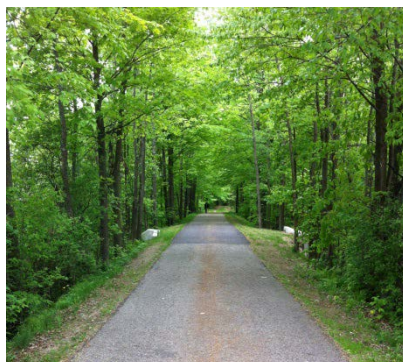


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Bicycle and Pedestrian Plan



January 2015

Prepared for:
CCRPC



Town of Essex



Village of Essex Junction



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About this Report

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Table of Contents

Inventory of Existing Facilities and Funded Projects	1
Current Needs and Opportunities	2
Future Pedestrian Network.....	2
Future Bicycle Networks	2
Options to Connect to Williston at Hubbell's Falls Bridge.....	3
Plan for Five Corners.....	4
Bicycle and Pedestrian Implementation Projects	5
Big Ticket Projects.....	5
Local Projects	6
Long Term Concepts.....	7
Infrastructure Toolbox.....	8
Infrastructure Toolbox: Sidewalks.....	9
Curbed, no buffer	9
Curbed, greenbelt buffer	9
Uncurbed with green buffer of 5 or more feet.....	9
Infrastructure Toolbox: Pedestrian and Bicycle Crossings Options.....	10
Median Refuge.....	10
Raised/Textured Intersection	10
Curb Extensions.....	10
Pedestrian Flags	11
Pedestrian Hybrid Beacon (PHB)	11
Rectangular Rapid Flashing Beacon (RRFB)	11
Bicycle Box.....	11
Off Road Connectors: Pathways and Trails.....	12
Pedestrian path (paved or unpaved).....	12
Shared Use Path (paved or unpaved).....	12
Trails	12
On-Road Bicycle Options	13
Bicycle Lane.....	13
Buffered Bicycle Lane.....	13
Protected Bicycle Lane	13
Shared Use Strategies and Designs.....	14
Sharrow.....	14

Shared Space or Woonerf.....	14
Advisory Bicycle Lanes.....	14
Network Options.....	15
Traffic Calming.....	15
Bicycle Boulevard	15
Ongoing Planning and Programming.....	16
Speed Enforcement	16
Maintenance.....	16
Wayfinding	16
Joint Town/Village Planning.....	16
Implementation through Pilot Projects.....	17
Open Streets and Public Art Events	18
Costs and Funding Options.....	18
Bicycle and Pedestrian Plan Costs	18
Local Capital Budgeting.....	19
Impact Fees	19
Grants	20
Grants for Bicycle Pedestrian Projects in Chittenden County.....	21
Project Listing.....	22
Design References	22

Attachment 1: Map A- Existing Infrastructure plus Funded Projects

Attachment 2: Map B- Future Pedestrian Network

Attachment 3: Map C- Bicycle Networks: Direct Routes and the Neighborhood Network

Attachment 4: Project List and Map D- Project Numbers

Bicycle-Pedestrian Plan

Town of Essex and Village of Essex Junction

With support from the Chittenden County Regional Planning Commission (CCRPC), the Town of Essex and Village of Essex Junction are updating their combined Bicycle and Pedestrian Plan. Both communities have made great progress on the development of bicycle and pedestrian infrastructure since 1994, when the first non-motorized transportation plan was developed. There are many miles of sidewalks, shared use paths, and other facilities that have been constructed, providing a functional and attractive network for bicyclists and pedestrians. Essex Junction has been designated a Walk Friendly Community, indicating a commitment to making the Village safe and attractive to encourage more widespread walking. This plan update includes an assessment of the needs and a review of emerging design alternatives to set the stage for future continuing investments.

Inventory of Existing Facilities and Funded Projects

The Town and Village have an extensive network of nearly 40 miles of pedestrian and bicycle infrastructure including sidewalks, shared use paths, bicycle lanes, and multi-use trails. The existing and funded bicycle and pedestrian network are shown on Map A, attached. In addition, there are a number of planned projects that are funded to some degree, shown on Table 1 below. Some of the projects identified below are subject to the legislative process that has established funding for Circ Alternatives projects. In addition, some of these will require a local match of 10% to 20%.

Table 1: Funded Projects

Map #	Route	Location	Notes
3	Colchester Road/Route 2A	Pinecrest to Old Colchester Road	Grant from CCRPC and VTrans, 2014 or 2015 Construction
6	Susie Wilson/Route 15	Intersection and Pedestrian Crossing	Scoping Complete - Circ Alternatives Funding
7	Pearl St Shared Use Path	Fort Ethan Allen to Susie Wilson	Scoping Complete - Circ Alternatives Funding
11	Sand Hill Rd/Jericho Rd	Intersection and Pedestrian Crossing	Scoping Complete - Circ Alternatives Funding
26	Sydney to Windridge	Neighborhood connection on easements	Partially constructed from Windridge; Town has developer funds for construction.
31	Pearl Street	Shopping Plaza to Five Corners	Scoping Complete for bicycle lanes- Circ Alternatives Funding
52	Crescent Connector	Park to Main	Design underway - Circ Alternatives Funding
53	New England Central Railroad ROW	North Street to Central Street	Shared Use Path / Rail with Trail

Current Needs and Opportunities

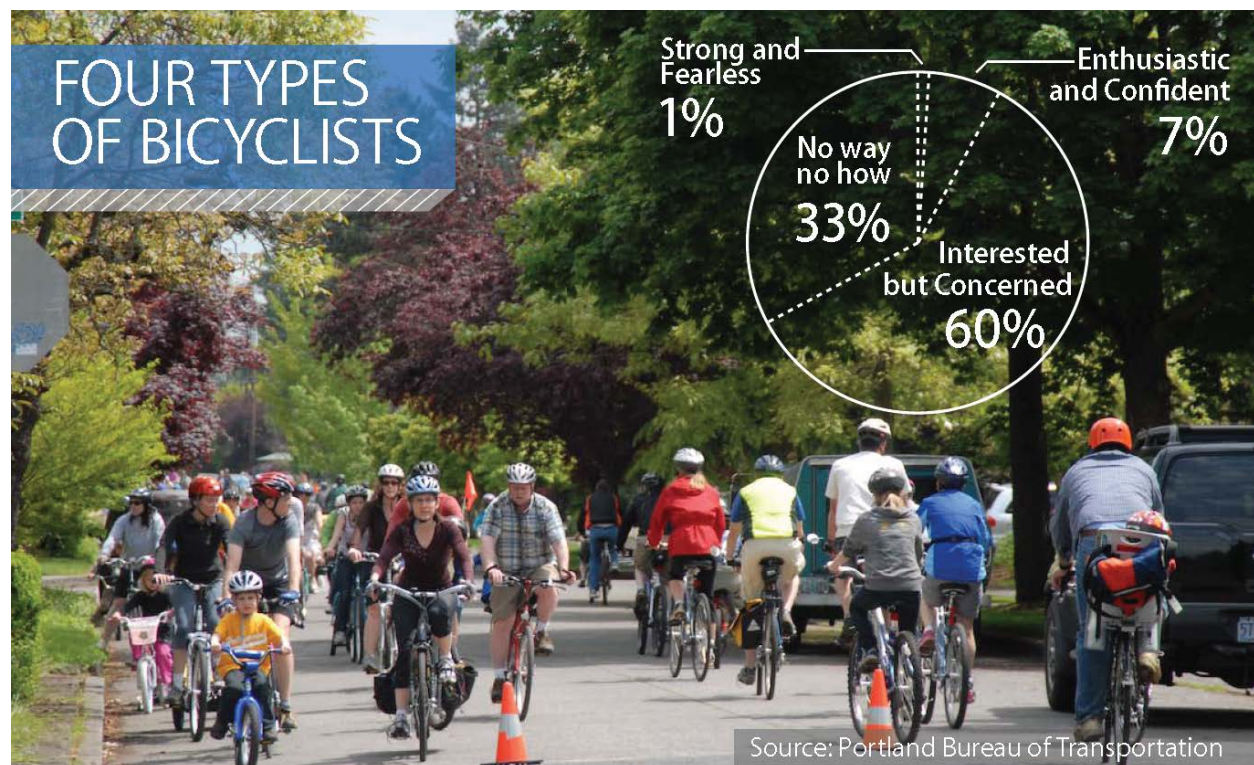
Needs were identified based on a review of existing conditions, funded and planned projects, and through consultation with a steering committee and the public. The steering committee members include representatives from the planning and public works staff of Town of Essex and Village of Essex Junction, local trails committees, CCRPC and Local Motion. The public offered input for two months via SeeClickFix, a crowd-sourcing online mapping application, and through public meetings held April 9, July 24, September 18, October 14, and November 17, 2014. This input resulted in the development of proposed future pedestrian and bicycle networks.

Future Pedestrian Network

Map B (attached) shows the proposed future pedestrian network. The proposed network primarily fills gaps in the existing sidewalk system, and provides shared use path and trail connections in appropriate contexts and locations.

Future Bicycle Networks

Because bicyclists vary so widely in ability and intention, there is simply not a “one size fits all” way to accommodate bicyclists. The following graphic illustrates the findings of current research in Portland, OR, which identifies four categories in relation to bicycling. The two smallest categories are the most confident and motivated riders, representing 8% of the population. At the other end of the spectrum, about one third of the population has no intention of riding a bicycle. The largest group are the “interested but concerned” who are potential riders if appropriate infrastructure is provided, but may refrain from bicycling if they do not feel safe.



In order to serve the widest range of riders, two networks are proposed in this Plan: 1) the Direct Route Network for the more confident riders, which will primarily consist of bicycle lanes on the routes that will provide the most direct travel; and 2) the Neighborhood Network, intended to serve the less confident riders who are willing to ride in the right circumstances. This network provides shared use paths or shared use with traffic on low volume/low speed neighborhood streets, and will by necessity involve somewhat more circuitous travel around major corridors and hubs. Table 2 lists the major Direct Route projects included in this plan.

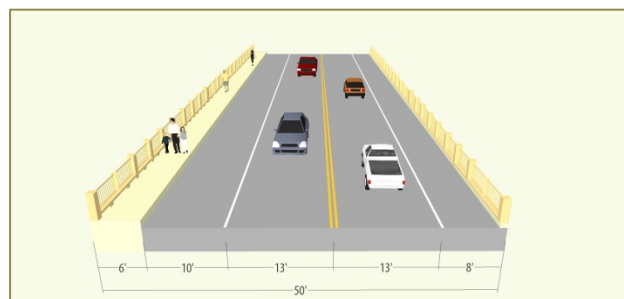
Table 2: Direct Route Network Projects

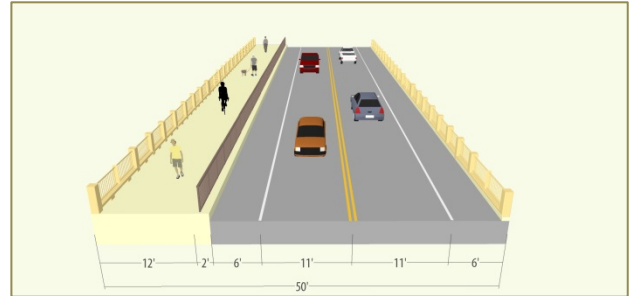
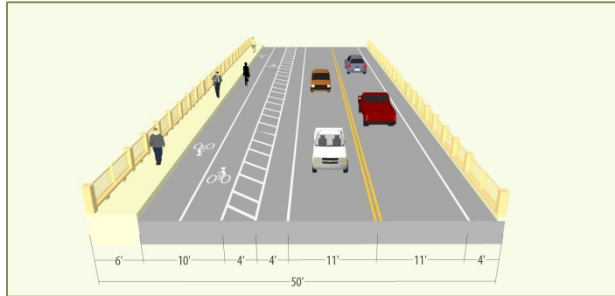
Map #	Route	Location	Priority	Notes
33	River Road/VT 117	289 to Skunk Hollow Rd	M	Should be widened as part of VTrans resurfacing program to have 4-5 ft shoulders. Not a local project.
34	Park Street/VT 2A	Pearl St or South Street to Hubbell's Falls Dam	M	Bicycle Lanes or Cycle track across Winooski River Bridge to meet with Williston path network.
36	Main St/VT 15	Fairview Dr to 289	H	Should be widened as part of VTrans resurfacing program to have 4-5 ft shoulders. Not a local project.
37	Upper Main St/VT 15	289 to Old Stage Rd	H	Need to determine if this is part of a high speed bike route or if Circ ROW and Susie Wilson is better route. Need will increase with development.
38	Center Road/VT 15	Old Stage Rd to Towers Rd	H	Should be widened as part of VTrans resurfacing program to have 4-5 ft shoulders. Not a local project.
39	Browns River Road	Towers Rd to Weed Rd	M	Should be widened as part of VTrans resurfacing program to have 4-5 ft shoulders. Not a local project.
40	Lincoln St/ VT 2A (Colchester Rd)	North St (end of shared use path on railroad) to Pinecrest	H	Should have scoping conducted; could be shared use paths or bike lanes + sidewalks. Connectivity for Town and Village important.

Establishing the Neighborhood Network will include a variety of small and large projects, ranging from new shared use paths to traffic calming (page 15) and wayfinding (page 16) on local streets. The core of this Neighborhood Network will be "bicycle boulevards" which are described on page 16. These two bicycle networks are shown on Map C, attached.

Options to Connect to Williston at Hubbell's Falls Bridge

There is a shared use path along VT 2A in Williston, which ends just south of the Vermont Agency of Transportation (VTrans)-owned Hubbell's Falls bridge, which carries VT 2A over the Winooski River. The bridge is approximately 50 feet wide, and currently has sidewalks and wide shoulders. In order to provide continuity in the shared use path network, options should be explored to reconfigure the bridge width to better serve a wider range of bicyclists. The diagram to the right shows existing conditions on the bridge, and those on the next page show potential reconfigurations of the bridge.

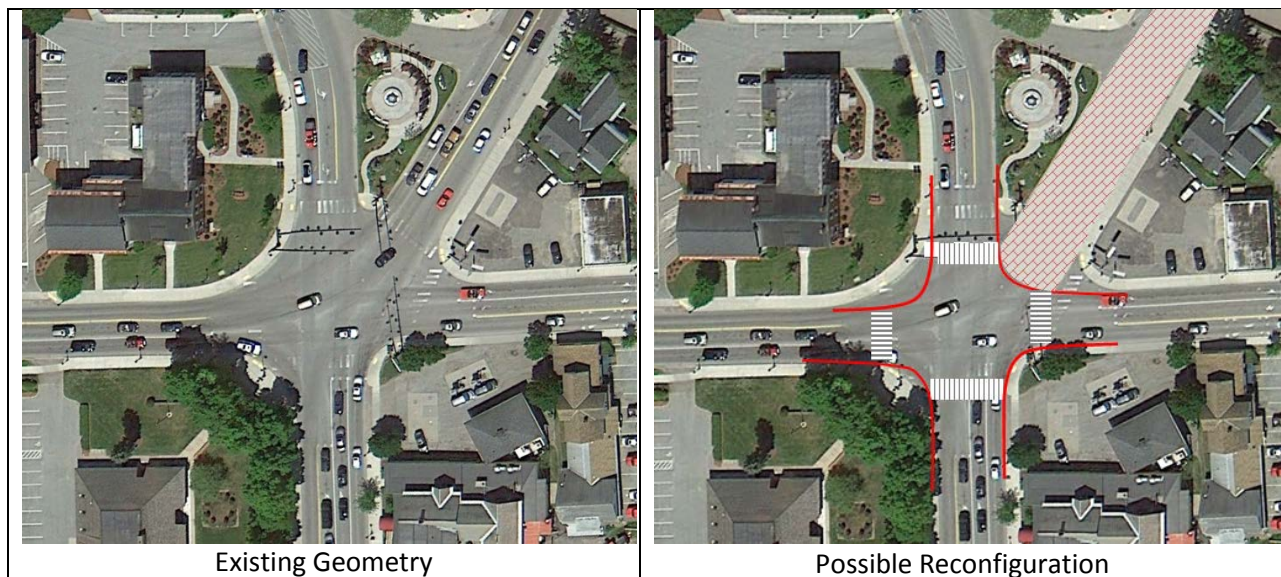




Plan for Five Corners

When construction is complete in 2016, the Crescent Connector will reduce vehicle congestion at the Five Corners intersection, and will also be an important bicycle and pedestrian connection through the center of Essex Junction. Once this street is open, traffic analysis and monitoring can be conducted at Five Corners to determine if intersection reconfiguration could improve bicycle and pedestrian travel. Lane reassignments, reducing crossing distances, providing bicycle lanes and bike boxes could all be considered at that time.

In the longer term, the potential for closing Main Street between Five Corners and Railroad Avenue can be considered. This could initially involve temporary closure of this block as a demonstration “Festival Street” for pedestrian-focused special events. Permanent closure could be considered upon evaluation of these temporary closures, which would substantially simplify the intersection operations and may improve traffic flow. The following graphics show the potential reduction in crossing distances that could result from intersection simplification.



Five Corners will also need two bicycle networks for travel through this regional hub. The Direct Route Network will use the state highway routes and the Crescent Connector, with bicycle lanes or shared lanes. There should also be a Neighborhood Network to provide routes around Five Corners for the less confident riders. These are shown on Map C.

Bicycle and Pedestrian Implementation Projects

The projects that need to be implemented to develop the Direct Route and Neighborhood Networks are divided into four categories to assist in further planning and implementation:

- **Big Ticket Projects** – these are higher cost or more complex infrastructure investments that will require some state or federal funds.
- **Lower Cost Projects** – these are simpler or lower cost projects that may be more suitable for local funding, public/private funding by developers, or the CCRPC Sidewalk grant program. These may be “bumped up” to Big Ticket Projects if further planning indicates higher than anticipated costs, which are beyond the scope of local funding.
- **Long Term Concepts** – these are some of the far-reaching projects that will need more consideration and study, but should be considered in overall Town and Village planning.
- **Ongoing Programs and Activities** – there are many opportunities for coordination between the Town and Village for activities such as wayfinding and joint planning.

Attached to this plan is a Project List, a comprehensive spreadsheet with a complete list of these projects and relevant information to guide implementation efforts.

Big Ticket Projects

These are projects that represent significant infrastructure investments, and will likely require state and federal participation in funding. They will also take more time to implement, and some will have challenges including environmental, cost, and right-of-way. Table 3 lists the Big Ticket Projects.

Table 3: Big Ticket Projects

Map #	Route	Location	Priority	Notes
1	Route 15/Upper Main St	North of 289, west side	H	Scoping Complete - Circ Alternatives - Federal Funding - Local Match Needed
2	Route 15/Main St	South of 289, east side	H	Difficult route due to ledge, wetlands, ROW
4	Pinecrest	West of Route 2A	H	Designed, seeking funding, high cost project due to drainage and ROW
14	Jericho Rd	Allen Martin to Whitcomb Meadows	L	Low density area, shoulder for bicycles and pedestrians may be adequate
15	Sand Hill Rd	South of Allen Martin	M	Gap between Allen Martin and hill top between shared use path. Segregate into two projects-above and below Greenbriar with upper of higher priority; development approvals would increase priority
16	River Rd west	West of 289	M	Needs scoping, medium to low priority due to lower density and use; consider shoulders for bike/ped use; development approvals would increase priority
17	River Rd east	East of 289	L	Low density area, shoulder for bicycles and pedestrians may be adequate; development approvals would increase priority

30	Pearl St	Susie Wilson to W St Ext	H	Important Gap. Consider bicycle boulevard on Pinecrest as short term alternative to a direct route in this segment.
32	Maple Street/River Road	Rivendell Dr to 289	M	Bicycle lanes for high speed route combined with #18
41	Colchester Rd	Pinecrest to 289 (South)	M	Shared use path or sidewalk and bike lanes; important connectivity between Town and Village; Scoping needed, south side preferred; crossing at #3; Higher priority if development advances
44	Susie Wilson Bypass	Kellogg Road to Colchester St	M	Connectivity between Susie Wilson corridor and Route 2A/Colchester Road could be accomplished with re-striping.
51	Circum Five Corners Route E	West St to Pearl	M	Shared Use Path across NECR tracks to connect with Fairgrounds neighborhood network.
67	Main Street	Five Corners to Crescent Connector	H	Close to traffic as Festival Street or permanently

Local Projects

Table 4 lists projects that are potentially smaller in scale than the Big Ticket projects, though the final costs will depend upon the alternatives that are pursued for implementation. These projects should seek less costly alternative solutions in appropriate settings, such as unpaved recreational trails rather than paved shared use paths.

Table 4: Projects for Local Funding

Map #	Route	Location	Priority	Notes
5	Park Terrace	Between Main St and School St		Consider closing east end of street to vehicles to reduce cut-through use and encourage bicycle and pedestrian travel.
8	Pinecrest Dr	At Jackson Heights		Sidewalk on north side ends; poor sight distance for crossing. Could be locally funded enhanced crosswalk.
9	Old Stage Rd	Indian Brook to Tower Rd	L	Low density area, shoulder for bicycles and pedestrians may be adequate
10	Tower Rd	North of Essex Center	H	Important gap in sidewalk network; may be appropriate for local funding
12	Sand Hill Rd	South of Jericho Road	H	Improved pedestrian crossing needed
13	Jericho Rd	Lumberyard to Allen Martin	H	Gap in sidewalk network; priority for scoping; development in area could provide some funding
18	River Rd	At Valley View	M	Pedestrian Crossing
19	Essex Way	At Sydney		Enhanced crossing needed, could be locally funded project
20	Tanglewood	Entire length		Restripe with advisory bicycle/pedestrian lanes
21	Essex Schools to Lang Farm	TBD		Should be scoped; could use 289 ROW for gravel path
23	Essex Schools to Laurel Drive	TBD		Could develop improved gravel path across Jenkins Land. Scoping not needed - Town can study and develop route.
24	Pinecrest to Warner/Edgewood	TBD		Off Road Connection

27	Five Corners	Intersection	H	Reconfigure after the Crescent Connector is completed; consider short term changes in pedestrian signal timing and phasing
28	Baker St	East of Greenfield		22 feet section - test advisory bicycle lanes
29	Greenfield Rd.	North of River Rd		30 feet paved section - can be restriped
35	Foster to Tanglewood	TBD		Off Road Connection
42	Susie Wilson/Pinecrest/Parizo	Pinecrest between SW and Parizo	H	Bicycle Boulevard with Traffic Calming
43	Parizo Street to Park	Pearl St Park	H	Improve trail from end of Parizo Street through Pearl St Park to for bicycles
45	Forest Road to Briar Lane	TBD		Neighborhood Bike/Ped Connection
46	Blair/Pinecrest/Kimberly	Blair to Kimberly		Neighborhood Bike/Ped Connection
47	Circum Five Corners Route A	Pearl St to Lincoln Street		Bicycle Boulevard Through Fairgrounds
48	Circum Five Corners Route B	Park St to Maple St		Path between Robinson and Town playing fields, railroad crossing
50	Circum Five Corners Route D	Park St to West St Ext	M	Bicycle boulevard along Wilkinson, Laurel and Dunbar Drives.
54	Lincoln St	North St to Fairgrounds		Bicycle Connection on Lincoln or Railroad
56	Center Road	At Essex Way	H	Pedestrian Crossing
57	Main Street	At Desmore Drive	M	Crosswalk
58	Champlain Valley Exposition	Pearl to Lincoln; connect to Hampshire Ct. or Dartmoor Ct.		Shared Use Path through fairgrounds
60	Main St/Route 15	At Crestview	H	Flashing Light/Signage
61	Hillcrest/Prospect	Pearl to Lincoln via Hillcrest and Prospect		
62	Whitcomb Farm Trails	Along Winooski River to Whitcomb Rd.		Shared Use Path, designed to avoid impacts to farming activities.
63	Pinecrest Dr	Pinecrest to Grove St.		Shared Use Path
64	Champlain Valley Exposition	CVE entrance to Grove St.		Shared Use Path
65	St. James Place	St James Place to Educational Drive		Shared Use Path

Long Term Concepts

While the Big Ticket and Lower Cost projects will take many years to implement, there have been several interesting long range concepts that emerged from this planning process. These should be considered as planning and implementation continues.

Table 5: Long Term Concepts for the Town/Village Bicycle Pedestrian Network

Map #	Route	Location	Notes
22	VT 289 Crossing	Laurel Drive to Timberlane or Windridge	Grade separated crossing will be cost prohibitive. At-grade crossing would require reclassification of VT 289 as lower speed, non-limited access highway.
25	VT 289 ROW	VT 2A to VT 15	Questionable need for high speed bike route; if needed, scoping should be conducted.

55	VT 289 ROW	VT 15 to VT 117	Questionable need for high speed bike route; if needed, scoping should be conducted.
59	Railroad ROW	Center Rd and Essex Way to Jericho	Shared Use Path or recreational trail on abandoned rail right-of-way connecting to Jeffersonville
66	Former Circ ROW	Abandoned Circ corridor NW of Essex Junction to Colchester	Shared Use Path on Circ right-of-way towards Colchester

Several of these concepts involve reevaluating the need for VT 289 to be a high speed, limited access highway. When VT 289 was designed, it was intended to be a segment of a longer high speed, limited access highway across Chittenden County called the Circumferential Highway. The highway concept was abandoned by Governor Shumlin in 2011, and other alternatives to meet the original needs of the former Circ Highway are being planned, designed and constructed. The need for VT289 to be a short high speed highway is therefore worthy of reconsideration, as the highway forms a significant barrier for bicycles and pedestrians, cutting off many Town residents from their schools and recreational resources. In future projects on the VT 289 corridor, the possibility of removing its limited access designation and allowing bicycles and pedestrians to use or cross the corridor should be considered. Other opportunities for paths to connect to neighboring communities include using the unused former Circ right-of-way connecting to Colchester, and a long abandoned railroad corridor heading east to Jericho.





Infrastructure Toolbox

Since the first Bicycle/Pedestrian Plan was adopted in 1994, Essex and Essex Junction have set out to improve their bicycle and pedestrian networks, and have learned many lessons along the way. There has also been a wealth of design research and implementation that provides a greater number of design options to consider for bicycle and pedestrian needs. The following pages describe a number of infrastructure design and management options that should be considered for addressing the bicycle and pedestrian needs and gaps in Greater Essex. These include:

- Sidewalks
- Crossings
- On-road Bicycle Facilities
- Network Options (traffic calming, bicycle boulevards)
- Ongoing Programs (open streets, enforcement and maintenance)

While it is beyond the scope of this plan to select alternatives for each need, these options can be considered in scoping studies, or by the Town/Village for locally funded or developer funded opportunities. Sidewalks, paths and crossings must meet the requirements of the Americans with Disabilities Act of 1990, as amended (ADA).

Infrastructure Toolbox: Sidewalks




Type/Indications	Example
<p>Curbed, no buffer</p> <ul style="list-style-type: none"> Minimum width 5 ft; desirable widths 6 to 8 ft Less protection from traffic, and less room for snow storage. Use in constrained areas where no room for a greenbelt is available. 	 <p><i>Above: example on higher speed, suburban roadway</i></p> <p><i>Left: example in urban setting (additional width desirable to provide space for trees)</i></p>
<p>Curbed, greenbelt buffer</p> <ul style="list-style-type: none"> Preferred design where space is available. Greenbelt provides space for snow storage, space for landscaping and trees if wider than 6 ft. Appropriate for places with urban character and available stormwater infrastructure. 	
<p>Uncurbed with green buffer of 5 or more feet</p> <ul style="list-style-type: none"> Low impact design for stormwater management. Preferred option in non-downtown locations. Greenbelt can be designed to accommodate parallel parking. 	

Infrastructure Toolbox: Pedestrian and Bicycle Crossings Options

Type/Indications	Example
Median Refuge <ul style="list-style-type: none"> Provides a midblock crosswalk that feels safer to the user and is more visible to the driver. Can be raised or textured. 	
Raised/Textured Intersection <ul style="list-style-type: none"> Improves visibility of pedestrians and crossing to oncoming drivers. Traffic calming effect due to change of texture and profile. Pedestrian accessibility and right of way enhanced by maintaining crosswalk at sidewalk level. 	
Curb Extensions <ul style="list-style-type: none"> Narrows street at the crosswalk, reducing the pedestrian exposure to street traffic. Can be used at signalized or unsignalized crossings. Designs should avoid “dead” areas for plowing. Can be combined with streetscape or raingardens for stormwater mitigation, while providing for necessary visibility. 	

Type/Indications	Example
<p>Pedestrian Flags</p> <ul style="list-style-type: none"> ▪ A short term program to facilitate crossing and improve pedestrian visibility at challenging crosswalks. ▪ Successfully used in numerous cities across the US. ▪ Low initial cost, but commitment to maintenance—and re-supplying flags since they are susceptible to vandalism—is essential to success. 	
<p>Pedestrian Hybrid Beacon (PHB)</p> <ul style="list-style-type: none"> ▪ Requires vehicles to stop for pedestrians when flashing. ▪ Can be used for mid-block bicycle or pedestrian crossings. ▪ Example on Route 15 in Colchester at Fanny Allen Hospital. 	
<p>Rectangular Rapid Flashing Beacon (RRFB)</p> <ul style="list-style-type: none"> ▪ Alerts drivers of pedestrian crossing by rapidly flashing white lights activated by pedestrian push button. ▪ Currently under review for compliance with Manual on Uniform Traffic Control Devices (MUTCD), and flashing pattern may need to be modified to comply. 	
<p>Bicycle Box</p> <ul style="list-style-type: none"> ▪ Provided at signalized intersections for streets with bicycle lanes or shared lanes on commuter routes. ▪ Gives bicycles a head start through the intersection in front of vehicles. ▪ Requires relocation of vehicle stop bar, and maintaining compliance with MUTCD requirements for setback from signals. 	

Off Road Connectors: Pathways and Trails

Type/Indications	Example
Pedestrian path (paved or unpaved) <ul style="list-style-type: none"> Designed for pedestrians only, though often they will be used by bicyclists too. 5 ft minimum width. Surface and grades must comply with ADA. 	
Shared Use Path (paved or unpaved) <ul style="list-style-type: none"> 10 ft wide preferred (8 ft minimum). Serves riders of lesser confidence and skill, and encourages wider participation in cycling. Paving allows for plowing for winter use. High cost, which leads many communities to seek federal funds. Typically require right-of-way acquisition, which is both costly and time consuming. 	
Trails <ul style="list-style-type: none"> Flexible design for width and surface depending on target uses. Serve a recreation function as well as transportation, and are an important part of an active, healthy community. Typically not plowed, limiting walking and biking when snow is on the ground, but allowing snowshoeing and cross country skiing. Can be used by pedestrians and bicyclists. 	

On-Road Bicycle Options

Type/Indications	Example
Bicycle Lane <ul style="list-style-type: none"> 5 ft is desired width. Greater widths desirable for high volume or high speed corridors; 4 ft is absolute minimum. Best serves more experienced and confident riders when on high speed thoroughfares. 	
Buffered Bicycle Lane <ul style="list-style-type: none"> When space is available, the buffer provides additional comfort and protection for less confident riders. Buffer can be delineated by using painted roadway markings, with plantings or seasonal installations, or with adjacent parallel parking. 	
Protected Bicycle Lane <ul style="list-style-type: none"> Provides protected two-way facility for cycling on streets that have sidewalks. Due to potential conflicts at driveways, only to be used where curb cuts have low turning volumes. Can sometimes be established in conjunction with a "lane diet" or roadway reconfiguration. 	

Shared Use Strategies and Designs

The following are options to consider for locations where providing exclusive facilities for bicyclists or pedestrians is not feasible due to constraints, or not desirable due to their effect on the area's character.

Type/Indications	Example
Sharrow <ul style="list-style-type: none"> Shared lane markings best used on low speed thoroughfares. Possible uses include: "branding" of a street as part of a bike route; guiding cyclists out of "door zone" on streets with parallel parked cars, or interim marking as connecting part of bicycle route. Can be combined with traffic calming and bicycle boulevard treatments on low volume/low speed streets. 	
Shared Space or Woonerf <ul style="list-style-type: none"> Woonerf's are low volume streets that have removed traffic signs and integrate bicyclists and pedestrians with vehicles. The distinction between traveled ways and pedestrian areas are blurred, resulting in all users moving at "walking speed." Consider for low volume streets where slow speeds are desired and space for pedestrian facilities is unavailable. 	
Advisory Bicycle Lanes <ul style="list-style-type: none"> On a two-way low volume street, the street is marked to provide one lane in the center of the road for vehicles and wide shoulders for bicyclists (and pedestrians if no sidewalks). Opposing vehicles must use shoulders to yield to each other, and yield to pedestrians. Reduces vehicular speeds and increases driver caution. Can be trialed in an experiment. Education and outreach will be required. 	

Network Options

Traffic Calming

- Effective neighborhood traffic calming can serve either to reduce volumes on neighborhood streets in favor of arterials, or reduce traffic speeds on local streets.
- Volume control measures to discourage/eliminate through traffic:
 - Full and half street closures, diverters, median barriers, forced turn islands
- Speed control measures to slow traffic:
 - Speed humps, speed tables, raised intersections, traffic circles, chicanes, chokers, lateral shifts, realigned intersections

- These techniques can be used in combination with many other pedestrian, bicycle or shared space options to further improve safety and comfort for non-motorized travelers.

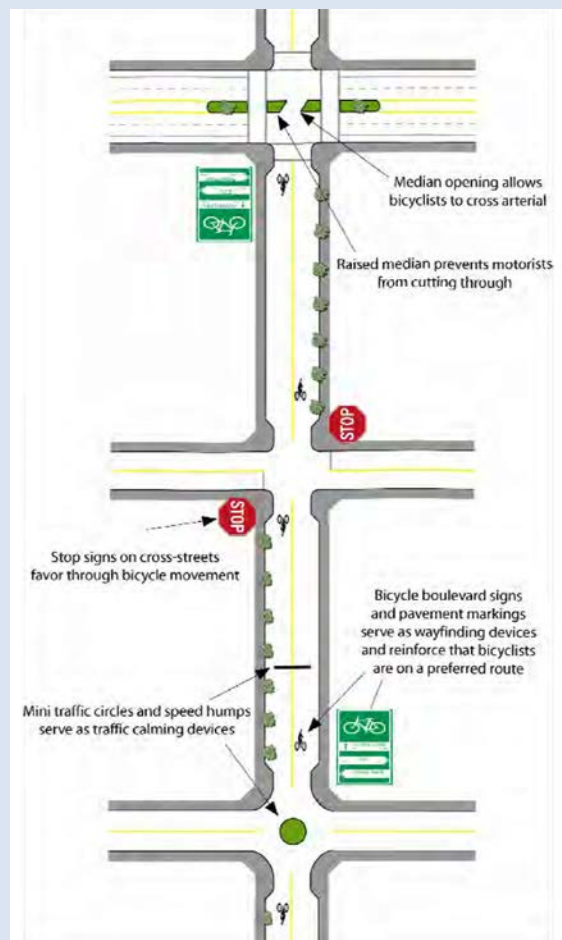


Bicycle Boulevard

- A corridor-wide implementation to create a safe and appealing bicycle route primarily using low volume neighborhood streets, and connecting segments that may be shared-use paths, bicycle lanes, or cycle tracks.
- Bicycle boulevards can be a highly cost effective way to expand bicycle infrastructure for less confident riders, as it maximizes the use of existing infrastructure.

Right: Illustration of how traffic management techniques work together in bicycle boulevard design.

Below: Example of partial vehicle closure.



Ongoing Planning and Programming

Speed Enforcement

- This option is both costly and potentially unpopular with residents who are recipients of tickets. However, it is the first immediately available option to reduce speeds in areas where non-motorized users are at the greatest risk.
- Consider radar feedback signs in areas where enforcement is needed.



Maintenance

- Bicycle and pedestrian facilities are particularly vulnerable to the elements, and typically require more intense maintenance than other types of facilities. Close communication between local bicycle/pedestrian committees and municipal maintenance staffs is essential for an effective network.



Wayfinding

- With the extensive networks already in place, more attention to wayfinding—signs, maps, and other graphics used to convey location and directions—will encourage more use of the facilities, particularly for the neighborhood connectors that may not be widely known or obvious. Many communities have seen increases in bicycle use with wayfinding and directional signage, with examples shown to the right.



Joint Town/Village Planning

Both the Town and Village have active groups engaged in bicycle and pedestrian planning. Occasional coordination and annual joint meetings would be valuable to assure continuity and mutual support of projects.

Implementation through Pilot Projects

Some of the projects may involve changes to streets or intersections that may not have full consensus of the community, or that may benefit from data collection and testing. In these cases, it may be helpful to conduct a pilot project, using a variety of materials available such as temporary curbing or speed humps.



Temporary Bulb-out in Hanover, NH



Pilot Lane Reduction and Streetside Dining



Temporary Curb Extension



Temporary Speed Hump

Open Streets and Public Art Events

Another way to generate interest and energy in street improvements is through public art and engagement projects. These two examples are neighborhood “street repair” projects from Portland, OR.:



Costs and Funding Options

With the wide variety of needs and potential options, there are also a variety of implementation strategies to consider. The following is a list of options, considerations and most appropriate uses.

Bicycle and Pedestrian Plan Costs

The Project List attached to this plan provides programming-level cost estimates, for purposes of Town or Village capital budgeting. Many of the projects have not been defined sufficiently to determine project-specific costs, so estimates were developed by making some assumptions on the likely outcome of further planning and design. These costs were developed by taking an average of the “Low Cost” and “High Cost” columns, which reflect the lowest and highest cost implementation alternatives. These are based on VTrans data of typical costs per linear foot, or cost per unit, as follows:

Facility Type	Unit Cost (\$ per foot or each)		Notes
	Low	High	
Bicycle Boulevard	10	50	Assumes striping, signage and limited traffic calming measures
Shared use path	70	384	VTrans unit costs, adjusted to current year; varies due to terrain and design
Sidewalk	96	283	VTrans unit costs, adjusted to current year; varies due to site conditions and design
Enhanced pedestrian crossing	15,000	30,000	Includes features such as RRFB or median refuges.

For each project, a low and high cost was assigned, using the above unit costs and adjusting for known conditions. Using this method, the total value of all projects in the Town and Village are summarized below.

	Town of Essex	Village of Essex Junction
Big Ticket (20% local share)	\$ 6,533,500	\$ 2,647,500
Lower Cost (100% local share)	\$ 3,253,500	\$ 1,485,500
TOTAL	\$ 9,787,000	\$ 4,133,000
Estimated Maximum Local Share*	\$ 4,560,200	\$ 2,015,000

While these totals may seem high, the value that the Town and Village will realize from a highly connected and well-designed pedestrian and bicycle network will be substantial. It should be noted that the “Big Ticket” projects are expected to be funded primarily through grants from VTrans or other sources. The estimated maximum local share includes the total lower cost project estimates, plus 20% of the Big Ticket project estimates, the likely local share of grant-funded projects. These are intended to be conservative numbers for planning purposes, and it is likely that some Big Ticket projects will require only a 10% share, and some of the Lower Cost projects might be funded with non-municipal sources, such as grants or developers. These projects would likely be implemented over a period of 15 to 20 years.

Local Capital Budgeting

Local funding and management is often the most cost efficient way to complete projects, especially when combined with other ongoing projects. Each municipality could set aside funds for bicycle and pedestrian projects, possibly a percentage of total transportation funds in proportion to mode share and priority or as a capital reserve fund, paid for by a property tax increment of around 0.5 cents (\$0.005). A capital reserve fund would give each community the flexibility to address the smaller projects that fill in important gaps when there is an opportunity, such as another infrastructure project that could easily address a bicycle or pedestrian need. It can also be used as a local match for more significant projects. A bicycle-pedestrian project capital budget can also form the basis for bonding for improvements, which can allow the Town and Village to proceed with projects at a steady pace, and provide matching funds for federal and state grant programs. The following link provides helpful information on capital budgeting:

<http://www.vpic.info/ImplementationManual.html>

Impact Fees

Once a capital budget is developed, and impact fee formula could be established that considers the amount of growth projected in the Town and Village over the plan horizon (i.e. 10 or 20 years) versus the need for improvements. In order to comply with State laws, the impact fee must be applied for infrastructure needs that are associated with growth. Examples of pedestrian or bicycle needs that would be eligible include:

- Sidewalks, shared use paths or bicycle lanes serving areas where new development is planned.
- New or upgraded facilities needed due to traffic growth.

The link provided above also contains helpful information on impact fees:

<http://www.vpic.info/ImplementationManual.html>

Grants

Numerous grant opportunities can be used to stitch together funding for bicycle and pedestrian improvements, which can significantly stretch local funds. However, many of these funding options have requirements or constraints that make them suitable only for a narrow range of projects. It is important that the communities be well aware of the strengths and weaknesses of each type of funding source. The following table summarizes many of the funding sources currently available at the time of publication. Because programs change and evolve over time, it is important to consult the funder for more information as to application processes, funding amounts, and other requirements. There are several additional possible funding sources which are targeted to specific circumstances, but can sometimes be used for bicycle and pedestrian improvements. These include Community Development Block Grants, Public Lands Highway Grants, and Scenic Byway Funds.

Grants for Bicycle Pedestrian Projects in Chittenden County

Funding Source	Requirements and Constraints	Indications
VTrans Transportation Alternatives	<ul style="list-style-type: none"> 20% local match. Federal funding administered through VTrans. Funding requirements and the design and review process mean that it typically takes four to five years to get from the grant application to construction. Maximum award currently \$300,000. http://vtransengineering.vermont.gov/bureaus/mab/local-projects/transportation-alternatives 	<ul style="list-style-type: none"> Medium to larger projects which may be broader than conventional bicycle or pedestrian infrastructure (i.e. aesthetic, environmental mitigation, etc.). Projects that will affect VTrans right-of-way, and therefore require extensive coordination with VTrans no matter the funding source. Program is highly competitive, and appropriate for projects that address many of the selection criteria.
VTrans Bicycle Pedestrian Program	<ul style="list-style-type: none"> 10% local match. Federal funding administered through VTrans. Funding requirements and the design and review process mean that it typically takes four to five years to get from the grant application to construction. No maximum project amount. http://vtransengineering.vermont.gov/bureaus/mab/local-projects/bike-ped 	<ul style="list-style-type: none"> Larger bicycle and pedestrian projects. Projects that will affect VTrans right-of-way, and therefore require extensive coordination with VTrans no matter the funding source. Program is highly competitive, and appropriate for projects that address many of the selection criteria.
CCRPC Sidewalk Grant Program	<ul style="list-style-type: none"> 20% local match. Federal funding administered through VTrans. Funding requirements and the design and review process mean that it typically takes four to five years to get from the grant application to construction. http://www.ccrpcvt.org/ 	<ul style="list-style-type: none"> Small projects, due to limits on funding availability and grant sizes.
Recreational Trails Grants	<ul style="list-style-type: none"> 20% local match. Federal funding administered through VTrans. Funding requirements and the design and review process mean that it typically takes four to five years to get from the grant application to construction. http://www.vtfpr.org/recgrant/trgrant.cfm 	<ul style="list-style-type: none"> Small to medium projects. Appropriate for trails that have more of a recreation focus in addition to those with a transportation focus.

Project Listing

The following pages list projects that have been identified previously in the Plan, along with relevant information to assist in prioritization and programming.

Design References

The following are resources that provide more information on current practices and specifications for the preceding design options.

Complete Streets: a guide for Vermont communities. Vermont Department of Health (September 2012)

http://healthvermont.gov/family/fit/documents/Complete_streets_guide_for_VT_communities.pdf

Designing Walkable Urban Thoroughfares: A Context Sensitive Approach. Institute of Transportation Engineers (March 2010)

<http://www.ite.org/emodules/scriptcontent/orders/productdetail.cfm?pc=RP-036A-E>

Guide for the Development of Bicycle Facilities, 4th Edition. American Association of State Highway Transportation Officials (2012)

https://bookstore.transportation.org/item_details.aspx?ID=1943

Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition. American Association of State Highway Transportation Officials (2004)

https://bookstore.transportation.org/item_details.aspx?id=119

Urban Bikeway Design Guide. National Association of City Transportation Officials (September 2012)

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

Urban Street Design Guide. National Association of City Transportation Officials (October 2013)

<http://nacto.org/usdg/>

Vermont Pedestrian and Bicycle Facility Planning and Design Manual. Vermont Agency of Transportation (December 2002)

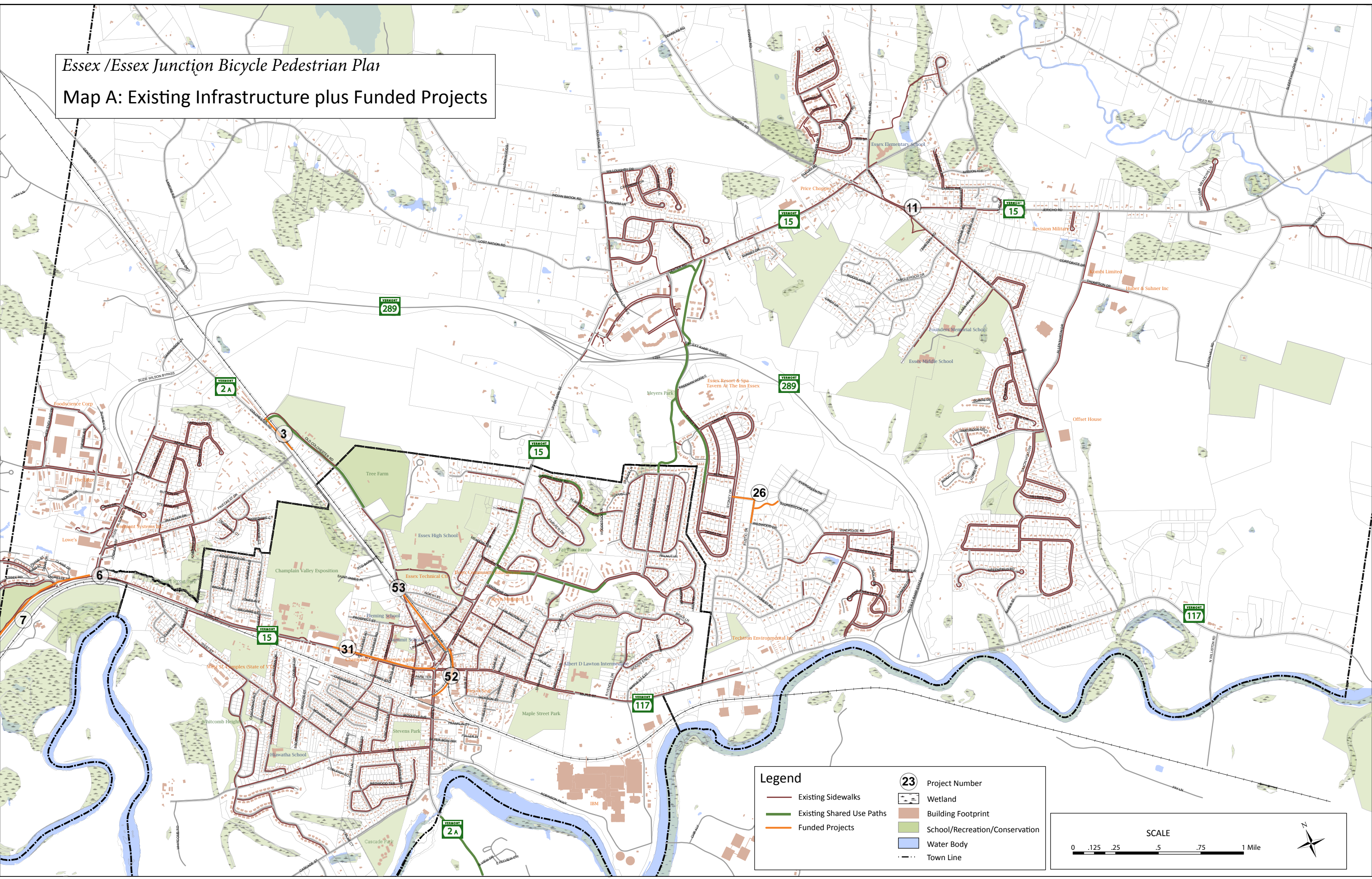
http://vtransengineering.vermont.gov/sites/aot_program_development/files/documents/ltf/PedestrianandBicycleFacilityDesignManual.pdf

Vermont Trails and Greenways Manual. Vermont Trails and Greenways Council (2005)

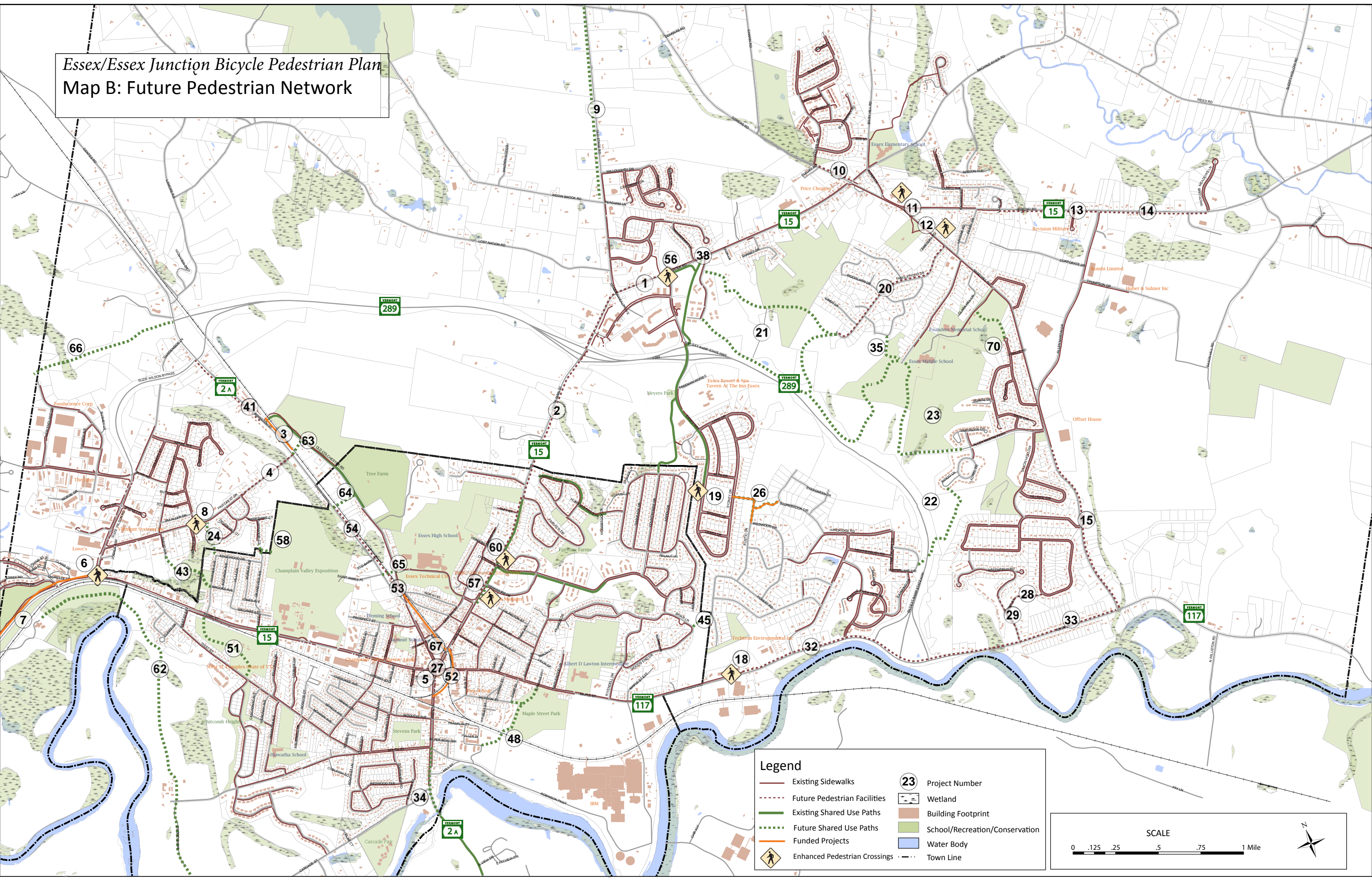
<http://vermonttrailsandgreenways.org/resources/manual>

Essex /Essex Junction Bicycle Pedestrian Plan

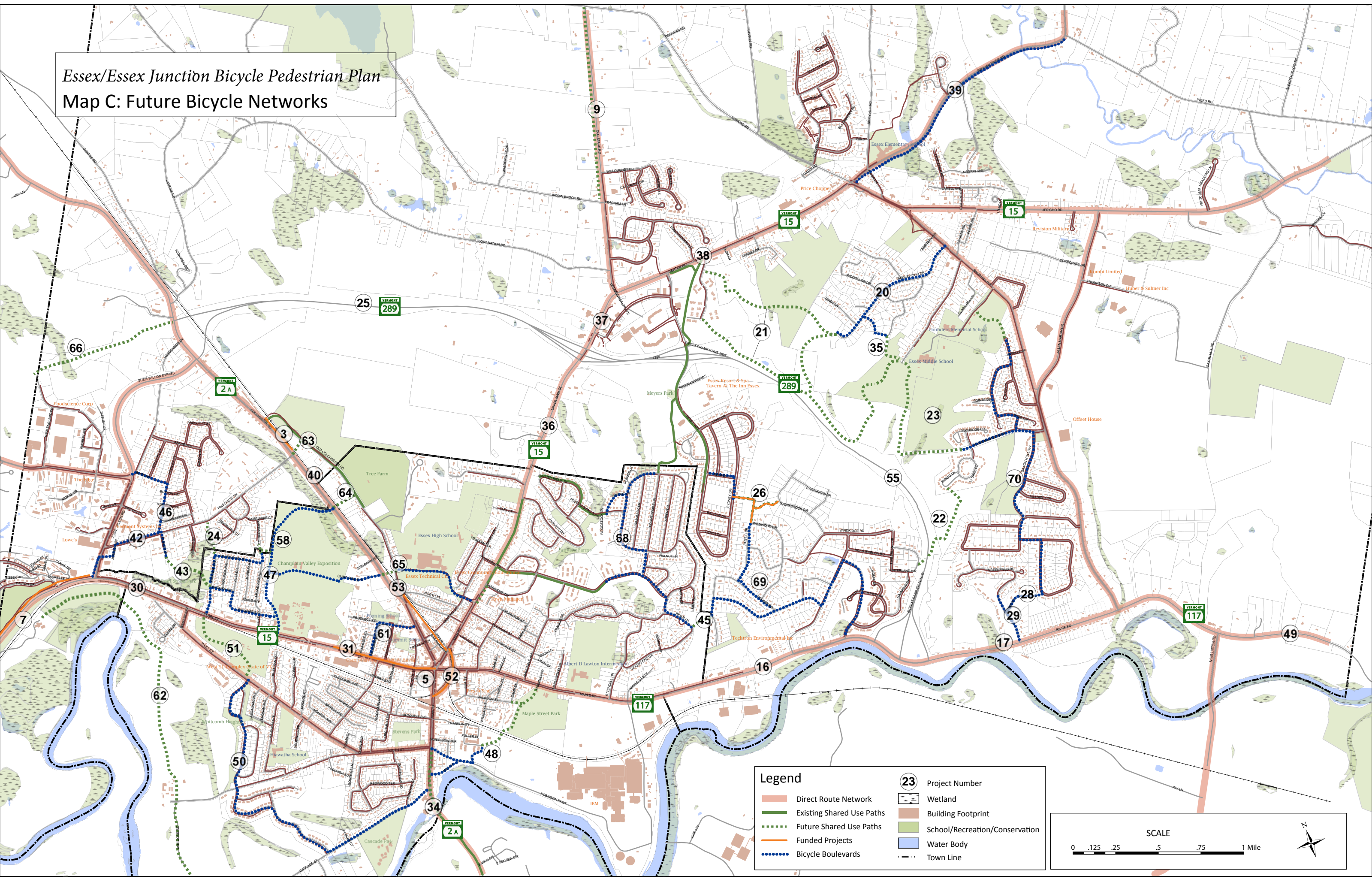
Map A: Existing Infrastructure plus Funded Projects



Essex/Essex Junction Bicycle Pedestrian Plan
Map B: Future Pedestrian Network



Essex/Essex Junction Bicycle Pedestrian Plan
Map C: Future Bicycle Networks



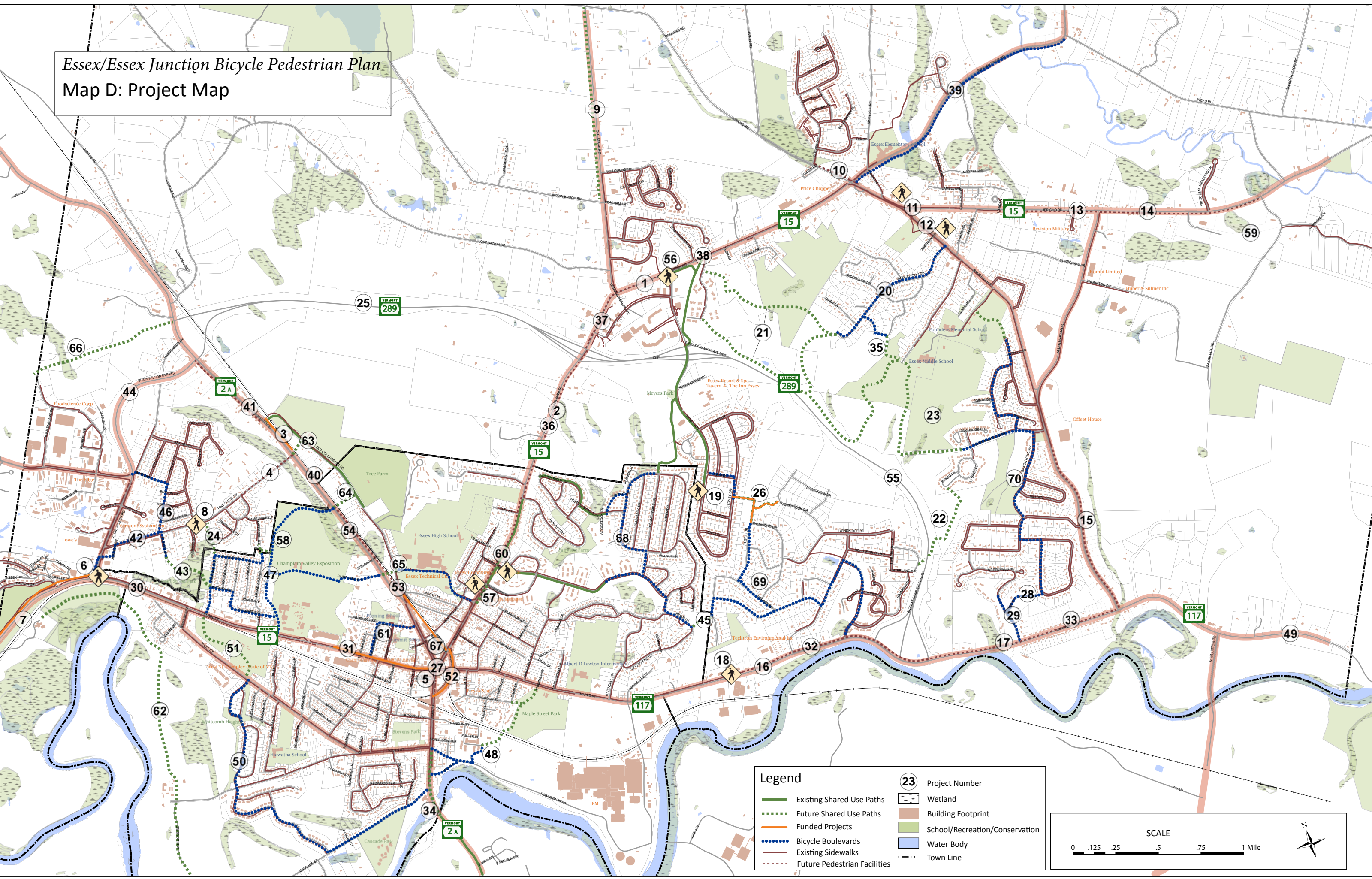
Legend

Direct Route Network	Project Number
Existing Shared Use Paths	Wetland
Future Shared Use Paths	Building Footprint
Funded Projects	School/Recreation/Conservation
Bicycle Boulevards	Water Body
	Town Line

SCALE

0 .125 .25 .5 .75 1 Mile

Essex/Essex Junction Bicycle Pedestrian Plan
Map D: Project Map



Legend

	Existing Shared Use Paths		Project Number
	Future Shared Use Paths		Wetland
	Funded Projects		Building Footprint
	Bicycle Boulevards		School/Recreation/Conservation
	Existing Sidewalks		Water Body
	Future Pedestrian Facilities		Town Line

SCALE

0 .125 .25 .5 .75 1 Mile