ROUTE 12S
NORTHFIELD
RIDGE+RIVER
ROUTES
Northfield Center - Bike/Ped Concepts
Legend
Parcels
Existing Trail
Roads
VAST Trail
Bike & Pedestrian Concepts
Advisory Shoulder
Bike Boulevard/ Sharrows
Sidewalk Improvements
Crosswalk Improvement
Trail / Off-road Path
Prepared by: SE GROUP
October, 2020
N
SCALE (ft)
0
200
400
600
800

Local Businesses

In May 2020, Camoin Associates connected with local business owners to better understand how the COVID-19 pandemic and associated closures impacted their business, continue to impact their business, and any role the town can play in mitigating losses or challenges. Many of the conversations revolved around creating an inviting and safe experience and touched on ways that the town could support outdoor dining and placemaking in the future. The complete report from those conversations is in Appendix X.

1) Include shaded outdoor seating: Having protected space for outdoor dining will be of the utmost importance to restaurants to remain open, profitable, and safe. This could be completed either as a shared group dining space (no table service, just extra seating for takeout/curbside customers) or allocated to individual businesses for service.

2) East Street outdoor dining: Finding ways to shift the transportation infrastructure to temporarily accommodate increased outdoor seating will make it possible for businesses to continue to serve their customers and follow the new regulations. On-street seating, beautification efforts (creating parklets out of parking spaces), and public art can create a nice atmosphere and attract people to the area. The town can help by providing flexibility in regulations and permitting during this time.

3) Creating a more Bike and Pedestrian Friendly Environment: Businesses are dealing with immediate concerns, but interviewees recognized that increased bike and pedestrian connections throughout Northfield enhances general economic development and quality of life for residents. Several initiatives supported by business owners include increasing signage to recreational trails, including Northfield in biking related promotional materials, and creating a more bike-friendly environment in town.

CHAPTER FIVE

CONNECTING RIDGE TO RIVER

THEME FOCUS:

Enhancing the ability and improving the experience of resident and visitor access to the Dog River, the Town Forest, and the ridgelines and hilltops that define Northfield's geography.

Context

Northfield's recreational assets are near to most residents, and they do not have to travel far to find ample walking, swimming, hiking, and biking opportunities. The 10-15 mile trail network that links the town to Paine Mountain and other nearby summits are used and valued. Dog River Park is both an important public recreation space and an enduring reminder of the community's relationship to the Dog River. Northfield's many covered bridges offer locals and visitors glimpses of the watercourses within the valley. The ridges and the river are always present but somehow disconnected to many.

Most trail and river access points lack signage, designated parking, ADA accessible features, and trail maps— amenities that can reduce barriers to recreation participation. With few exceptions, access points to the Northfield Town Forest and Dog River are informal. Social trails and pull-offs have been established in areas to enable access where no formal access exists. Informal access points may lack necessary landowner permissions and do not facilitate access to newer residents and visitors who may not know where these areas are or how to get to them.

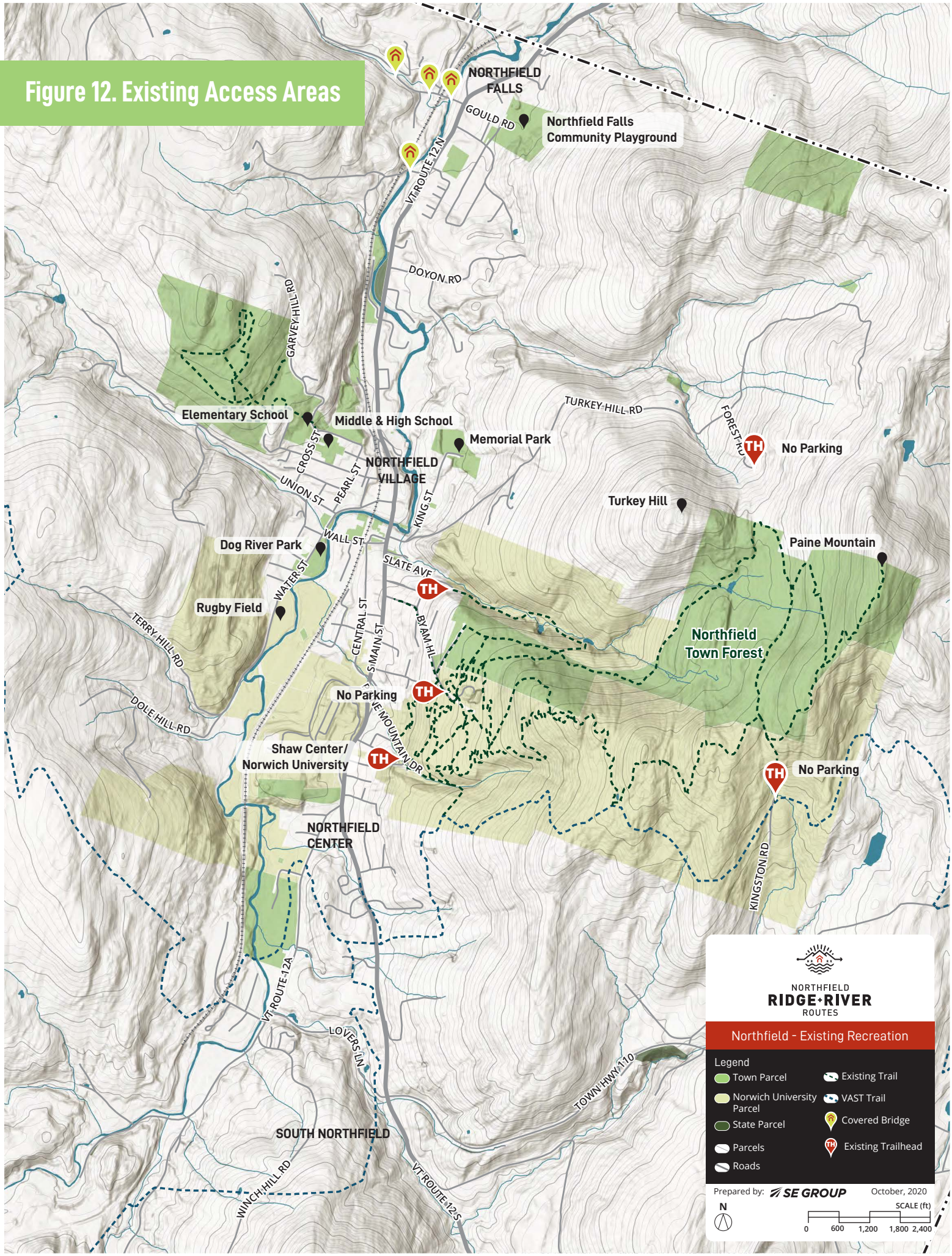
The Shaw Outdoor Center is a formal access point; however, community members mentioned access challenges. Some community members found it very difficult to find parking there on the weekends, and others found many of the trails originating from there to be too steep for a casual walk in the woods. Additionally, the Outdoor Center's trail map has not been updated to capture new trails and does not show the Northfield Town Forest's existing trail connectivity.

Opportunities and Challenges

Townwide

At present, recreating in Northfield requires previous knowledge of the trail system, access points, and parking areas. Sharing this knowledge and enhancing existing trail facilities will go a long way to create more open and inviting recreational opportunities in Northfield. This is not merely for the betterment of visitors. Creating a clear and consistent trail wayfinding system (trail maps, directional markers, color-coded blazes) will go a long way in establishing a welcoming and navigable recreation space. Opportunities to expand the existing system, formalize parking areas, and create new trail connections will require ongoing discussions with relevant landowners.

Figure 12. Existing Access Areas



SURVEY SAYS:

"I would love to see Kingston Road trail access. There are lots of trails here not indicated on a map."

"I would like to see a route to connect to existing trails to downtown business/parking"

"There is no parking to walk through the covered bridges"

"A trailhead to link the Falls with Paine mountain trail system is needed"

Northfield Falls

The area around the Falls General Store already functions as an informal access point to the Dog River. Strengthening this location's role in supporting appropriate access to the river could benefit both locals and the many visitors who consider the Falls General Store as a landmark during outings. Additionally, this zone generally lacks trail connectivity to the Town Forest and the summits. Enabling that connectivity could enhance local use and enjoyment of those resources.

Key Opportunities

- Creating an informational kiosk near the Falls General Store
- Formalizing river access points and parking improvement near the Falls General Store
- Establishing a new trail connection from the Northfield Falls Community Playground to the Town Forest trails.

Key Challenges

- Topographic and design challenges of working along the Dog River might complicate the establishment of new parking and trails
- Working with private property owners to secure access for new trails might take time and involve a considerable process

Northfield Village

The opportunities within the Northfield Village zone are focused on signage and formalizing river access where possible.

Key Opportunities

- Installing a new informational kiosk and bus shelter, design by Norwich University's Architecture program in Depot Square
- This kiosk could include information about the trail system and suggestions on how to drive, bike, or walk to the trail system
- Studying the feasibility of a more formal river access (with benches) on Town-owned land near the Dollar General
- Trailhead upgrades off Slate Avenue, including some parking and a kiosk
- New kiosk and trailhead at Memorial Park
- New trailhead and kiosk the Elementary School
- Improving the connectedness between the Common and Dog River Park
- Establishing an off-road path or trail between Wall Street and Water Street along Freight yard way – enhancing access to Dog River Park

Key Challenges

- Topographic and design challenges of working along the Dog River might complicate the establishment of connections
- Working with private property owners to secure access for new trails might take time and involve a considerable process
- Working near the established railroad right-of-way complicates the process

Northfield Center

The opportunities within Northfield Center include improving pedestrian crossings around Norwich University and better-defining pedestrian access to points of interest such as the Shaw Outdoor Center and Dog River Park.

Key Opportunities

- Upgraded trailhead at the Shaw Outdoor Center highlighting the overall kiosks
- Upgraded trailhead at the medical building near Shaw Outdoor Center for public access
- Byam Hill trailhead (more informal) upgrade to include a trail map

Key Challenges

- Cooperative engagement between the Town and Norwich University is essential for access and coordination with the Shaw Outdoor Center on access to the trail network
- The existing Byam Hill trailhead has no parking and is on a private road, so a more formal agreement for access is likely needed
- Working with private property owners to secure access for new trails might take time and involve a considerable process
- Working near the established railroad right-of-way complicates the process.

ACTIVE TRANSPORTATION

Trails and active transportation facilities (sidewalks, multi-use paths, bike lanes, etc.) are important community amenities that spur economic development. These assets' economic effects are sometimes readily apparent, but other times more subtle, like their ability to encourage a company to relocate to a community because of such amenities.

Active transportation facilities have been shown to:

- Improve the quality of life and support an active and outdoor recreation-oriented lifestyle
- Contribute to tourism and economic development
- Increase tax revenues
- Increase property values and make homes easier to sell
- Attract residents, businesses, and a high-quality workforce

South Northfield

The opportunities within South Northfield are much more low key and driven by the desire to have some more convenient and formalized access into the town and Shaw Center trail network. An existing Vermont Association of Snow Travelers (VAST) trail exists to broaden accessibility to recreation in this zone.

Key Opportunities

- Upgrading the existing access point to Shaw Outdoor Center and Northfield Town Forest trails at Kingston Road. Signing and formalizing this access point will create more proximate recreation opportunities for South Northfield residents
- Studying the viability of creating year-round access to existing VAST system trails to enhance zone-wide recreation and access to ridges

Key Challenges

- Working with private property owners to clarify the capacity at each trailhead location will be essential to assure its use does not conflict with their expectations
- Working with VAST and individual landowners on access/use requires considerable time and effort

C H A P T E R S I X

BRINGING NORTHFIELD TOGETHER

THEME FOCUS:

Enhancing multimodal connectivity primarily along the VT Route 12 corridor to physically link the Town's population centers and establish a gateway and arrival strategy that speaks to this community unity.

Context

Connectivity on VT Route 12 has been a topic of discussion for many years in Northfield. As it stands, VT Route 12 has made non-vehicular travel between Northfield Village and Northfield Falls difficult. The Bicycle and Pedestrian Facility Conceptual Alignment Analysis study in 2005 analyzed potential on-road and off-road connectivity between the Northfield Falls and Northfield Village. The study concluded that an on-road/shoulder multi-use path was the preferred connectivity option because an agreement could not be found with landowners to support the off-road path alternative. Unfortunately, narrow shoulder and lane widths and associated road widening costs have prevented such a development from moving forward. There are five high crash locations along VT Route 12 within the study area—four of them in the 2.6 mile stretch of road between Norwich University and the Falls General Store. Two of these involved pedestrians. When taken together, crash data and anecdotal evidence about high traffic speeds and poor visibility along VT Route 12 produce a compelling reason to create a safer road environment for all users.

Opportunities and Challenges

Gateway and Sense of Place

Gateways are physical structures that demarcate the entrance to an area and can create a feeling of arrival. Vertical elements such as gateways, street trees, lighting, and banners can help create a sense of place, calm traffic, enhance the aesthetic environment, and communicate the unique identity of the area. Creating a gateway into Northfield Village and improving the gateway into Northfield Falls would help establish a design character that can be borrowed elsewhere to create visual cohesion throughout the town.

VT Route 12

The opportunity for on-road pedestrian and bicyclist facilities is limited by road geometry and state right-of-way policies and processes. While procedural hurdles can be overcome, the cost of widening the roadway and constructing on-road facilities is steep. Because no one overarching improvement scheme was suggested for the VT Route 12 corridor, this analysis separated the corridor into sections and identified improvements within each.

SURVEY SAYS:

"I would absolutely love to see an off-road path from the Falls that can link up to Memorial Park and the Town Forest and Paine Mountain trail system."

"A multi-use off-road path connecting Norwich, Depot Sq. and Northfield Falls would truly unite the three communities and encourage use/visits to all three."

"I am excited about the off-road trails from the village and the falls to the trails on Paine Mountain."

Location-Specific VT Route 12 Opportunities and Challenges

Slaughterhouse Road to the Bridge (just south of Tops)

Opportunities

- Wide shoulders from Martin Lane to the bridge provide room for bicycling, however likely contribute to higher vehicle speeds. Consider re-purposing the roadway space to provide a two-way dedicated shared-use path in this segment. The challenge is finding a logical terminus in the Northfield Falls zone.

Constraints

- Narrow roadway, steep embankment on west side of the road; ledge, roadway drainage, and utility poles on east side of the road
- Long distance from Slaughterhouse Road to Northfield Village (1.4 miles)– A continuous sidewalk along VT 12 outside of the Village core will be technically challenging and likely expensive to construct (steep embankments, ledge, utility relocations). Sidewalk segments along VT 12 may be desired to support specific critical connection for residents. More detailed analysis is needed to explore strategies to overcome the technical challenges VT 12 presents.
- More broadly, bicycle and pedestrian connectivity may be better served and likely easier to implement with local roads and an off-road path. Consider using local roads (Burnham Road & Dickenson Drive) and off-road shared-use path to connect neighborhoods to Darn Tough, Memorial Park, and Northfield Village. If landowner issues are a concern, prioritize segments that will be easy to construct and have logical begin/end points.

Figure 13. VT Route 12 Sections

Bridge (just south of Tops) to Fiske Drive

Opportunities:

- Construct new sidewalk along VT 12 from Dogwood Glen to existing sidewalk across from Cumberland Farms to provide better pedestrian access from apartments to the Village and the schools.
- Better manage access to excessively wide driveways. This will slow traffic and provide a more defined pedestrian route.
- Perform sidewalk inventory along VT 12. Prioritize and begin upgrading segments that have deteriorated or do not meet ADA.
- Add crosswalk across Fiske Dr with pedestrian refuge
- Replace diagonal crosswalk from northerly corner of Fiske Dr to Belknap Ave with a crosswalk perpendicular to VT 12 from southerly corner of Fiske Drive
- Extend sidewalk on westerly side of VT 12 north to southerly corner of Fiske Drive
- Consider closing driveway access to VT 12 for property at corner of Cole Ave and Fiske Dr
- Reduce width of Fiske Drive at VT 12

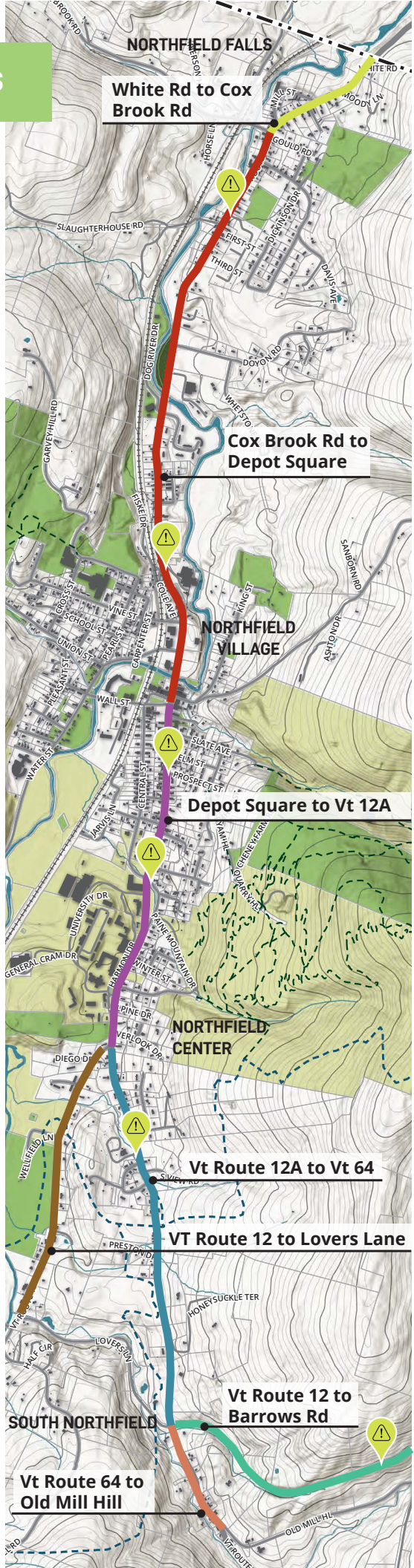
Constraints:

- Wide roadway width on VT 12 for pedestrian crossing at Dogwood Glen
- Existing aerial utilities on east side of VT Route 12 from Bridge to Fiske Drive
- Existing driveway access to VT 12 for property at corner of Cole Ave and Fiske Dr

Fiske Drive to Water Street

Opportunities:

- Perform sidewalk inventory along VT 12. Prioritize and begin upgrading segments that have deteriorated or do not meet ADA.



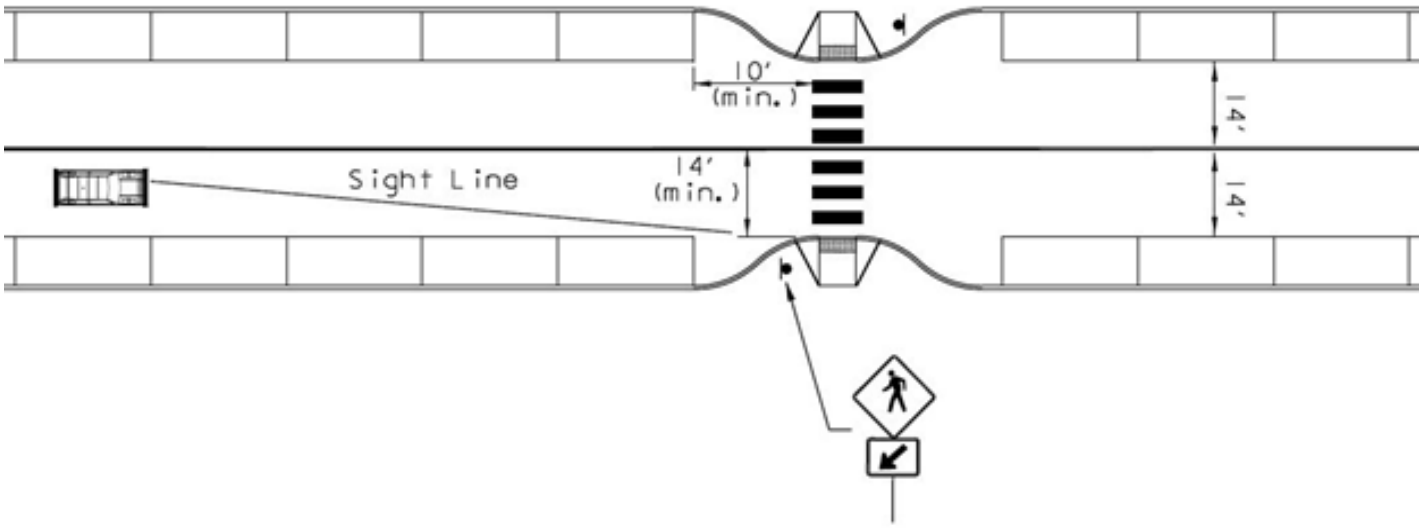


Figure 14 from VTrans Guidelines for Pedestrian Crossing Treatments (2019)

- Reduce corner radii at Vine St / VT 12 intersection to provide safer pedestrian crossings, especially for children walking to/from school.
- Take look at overall ADA compliance of Vine St signal system/intersection (orientation of pedestrian bush buttons, curb ramp landing areas, detectable warning surfaces for WB approach, pedestrian signal heads for crossing WB approach)
- Consider curb bulb-outs and pedestrian refuges for crosswalks at Water Street (see figure from VTrans Guidelines for Pedestrian Crossing Treatments (2019); these will be addressed during scoping and design)
- Consider Safer Routes to School exercise. Dedicate bicycle route(s) from core residential areas to the grade schools. Prioritize these routes by working with schools and community to map them, raise awareness of them (branding, education), and improve conditions such as new signing/ markings, and new off-road path infrastructure where feasible.

Constraints:

- Existing retaining walls and ledge on westerly side of VT 12
- Buildings close to roadway on easterly side of VT 12
- Existing aerial utilities on north side of VT Route 12 from Fiske Drive to Water Street
- Existing aerial utilities on south side of Vine Street
- On-street parking

Water Street to Kent Street

Opportunities

- Expand scope of sidewalk audit efforts completed in 2018 and 2019 to include other areas of the Village. Perform sidewalk inventory along VT 12 and within Village. Prioritize and begin upgrading segments that have deteriorated or do not meet ADA.
- Better manage access to excessively wide driveways. This will slow traffic and provide a more defined pedestrian route.
- Build curb extensions on VT 12 to reduce crossing distances for pedestrians and increase visibility.
- Improve bicycle/pedestrian safety and connectivity from Depot Square to other destinations within the Village.
    - Add crosswalks to the Common
    - Add bike racks to the Common
    - Close pedestrian railroad crossing from Common to path, remove path and install barrier such as trees/shrubs/flower garden
    - Add path west of railroad crossing to connect to existing path to Water Street
    - Consider widening pedestrian bridge to 12 FT upon replacement to improve bicycle connections
    - Add sidewalk on Wall Street connecting to Water Street and Dog River Parks.

Constraints

- Railroad right-of-way
- Wide pavement at Depot Square
- Existing aerial utilities on east side of VT Route 12 from Water Street to Kent Street
- Buildings along sidewalk in Village Center

Kent Street to Spring Street

Opportunities

- Expand scope of sidewalk audit efforts completed in 2018 and 2019 to include other areas of the Village. Perform sidewalk inventory along VT 12 and within Village. Prioritize and begin upgrading segments that have deteriorated or do not meet ADA.

- Build curb extensions on VT 12 to reduce crossing distances for pedestrians and increase visibility.
- Install curb extensions at crosswalks to reduce crossing distances and increase visibility for pedestrians
- Improve Central Street to enhance connectivity between Norwich U and the Village. Consider narrowing road and identifying this as a bike route. Possible road narrowing option includes adding greenbelt between road and sidewalk along both sides of street. Will provide space for snow storage, trees, and other neighborhood enhancements.

Constraints

- Widening pavement for bike lanes could encourage higher speeds.
- Existing aerial utilities on east side of VT Route 12 from Kent Street to Spring Street
- Utility poles encroaching on sidewalk width
- Steep terrain embankments encroaching on sidewalk
- Stairs from sidewalk up to private properties along VT 12
- Existing large trees along both sides of portions of VT Route 12
- Drainage on east side of VT 12

Spring Street to Winch View

Opportunities

- Improve pedestrian crossing from Norwich University to Crescent Avenue
- Better define pedestrian access from VT 12 to Shaw Center. Consider wayfinding markings or sidewalk on Crescent Avenue to connect to existing sidewalk on Paine Mountain Drive.
- Improve Crescent Avenue south intersection with VT 12 to eliminate skewed intersection
- Perform sidewalk inventory along VT 12 and within Village. Prioritize and begin upgrading segments that have deteriorated or do not meet ADA.
- Work in collaboration with Norwich University to explore ways to interconnect its on campus circulation systems with those in the community
- Improve Park Avenue/VT Route 12 intersection to eliminate skew. Close southerly access point and realign to Tee intersection with VT 12.
- Consider realigning VT 12/VT 12A intersection to be more perpendicular. Could be done simply with restriping.

Constraints

- Sidewalk on easterly side of VT 12 just south of Spring Street is heavily narrowed by terrain and utility poles
- Existing aerial utilities on east side of VT Route 12 from Spring Street to Crescent Avenue
- Existing aerial utilities on west side of VT Route 12 from Crescent Avenue to just south of VT Route 12A, with some crisscrossing near Winter Street
- Existing aerial utilities on east side of VT Route 12 from just south of VT 12A to Winch View
- Steep terrain with some ledge adjacent to westerly side of VT 12 from Crescent Ave to Park Avenue

Winch View to Old Mill Hill

Opportunities

- Consider T-intersection of Old Mill Hill/VT Route 12
- High crash locations within segment. Consider safety improvements on VT 12. Consider traffic calming.
- Constraints
- Existing aerial utilities on east side of VT Route 12 from Winch View to Southview Drive
- Existing aerial utilities on west side of VT Route 12 from Southview Drive to Old Mill Hill, where aerial utilities move to east side of VT Route 12

Off-Road Connection

The general consensus of the public is that an off-road path would create a unique and cost-effective route between the Falls and the Village. Developing an off-road path would require permission from and ongoing coordination with landowners. The development and coordination of an off-road path is often led by a non-profit or a town commission and typically involves the creation of a written agreement or easement to provide property access. See Appendix F for more information about attaining necessary easements to confirm recreation access.

State Right of Way Discussion

The State Transportation Agency (VTrans) controls the state highways (such as VT Route 12), and the corridor that surrounds them to ensure and promote safe and efficient travel along the highway corridor. These areas are what is known as the highway right-of-way (ROW). The minimum width of the ROW in the state of Vermont is 49.5 feet.

The only activities allowed within state-owned highway ROW are activities that are consistent with transportation function. Any construction and other infrastructure improvement projects within the ROW by non-state entities, such as the town, all require additional permitting, engineering, and approval by VTrans. Municipalities can streamline these processes by adopting control of the highway and converting the state highway to a Class 1 Town Highway. Northfield has undergone this process and has adopted the portion of VT Route 12 between VT Route 12A and Houston Street. Class I Town Highways give the municipality greater control over streetscape design and amenities but also require the town to take on road maintenance and upkeep (see sidebar on page 17).

Class 1 Town Highway

The Town of Northfield currently has 2.2 miles of Class 1 Town Highway (C1TH), including 1.8 miles of VT Route 12 and 0.4 mile of VT Route 12A. The portion of C1TH along VT 12 runs north from just south of the intersection with VT Route 12A in Northfield Center to just north of Houston Street (TH-419) in Northfield Village.

The portion of VT Route 12 that passes through Northfield Falls is State Highway. As such, certain rules about travel lanes and widths apply. The recommended addition of sidewalks and crossings in Northfield Falls requires extensive pre-construction process and review by VTrans. Municipalities can streamline these processes by adopting control of the highway and converting the state highway to a Class 1 Town Highway as Northfield has already done for VT Route 12A to Houston Street. VTrans provides a worksheet that can help Towns weigh the trade-offs between design control and maintenance costs.

Reclassification of the Northfield Falls segment of VT 12 to C1TH would:

- Increase the amount of C1TH by 1.3 miles, from 2.2 miles to 3.5 miles
- Increase annual revenue received from the State for highway maintenance by approximately $14,500, from approximately $146,900 to $161,400
- Increase Town maintenance costs by approximately $10,500
- Provide Town more design flexibility for certain items o Posted speed limits, travel lane widths, shoulder widths, bulb-outs or curb extensions
- Increase Town responsibility for roadway maintenance items
    - Street lights, culvert/bridge repair/maintenance, stop bars, edge lines, crosswalks, plowing, patching/crack sealing, stormwater management/compliance/maintenance/cleaning, sign repair/replacement

- Allow Town to pursue funding for bridge or culvert repair, rehabilitation, or replacement
    - Grants up to $175,000 with 10-20% local match, depending on local infrastructure codes and standards, for bridges/culverts greater than 36”, or retaining walls on Class 1, 2, or 3 highway

The Town is responsible for performing annual roadway repairs along C1TH, while the State repaves these roads every 10-12 years. The State maintains centerline striping, while the Town maintains other annual roadway striping, although major State resurfacing projects do include all striping.

It is possible to pursue the recommended improvements developed as part of the Better Connections Project for this portion of VT 12 without reclassification as C1TH.

Based on assumptions and calculations in the VTrans cost spreadsheet (Appendix H), additional revenue will cover increased annual maintenance costs. However, the Town may find the amount of increased annual revenue, and the ability to pursue improvements without reclassification, may not be enough to justify reclassification at this time.

Infrastructure Considerations

Crosswalks

1. Maintain 14 FT from centerline to curb for snow plowing
2. No parking spaces should be marked within 20 FT of marked crosswalk
3. Criteria for crosswalk at uncontrolled intersection approach per VTrans Guidelines for Pedestrian Crossing Treatments (2019)
    a. Speed limit less than 40 mph
    b. 20 or more pedestrians using crossing per hour during highest pedestrian volume hour (elementary school age children and elderly pedestrians count as 2 each)
    c. Annual Average Daily Traffic (AADT) greater than 3,000 per day
        i. These locations have AADT over 4,000
    d. No other crosswalk across same roadway within 200 FT
    e. Adequate sight distance, equal to or greater than stopping sight distance (Stopping sight distance for 35 mph level roadway is 250 FT)
    f. When a crosswalk is proposed in relation to a new sidewalk, an engineering study can be used to estimate if these criteria will be met upon construction

4. Marked crosswalks can be pursued along with other improvements in Northfield Falls:

a. Sidewalk construction along VT 12

b. Realignment of Mill Street intersections with VT 12

c. Opportunities for access management

d. Crosswalks at these locations:

i. Corner of Gould Road to Corner of Cox Brook Road

ii. Davis Avenue

iii. Falls Trailer Park

5. Prepare scoping study to address crosswalk warrant and project definition of other project components

6. Prepare conceptual engineering plans and refine cost estimate

7. Secure funding for final engineering and construction once cost estimate is refined

8. Complete final engineering and construction

Rectangular Rapid Flashing Beacon (RRFB)

1. Factors to address when considering RRFBs at crosswalks on State Highways per VTrans Guidelines for Pedestrian Crossing Treatments (2019)

a. Best placed where special emphasis required (e.g., vulnerable users or history of pedestrian crashes)

b. Only use at uncontrolled crosswalks

c. Consider RRFB where crosswalk has significant nighttime crossings

d. RRFBs generally owned/maintained by the municipality

i. Usually addressed with a finance and maintenance agreement or a Section 1111 permit on State highways

e. Must follow all guidance from the March 20, 2018 FHWA Memo on RRFBs

Speed Mitigation

1. If Town wants to consider more traffic calming measures, like bulb-outs or curb extensions, VTrans typically requires a speed study (can request from VTrans or Regional Planning Commission)

2. If speeding is an issue, traffic calming mitigation measures can be pursued

3. Classification of roadway as town highway provides the Town with more design flexibility for posted speed limits. Changes in posted speed limits involve an engineering study.

CHAPTER SEVEN

IMPLEMENTATION GUIDEBOOK

Introduction

The three core themes considered in this plan encompass a wide variety of opportunities. This implementation guidebook functions to consolidate these opportunities, highlighting specific projects, and how they advance the core themes.

The implementation guidebook is divided into four sections: improvement types, project focus areas, implementation matrices, and funding sources.

Collectively, these four sections help determine the design, location, cost, priority, and potential funding for recommended improvements.

1. Improvement Types

2. Project Focus Areas

3. Implementation Matrix

4. Funding Sources

Legend

Improvement

- SW — Sidewalk Improvements
- IS — Interpretive Signage
- RA — River Access
- WO — Wayfinding Opportunity
- CW — Crosswalk Improvements
- ST — Stormwater Infrastructure
- OP — Off-Road Path
- T — Trail Connection
- GW — Gateway Opportunity
- TH — Trailhead Improvements
- PL — Placemaking Opportunity
- TC — Traffic Calming
- BP — Bicycle/Ped Infrastructure

Themes

- Enhancing Local Connectivity
- Connecting to Ridges and River
- Bringing Northfield Together

IMPROVEMENT TYPE

Wayfinding & Interpretive Signage

WO

Wayfinding

Wayfinding is not the same as signage. Many communities, including Northfield, have signs that help direct people (or more often cars) to important destinations. Signage can help communicate information (where, how far, what) and can help visually reinforce a community's identity.

Wayfinding, on the other hand, is a broader term that brings together signage with other elements (streetscape, key architects, landmarks, etc.) to help users gain a stronger sense of where they are and how they move about. Wayfinding is a "system" not a sign. An important part of any wayfinding is establishing clear and welcoming arrival points. Wayfinding can also serve to underscore walkability and scale, help support a community's sense of identity, and reflect important values and characteristics central to this sense of identity. Through an appropriate design process, wayfinding can establish a hierarchy of signage that function as aids to navigation and evoke community identity.

Wayfinding System

Streetlight Banners

Directional and Informational Signage

PL

IMPROVEMENT TYPE

Placemaking

The Value of Placemaking

Communities thrive on a combination of people and commerce. In villages and downtowns, this combination can, if properly nurtured, support a dynamic and active environment. Placemaking is the art of making this environment unique and distinctive. Placemaking is achieved through physical features like outdoor plazas, benches, exterior lighting, and wayfinding unified through design to evoke the sense of place. The design embraces the community; its architecture, cultural, natural environment, and history. The design feels real, authentic, and appropriate. When realized, placemaking helps unify the experience of a village or downtown.

Supporting local economic development goals by establishing rich and dynamic physical environments is a hallmark of effective placemaking. Improvements can support local businesses needs, enhance the ability of the community to attract and retain new residents, and reinvigorate a community's own identity. The newly installed benches and bike racks are an example of effective placemaking efforts in Northfield.

Dining Parklet

Painted crosswalk

Lighted streets

Colorful public benches

IMPROVEMENT TYPE

Gateways

Gateways

Gateways set a tone for arriving visitors and create a physical element contributing to a “sense of arrival.” A well crafted gateway, often coupled with signage and wayfinding components, establishes an opportunity to welcome locals and visitors into your town while enhancing their understanding and experience of the community. Gateways can build upon established structural elements (a bridge, iconic structure) and often use artistry to evoke local history, culture, or heritage.

Bridge Gateway

Gateway

Gateway

Pedestrian Gateway

IMPROVEMENT TYPE

ST Stormwater Infrastructure

Bioswales

Bioswales are typically built into low-lying areas to collect stormwater runoff from nearby impermeable surfaces such as roads or parking lots. Bioswales filter out pollutants and absorb runoff from storm events. During larger storm events, bioswales can act as a conduit to the larger wastewater treatment system. They also can prevent erosion, improve air quality, and provide habitat for birds and pollinators.

Rain Gardens

Similar to bioswales, rain gardens are designed to temporarily hold and absorb rain water runoff that flows from nearby areas. Rain gardens are well-equipped to remove nutrients, chemicals, and sediment from stormwater.

Dry Wells

Dry wells are underground structures that collect stormwater and allow it to gradually dissipate into the soil. To be effective, dry wells must be located in areas with adequate soil infiltration rates.

Bioswale

Rain Garden

Storm Swale

Rain garden sidewalk planters

IMPROVEMENT TYPE

Sidewalks

Sidewalks

Sidewalks are roadside facilities reserved for pedestrian use. They support pedestrian comfort and safety and are encouraged in areas where the road network is dense and vehicle volume is high. Sidewalks can either be attached, separated from the street only by the curb, or detached, separated by grass, tree, or other landscaping buffer. The United States Access Board's proposed Public Rights-of-Way Accessibility Guidelines (PROWAG) identifies 5' sidewalks for areas that do not have frequent passing spaces available. Based on these

PROWAG standards, it is recommended that Northfield widen existing sidewalks to at least 5' and implement at least 5' sidewalks in locations where there currently is not a sidewalk present. The following recommended guidelines should be applied to both new construction and retrofits.

Streets with a speed limit of 35 mph or greater and/or Average Daily Traffic greater than 12,000 vehicles per day are recommended to have sidewalks at least 5' in width as well as a 2' buffer or landscaping. The tree lawn will provide shade for pedestrians, a buffer against faster moving traffic and a place to store plowed snow without infringing on sidewalk width.

Streets with speed limits of 30 mph or less and Average Daily Traffic of less than 12,000 vehicles must have sidewalks with a minimum width of 5' in order to meet Public Rights-of-Way Accessibility Guidelines (PROWAG) and the Americans with Disabilities Act (ADA). A buffer or amenity zone is not required on streets serving primarily residential uses but can be a nice neighborhood amenity.

Sidewalk with tree and planting buffer

Sidewalk along road

Crosswalks

Marked crosswalks improve pedestrian safety and encourage walking. Frequent crosswalks and crossings facilitate easy access to destinations and indicate that the area is pedestrian-friendly. Crosswalks guide pedestrians to cross at the designated location and alert motorists of potential crossings. All signalized intersections should have crosswalks on all legs. An engineering study should be conducted to determine appropriate locations for additional crosswalks.

Bulb-outs

Bulb-outs are curb extensions designed to increase pedestrian safety while crossing. The bulb-outs reduce the distance the pedestrian must cross, encourage pedestrians to cross at designated locations, improve vehicle sight-lines of pedestrians, reduce vehicle turn speeds by decreasing the curb radii, and provide additional space for amenities and pedestrians waiting to cross. Bulb-outs are only appropriate where there is an on-street parking lane and should not extend into travel lanes or shoulders.

Curb Radii

The radius of the curb, the distance a vehicle must travel to go around the curb, determines a vehicle's turning speed and therefore can have a strong influence on pedestrian's safety while crossing an intersection. With larger curb radii, vehicles do not need to slow down to turn, increasing the risk of a pedestrian collision. Smaller curb radii, where vehicles are forced to make sharp turns, slow vehicles and reduce pedestrian crossing distances, making pedestrians safer while crossing. In addition, smaller curb radii have more waiting space at corners, better sight-lines for pedestrians and motorists, and more space for appropriate curb ramp placement.

Bulb outs increase curb radii

Continental Crosswalk

IMPROVEMENT TYPE

Bicycle Infrastructure

BP

Bike Lanes

Bike Lanes are portions of the roadway that have been designated for cyclists by striping, signage, and pavement markings. At a minimum, they should be 5' wide from the face of the curb or parking lane to the outside stripe. On streets where the bike lane is adjacent to the curb, the lane should be at least 4' wide beyond the gutter pan. When the bike lane is adjacent to a parking lane, a 3' buffer between the bike lane and parking lanes is encouraged for safely opening car doors without creating a conflict with bicyclists. Angled parking is not recommended on roadways with a bike lane. We recommend back-in angled parking on all roadways with a bike lane or sharrow. Bike lanes should be marked intermittently with a bicycle symbol and signs should indicate that a bike lane is present. Bike lane striping should be continued through the intersection when possible to minimize conflicts with motor vehicles. For roads with high parking turnover, very high traffic volume, and regular truck traffic, protected bike lanes may be necessary.

Bike Lane

Bicycle Boulevards

Bicycle Boulevards are recommended on streets with lower vehicle volumes and speeds such that designated lanes are not necessary and bicyclists can comfortable share the roadway with. Bicycle boulevards have signs and markings that make it a bike-friendly route. The signs and markings indicate that it is a shared, slow street and discourage vehicles from using it as a through street. Possible signs and markings include a bicycle stamped with chevrons ("sharrows") and bicycle wayfinding signs. Removing the yellow centerline slows vehicles and encourages them to give cyclists a wider berth when passing. Other vertical and horizontal elements should slow vehicles (i.e., speed humps, striping, bollards, etc.) and manage vehicle volume (restricting access or diverting traffic).

Bicycle Boulevard

Advisory Shoulder

Advisory shoulders create usable shoulders for bicyclists on a roadway that is otherwise too narrow to accommodate one. The shoulder is delineated by pavement marking and optional pavement color. Motorists may only enter the shoulder when no bicyclists are present and must overtake these users with caution due to potential oncoming traffic. Advisory shoulders are experimental and will require FHWA approval to implement.

Advisory Shoulder

OP

IMPROVEMENT TYPE

Off-Road Path

Multi-Use Paths

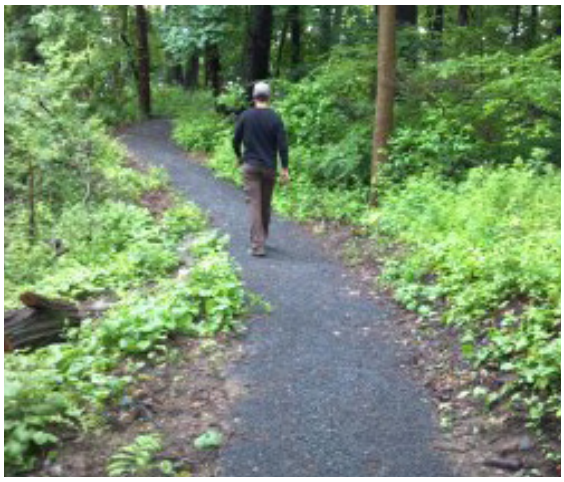
Multi-Use Paths accommodate both pedestrians and bicyclists traveling in either direction. The recommended widths for multi-use paths are wider than for sidewalks to accommodate both user groups; the recommended width is between 8’ and 12’. They are typically a paved or crushed gravel surface and can be separated, with a buffer between them and the roadway, or attached, only separated from the roadway by a curb. Multi-use paths adjacent to roadways are generally built where bicyclists may feel uncomfortable riding in the roadway.

Universal Access Gravel Paths

Universal access gravel paths are wide paths designed to accommodate multiple uses on a firm graded gravel surface. These trails have specific requirements relating to trail surfacing, tread and clearing widths, grades, along with other parameters for design. Refer to the USDA Accessibility Guidebook for Outdoor Recreation for specific criteria. These trails are appropriate for child and adult bicyclists, horseback riding, strollers, wheelchairs, walking, jogging/running, and dog walking. Unpaved gravel paths can be anywhere from 4" to 8" depending on the location and the expected traffic.

Mowed Path

A mowed path is a low-cost alternative to an expensive stone or graded path, and can be a great low-impact transportation corridor. These paths typically serve as a recreation oriented facilities and are generally suitable for providing access to natural areas and some rural connections.



Universal Access Gravel Path

Mowed Path

IMPROVEMENT TYPE

Trails & Trailheads

TH T

Trails are an important resource for any community. Natural surface trails will have different design specification based on a variety of factors such as user type, ability level, natural terrain features, slopes, environmental constraints, and seasonal use. The character of the trail should reflect the designed use and be developed in a manner that has minimal long-term impact to the environment and follow sustainable practices. In general, natural surface trails are narrow, follow sustainable design and have rolling contour alignments that have minimal impact on natural systems. The trail surface or tread should include design features such as benching, out-sloped surface, grade reversals, armoring, switchbacks, and other techniques to minimize erosion and wear by trail users. Natural surface trails tend to wind around obstacles such as trees, large rocks and bushes. When natural surface trails are intended for mountain biking, they may also exhibit technical sections with features such as roots, logs and rocks, or man-made technical features such as elevated bridge.

Trailheads are the gateway to the trail system and provide users with information about that system. Kiosks are usually found at the trailhead and include information such as a map of the trail system, general information about the trails (distance, ability level, user group), rules and regulations, and safety issues. Paper maps or a link to digital maps are useful to include especially for people unfamiliar with the trail system. Trailheads often include parking but can also serve as a pedestrian and bicyclist access point.

Kiosk


Kiosk at trailhead


Wayfinding signs on crushed gravel path


Narrow trail

Directional and wayfinding signage


Bench along trail

RA

IMPROVEMENT TYPE

River Access Points

The Dog River is an important community asset although current access locations are informal and often in unstable and unsustainable locations. Creating a formal access point will likely involve conversations with property owners although opportunities exist on town-owned land. Armoring the riverbank with rock stairs or wooden steps can reduce erosion and create an exciting public amenity.

Concrete steps to river

River parklet

Steps with railing to river

Wooden walkway to river

River parklet

IMPROVEMENT TYPE

Traffic Calming

TC

Lane Reductions

Lane reductions, or road diets, reallocate the roadway space together uses such as bike lanes or wider sidewalks and buffers for cyclists and pedestrians. The typical lane reduction is four lanes to three, with a travel lane in each direction and a center two-way left turn lane. These conversions should be considered for roads with under 15,000 AADT, although up to 25,000 can be considered, roads with documented pedestrian or cyclist safety concerns, or along high priority walking and biking routes. Beyond creating space for sidewalks, bike lanes, and buffers, lane reductions reduce pedestrian crossing distances, improve sight distances, and lower vehicle speeds by narrowing the roadway. Further study should be conducted on traffic volumes, level of service, and impacts before a lane reduction is implemented.

Street Landscaping

Landscaping

Landscaping along a street creates a buffer between pedestrians and the roadway, provides a more pleasant street environment, and reduces the visual width of the road, which in turn slows vehicle speeds. Trees, bushes, or flower pots can be planted in the buffer but should not require intensive irrigation, obscure the views of pedestrians at driveways, or cause the sidewalk to crack as the plant matures. It should be clearly indicated who (the city or the adjacent property owner) is responsible for maintenance of the landscape buffer.

Lane Reduction

Bulb-outs

Bulb-outs are curb extensions located at intersections to improve the safety of pedestrians when crossing the street. However, they also visibly narrow the roadway, encouraging drivers to drive slower.

Bulb-out

How to Use

This plan includes the following projects and recommendations, which reflect issues and opportunities identified by residents and stakeholders. They are also responsive to the findings of the community surveys, stakeholder and public outreach events, and existing conditions analysis. In addition to project descriptions, the implementation timing/priority (immediate, short-term, long-term, or ongoing) and supported themes are provided. In general terms, implementation timing/priority is defined as follows: immediate refers to implementation in 0 to 2 years, short-term from 2 to 5 years, and long-term at 5+ years.

While some projects could be implemented with little or no additional planning, it is important to note that additional planning and design will be required prior to implementation of many projects and recommendations. For example, proposed projects and trail alignments are conceptual in nature and only meant to demonstrate the need to provide a particular recreational experience or a connection between two points. Detailed design and construction documents for each project are not within the broad scope of this master plan and will need to be completed prior to implementation. The Town should continue to engage the public through open design processes wherever possible.

Improvement

- SW — Sidewalk Improvements
- WO — Wayfinding Opportunity
- OP — Off-Road Path
- TH — Trailhead Improvements
- BP — Bicycle/Ped Infrastructure
- GW — Gateway Opportunity
- TC — Traffic Calming
- IS — Interpretive Signage
- CW — Crosswalk Improvements
- T — Trail Connection
- PL — Placemaking Opportunity
- RA — River Access
- ST — Stormwater Infrastructure

Themes

- Enhancing Local Connectivity
- Connecting to Ridges and River
- Bringing Northfield Together

Wall Street to Dog River Park Corridor

IMPROVEMENT

SW OP BP ST CW PL WO IS

THEME

INITIATIVES

WS-1, WS-2, WS-3, WS-4, WS-5, WS-6, WS-7

Project Description

This concept looks to increase connectivity from the Village Center along Wall Street to Dog River Park and provide a safer environment for cyclists and pedestrians. Sidewalks are currently lacking along the north side of the street and only a paved shoulder is provided along the south, this area is particularly dangerous at the railroad crossing. There is currently no sidewalk or at grade pedestrian crossing of the railroad tracks. An attached sidewalk along the north side of the street provides access between the Village Center and Senior Center. An RRFB signal should be installed at the existing crosswalk near the Senior Center. Upgrades to the southern sidewalk include extending it to Central Street and raising it above the road level with curbing. The sidewalks should meet grade at the Railroad Crossing and provide a consistent level surface for pedestrians. Grade adjustments are also needed where the sidewalk meets the bridge.

Placemaking opportunities also exist along this corridor for a parklet/community garden space along the Firehouse. A gravel path would connect to the existing path along the senior center. Access to the existing path crossing the railroad to Depot Square would be closed off allowing people to connect to the Village Center from the new sidewalk at the signalized railroad crossing.

CONCEPT PLAN

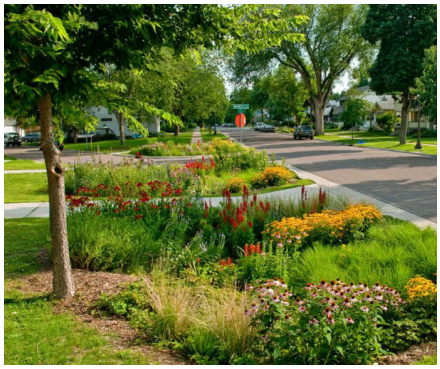
Wall Street to Dog River Park Corridor

CHARACTER IMAGRY

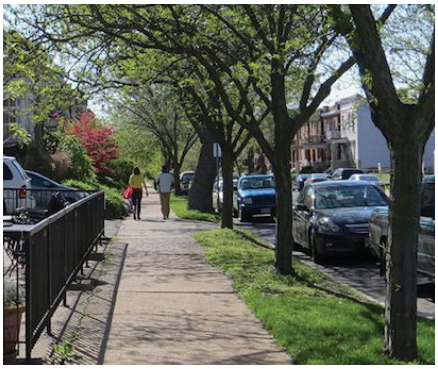

Sharrows


Community Garden


Kiosk


Rain Garden


Park Benches


Sidewalk


Off Road Path

RRFB Crosswalk


Accessible Railroad Crossing

KEY

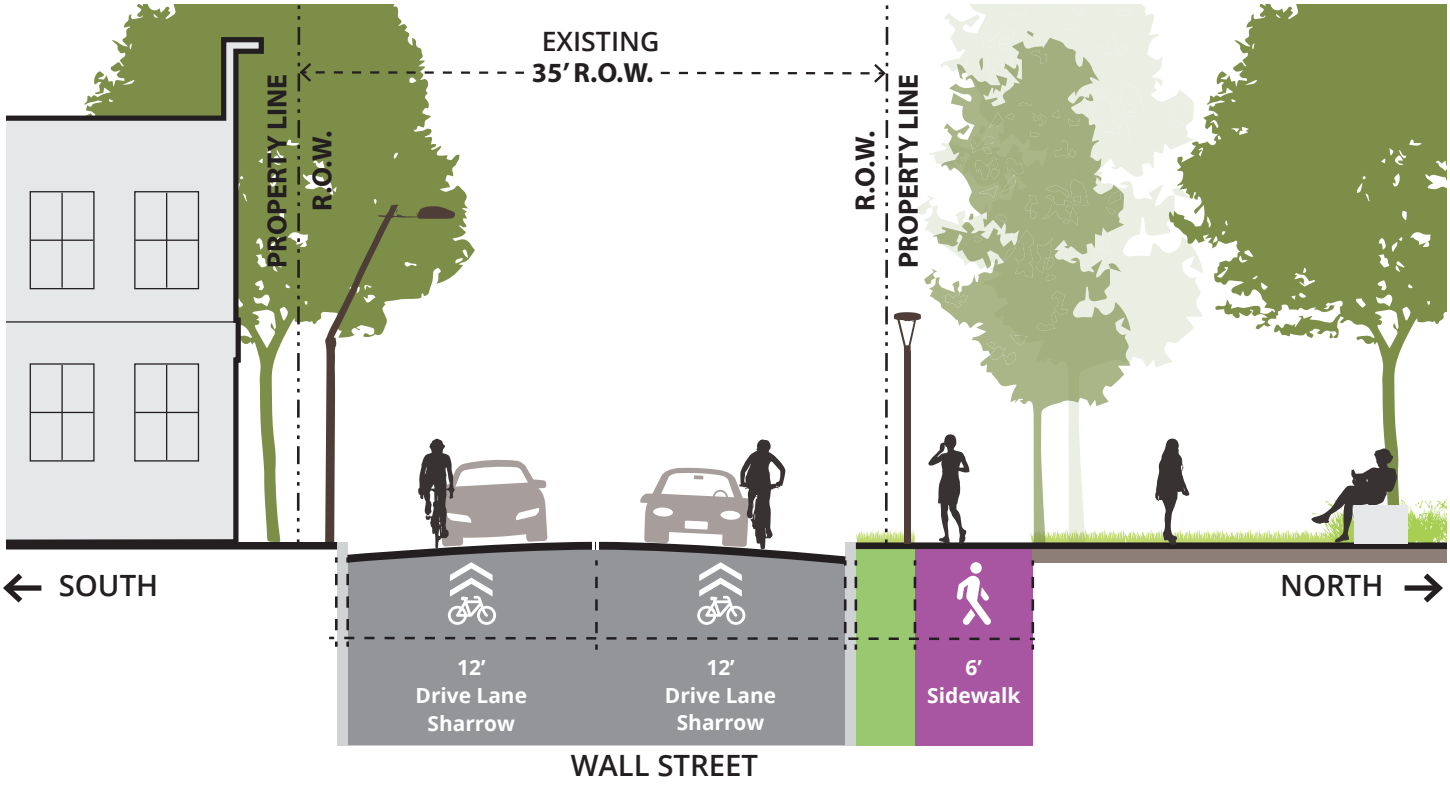
1. New 6' wide sidewalks or existing upgraded to ADA standards
2. RRFB crosswalk
3. Continental Crosswalk
4. Grading of sidewalk at bridge for ADA accessibility
5. Community garden
6. Benches
7. Raingarden/bioretention
8. New gravel sidepath
9. Bike boulevard / Sharrows
10. Existing Gravel Sidepath
11. Bump outs
12. New at grade pedestrian railroad crossing
13. Remove path crossing railroad tracks

NORTHFIELD VILLAGE CENTER

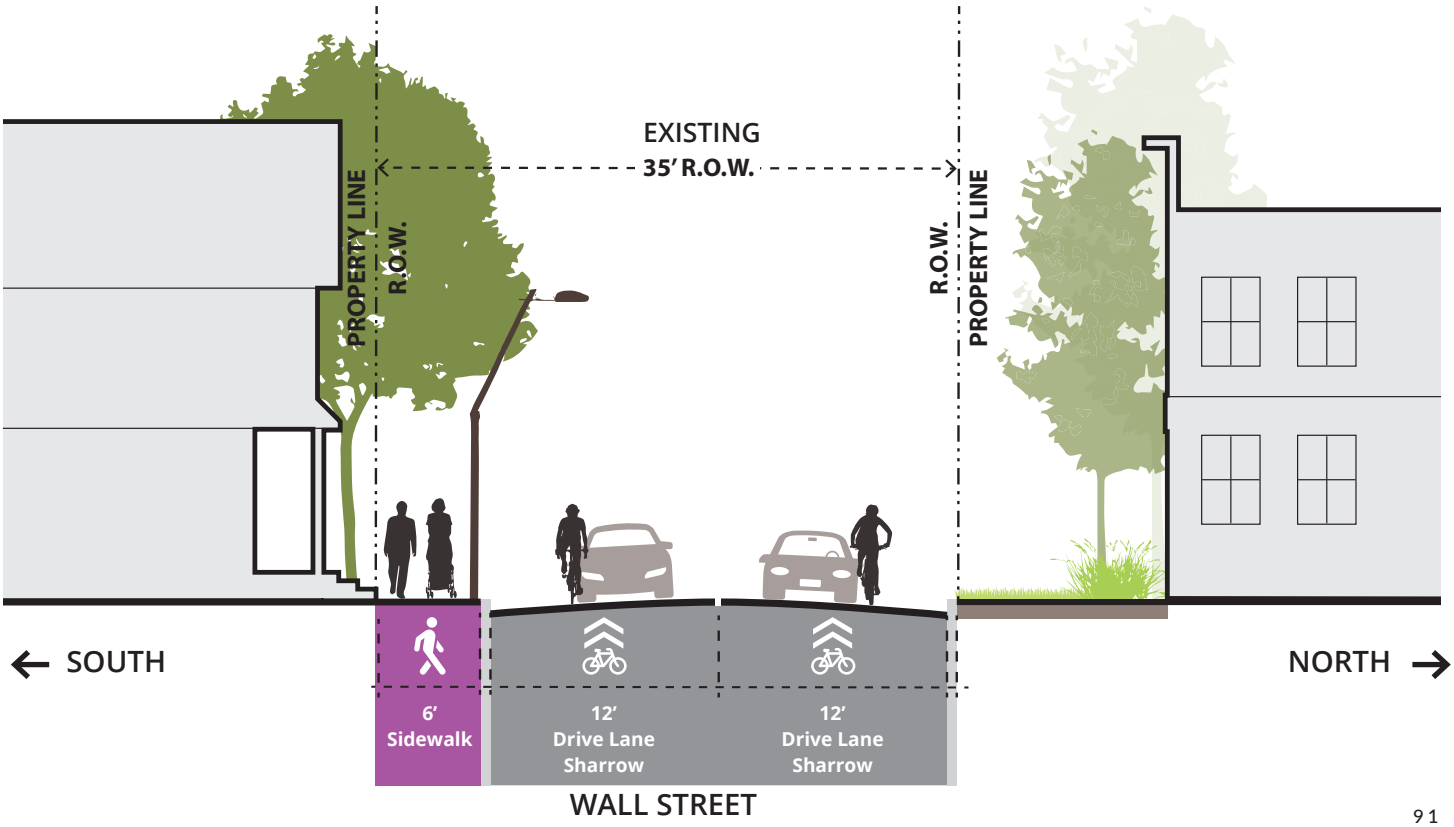
Wall Street to Dog River Park Corridor

Wall Street to Dog River Park Corridor

STREETSCAPE SECTION (NORTH SIDE SIDEWALK)



STREETSCAPE SECTION (SOUTH SIDE SIDEWALK)



Central Street

IMPROVEMENT

SW BP CW PL TC

THEME

INITIATIVES

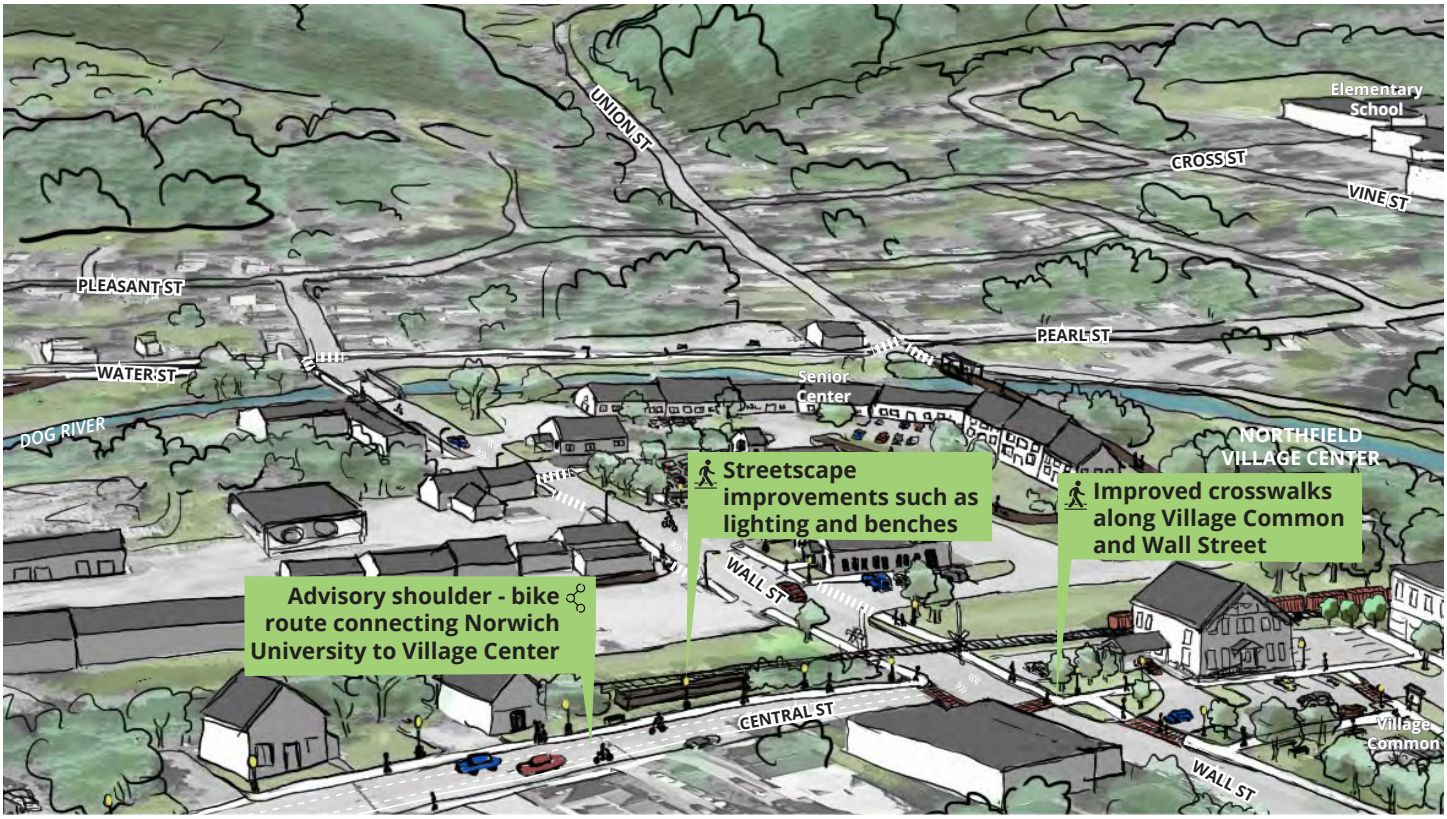
CS-1, CS-2

Project Description

Running parallel to VT Route 12, Central Street provides a great opportunity for an improved bike/pedestrian connection between the Village Center and Norwich University. Sidewalks have been widened and improved on the west side of Central Street all the way to the University. Sidewalks on the east side only run to Washington Street and are unimproved. In the short-term, the sidewalks on the east side of Central Street could be removed to reduce maintenance costs, but maintaining the right-of-way for future opportunities is recommended.

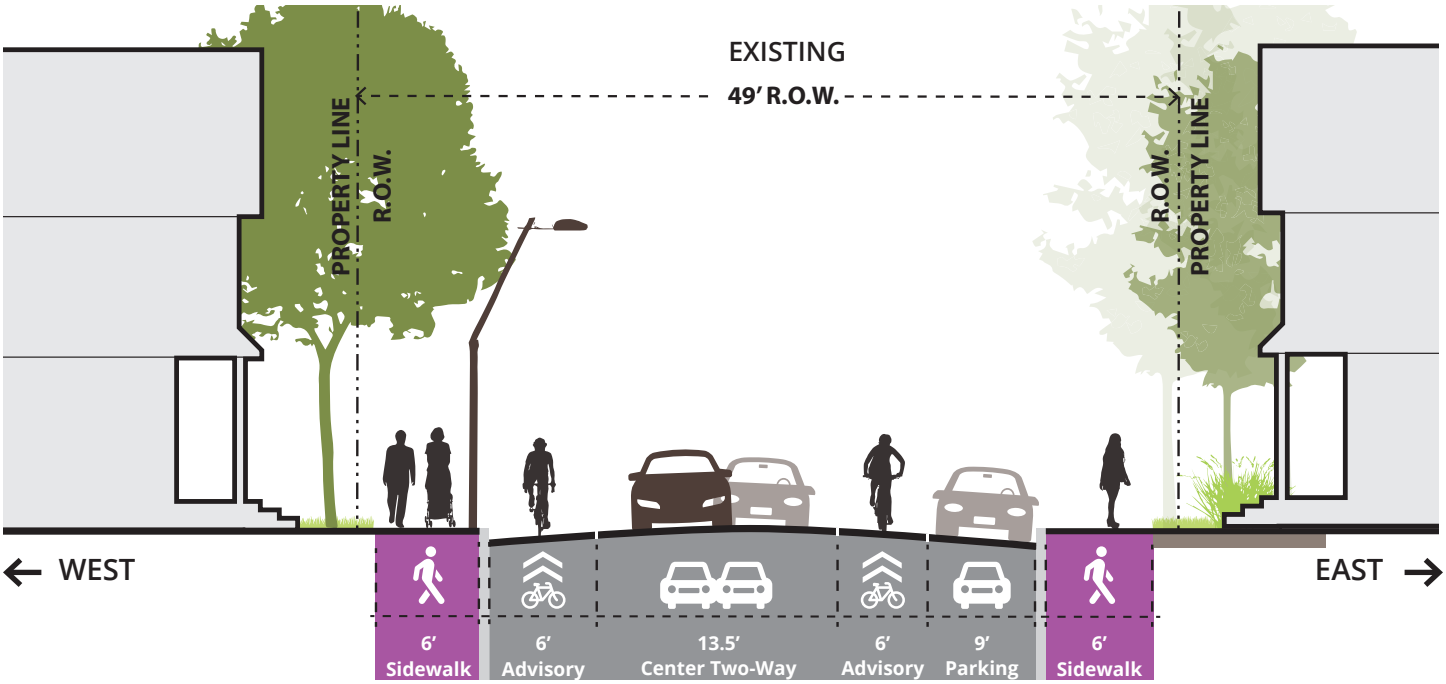
Low traffic volumes make this a great candidate for an Advisory shoulder in order to improve bike connectivity. Advisory shoulders prioritize bicycle use along the roadway where vehicles will need to yield or use the advisory shoulder space when an opposing vehicle is present. This shared use space has the benefit of reducing vehicle speeds along the roadway. Streetscape improvements such as streetlights, benches, and banners will further prioritize Central Street as the main pedestrian connection from the village to the university.

CONCEPT SKETCH



Central Street

STREETSCAPE SECTION - ADVISORY SHOULDER



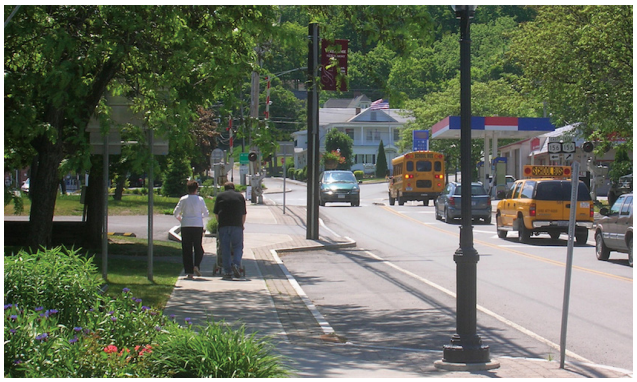
CENTRAL STREET

CHARACTER IMAGERY

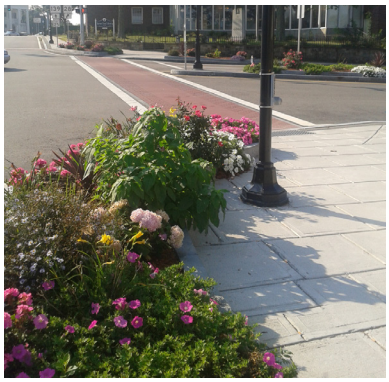
Advisory Shoulder

Advisory Shoulder

ADA Curb



Streetscape lighting and banners



Planters/Flower Beds

East Street

IMPROVEMENT

SW BP CW PL WO
GW ST TC T RA

THEME

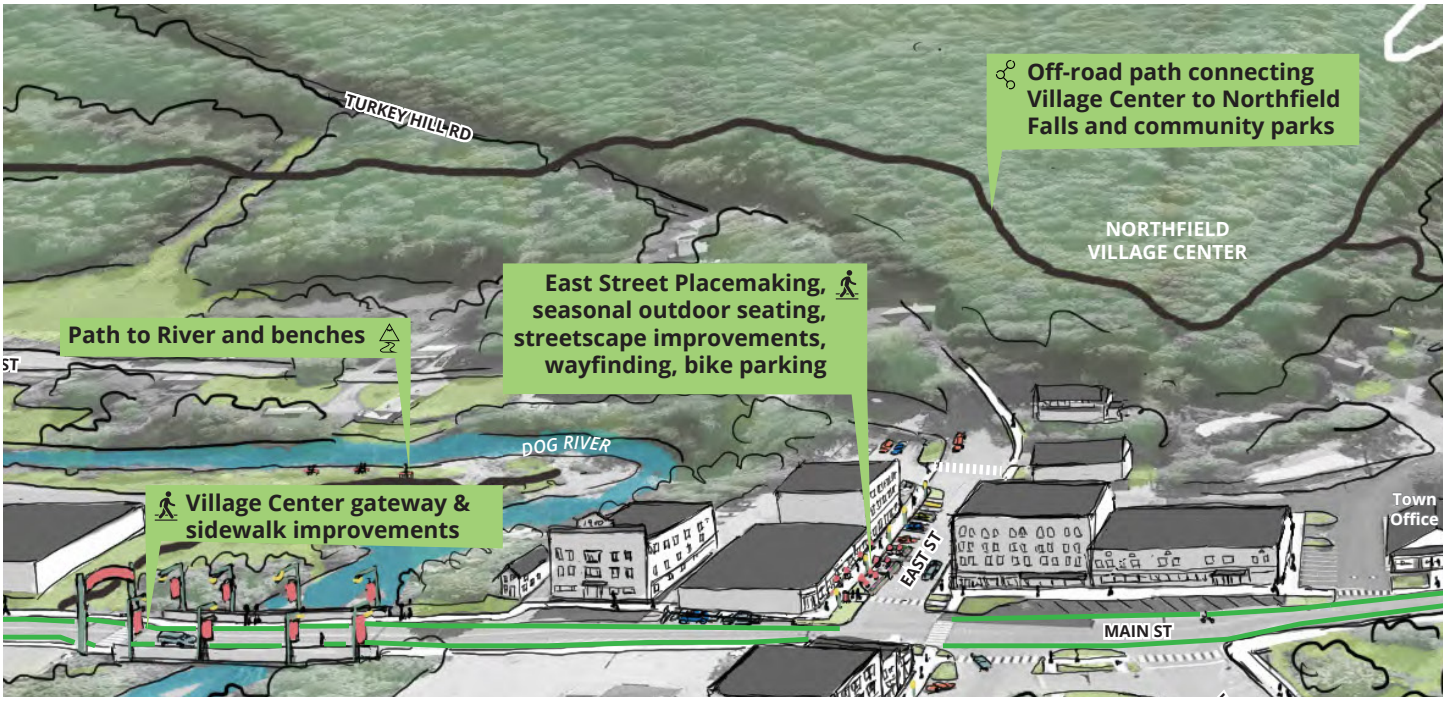
INITIATIVES

ES-1, ES-2, ES-3

Project Description

East Street currently is used primarily to access nearby businesses such as Carrier Roasting Co., Good Measure Brewing, Cornerstone Burger Company, Subway, and Northfield Savings Bank. Small improvements on East Street, such as lighting and temporary seating, could create a much more welcoming and vibrant space. Northfield should look to continue work on pedestrian improvements in that area such as crosswalks, sidewalks, and bump-outs, and add in placemaking elements such as benches, lighting, and public art. Temporary outdoor seating could be placed along the sidewalk or in nearby parking spaces to create flexible and attractive dining and seating options. Bike racks and benches would also be a welcome addition to this area. East Street may also be a good location to place wayfinding elements such as a kiosk with information on local businesses, nearby trailheads, and village history.

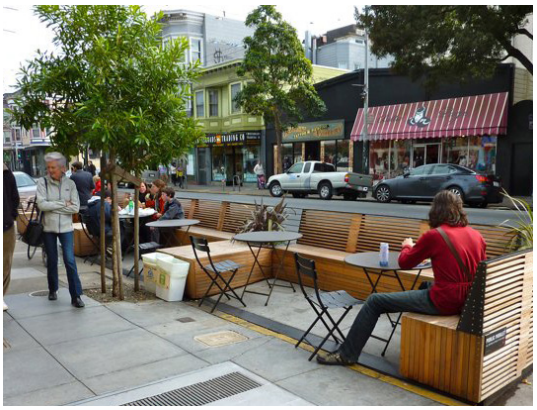
CONCEPT SKETCH



East Street

CHARACTER IMAGERY

Bump-outs



Flexible outdoor seating

Bike boulevard- Sharrows

Benches

Gateway and banners

Bike racks

Kiosk

Stormwater bioretention planter

Flexible outdoor seating

River access overlook

Slate Ave Neighborhood

IMPROVEMENT

SW ST TH T

THEME

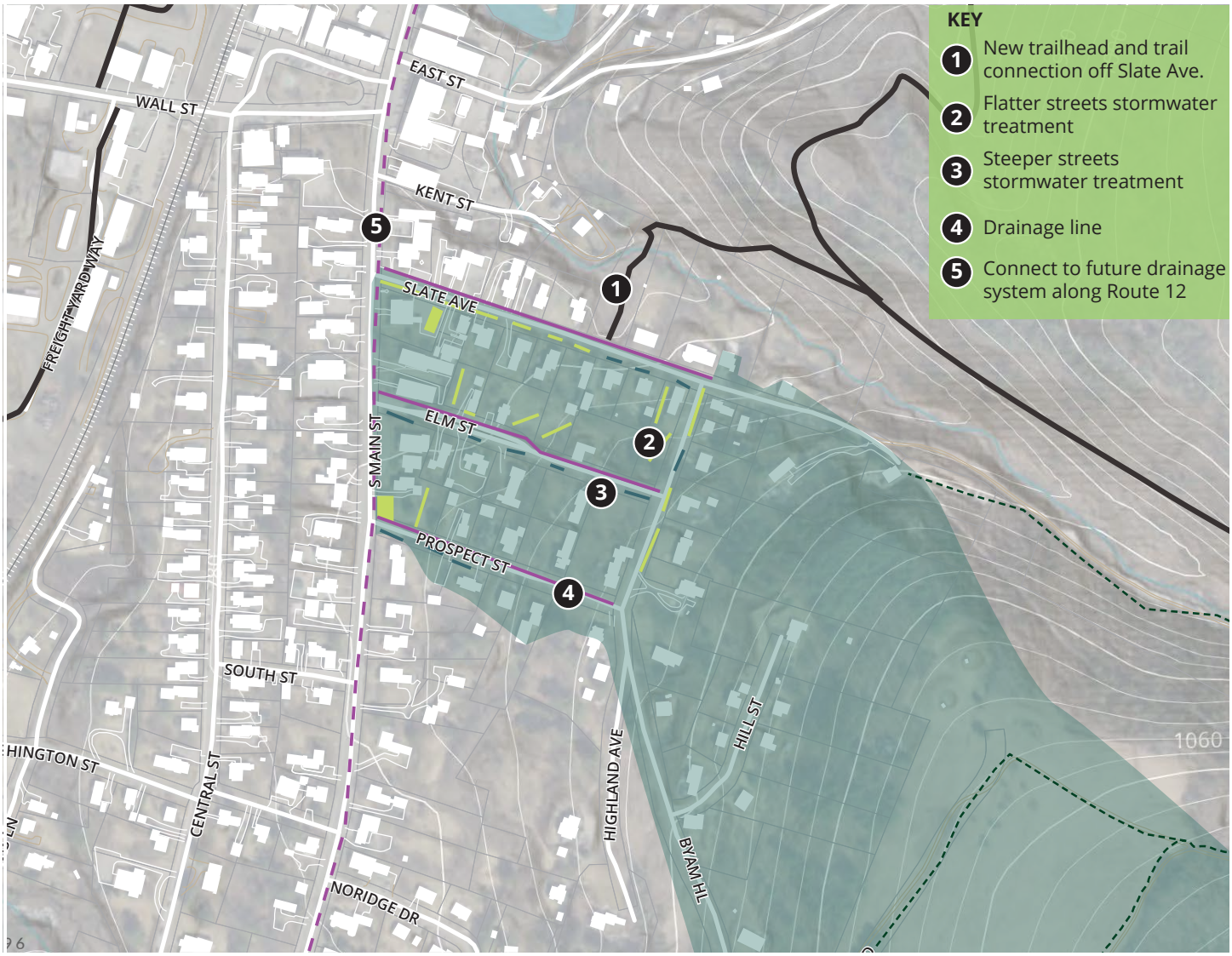
INITIATIVES

SA-1, SA-2, SA-3, SA-4

Project Description

The Slate Ave neighborhood (Slate Ave, Elm Street, Prospect Street, Byam Hill Road) is the proposed location of a variety of streetscape and stormwater mitigation improvements. To effectively capture run off in this area, two main forms of treatments are proposed: flatter streets treatments and steeper streets treatments. These treatments, which are explained in further detail in Appendix B, should be coupled with necessary road resurfacing and sidewalk repairs.

A new trail connections on Slate Ave and trail signage at Brown Public Library will help guide residents to the Town Forest trails and may reduce demand for parking at the Slate Ave trailhead.



Slate Ave Neighborhood

CHARACTER IMAGERY

Stormwater bioretention planter

Storm Swale

Dry Well Installation

Interpretive Signage

Stormwater bioretention planter

Kiosk

Stormwater bioretention planter

Dog River Park

IMPROVEMENT

SW BP CW PL OP WO TH RA

THEME

INITIATIVES

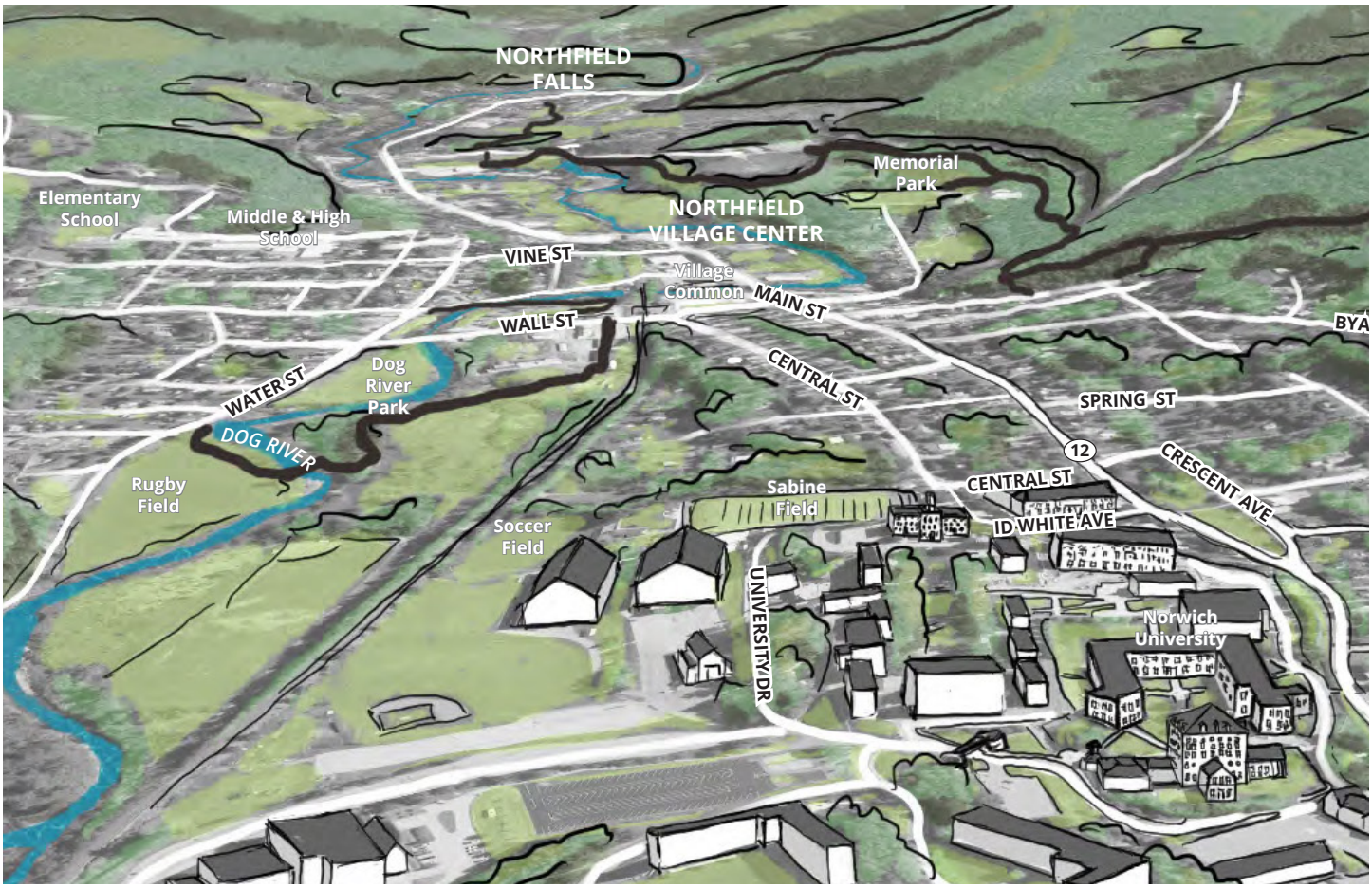
DRP-1, DRP-2

Project Description

The improvements around Dog River Park focus on improving pedestrian access from the surrounding neighborhoods as well as the Village Center. Sidewalk and crosswalk upgrades along Water Street, Wall Street, and Pearl Street will create a safer environment for pedestrian trying to access the park and establish more clear separation between pedestrians and vehicles along Water Street.

The Town should also explore creating a formalized river access area in Dog River Park to reduce the number of social trails and subsequent impacts to the riparian environment.

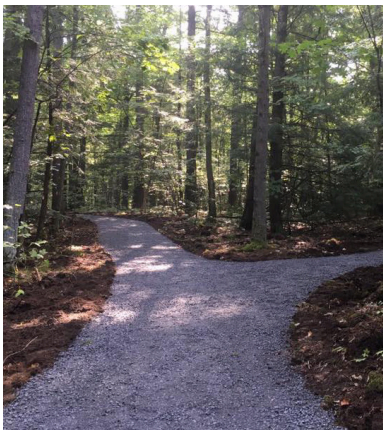
The Town should continue to collaborate with the local organizations to establish informational signage around Dog River Park. Information about ecological value and unique history of Dog River Park could be posted online or incorporated into school curriculum.



Dog River Park

CHARACTER IMAGERY

River access - overlook



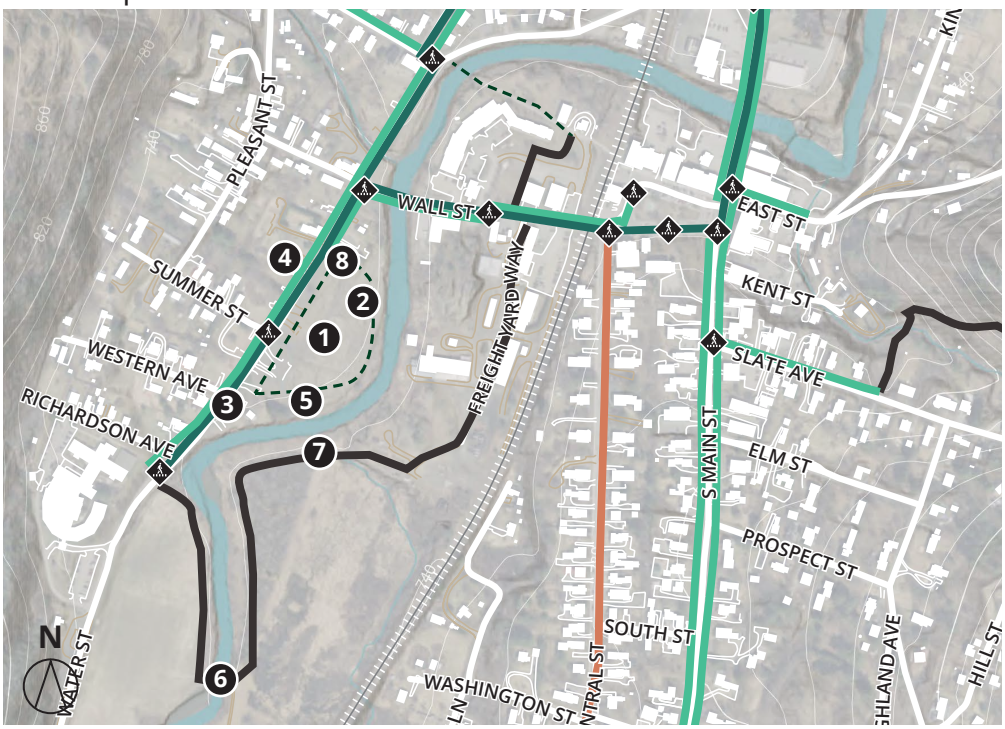
Crushed stone path

River access - overlook

Mowed path

Kiosk

Stone steps



KEY

1. Dog River Park
2. Existing hardpack crushed stone path
3. Bike boulevard - sharrrows
4. Sidewalk improvements to meet ADA standards
5. River access
6. Existing footbridge
7. New gravel sidepath
8. Wayfinding kiosk
- Crosswalk

Trail Connectivity

IMPROVEMENT

TH T OP WO

THEME

INITIATIVES

TC-1, TC-2, TC-3, TC-4, TC-5, TC-6, TC-7

Project Description

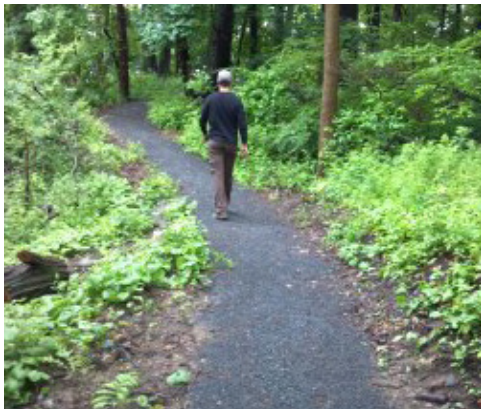
New trailheads and trail connections in Northfield Village Center will guide trail users to the village and village visitors to the trails! Trail signage and an information kiosk at Brown Public Library will help serve as a gateway for community members to the nearby trail access point at Slate Ave and could potentially reduce the need to expand trailhead parking.

Many existing trailheads are either informal or lack information for trail users, formalizing these access points and providing trail information at these locations will ensure access for community members and visitors alike.

Off-road paths and trails are an important part of the puzzle in connecting Northfield. As an alternative to Route 12 connectivity, an off-road path or trail could provide the connectivity the community desires while also becoming a recreational asset. Off-road paths within the village will also provide recreational opportunities for people of all ages and ability levels.

Further planning and ground truthing will be needed to determine exact routes, but a connection between Northfield Falls and the Village Center should be prioritized. Public/Private partnerships will be essential to create these connections.

CHARACTER IMAGERY



Crushed stone path

Trailhead kiosk and trail marker

Off-road path with wayfinding

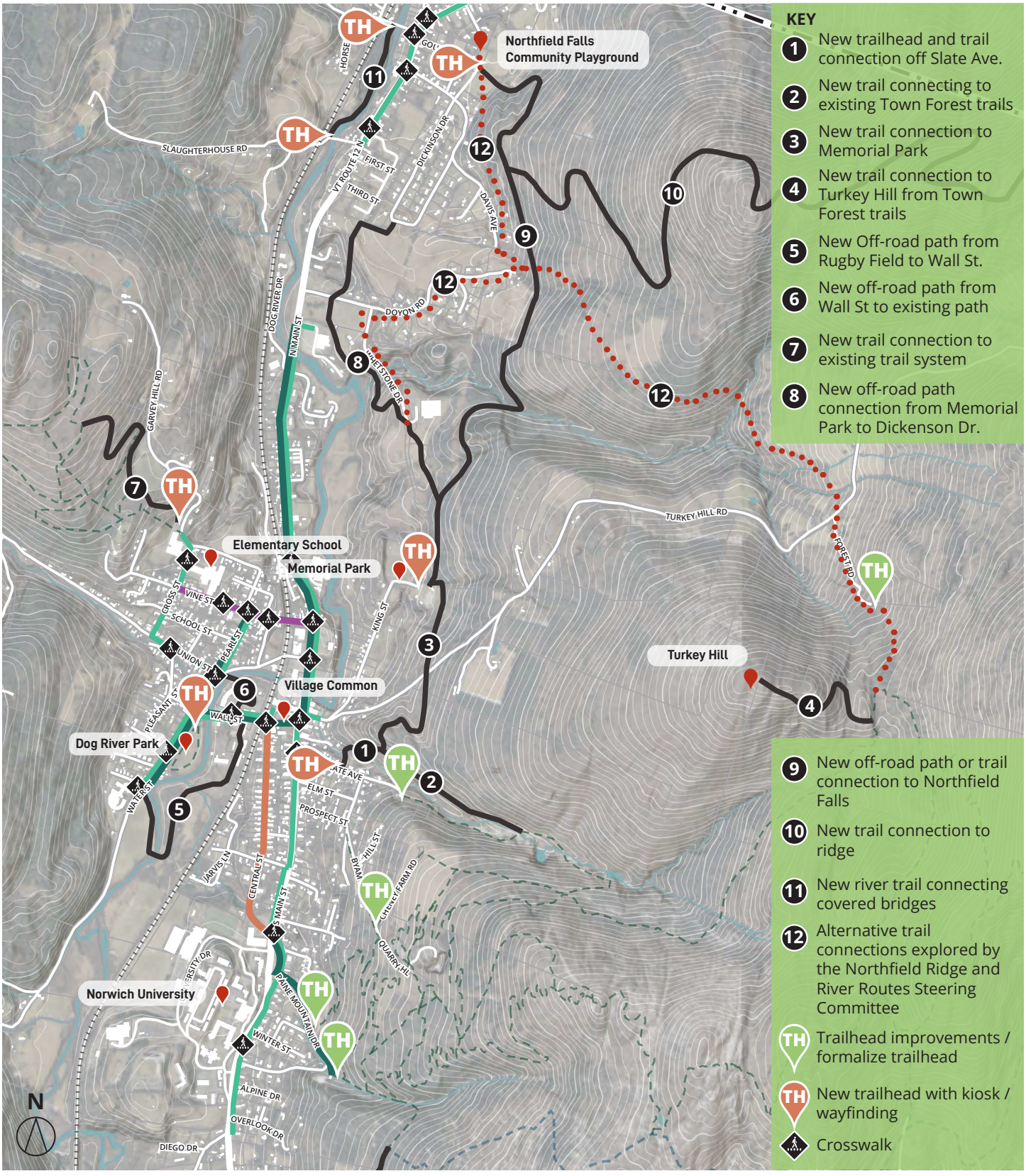
Mowed path

Off-road path with bench

Trail

Trail Connectivity

TRAIL CONCEPTS



VT Route 12

IMPROVEMENT

SW BP CW TC

THEME

INITIATIVES

VT12-1, VT12-2, VT12-3, VT12-4

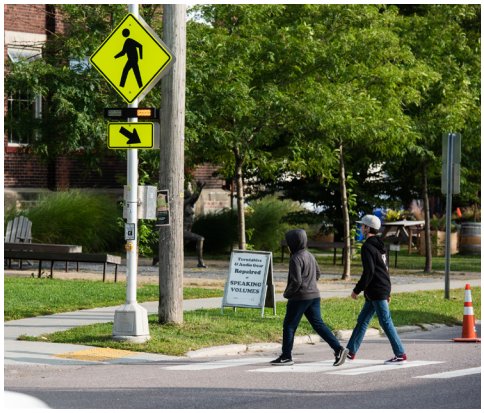
Project Description

Potential enhancements along VT Route 12, explained in detail in Chapter 6, are meant to enhance the pedestrian and bicyclist experience. Enhancements include extending and upgrading sidewalks from Tops to Norwich University, creating a bike boulevard from Wall Street to Plaza Drive, upgrading crosswalk, and implementing traffic calming measures such as lane reductions, chicanes, bulb outs, and landscaping elements.

CHARACTER IMAGERY

ADA Curb Ramp

Sidewalk



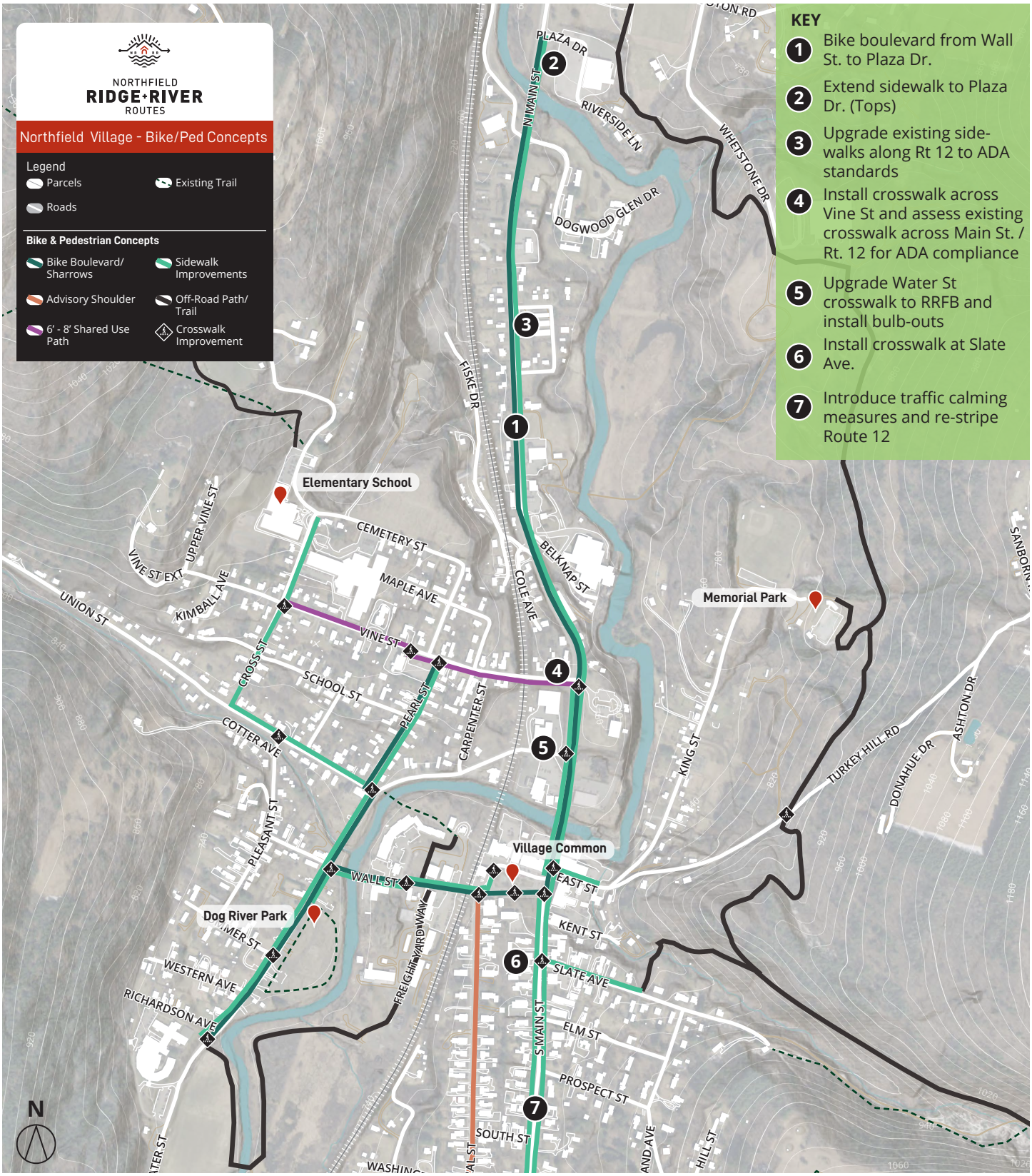
RRFB crosswalk

Bike boulevard / sharrow

Bulb - out

Chicane - Traffic Calming

VT Route 12


NORTHFIELD
RIDGE+RIVER
ROUTES
Northfield Village - Bike/Ped Concepts
Legend
Parcels
Existing Trail
Roads
Bike & Pedestrian Concepts
Bike Boulevard/ Sharrows
Sidewalk Improvements
Advisory Shoulder
Off-Road Path/ Trail
6' - 8' Shared Use Path
Crosswalk Improvement
KEY
1 Bike boulevard from Wall St. to Plaza Dr.
2 Extend sidewalk to Plaza Dr. (Tops)
3 Upgrade existing side-walks along Rt 12 to ADA standards
4 Install crosswalk across Vine St and assess existing crosswalk across Main St. / Rt. 12 for ADA compliance
5 Upgrade Water St crosswalk to RRFB and install bulb-outs
6 Install crosswalk at Slate Ave.
7 Introduce traffic calming measures and re-stripe Route 12
Elementary School
Memorial Park
Village Common
Dog River Park
PLAZA DR
N MAIN ST
RIVERSIDE LN
WHETSTONE DR
DOGWOOD GLEN DR
FISKE DR
BELKNAP ST
COLE AVE
CEMETERY ST
UPPER VINE ST
VINE ST EXT
KIMBALL AVE
UNION ST
MAPLE AVE
VINE ST
GROSS ST
SCHOOL ST
PEARL ST
CARPENTER ST
COTTER AVE
PLEASANT ST
KING ST
TURKEY HILL RD
DONAHUE DR
ASHTON DR
SANBORN
WALL ST
EAST ST
KENT ST
SLATE AVE
FREIGHT YARD WAY
S MAIN ST
ELM ST
PROSPECT ST
SOUTH ST
WESTERN AVE
RICHARDSON AVE
HILL ST
N

Village to School Connections

IMPROVEMENT

SW BP CW

THEME

INITIATIVES

V-1, V-2, V-3

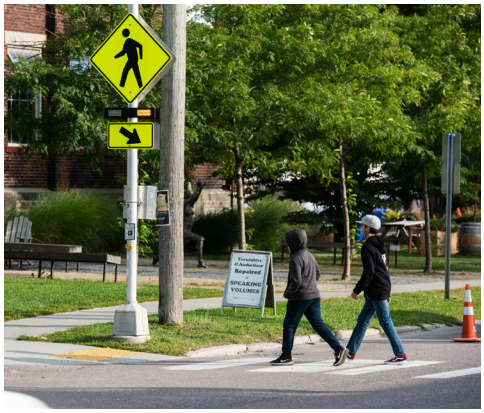
Project Description

The Northfield Elementary, Middle, and High School are northwest of the Village Center and are often accessed via Vine Street, Pearl Street, and Maple Ave. The existing pedestrian facilities in this area are in poor condition and the narrow sidewalks are often transected by utility poles. Sidewalks in this neighborhood (Cross St, Vine ST, Pearl Ave, Union St, Water St, Wall St.) should be upgraded to meet ADA standards. More study may be needed to determine improvement priorities. A shared use path or upgraded sidewalk along Vine Street will help enhance walkability to the school zone.

CHARACTER IMAGERY

ADA Curb Ramp

Sidewalk



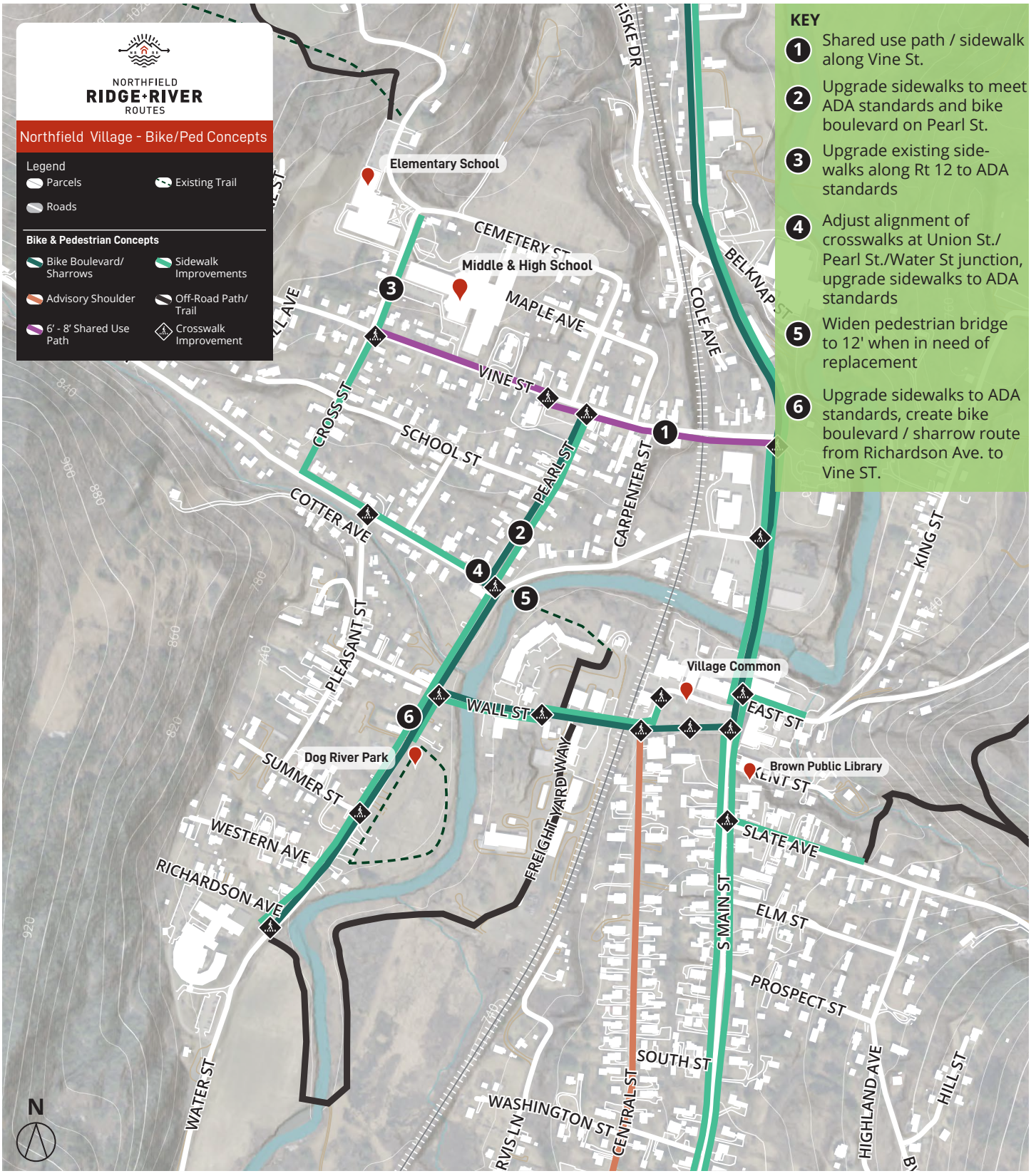
RRFB crosswalk

Bike boulevard / sharrow

Shared use path

Crosswalk

Village to School Connections



Falls General Store and Dog River Connection

IMPROVEMENT

SW BP ST CW PL TH T RA

THEME

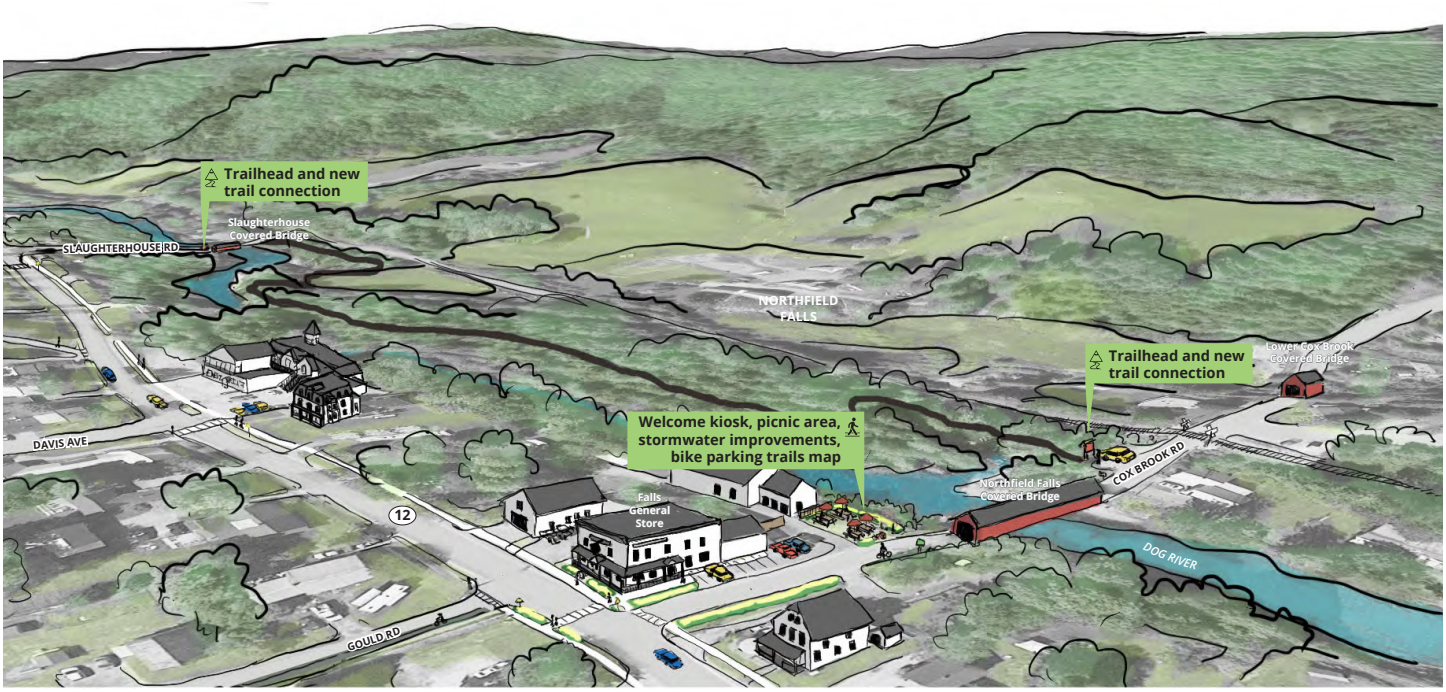
INITIATIVES

NF-(1-12)

Project Description

The Falls General Store is a community asset and visitor attraction. Connectivity and placemaking improvements in this area would need to be part of a public-private partnership between the Town and the Falls General Store. The Falls General Store is one of the first prominent buildings in Northfield Falls, located just down the road from the Welcome sign. Information at the General Store would help inform visitors of the local points and point people in the direction of recreation, sightseeing, and dining opportunities. The existing outdoor seating could include more placemaking elements such as umbrellas, awnings, lights, and a bike rack. Stormwater retrofits around the General Store would help reduce erosion and runoff into the nearby Dog River. Access to the Falls General Store would also be greatly improved by adding a crosswalks across VT Route 12 and sidewalks along the east side of the road. The Town should explore the options to put a RRFB crosswalk between the General Store and Community Playground.

New trailheads and an off-road path or trail connecting Cox Bridge and Slaughterhouse Bridge would provide a unique recreation and sightseeing opportunity.



Falls General Store and Dog River Connection

CHARACTER IMAGERY

Trailhead kiosk

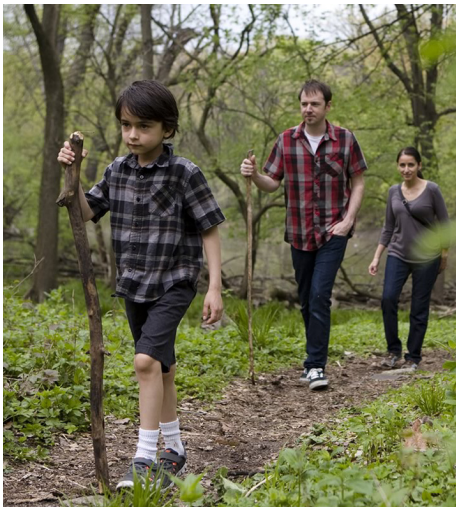

Outdoor seating area


Bike racks


RRFB crosswalk


Trail


Sidewalk


Trail / off-road path


Outdoor seating

Northfield Falls Connections

IMPROVEMENT

SW CW GW ST PL

TH T OP WO TC

THEME

INITIATIVES

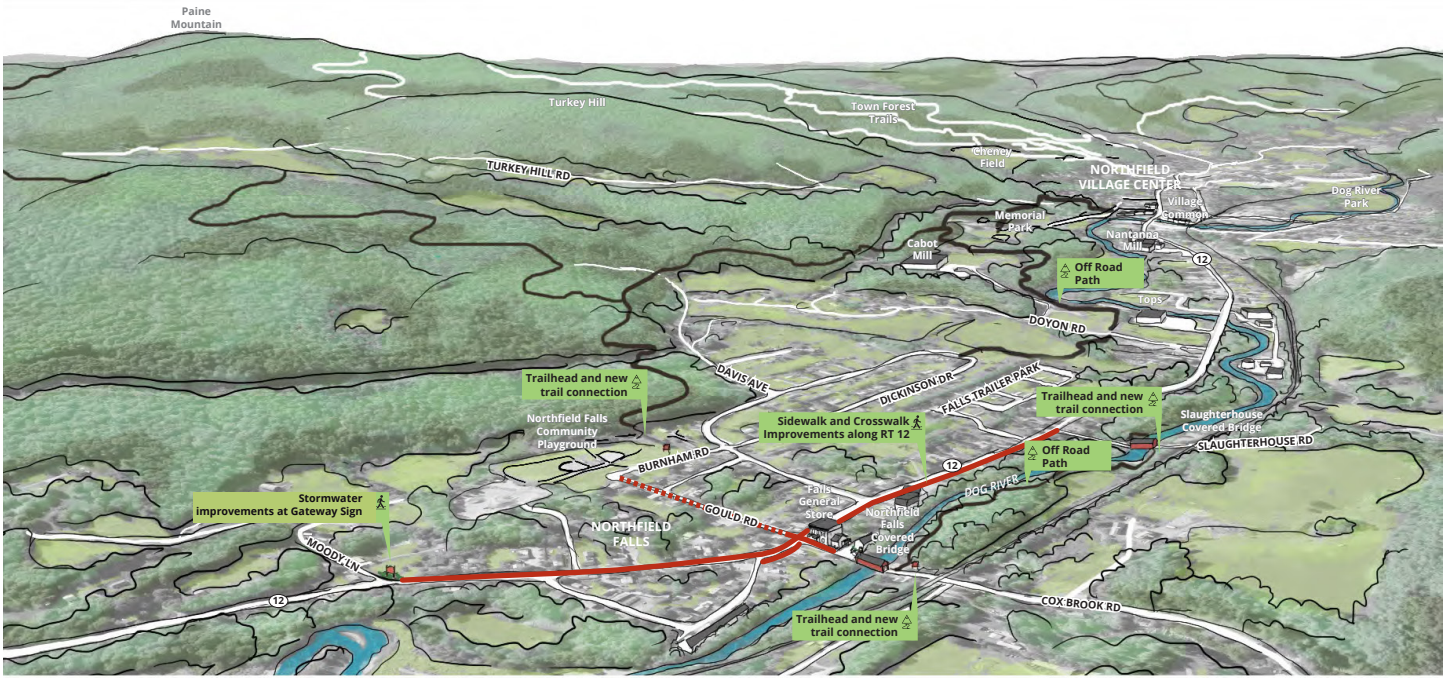
NF-(1-12)

Project Description

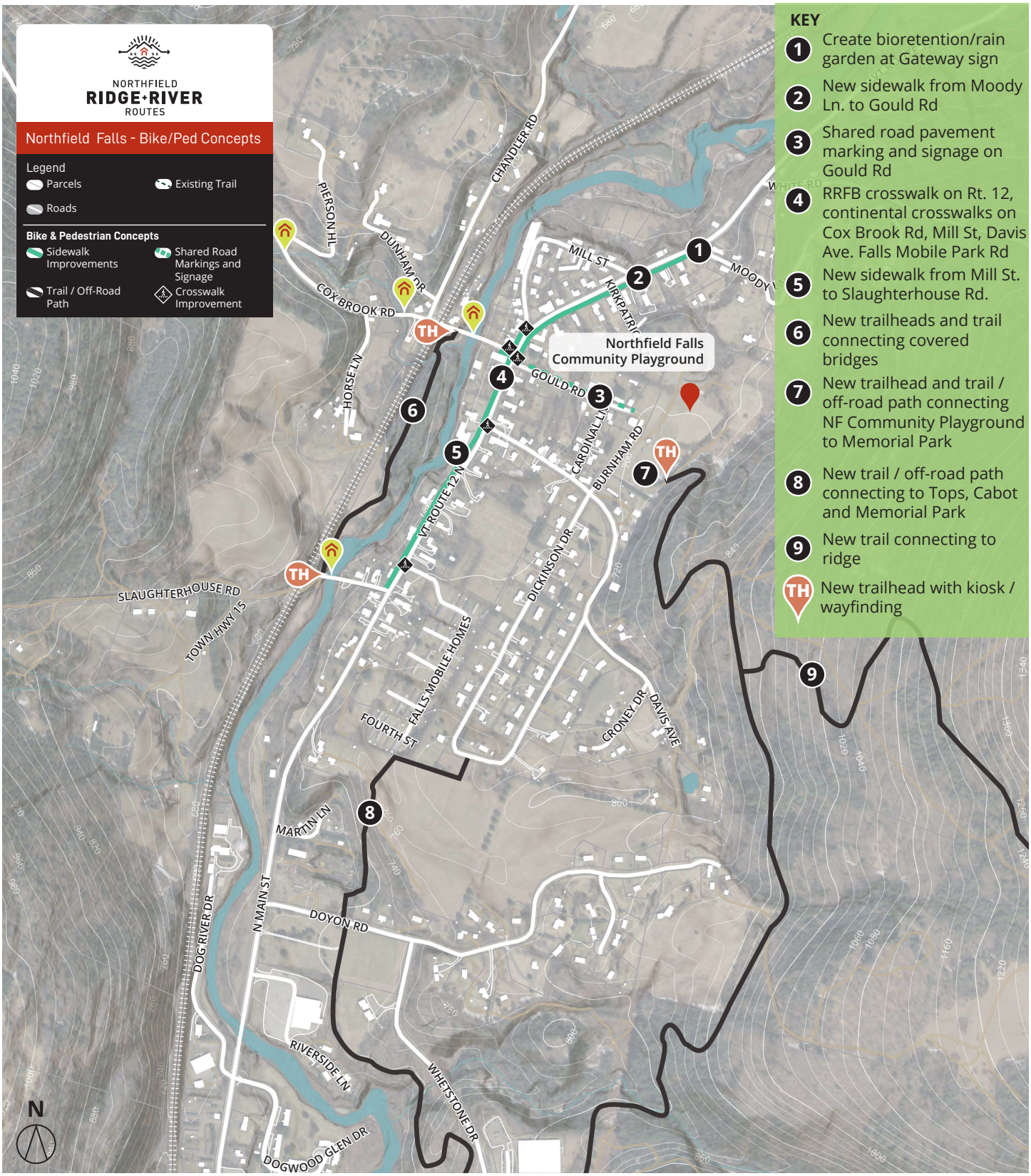
The concepts in Northfield Falls focus on pedestrian connectivity to key services and amenities in the area such as the Falls General Store, Post Office, and Community Playground. Sidewalks along VT Route 12 from Moody Lane to Slaughterhouse Road will help connect residential areas to services in the Falls. Crosswalks across VT Route 12, Cox Brook Road, and Mill Street will create a more pedestrian friendly environment for visitors and community members alike.

Conditions along VT Route 12 make installing a sidewalk between Northfield Falls and the Village Center cost prohibitive, making an off-road path an attractive option to connect the two zones. An off-road path from Memorial Park to the Northfield Falls Community Playground would enhance connectivity between the two population zones, the exact alignment of which will involve ongoing conversations with property owners.

New trailheads and trails connecting Northfield Falls to Paine Mountain, the Northfield Town Forest, and the covered bridges will help create unique and sought-after recreation experiences.



Northfield Falls Connections



Northfield Center Bike / Pedestrian Connectivity

IMPROVEMENT

SW BP CW

THEME

INITIATIVES

NC-3, NC-4, NC-5, NC-6, NC-7, NC-8, NC-9

Project Description

Pedestrian and bicyclist improvements in Northfield Center include crosswalks across VT Route 12, sidewalk improvements, and the addition of a bicycle boulevard. A crosswalk and sidewalks from Center Street to Crescent Ave would help extend the pedestrian connectivity to the Shaw Center and nearby neighborhoods.

Add bicyclist connectivity to the Shaw Center by adding a bike boulevard from Center Street along Crescent Ave and Paine Mountain Drive.

A new sidewalk from Crescent Ave to Route 12A would provide access to and from Norwich University to the surrounding residential neighborhoods.

CHARACTER IMAGERY

ADA Curb Ramp

Sidewalk

Crosswalk

Bike boulevard / sharrow

Bulb - out

Chicane - Traffic Calming

Northfield Center Bike / Pedestrian Connectivity

KEY

1. Crosswalk from Central St to Crescent Ave
2. Sidewalk / pedestrian improvements along Crescent Ave to Paine Mountain Dr
3. Advisory shoulder bike route Central St
4. Traffic calming (bulb-outs at crosswalk)
5. New sidewalk from Crescent Ave to Route 12A
6. Bike boulevard / Sharrows along Crescent Ave to Shaw Center
7. New trailhead and trail / off-road path connecting NF Community Playground to Memorial Park

Shaw Center and Trail Connections

IMPROVEMENT

TH T WO IS

THEME

INITIATIVES

NC-1, NC-2, NC-12

Project Description

Improvements in the Northfield Town Forest and at the Shaw Center focus on the formalization of trail access, information availability, wayfinding, and directional signage. Many community members already use the Shaw Center parking to access trails, making it a great location for trail maps and information. Opportunities exist to expand information access at other trail access points such as Byam Hill Road and Slate Avenue. Trail kiosks with maps can indicate the formal entry point to a trail system while also providing key information to the community.

The Town of Northfield should continue to work with the Conservation Commission and the Town Forest Stewardship Committee to increase the availability of signage in the Town Forest and identify opportunities for interpretive signage along trails.

Maps at entry points help formalize access points, while on-trail blazes and directional signage can help people orient themselves.

CHARACTER IMAGERY

Trailhead kiosk

Trailhead kiosk and trail marker

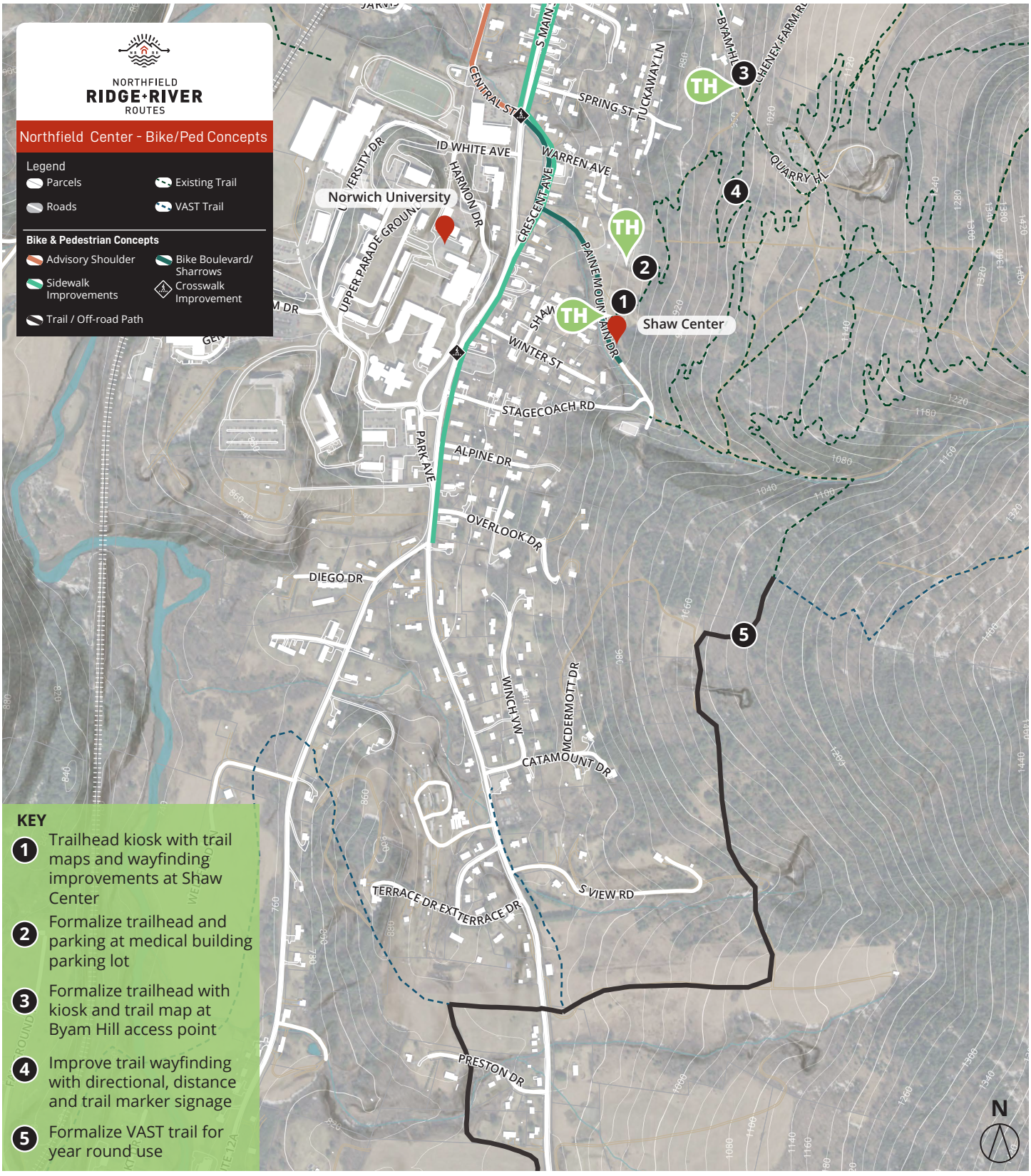
Wayfinding / interpretive signage

Trailhead parking

Trail signage

Mowed path

Shaw Center and Trail Connections



KEY

1. Trailhead kiosk with trail maps and wayfinding improvements at Shaw Center
2. Formalize trailhead and parking at medical building parking lot
3. Formalize trailhead with kiosk and trail map at Byam Hill access point
4. Improve trail wayfinding with directional, distance and trail marker signage
5. Formalize VAST trail for year round use

IMPLEMENTATION MATRIX

How to Use

The following implementation matrix summarizes the recommendations and considerations around project implementation within each of the four zones in Northfield. The matrix includes a cost estimate, design specifications where available, grants that align with the recommended project, and notes for consideration. The implementation matrix should be considered a living document. That is to say, a long-term opportunity may become a short-term priority if conditions such as funding, land availability, and staffing change.

Estimates of site improvement costs are provided to inform the user (Town, public, developer, etc.) of what each project entails and will hopefully ensure that funding is allocated to improvements efficiently. It must be noted that site improvement costs can vary widely depending on the specific project, the project site, materials, environmental concerns and other factors. Some projects may be able to constructed and/or implemented in house, potentially reducing overall costs, while other projects will require further concept and pre-design planning to better understand the design program (size, capacity, and specific features to be designed) before accurate costs can be estimated). Therefore, the cost information contained in this Master Plan should not be considered definitive, but rather a relative range of costs to be used only for budget and planning purposes and not necessarily for determining actual bid prices for a specific site improvement.

For each of the project groupings, four general steps (outlined here) should be followed.

1. Complete project scoping study

2. Prepare conceptual engineering plans and refine cost estimate

3. Secure funding for final engineering and construction once cost estimate is refined

4. Complete final engineering and construction

Timing Key

- **I** — Immediate *Within the next year*
- **ST** — Short-Term *1-2 years*
- **MT** — Mid-Term *3-5 years*
- **LT** — Long-Term *5+ years*
- **O** — Ongoing *Active and continuing*

ZONE: NORTHFIELD FALLS

ID	Location	Opportunity	Improvement Group	Timing	Cost Range	Cost Range 2	Theme	Design Specifications	ROW Status	Grants	Notes
	Northfield Falls										
NF											
NF-1	Northfield Falls General Store	Welcome Kiosk, stormwater mitigation	Placemaking, Stormwater	Short-term		Tens of thousands	Connecting to Ridges and River	stormwater planter, buffering, sediment trap	Within State ROW		Private property impacts + State ROW
NF-2	VT Route 12	RRFB crosswalk across VT Route 12	Crosswalk	Short-Term	Tens of thousands	$10 K	Enhancing Local Connectivity	RRFB enhanced crosswalk	Within State & Town ROW		Will require consultation and review process with VTRANS
NF-3	Northfield Falls Community Playground	Trailhead for off-road path connections to Memorial Park and ridge trail connection	Trailhead, Trail Connection	Mid-term	Tens to Hundreds of Thousands	More scoping and conceptual design is needed to fine tune cost ranges.	Connecting to Ridges and River, Bringing Northfield Together	2' - 6'		LWCF, RD, RTC, RTP, RFG, Local Funds	Private property impacts
NF-4	Slaughterhouse Rd to Cox Brook Rd	New trail connection	Trailhead, Trail Connection	Mid-term	Tens to Hundreds of Thousands		Connecting to Ridges and River, Enhancing Local Connectivity				Private property impacts
NF-5	Northfield Welcome Sign	Placemaking opportunity, stormwater mitigation	Placemaking, Stormwater	Mid-term	Tens of thousands	Tens of thousands	Enhancing Local Connectivity	bioretention or gravel wetland area	Both within and outside of Town ROW	TAP, STP, CDBG, TPI, Local Funds,	Possible private property impacts
NF-6	Gould Road	Consider shared road markings for pedestrians/bicycles to provide more visible biking/walking option to access New Promise Community Playground.	Sidewalk	Mid-term	Tens of thousands	Tens of thousands	Enhancing Local Connectivity	Shared road markings	Within Town ROW		Local roads off of VT 12 are likely walkable given low traffic volun
NF-7	Davis Ave	Consider shared road markings for pedestrians/bicycles to provide more visible biking/walking option to access New Promise Community Playground.	Pedestrian/Bicycle Markings	Mid-term	Tens of thousands	Tens of thousands	Enhancing Local Connectivity	Shared road markings	Within Town ROW		Local roads off of VT 12 are likely walkable given low traffic volun
NF-8	Mill Street	Realign Mill Street intersections with VT Route 12 to T-intersections	Intersection	Mid-Term	Hundreds of thousands	Hundreds of thousands	Enhancing Local Connectivity		Both within and outside of State & Town ROW		Private property impacts
NF-9	VT Route 12	Add crosswalk across Cox Brook Road north of General Store	Crosswalk	Mid-Term	Tens of thousands	$10K	Enhancing Local Connectivity	2' - 6'	Within State & Town ROW		Private property impacts
NF-10	VT Route 12	Construct sidewalk along south side of VT Route 12 from Moody Lane to Gould Road	Sidewalk	Long-term	Hundreds of Thousands	$415K (Note 7)	Enhancing Local Connectivity	5' sidewalk with buffer	Both within and outside of State ROW		
NF-11	VT Route 12	Construct sidewalk along west side of VT Route 12 from Cox Brook Road to Slaughterhouse Road + Access Management for wide driveways	Sidewalk	Long-term	Hundreds of Thousands	$500K (Note 8)	Enhancing Local Connectivity	5' sidewalk with buffer	Both within and outside State ROW		
NF-12	VT Route 12	Add sidewalk from Mill Street to Cox Brook Road	Sidewalk	Long-term	Tens of thousands	$50K (Note 9)	Enhancing Local Connectivity	5' sidewalk with buffer	Within State & Town ROW		

1 Based on 2400LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
2 Based on 600LF of new sidewalk construction at $227 per foot of bituminous sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
3 Based on 820LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
4 Based on 2400LF of new sidewalk construction at $184 per foot of concrete sidewalk without curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
5 Based on 850LF of new sidewalk construction at $227 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
6 Based on 515LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
7 Based on 1300LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
8 Based on 1550LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
9 Based on 140LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
10 Based on 1800LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
11 Based on 300LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
A Based on 300 LF of new shared use path construction at $384 per foot of 12 FT wide bituminous concrete path from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
B Based on 515 LF of new shared use path construction at $384 per foot of 12 FT wide bituminous concrete path from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
C Based on 300LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
D Based on modeled value of 38,000 CF of total storage for infiltration chambers at $7 per cubic foot of storage volume from Stormtech (2019) multipled by a factor of 2 to account for design, permitting, CE and challenging site conditions.
E Based on recent construction bids for Waterbury Main Street and South Burlington Market Street, excluding new water & sewer, drainage, streetscape, signals, and

ZONE: NORTHFIELD VILLAGE CENTER

Initiative ID & Location		Opportunity	Improvement Group	Priority	Cost Range	Cost Range 2	Theme	Design Specifications	ROW Status	Grants	Notes
	Northfield Village Center										
WS	**Wall Street to Dog River Park Corridor**										
WS-1	Wall Street	Sidewalk improvements from Common to Dog River Park	Sidewalk	Short-Term	Hundreds of Thousands	$265K (Note 3)	Enhancing Local Connectivity	6' sidewalk	Both within and outside of Town ROW	TAP, STP, CDBG, TPI, MPG (Planning), HSG (Bridge and Culvert) Local Funds,	Add sidewalk on southerly side of Wall Street connecting to Water Street and Dog River Park
WS-2	Depot Square	Bicycle and pedestrian improvements	Bicycle Infrastructure, Crosswalk	Short-Term	Tens of thousands	Tens of thousands	Enhancing Local Connectivity	Prioritize pedestrian connections	Within Town ROW		Add crosswalks to Common. Add bike racks to Common. Close pedestrian railroad crossing from Common to path
WS-3	Wall Street	Improve pedestrian crossing at railroad tracks	Other	Mid-Term	Tens of thousands	Tens of thousands	Enhancing Local Connectivity		Within Town ROW		Extend sidewalk along southerly side of Wall Street from Central Street, with detectable warning surfaces at crossing and rail gap fillers. Add path west of RR crossing to connect to existing path on Water St.
WS-4	Wall Street	Bicycle infrastructure improvements along Wall Street	Bicycle Infrastructure	Mid-Term	Tens of thousands	Tens of thousands	Enhancing Local Connectivity	Bike Boulevard / Sharrow	Within Town ROW		
WS-5	Water Street	Crosswalk and sidewalk improvements	Crosswalk, Sidewalk	Mid-Term	Tens of thousands	Tens of thousands	Enhancing Local Connectivity		Mostly within Town ROW		Some private property impacts
WS-6	New connection from existing path	Off road path with interpretive signage from Wall Street to existing path	Off Road Path	Long-Term	Tens - Hundreds of thousands		Enhancing Local Connectivity	8'-12'	Both within and outside of Town ROW		
WS-7	Pedestrian Bridge	Consider widening pedestrian bridge to 12 FT upon replacement	Bicycle Infrastructure, Off Road Path	Long-Term	Hundreds of Thousands	$500 K	Enhancing Local Connectivity		Mostly within Town ROW		Some private property impacts
CS	**Central Street**										
CS-2		Advisory bike lane from Norwich to Common	Bicycle Infrastructure	Mid-Term	Tens of thousands	Tens of thousands	Enhancing Local Connectivity, Bringing Northfield Together	Painted shoulder bike lane	Within Town ROW		
CS-3		Pedestrian improvements from Norwich to Common	Sidewalk	Long-Term	Hundreds of Thousands	$450K (Note 4)	Enhancing Local Connectivity, Bringing Northfield Together	6' Sidewalk	Mostly within Town ROW	TAP, STP, CDBG, TPI, MPG (Planning), Local Funds,	In the short-term it may be appropriate to remove the exisiting sidewalk along the east side of Central Street. Continue to study the connections between the Downtown and University. In Long-term replace degraded sidewalk along easterly side of Central Street from Wall Street to Washington St; Extend sidewalk to terminus of sidewalk near campus. Some private property impacts.
ES	**East Street**										
ES-1	East Street	Placemaking opportunity	Placemaking	Mid-Term	Millions	$1.5M+ (Note E)	Enhancing Local Connectivity	To Be Determined	Both within and outside of Town ROW	TAP, STP, CDBG, TPI, MPG (Planning), Local Funds,	Placemaking, including lighting, paving, etc. Prepare conceptual engineering plans and refine cost estimate. Secure funding for final engineering and construction once cost estimate is refined. Complete final engineering and construction. Costs do not include utility upgrades that might be done concurrently with any placemaking or streetscape enhancement. Surface treatments only.
ES-2	Main Street Bridge	Gateway feature	Placemaking	Mid-Term	Hundreds of Thousands	$700K+ (Note E)	Enhancing Local Connectivity	TBD - Wayfinding Master Plan Advised	Both within and outside of Town ROW		Design of gateway would benefit from a wayfinding master plan ($30-40K). Conceptual design will include scoping to address potential private land and right-of-way impacts. Vtrans is currently doing a scoping study for the bridge. Town should indicate its interest in enhancing the gateway and work with Vtrans to explore how placemaking improvements might be incorporated into the new design.
ES-3	North Main Street Bridge	River access opportunity, outfall stabilization project	River access, Stormwater	Long-Term	Hundreds of thousands	$500 K	Connecting to Ridges and River	Outfall stabilization, subsurface filter, potential surface bioretention	Both within and outside of Town ROW		Private land access issues
SA	**Slate Ave. Neighborhood**										
SA-1	Slate Ave	Replace existing bituminous sidewalk with PCC sidewalk and curb	Sidewalk, Stormwater	Short-Term	Hundreds of Thousands	$165K (Note 6)	Enhancing Local Connectivity	5' sidewalk if roadway allows	Mostly within Town ROW	TAP, STP, CDBG, TPI, Local Funds,	Private property impacts
SA-2		Propose markings and signage for pedestrians traveling to Town Forest Access	Wayfinding	Short-Term	Thousands	$5-10K	Connecting to Ridges and River		Within Town ROW		Could be done independently of any other Slate Avenue
SA-3		Install stormwater mitigation on Slate Ave up to Highland Avenue	Stormwater, Roadway	Short-Term		$525K (Note D)	Enhancing Local Connectivity	surface / subsurface infiltration systems	Both within and outside of Town ROW		Coordinate with other improvement work on roadway
SA-4		Install stormwater collection on Slate Ave up to Highland Avenue	Stormwater, Roadway	Short-Term	Hundreds of Thousands	Hundreds of Thousands	Enhancing Local Connectivity	Storm lines and associated structures	Within Town ROW		Coordinate with other improvement work on roadway
DRP	**Dog River Park**										
DRP-2	Dog River Park	Information kiosk / wayfinding	Wayfinding	Short-Term	Thousands	$5-10K	Connecting to Ridges and River	TBD - Wayfinding Master Plan Advised	Within Town ROW		Wayfinding Master Plan would be advised to assure conformity in signage and information
DRP-1	Dog River Park	River access / overlook	Placemaking	Mid-Term	Tens of thousands	20K to 30K	Connecting to Ridges and River		Within Town ROW	LWCF, RD, RTC, RTP, RFG, Local Funds	Additional master planning and scoping needed to determine issues associated with riparian zone development.
TC	**Trail Connectivity**										
TC-1	Slate Ave, Memorial Park, Elementary School, Byam Hill Rd	New Trailhead with wayfinding and kiosk	Trailhead, wayfinding	Mid-Term	Tens of thousands	More scoping and conceptual design is needed to fine tune cost ranges. Many of these improvements will require coordination with Norwich University and other Private Parties	Connecting to Ridges and River		Outside ROW; On public property	LWCF, RD, RTC, RTP, RFG, Local Funds. Coordinated Fundraising with Norwich University might provide seed money for some improvements	Some private property impacts
TC-2	Slate Ave	New trail connection to Town Forest trails and Memorial Park	Trail connection	Mid-Term	Tens to Hundreds of Thousands		Connecting to Ridges and River	18" - 48"	Outside ROW; On public and private property		Some private property impacts
TC-3	Rugby Fields to Water St	Off road path around Rugby fields and east of Dog River Park	Off Road Path	Mid-Term	Tens of thousands		Connecting to Ridges and River, Enhancing Local Connectivity	6' - 10'	Outside ROW; On public and private property		Some private property impacts
TC-4	Elementary School	New trail connection to existing trail network	Trail connection	Mid-Term	Tens of thousands		Connecting to Ridges and River	18" - 48"	Outside ROW; On public and private property		Some private property impacts
TC-5	Turkey Hill	New trail connection to Turkey Hill	Trail connection	Mid-Term	Tens of thousands		Connecting to Ridges and River	18" - 48"	Outside ROW; On public and private property		Some private property impacts
TC-6	Memorial Park	New trail connection to Town Forest trails and Northfield Falls	Trail connection / Off Road Path	Mid-Term	Tens to Hundreds of Thousands		Connecting to Ridges and River, Bringing Northfield Together	2' - 6'	Outside ROW; On public and private property		Some private property impacts
TC-7	Brown Public Library	Possible trailhead	Trailhead	Mid-Term	Tens of thousands		Connecting to Ridges and River	Kiosk, Trail Map	Outside ROW; On public property		
VT12	**Route 12**										
VT12-1	VT Route 12	Explore traffic calming strategies	Traffic Calming	Short-Term	Tens of thousands	$30-40K study	Enhancing Local Connectivity		Within Town ROW		Widening pavement for bike lanes could encourage higher speeds.-Better manage access to wide driveways. Build curb extensions to reduce pedestrians crossing distances and increase visibility.
VT12-2	VT Route 12	Construct sidewalk along VT Route 12 between Dogwood Glen and existing sidewalk across from Cumberland Farms	Sidewalk	Long-Term	Hundreds of Thousands	$140K (Note 2)	Enhancing Local Connectivity	5' sidewalk with buffer	Within State ROW	TAP, STP, CDBG, TPI, Local Funds,	
VT12-3	VT Route 12	Perform sidewalk inventory along VT Route 12	Sidewalk	Long-Term	Thousands	Study and Analysis	Enhancing Local Connectivity		Within Town ROW		Prioritize and upgrade segments that have deteriorated or do not meet ADA
VT12-4	VT Route 12	Build curb extensions on VT Route 12	Crossings	Long-Term	Tens of thousands	Tens of thousands	Enhancing Local Connectivity		Within Town ROW		Curb extensions reduce crossing distances for pedestrians and increase visibility
V	**Village to School Connections**										
V-1	Vine St	Sidewalk improvements from N Main Street to schools	Sidewalk	Mid-Term	Hundreds of Thousands	$765K (Note 1)	Enhancing Local Connectivity	5' sidewalk	Within Town ROW	TAP, STP, CDBG, TPI, SRTS, Local Funds,	Consider Safe Routes to Schools exercise. Work with Local Motion to study process for SRTS w/ emphasis on Vine St
V-2	Vine St	Assess ADA compliance of Vine Street traffic signal system & pedestrian features of intersection with N Main Street	Traffic Signal, Intersection	Mid-Term	Needs scoping: Tens of thousands to over a hundred thousand	Scoping Study	Enhancing Local Connectivity		Within Town ROW		Reduce corner radii at intersection for safer pedestrian crossings; consider adding crosswalk on north side of intersection
V-3	Pearl Street	Enhanced pedestrian facilities (sidewalks, crosswalks)	Sidewalk, crossing	Mid-Term	Hundreds of Thousands	$200 K5	Enhancing Local Connectivity		Within Town ROW		

ZONE: NORTHFIELD CENTER & SOUTH NORTHFIELD

ID	Location	Opportunity	Improvement Group	Timing	Cost Range	Cost Range 2	Theme	Design Specifications	ROW Status	Grants	Notes
	Northfield Center										
NC	**Northfield Center**										
NC-1	Shaw Center	Formalize trailhead at Shaw Center, include trail kiosk and parking information	Trailhead	Short-term			Connecting to Ridges and River				
NC-2	VT Route 12	Consider crosswalk from Central Street to Crescent Ave if this is a current desire line	Crossings	Short-term	Tens of thousands	$10K	Enhancing Local Connectivity		Within Town ROW		C1TH portion gives Town flexibility for adding crosswalk. Meets VTrans crossing spacing guidelines.
NC-3	VT Route 12	Include signage to Shaw Outdoor Center on VT Route 12	Wayfinding	Short-term	Tens of thousands	Tens of thousands	Connecting to Ridges and River		Within Town ROW		
NC-4	Byam Hill	Formalize trailhead at Byam Hill Rd	Trailhead	Mid-term			Connecting to Ridges and River			LWCF, RD, RTC, RTP, RFG, Local Funds	
NC-5	VT Route 12	Explore traffic calming strategies in Norwich campus zone	Traffic Calming	Mid-term	Tens of thousands	Study	Enhancing Local Connectivity		Within Town ROW	TAP, STP, CDBG, TPI, Local Funds,	Curb extension installments at crosswalks to reduce crossing distances and increase visibility for pedestrians
NC-6	Central Street	Extend proposed bike route on Central Street to Shaw Center	Bicycle Infrastructure	Mid-term	Tens of thousands	Tens of thousands	Enhancing Local Connectivity	Advisory shoulder/ Sharrows	Within Town ROW		Town could move forward with sharrows/markings during spring pavement marking projects.
NC-7	South Main Street	Bioswale opportunity to facilitate infiltration	Stormwater	Mid-term	Tens of thousands		Connecting to Ridges and River	swale improvement for infiltration			Coordinate
NC-8	VT Route 12 and Crescent Ave	Consider building sidewalk from Crescent Ave to VT Route 12A	Sidewalk	Long-term	Hundreds of Thousands	$575K (Note 10)	Enhancing Local Connectivity	5' sidewalk	Within Town ROW		Constructing sidewalk on easterly side of road will avoid impacts to aerial utilities and embankment
NC-9	Crescent Ave	Pedestrian improvements from Crescent Ave to existing sidewalk on Paine Mountain Drive	Sidewalk, Wayfinding	Long-term	Hundreds of Thousands	$100K (Note 11)	Enhancing Local Connectivity		Within Town ROW		Connect sidewalk from Crescent Ave greenspace to Paine Mountain Drive
NC-10		Improve Crescent Ave south intersection with VT Route 12 to eliminate skewed intersection	Intersection	Long-term	Hundreds of thousands	Hundreds of thousands	Enhancing Local Connectivity		Mostly within Town ROW		May impact corner of parcel owned by Norwich
NC-11	Park Ave	Improve Park Ave/VT Route 12 intersection to eliminate skew	Intersection	Long-term	Tens of thousands	< $100 K	Enhancing Local Connectivity		Within Town ROW		Could start as pilot with large concrete planters and striping
NC-12	VT Route 12A	Consider realigning VT Route 12A/VT Route 12 intersection to be more perpendicular.	Intersection	Long-term	Tens of thousands	Tens of thousands	Enhancing Local Connectivity		Mostly within Town ROW		Could be done simply with restriping. May reduce current impacts to private property.
NC-13	VAST Trail	Formalize VAST trail access to southeast portion of Norwich trails	Other	Long-term			Connecting to Ridges and River				
NC-14	Diego Drive	Stormwater retrofits	Stormwater	Long-term	Hundreds of Thousands		Connecting to Ridges and River	infiltration basin			
	South Northfield										
SN	**South Northfield**										
SN-1	VAST corridor	Formalize year-round access along existing VAST trail	Other	Mid-term			Connecting to Ridges and River			Local Funds	
SN-2	Kingston Road	Formalize Trailhead to Shaw Center trails and Town Forest	Trailhead, Wayfinding	Mid-term			Connecting to Ridges and River			RTC, RTP, Local Funds	Need to explore property owner issues
SN-3	Old Mill Hill	Consider realigning Old Mill Hill/VT Route 12 intersection to be more perpendicular	Intersection	Long-term	Hundreds of thousands	Hundreds of thousands	Enhancing Local Connectivity		Within State & Town ROW	TAP, STP, CDBG, TPI, Local Funds,	Private property impacts

1 Based on 2400LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
2 Based on 600LF of new sidewalk construction at $227 per foot of bituminous sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
3 Based on 820LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
4 Based on 2400LF of new sidewalk construction at $184 per foot of concrete sidewalk without curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
5 Based on 850LF of new sidewalk construction at $227 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
6 Based on 515LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
7 Based on 1300LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
8 Based on 1550LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
9 Based on 140LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
10 Based on 1800LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
11 Based on 300LF of new sidewalk construction at $317 per foot of concrete sidewalk with granite curb from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
A Based on 300 LF of new shared use path construction at $384 per foot of 12 FT wide bituminous concrete path from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)
B Based on 515 LF of new shared use path construction at $384 per foot of 12 FT wide bituminous concrete path from VTrans Report on Shared-Use Path and Sidewalk Costs (2020)

FUNDING RESOURCES TO SUPPORT IMPLEMENTATION

Funding Sources

Moving the objectives and initiatives forward is something that will require resources. No community goes at it alone as it shapes its future. Communities also need to mine local resources and support efforts. It can be a challenge to get community by-in on specific initiatives. Perhaps the best approach for moving any initiative forward is to align it with appropriate grants, leverage existing local resources and position it for private sector investment. The following programs may be relevant to some or all of the initiatives expressed in the Implementation Matrix. Key programs have been identified on the matrix for reference using their respective abbreviations (LWCF, for example).

F U N D I N G T Y P E

Federal And State Grants

Land and Water Conservation Fund State and Local Assistance Program (LWCF)

Administered by Vermont Forests, Parks, and Recreation, the Land and Water Conservation Fund (LWCF) state assistance program provides matching grants to help states and local communities protect parks and recreation resources. LWCF funding has benefited nearly every county in America, supporting over 41,000 projects. From building hiking and biking trails, to improving community parks, playgrounds and ballfields, this 50:50 matching program is the primary federal investment tool to ensure that families have easy access to public, open spaces.

Surface Transportation Plan (STP)

The State Surface Transportation Program (STP) is the main program of Federal Transportation Funds, managed by VTrans, for transportation improvements in the state. STP projects are typically planned and designed at the state level for local implementation.

Surface Transportation Signage Plan (STPG)

The State Surface Transportation Signage Program (STPG) is a program of Federal Funds, managed by VTrans, for updating and improving transportation signage in the state.

USDA Rural Development Loan and Grant Assistance (RD)

USDA Rural Development (RD) forges partnerships with rural communities, funding projects that bring housing, community facilities (including trails and active transportation facilities), business guarantees, utilities and other services to rural America. Rural Development works with state, local, and Indian tribal governments, as well as private and nonprofit organizations and user-owned cooperatives.

This program provides affordable funding to develop essential community facilities in rural areas. An essential community facility is defined as a facility that provides an essential service to the local community for the orderly development of the community in a primarily rural area.

Federal And State Grants

National Park Service Rivers, Trails, and Conservation Assistance Program (RTC)

The National Park Service Rivers, Trails, and Conservation Assistance (RTC) program supports community-led natural resource conservation and outdoor recreation projects across the nation. Their national network of conservation and recreation planning professional's and partners with community groups, nonprofits, tribes, and state and local governments to design trails and parks, conserve and improve access to rivers, protect special places, and create recreation opportunities.

FHWA Recreational Trails Program (RTP)

The Recreational Trails Program (RTP) provides funds to communities to support a wide variety of trail activities and related facilities, as well as environmental education and safety programs. The program is administered by the Vermont Department of Forests, Parks and Recreation in the Agency of Natural Resources.

Highway Safety Grants (HSG)

Federal Highway Safety Grants (HSG) are managed by VTrans. They are available to support countermeasure projects to create safer roads for all users. Improvements must be part of the Highway Safety Plan and could include roadway or intersection projects.

Transportation Alternatives Program (TAP)

The Transportation Alternatives Program (TAP) is a competitive grant program administered by VTrans that provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, and infrastructure projects for improving non-driver access to public transportation and enhanced mobility. These funds will cover a maximum of 80% of the project with the remaining portions most likely coming from the project-sponsoring organization. The maximum size of a grant under this program is currently $300,000.

F U N D I N G T Y P E

Federal And State Grants

VTrans Bicycle and Pedestrian Program (BPP)

The Vermont Bicycle and Pedestrian Program (BPP) provides federal funds managed by VTrans, to cover specific bicycle and pedestrian improvement projects and are provided via a competitive grant program.

Vermont Community Development Program (CDBG)*

Accessibility Modification Grants – Federal grants to bring existing municipal buildings and non-school libraries into compliance with the Americans with Disabilities Act (ADA).

Implementation Grants – Federal grants for economic development, housing, public facilities, and public services that will benefit low/moderate income individuals, eliminate slums or blight, or address an urgent need.

Planning Grants – Federal grants for community development planning, downtown planning studies, and project development to benefit people with low to moderate incomes and/or eliminate "slums and blight." Range: $30,000–$1,000,000

Eligibility: Municipalities and/or municipalities on behalf of organizations and private owners

State Grants and Programs

Vermont Community and Urban Forestry Council Grants (Caring for Canopies Grants, CCG)

These Caring for Canopies Grants (CCG) are awarded to municipalities to aid in taking the necessary actions to developing and sustaining a community-wide tree program, including tree plantings, inventories, maintenance, and planning. The grants range in size from $500 to $5,000 and require a 50% match.

Municipal Planning Grant Program (MPG)

The Municipal Planning Grants (MPG) are Vermont State grants for a wide range of municipal planning projects including municipal land use plans, zoning and subdivision bylaws, designated downtown, village and neighborhood planning. The range of the grants is from $2,500 to $20,000. Municipalities with adopted plans confirmed by their regional planning commission are eligible for these grants.

Regional Economic Development Grant Program (REDG)

The Vermont Regional Development Grant Program (REDG) is a program that provides matching state grants to stimulate the creation and development or retention of economic development of individual or regional Vermont communities. The grants range from $1,000 to $25,000 and are available to Vermont municipalities and non-profit organizations.

Recreational Facilities Grants Program (RFG)

The Recreational Facilities Grants (RFG) program provides matching state grants for capital costs associated with the development and creation of community recreational opportunities.

Transportation Planning Initiative (TPI)

VTrans administers the Transportation Planning Initiative (TPI), which distributes funding to regional planning commissions to undertake transportation planning work in their regions.

F U N D I N G T Y P E

State Grants and Programs

Cultural Facilities Grant Program (CFG)

The Cultural Facilities Grants (CFG) are matching state grants to improve community facilities used to provide cultural activities to the public to enhance or expand the capacity of an existing building to provide cultural programming. Grants can be from $1,000 to $30,000 and are given to municipalities and non-profit organizations.

ACCD State Historic Preservation Grants (SHPG)

State 50:50 matching grants for the repair and restoration of historic buildings listed or eligible for listing in the National Register of Historic Places in Vermont.

ACCD Downtown and Village Center Tax Credits (VCTC)

State income tax credits for projects that enhance historic commercial buildings.

Better Places Pilot Program (BP)

The Better Places pilot program provides “placemaking” grants ranging from $5,000 to $20,000 that improve the vitality of state designated downtowns, village centers, new town centers, or neighborhood development areas.

Bicycle and Pedestrian Program (BPP)

Funded through VTrans, the Small-scale Bicycle and Pedestrian Program goal is to improve access and safety for people walking and/or bicycling through the construction of simple physical improvements.

Grants are to reimburse construction costs only and will be awarded in the range of $5,000 to $75,000. The local share of projects is 50%. Local match may be cash, in-kind labor, donated materials, or any combination thereof. Small scale projects include bicycle lanes, shoulders, sidewalks, crossing improvements, pedestrian signals, etc.

State Organizations

Vermont Community Foundation (VCF)

A variety of grants are available to support projects to improve environmental sustainability, cultural heritage, social justice, historic preservation, and vitality of Vermont communities.

VHCB Local Conservation Projects (VHCP)

Local conservation projects for agricultural and recreational land, town parks and forests, swimming holes, greenways, and buildings for public use.

Lintilhac Foundation (LF)

Grants available for the purpose of land use and environmental equity, especially for recreational access to lands and integrative land use planning.

Vermont Arts Council Animating Infrastructure Grant (AIG)

The Animating Infrastructure Grant (AIG) funds projects that integrate public art into existing or proposed infrastructure improvements, which could include buildings, recreational paths, parks, bridges, small-scale renewable energy projects, and water treatment facilities.

Vermont Arts Council Cultural Facilities Grant (VACCFG)

The Cultural Facilities Grant (VACCFG) funds projects that work to enhance, create, or expand the capacity of an existing building to provide cultural activities for the public.

Ben & Jerry's Foundation

Funds community programs in Vermont, including social service organizations, cultural, recreational, or arts programs, and community celebrations.

F U N D I N G T Y P E

National Organizations

People For Bikes Community Fund (PBCG)

The People For Bikes Community Grant Program (PBCG) provides funding for important and influential projects that leverage federal funding and build momentum for bicycling in communities across the U.S. These projects include bike paths and rail trails, as well as mountain bike trails, bike parks, BMX facilities, and large-scale bicycle advocacy initiatives.

Robert Wood Johnson Foundation Grants (RWJF)

The Robert Wood Johnson Foundation (RWJF) provides funds for demonstration projects that provide information and demonstrations on creating more healthy communities. They have in the past used this funding to assist in the creation of community walking and bicycling facilities.

Trails Connecting People with Nature: A program of the Sierra Club's Nearby Nature Initiative (NNI)

In collaboration with Sierra Club Outdoors, Sierra Club's Nearby Nature Initiative (NNI) broadens the conservation movement by protecting and establishing close-to-home natural spaces to ensure that access to the outdoors is increasingly equitable and available to all communities. Sierra Club Outdoors connects people to nature for the benefit of both, hosting over 265,000 people per year in the outdoors and inspiring millions more. The Sierra Club's Trails program aims to create, restore, and maintain trails in urban areas with limited access to nature and in more remote areas on public lands, like the Green Mountain National Forest. The Sierra Club Foundation will award one-year Trails project grants ranging from $5,000 to $20,000 towards trail creation or maintenance project proposals that engage new leaders and provide opportunities for communities to connect with nature.

Non-Grant Funding Sources

Development Impact Fees (DIF)

A development Impact fee (DIF) is an assessment on development used to pay for its proportionate share of the impacts to public facilities. Some communities assign a standard dollar figure to the public sites, some use a park, pedestrian improvements, trails and open space development impact fee, some give the developer an opportunity to arrive at a fee value based on projected impact, while others allow for the dedication of parkland, or fee-in-lieu, in place of the impact fee. A full spectrum of leisure services which contain costs for recreation centers, trails and open space, in addition to parks, has been included in some communities' development impact fees. Some of these development impact fees could be contributed to a fund to support enhanced community and pedestrian accommodations.

Bond Issues (BI)

Bonds issued by the Towns may provide important opportunities to leverage other funds, such as required match amounts for federal or state grant programs, and regional bonds may be needed for larger scale projects.

Local Funds (LF)

Local Funds (LF) are sources of funding that are provided by local governments through local budgets or funds other than bonds. Capital Improvement Plans (CIP) can be leveraged to help advance specific initiatives.

Private Donors & Fund Raising (PFDR)

Funds can be provided by private donors or through special fund-raising efforts (PDFR), which can supplement or substitute for local funds. In many communities, the design of specific improvements is often crafted to encourage private donations; donor benches, bricks, trees. The use of private funding is often less constrained and restricted and opens up new or expansive opportunities for creativity in design outcome. Fundraising efforts can be very time consuming and require reaching out broadly to the community, business interests and others.

The use of crowd-sourcing sites such as Kickstarter can make the process of seeking input or funding easier in many ways. The web-based platforms allow communities to broadcast ideas widely, often attracting the interests of people who might never have visited otherwise. Keys to this process include making a compelling case about the reasons for the project, offering up some definitive value to the donor (i.e., a memorial brick, commemorative map, etc.) and communicating how the project supports the broader vision for the area. This last point is important as it is often appropriate to take big ideas and break them down in crowdfunding—smaller projects can be done more quickly and link together to provide bigger outcomes.

NORTHFIELD **RIDGE+RIVER** ROUTES

NORTHFIELD RIDGE+RIVER ROUTES

APPENDIX PACKAGE

APPENDIX A

VT ROUTE 12 EXISTING CONDITIONS SUMMARY

APPENDIX B

STORMWATER ANALYSIS AND BMP RECOMMENDATIONS

APPENDIX C

COMMUNITY ENGAGEMENT SUMMARY

APPENDIX D

BUSINESS OUTREACH MEMORANDUM

APPENDIX E

TRAIL COUNT SUMMARY

APPENDIX F

RECREATIONAL ACCESS GUIDANCE

APPENDIX G

SCOPING STUDIES

APPENDIX H

VTRANS COST SPREADSHEET