



## Memorandum

To: Matt Waitkins - AICP  
Senior Transportation Planner  
Nashua Regional Planning Commission  
Metropolitan Planning Organization  
30 Temple Street, Suite 310, Nashua,  
NH 03060

Date: October 2, 2022

Project #: 52922.01

From: Gregory L. Bakos, PE

Re: On-Call Engineering  
Task # 16 – Amherst: Baboosic Greenway - South 04

As requested, VHB has performed an evaluation and estimated the cost for completing bike and pedestrian related improvements on Segment "South 04" of the planned Baboosic Greenway in Amherst. The below cost estimate is provided to assist the Nashua Regional Planning Commission (NRPC) and the New Hampshire Department of Transportation (NHDOT) in considering this project for inclusion in the Ten-Year-Plan (TYP).

### Project Purpose and Need

The stated purpose of this project is to complete a segment of the Baboosic Greenway by the establishment of ROW and a shared-use path connecting the southern school campus area to destinations in the center and north of town, including the rest of the Baboosic Greenway. This segment of the route has perennially appeared in local plans, studies, and requests in the Town of Amherst as it stands to serve a crucial role in a north-south alternative transportation corridor in town, with hopes of connecting the Amherst Village to the southern school campus area.

This portion of Boston Post Road is one of the most consistently utilized by pedestrians (and other modes), as it is the only public way to access Souhegan High School and the primary means of accessing Amherst Middle School. Furthermore, adjacent recreational facilities, such as Bean Fields, are frequently used throughout the year with a usership of approximately 30,000 participants per year. **This is one of the Town's highest priority active transportation projects.** Refer to Amherst's project proposal which includes substantial documentation on the Purpose and Need and the many benefits that this segment of the Baboosic Greenway will bring to the community.

### Proposed Improvements

This proposed project will complete an approximately 8,000-foot-long 8-foot-wide paved sidepath along Boston post Road from Segment South-03 at River Road to Segment South-05 and beyond to a future sidepath at Homestead Road. The work will also include a new bridge crossing the Souhegan River.

Central to this segment is a proposed modern roundabout at Davis Witty Drive, the main entrance road to Amherst Middle School and Souhegan High School.

#### Sidepath Improvements:

The Town's goal is to construct the sidepath on the northeast side of Boston Post Road and to construct a vegetated buffer between the proposed sidepath and the road wherever space allows. The photo below shows a constrained section with a home on the northeast side of the road just south of River Road. Clearly a sidepath would be difficult to construct at this location, let alone a vegetated buffer. A similar condition exists at another house on the northeast side closer to River Road. As a result of these constraints VHB is recommending building the sidepath on the southwest side of Boston Post Road for the first 1,370-foot section between River Road and a point 450-feet south of

2 Bedford Farms Drive  
Suite 200  
Bedford, NH 03110-6532  
P 603.391.3900

Thornton Ferry Road II, at which point there would be an enhanced midblock crossing instead of crossing at River Road. Note that the sidepath section between River Road and Thornton Ferry Road II may require curbing and drainage systems since the right-of-way along this portion of road is only 40-feet wide. That side of the road is largely wooded, and it may be more prudent to seek easements for the width needed for a buffer rather than constructing curbing and drainage systems. The road in this area appears fairly flat and drainage systems may be needed anyway to drain the water collected in the buffer.



After crossing to the southeast side of the road the sidepath would continue to a point where it would veer away from the road to cross the Souhegan River on a new prefabricated bike/pedestrian bridge. The Town estimates the required bridge length to be 130-feet. VHB assumes the rail-to-rail bridge width would be 12-feet to comfortably accommodate a mix of cyclists and pedestrians. The sidepath would continue along the southwest side of the road all the way to the end of this segment. The total length of sidepath on Boston Post Road will be approximately 5,230 feet.

The town also proposes two 8' wide paved spurs off Boston Post Road. One would extend 620-feet to Souhegan High School and the other would extend approximately 1,500-feet to the Amherst Middle School.

### Roundabout

A one-lane roundabout is proposed for the Davis Witty Drive intersection. This intersection is currently stop controlled and police are used to direct traffic during peak hours 180 days a year due to the congestion and safety concerns. The

VHB schematic plans depict a 120-foot diameter roundabout. For reference, that is the same diameter as the roundabout at the entrance to the Nashua B North high school. The plans also show the sidepath circulating around the outside of the roundabout with a single crossing of Davis Witty Drive, one lane at a time, separated by the raised splitter island on that approach. Note that the multiuse path from Segment South-05 also enters the intersection on the west side of the roundabout and crosses Boston Post Road in similar fashion.

#### Structures:

Based on the information provided it will be necessary to span the Souhegan river north of Boston Post Road. A 130-foot prefabricated clear span bridge with 12-foot rail-to-rail widths is assumed.

### **Other Considerations**

The following information is provided for context and to help assess the challenges and readiness of this proposed project.

#### Right-of-Way

The materials provided by the Town indicate that no additional rights will be needed to construct the proposed improvements. This will be evaluated further during the design phase, but it bodes well in terms of readiness. We have included a nominal cost in the below estimate for right-of-way.

#### Natural Resources

The environmental considerations within this segment will likely be centered around the proposed Souhegan River stream crossing. There do not appear to be wetland areas associated with the remainder of the project, but it is possible there will be minor impacts due to stormwater collection and conveyance.

If federal funds are used the project will need to complete NEPA documentation that will include a wide range of natural and cultural resource documentation. It is unlikely that the impacts within this segment would be deemed significant.

### **Project Cost Estimate**

VHB based the below costs on an interpretation of the materials provided by the community as well as additional online data gathering, design assumptions, and engineering judgement.

### **Estimated Trail Costs**

The sidepath construction is assumed to be relatively straightforward given the location. The sidepath costs are estimated based on a 3-inch pavement thickness and 8-foot path width. The base material will be 12-inches of crushed stone-fine gradation. VHB has included some costs for curbing and drainage systems for the constrained section. The Boston Post Road midblock crossing will include costs for Rectangular Rapid Flashing Beacons (RRFB's) and lighting.

## Estimated Roundabout Costs

VHB included construction costs for the proposed roundabout based on the 120-foot diameter. The work will include curbing all around, a concrete truck apron, lighting, and landscaped center island.

## Estimated Bridge Costs

Based on the information provided that the Baboosic Greenway South Segment 4 is looking to install a bridge to carry the Greenway over Souhegan River east of Amherst 193/130 bridge that carries Boston Post Road over Souhegan River. The estimated length of the bridge is noted as 130'. Based on this a cost of \$750 per square foot of proposed deck area (16' wide x 130' long) yields a cost of \$1,560,000 for Construction of the bridge not including any trail work to access the bridge location. Access to the site needs to be reviewed to confirm no additional cost is needed given the location of road in the area to the bridge location, but over farmland.

## Design and Permitting Costs

It is assumed that the project will be advanced as a Local Public Agency (LPA) project administered locally and following the prescribed LPA project development process with NHDOT oversight. This is significant since the process has cost implications. In determining the design phase costs VHB applied rule of thumb percentages adjusted for the anticipated permitting or other complexities such as structural designs.

The design and permitting costs are assumed to be relatively high for the pedestrian bridge and the roundabout but the other project components are expected to fall within standard norms.

## Summary of Estimated Project Costs

Based on the above discussions and the attached concept plan VHB developed program level estimates of probable cost broken out by primary components as shown below.

<u>Proposed Improvements:</u>	<u>PE</u>	<u>ROW</u>	<u>Construction</u>	<u>Totals</u>
New Multi-Use Trail Bridge over Souhegan River	\$400,000	\$0	\$1,560,000	\$1,960,000
Paved Sidepaths and Roundabout	\$200,000	\$10,000	\$1,583,000	\$1,793,000
<b>Totals</b>	<b>\$ 600,000</b>	<b>\$10,000</b>	<b>\$3,143,000</b>	<b>\$3,753,000</b>

**CONSTRUCTION COST ESTIMATE**

PROJECT : Nashua Regional Planning Commission TYP Project Candidates

LOCATION : **Baboosic Greenway SOUTH - 04**

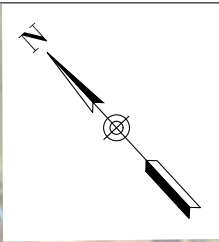
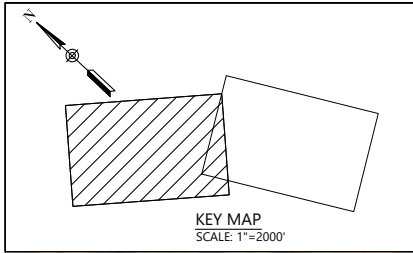
VHB PROJECT NO. 52922.01

DATE: 10/2/2022

TYPE: **Program Level Conceptual Estimate**

	ITEM DESCRIPTION	UNIT	UNIT PRICE	QUANTITY	TOTAL COST
201.1	CLEARING AND GRUBBING	AC	\$ 10,000.00	2	\$20,000
214	FINE GRADING	U	\$ 10,000.00	1	\$10,000
304.4	CRUSHED STONE (FINE GRADATION) (F)	CY	\$ 40.00	2800	\$112,000
304.5	CRUSHED STONE (COURSE GRADATION) (F)	CY	\$ 40.00	900	\$36,000
403.11	HOT BITUMINOUS PAVEMENT - MACHINE METHOD	TON	\$ 100.00	500	\$50,000
603.00215	15" R.C. PIPE, 2000D	LF	\$ 80.00	1000	\$80,000
604.0007	POLYETHELENE LINER	EA	\$ 350.00	10	\$3,500
604.124	CATCH BASINS TYPE B, 4-FOOT DIAMETER	UNIT	\$ 4,000.00	10	\$40,000
604.324	DRAINAGE MANHOLES, 4 FT DIAMETER	UNIT	\$ 4,000.00	4	\$16,000
607.5340	WOOD FENCE (SPLIT RAIL), 4'-0" HIGH	LF	\$ 25.00	100	\$2,500
608.13	3" BITUMINOUS SIDEWALK (F)	SY	\$ 65.00	1200	\$78,000
608.24	4" CONCRETE SIDEWALK (F)	SY	\$ 80.00	20	\$1,600
608.36	6" REINFORCED CONCRETE SIDEWALK (F)	SY	\$ 100.00	170	\$17,000
608.38	8" REINFORCED CONCRETE SIDEWALK (F)	SY	\$ 200.00	210	\$42,000
608.54	DETECTABLE WARNING DEVICES, CAST IRON	SY	\$ 500.00	22	\$11,000
609.01	STRAIGHT GRANITE CURB	LF	\$ 45.00	1400	\$63,000
609.01123	STRAIGHT GRANITE CURB, 12" HIGH WITH 3"x3" MOUNTABLE BEVELED EDGE	LF	\$ 70.00	220	\$15,400
609.216	STRAIGHT GRANITE SLOPE CURB 6" HIGH	LF	\$ 30.00	800	\$24,000
615.0301	TRAFFIC SIGN TYPE C	SF	\$ 90.00	200	\$18,000
616.26101	RECTANGULAR RAPID FLASHING BEACON	U	\$ 35,000.00	1	\$35,000
618.61	UNIFORMED OFFICERS W/ VEHICLE	HR	\$ 75.00	320	\$24,000
618.7	FLAGGERS	HR	\$ 40.00	1000	\$40,000
619.1	MAINTENANCE OF TRAFFIC	UNIT	\$ 70,000.00	1	\$70,000
619.253	PORTABLE CHANGEABLE MESSAGE SIGN (UNIT WEEK)	UWK	\$ 600.00	40	\$24,000
625.525	STREET LIGHTS INCLUDING POLES, FOUNDATIONS AND LUMINAIRES	EA	\$ 8,000.00	6	\$48,000
628.2	SAWED BITUMINOUS PAVEMENT	LF	\$ 4.00	1500	\$6,000
645.531	SILT FENCE	LF	\$ 4.00	7000	\$28,000
645.7	STORM WATER POLLUTION PREVENTION PLAN	U	\$ 4,000.00	1	\$4,000
646.51	TURF ESTABLISHMENT WITH MULCH, TACKIFIERS AND LOAM	SY	\$ 7.00	2500	\$17,500
650.2	LANDSCAPING	U	\$ 20,000.00	1	\$20,000
692	MOBILIZATION	UNIT	\$ 200,000.00	1	\$200,000
698.13	FIELD OFFICE TYPE C	MON	\$ 1,800.00	12	\$21,600
699	MISCELLANEOUS TEMPORARY EROSION AND SEDIMENT CONTROL	\$	\$ 1,000.00	1	\$1,000
<b>SUBTOTAL</b>					<b>\$1,179,000</b>
MISCELLANEOUS ITEMS (10%)					<b>\$117,900</b>
CONTINGENCIES (20%)					<b>\$235,800</b>
SUBTOTAL:					<b>\$1,533,000</b>
TRAIL ENGINEERING (PE) (INLCUDING PERMITTING)					<b>\$200,000</b>
TRAIL CONSTRUCTION ENGINEERING, INSPECTION AND TESTING					<b>\$50,000</b>
TRAIL TOTAL					<b>\$1,783,000</b>
<b>STRUCTURES:</b>					
PREFABRICATED 130' X 16' PEDESTRIAN BRIDGES					<b>\$1,560,000</b>
STRUCTURE ENGINEERING (PE) (INLCUDING PERMITTING & AGENCY COORDINATION)					<b>\$400,000</b>
ROW					<b>\$10,000</b>
ESTIMATED PROJECT TOTAL:					<b>\$3,753,000</b>





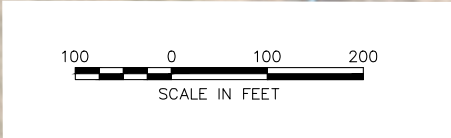
CONNECT TO PATH  
CONSTRUCTED UNDER  
SEPARATE PHASE (AMHERST  
SOUTH-03)

CONSTRUCT 8' PAVED  
SIDEPAH INCL. CURBING  
AND DRAINAGE SYSTEMS  
WHERE NECESSARY (TYP.)

CONSTRUCT 130'  
PREFAB BIKE/PED  
BRIDGE OVER THE  
SOUHEGAN RIVER

CONSTRUCT ENHANCED  
MIDBLOCK CROSSING

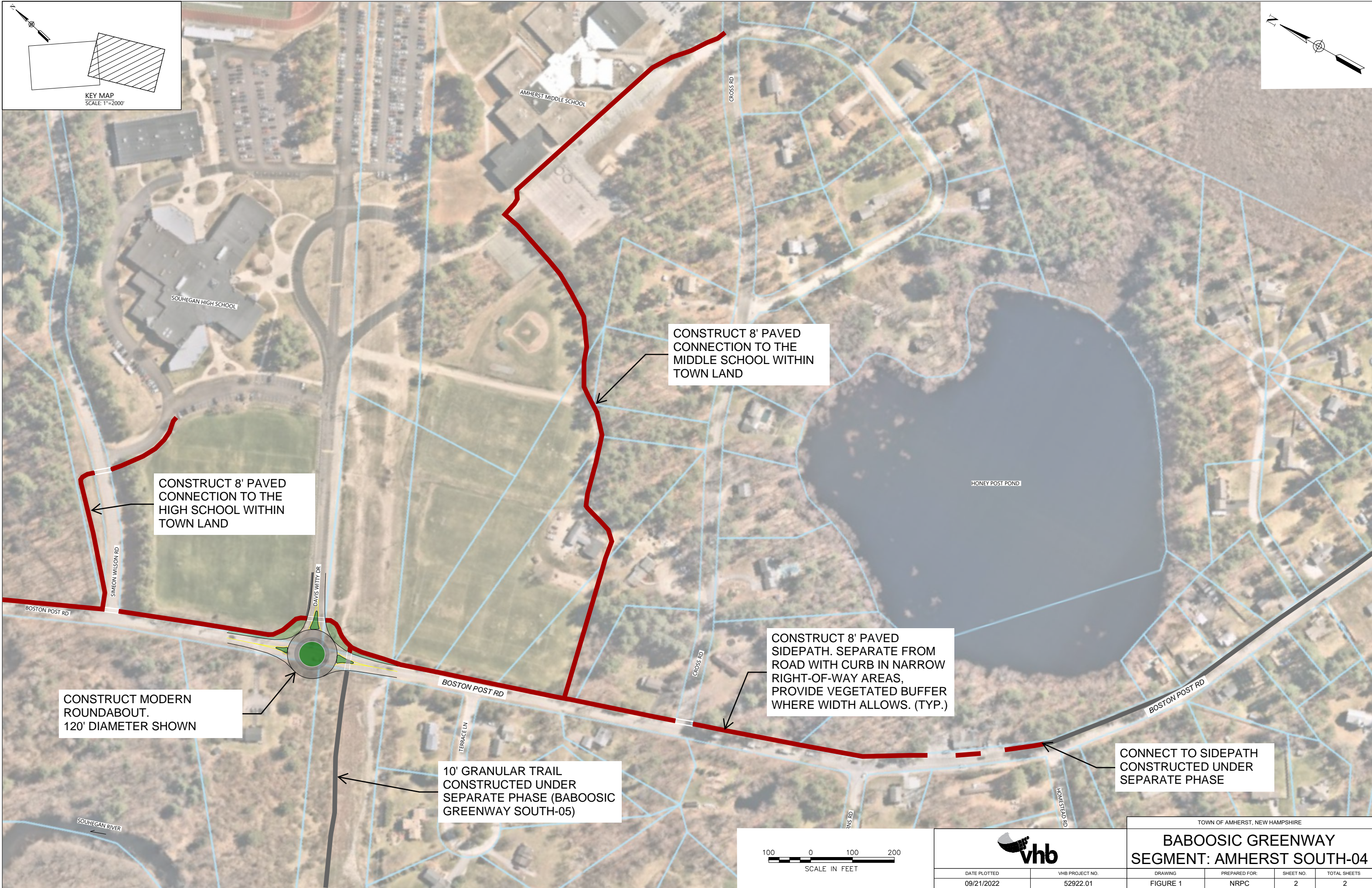
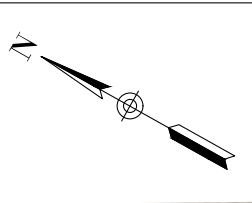
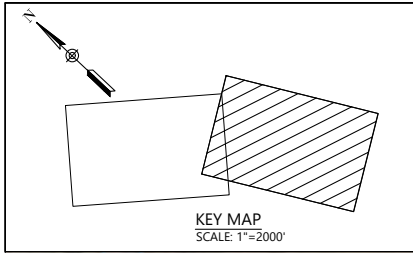
CONSTRUCT CURBED 8' PAVED  
SIDEPAH INCL. DRAINAGE  
SYSTEMS (TYP.),  
RELOCATE UTILITIES AND SECURE  
EASEMENTS AS NEEDED.



	
DATE PLOTTED	VHB PROJECT NO.
09/21/2022	52922.01

TOWN OF AMHERST, NEW HAMPSHIRE				
BABOOSIC GREENWAY SEGMENT: AMHERST SOUTH-04				
DRAWING	PREPARED FOR:	SHEET NO.	TOTAL SHEETS	
FIGURE 1	NRPC	1	2	





CONSTRUCT MODERN  
ROUNDBOUT.  
120' DIAMETER SHOWN

CONSTRUCT 8' PAVED  
CONNECTION TO THE  
HIGH SCHOOL WITHIN  
TOWN LAND

CONSTRUCT 8' PAVED  
CONNECTION TO THE  
MIDDLE SCHOOL WITHIN  
TOWN LAND

CONSTRUCT 8' PAVED  
SIDEPATH. SEPARATE FROM  
ROAD WITH CURB IN NARROW  
RIGHT-OF-WAY AREAS,  
PROVIDE VEGETATED BUFFER  
WHERE WIDTH ALLOWS. (TYP.)

10' GRANULAR TRAIL  
CONSTRUCTED UNDER  
SEPARATE PHASE (BABOOSIC  
GREENWAY SOUTH-05)

CONNECT TO SIDEPATH  
CONSTRUCTED UNDER  
SEPARATE PHASE

TOWN OF AMHERST, NEW HAMPSHIRE					
BABOOSIC GREENWAY SEGMENT: AMHERST SOUTH-04					
DRAWING	PREPARED FOR:	SHEET NO.	TOTAL SHEETS		
FIGURE 1	NRPC	2	2		

DATE PLOTTED	VHB PROJECT NO.
09/21/2022	52922.01

100	0	100	200
SCALE IN FEET			