

Town of Underhill

ARPA Funds Use Proposal - PHASE I

Committee/Group/Individual Requesting Funding: **Planning Commission**

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Date: **2/3/2023**

Proposal Name/Brief Description: **Addressing Two High Priority Stormwater Issues**

Underhill is a town of steep hills that bring water down into valleys and ultimately to Lake Champlain. Lake Champlain is currently in violation of the Clean Water Act for its high phosphorus contamination. We are part of this larger watershed where what we do on the land contributes to the broader stream network. The new Underhill Hazard Mitigation Plan identifies heavy rain events as a risk for residents and natural resources. As significant precipitation events are more common, the risk for erosion and runoff into streams increases. While we have an opportunity to take remedial actions using ARPA funds, it seems prudent to advance goals that are identified in the Underhill Town Plan, the Hazard Mitigation Plan, and the Stormwater Master Plan.

The Underhill Stormwater Master Plan was completed in 2018 and identified 5 locations where significant runoff requires action to reduce phosphorus and sediment from entering streams. Currently only one of these areas, the Town Hall, has had remedial action.

- 1. This proposal is to use ARPA funds to address stormwater runoff of sediment and phosphorus into the Browns River headwaters from a culvert draining portions of Maple Leaf Road.**

The Cost Estimate at the time of the 2018 Report was \$36,000, so based on price increases we are requesting \$40,000

Our streams often run parallel with back roads where road ditching, erosion, and soil movement impact water quality. As part of the Municipal Roads General Permit (MRGP) the Town has identified road segments that are rated as very high risk for contributing to phosphorus movement into Lake Champlain. In order to comply with the permit these road segments are in urgent need of remedial action to prevent ongoing phosphorus and sediment runoff. The State will be reevaluating road segments that need remedial action in the spring of 2023, so the which of the very high priority segments will be finalized at that point.

- 2. This proposal is to address water quality issues on the top 10-13 very high priority road segments where steep slopes and nearby streams require special ditching and relining with rock base to prevent runoff into streams.**

Costs for staff and equipment are paid for, so the need is for ditching stone material, culverts and tree removal at a cost estimate of about \$100,000.

Total Request = \$140,000

Benefit to Town of Underhill

Does this proposal ...

	YES	NO	Not Sure
Invest in the town without creating a need for additional or ongoing revenue or expenses? Is this a one-time expense?	X		
Benefit a population that was disproportionately impacted by the pandemic?		X	
Benefit a population underserved prior to the pandemic?		X	
Mitigate and/or help the Town adapt to the effects of climate change?	X		
Improve or create infrastructure for Underhill? Ex. Natural resources pedestrian access, transportation but not limited to	X		
Align with or impact the goals and priorities of the Town Plan?	X		

Comments: These projects are the Town of Underhill's contribution to clean water in our streams, and especially in reducing our contribution to pollution in Lake Champlain.

Feasibility of Project

Can this proposal ...

	YES	NO	Not Sure
Be fully planned, estimated and obligated to the Town by December 31, 2024?	X		
Be fully completed and paid for by the end of 2026?	X		
Be used to leverage or match other grants, funds or projects?	X		

1. Maple Leaf Road Stormwater Runoff

Excerpt from the 2018 Underhill Stormwater Master Plan

6.2 Maple Leaf Rd (1)

6.2.1 30% Concept Design Description

Stormwater from the Maple Leaf Rd (1) site is currently unmanaged. This includes drainage from the road, and the residential subdivision on Wheeler Rd. Stormwater is conveyed in roadside ditching to a cross-culvert under a driveway, and to the Stevensville Brook. This driveway suffers from chronic wash-outs during spring melt and a larger culvert was recently installed to mitigate this problem. At this time, the area between the culvert outlet and the brook was excavated, forming a direct drainage path from the culvert to the brook.

Soils in this location are very good, Hydrologic Soil Group A, with high infiltration potential. As such, the proposed practice for this site is infiltration based.

The proposed retrofit for this site involves rerouting drainage from the culvert to an infiltration basin along the edge of the driveway (see starred location in Figure 16). The basin will be located outside of the defined river corridor. The design for this site also incorporates restoring the riparian buffer and the excavated area between the culvert and the brook to its natural state (Figure 16).

The design standard used for this retrofit was full infiltration of the channel protection volume (CPv, or 2.02" of rain in a 24-hour period), equal to 8,276 ft³ of runoff.

A 30% design plan is provided in Appendix J - 30% Designs.



Figure 16. The drainage area for the proposed BMP is shown in red for the Maple Leaf Rd (1) site. The proposed BMP location is shown with a star.

6.2.2 Pollutant Removal and Other Water Quality Benefits

A retrofit of this site has the potential to prevent 8,291 lbs of TSS and 5.58 lbs of TP from entering receiving waters annually (Table 10).

Table 10. Maple Leaf Rd (1) benefit summary table.

Total Suspended Solids Removed	8,291 lbs
Total Phosphorus Removed	5.58 lbs
Impervious Treated	2.63 acres
Total Drainage Area	27.1 acres

6.2.3 Cost Estimates

Note that these costs and benefits are very preliminary. Initial cost projections can be found in Table 11. This amount differs from the amount initially projected for this site as design-specific amounts and costs were used. The estimated cost for implementation of this project is \$36,000.

- The cost per pound of phosphorus treated is \$6,451.61.
 - The cost per impervious acre treated is \$13,688.21.
 - The cost per cubic foot of runoff treated is \$4.35.
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Table 11. Maple Leaf Rd (1) project initial construction cost projection.

VTrans Code	Description	Unit	Quantity	Unit Price	Amount
Site Preparation					
	Mobilization	LS	1	\$ 500.00	\$ 500.00
653.55	Project Demarcation Fencing	LF	250	\$ 1.17	\$ 292.50
653.20	Temporary Erosion Matting	SY	100	\$ 2.20	\$ 220.00
649.51	Geotextile for silt fence	SY	25	\$ 4.13	\$ 103.25
652.10	EPSC Plan	LS	1	\$ 500.00	\$ 500.00
652.20	Monitoring EPSC Plan	HR	8	\$ 37.22	\$ 297.76
<i>Subtotal:</i>					\$ 2,633.51
Infiltration Basin					
203.15	Common Excavation	CY	750	\$ 9.86	\$ 7,395.00
613.10	Type I Stone	CY	80	\$ 43.91	\$ 3,512.80
651.15	Seed (grass)	LBS	20	\$ 7.66	\$ 153.20
601.0920	24" CPEP Outlet Works	LF	10	\$ 64.04	\$ 640.40
N/A	24" Beehive Grate with Anti-Vortex Baffle	EACH	1	\$ 615.00	\$ 615.00
<i>Subtotal:</i>					\$ 12,316.40
New Infrastructure					
601.0915	24" CPEP	LF	50	\$ 64.04	\$ 3,202.00
<i>Subtotal:</i>					\$ 3,202.00
Riparian Buffering & Trench Filling					
656.16	Deciduous Seedling	EACH	65	\$ 81.47	\$ 5,295.55
651.35	Topsoil	CY	60	\$ 30.96	\$ 1,857.60
653.20	Temporary Erosion Matting	SY	200	\$ 2.20	\$ 440.00
651.15	Seed (grass)	LBS	5	\$ 7.66	\$ 38.30
<i>Subtotal:</i>					\$ 7,631.45
Subtotal:					\$ 25,783.36
	Construction Oversight**	HR	16	\$ 100.00	\$ 1,600.00
	Construction Contingency - 10%**				\$ 2,578.34
	Incidentals to Construction - 5%**				\$ 1,289.17
	Minor Additional Design Items - 5%**				\$ 1,289.17
	Final Design	HR	30	\$ 100.00	\$ 3,000.00
	Permit Review and Applications (exclusive of permit fees)	HR	8	\$ 100.00	\$ 800.00
Total (Rounded)					\$ 36,000.00

Link to full report:

[Microsoft Word - SWMP Draft12 \(ccrpcvt.org\)](https://www.ccrpcvt.org/Microsoft%20Word%20-%20SWMP%20Draft12)

2. Very High Priority Road Segment Remedial Action (information from Brad Holden)

Costs for staff and equipment are paid for, so the need is for ditching stone material, culverts and tree removal at a cost estimate of about \$100,000.

Municipality	Segment ID	Road Name	Road Type	Assessment Date	Hydro Connected	Slope	Segment Only Score	Combined Outlet Score	Overall Score	Overall Priority	Outlets	Segment Assessment Details	History	Map
Underhill	105961	GREEN ST	Gravel	12/30/2016	Yes	11.36	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	127724	LOWER ENGLISH SETTLEMENT RD	Gravel	8/31/2022	Yes	12.00	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	136772	MOUNTAIN RD	Gravel	12/30/2016	Yes	13.84	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	136774	MOUNTAIN RD	Gravel	12/30/2016	Yes	10.42	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	127722	LOWER ENGLISH SETTLEMENT RD	Gravel	8/31/2022	Yes	13.00	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	127723	LOWER ENGLISH SETTLEMENT RD	Gravel	8/31/2022	Yes	17.00	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	188582	TUPPER RD	Gravel	12/30/2016	Yes	13.78	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	31742	DEANE RD	Gravel	12/30/2016	Yes	10.67	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	39029.1	MEADOW LN	Paved with open ditches	12/30/2016	Yes	10.39	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	26964	CORBETT RD	Gravel	12/30/2016	Yes	10.91	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	132294	MEADOW LN	Gravel	12/30/2016	Yes	11.85	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	6655	BEARTOWN RD	Gravel	12/30/2016	Yes	11.01	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	31741	DEANE RD	Gravel	12/30/2016	Yes	13.96	Does Not Meet		Does Not Meet	Very High		Details	History	Map
Underhill	100492	FULLER RD	Gravel	12/30/2016	Yes	1.56	Does Not Meet		Does Not Meet	Moderate		Details	History	Map
Underhill	102045	GERTS KNOB RD	Gravel	12/30/2016	Yes	11.34	Partially Meets		Partially Meets	Moderate		Details	History	Map

Two of the segments on Lower English Settlement Road are planned to be brought into compliance in the spring of 2023 using Grants in Aid funds that we received from the State of Vermont. The Town has applied for a Better Back Roads grant to complete the remaining segment on Lower English Settlement, if the grant is awarded, then this work would take place in FY24.