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TOWN OF SHAFTSBURY

MUNICIPAL OFFICES AT COLE HALL

Received

APR 16 2016

VTrans
PDD-LTF

P. O. Box 409
61 BUCK HILL ROAD
SHAFTSBURY, VT 05262-0409
FAX 802-442-0955

Alan May
Agency of Transportation
Municipal Assistance Bureau
1 National Life Drive
Montpelier, Vermont 05633

April 13, 2016

Mr. May,

We are submitting our application for a Category B Grant to correct road related erosion and storm water runoff along six sections of Shaftsbury Hollow Road. The roadway is along the Little White Creek from distances of 100' to 500' running North to South.

Included with our application is a report of 'Drainage Improvements and Capital Budget for Shaftsbury Hollow Road, Shaftsbury, Vermont'. This report was provided by Summit Engineering of South Burlington Vermont and was funded by a Better Back Roads category A grant. The Roadway is identified in the ANR Natural Resource Atlas under Road Erosion Risk with rankings from low to high.

The areas of the road identified in the report are broken into six sections. A detailed cost estimate is provided in the report for each section. The total cost coming to \$68,411.00 in the Summit estimate based on VAOT prices. We have taken those estimates and produced the Cost Estimate Worksheet, attached, based on April 4, 2016 pricing for material at our location. We have not estimated Section 2 as this is a private road and the property owners are aware of the need to fix the drainage. The tree removal estimates on the worksheet reflect the rate with our private contractor. The Town and its Highway Crew can provide all needed equipment and manpower to complete the project. What the Town lacks is the availability to fund the purchase of materials for the project. The worksheet total is 27,841.00 for material and the labor of our contracted tree service. Our cash match is 7,841.00. Our match contribution in man hours and machinery would exceed the amount being asked for in the grant.

We look forward to hearing from you and what assistance that can be provided to correct this long standing and deteriorating problem.

Thank You

David Kiernan
Town Administrator



Received

APR 15 2016



VTrans
PDD-LTF

Vermont Better Roads Grant Program Application

Please complete one application per category and/or project you are applying for. You may make copies of the application for multiple applications per category and/or multiple categories.

Please check the Category you are applying for:

- B. Correction of a Road Related Erosion Problem and/or Stormwater Mitigation Retrofit for both gravel and paved roads
- C. Correction of a Stream Bank or Slope Related Problem
- D. Structure/culvert upgrades

Town/Organization: Town of Shaftsbury

Project Name: Drainage Improvements Shaftsbury Hollow Road

Road Name: Shaftsbury Hollow Road TH #: 9 Structure # (if applicable): _____

Road Type: Unpaved Uncurbed

Class 3

Watershed: Little White Creek

Please provide a thorough description of the problem (ex. Roadway has steep slope with no ditch which is causing roadway erosion):

Please refer to Summit Engineering Report attached.

Description of Project and how you plan to complete the work (ex. Stone line 500' of ditch by reshaping ditch and stone lining, working from the top of the project down to the bottom):

Please Refer to Summit Engineering Report attached. Project broken into six sections with description of each section and plan for work.

Expected Effects (+ & -) on water quality (ex. Erosion will be eliminated by placing the stone ditch):

Erosion will be controlled by a series of improvements including tree removal, ditching, seeding, stone filled ditching and improvement to road base. reducing runoff toward Little White Creek. Each improvement listed by section in Summit Engineering report.



Distance from end of project to nearest water (stream, lake, or stormwater system that outlets directly to water). 50-250'

Progress to Date:

Completion of Engineering Study Drainage Improvements and Capital Budget/BBR Grant

Is there an emergency reason this project must be completed quickly? If yes, please explain:

No

Has this project been identified through a municipal road inventory, capital budget plan, tactical basin plan, culvert inventory, or other management plan? If yes, please list which.

Yes: Capital Budget Plan/Road Inventory

No

Please list any professionals you may have contacted for assistance with this project (ANR River

Management Engineer, Army Corps of Engineers, VTrans District Technical staff, Basin Planner etc.):

Summit Engineering Inc. South Burlington VT.

Is the project located in the town "Right of Way?" Yes, No, Both (if "Both" please explain further).

Both, Section 1 requires tree work outside of the ROW. This Section is the farthest from the Little White Creek. Section 2 improvement is to Dwyers Camp Road, which is private. They have approached the Town to fix their problem. Sections 3-4-5-6 do not require any work outside of the ROW and are the closest to the Little White Creek. This section has been the biggest problem for the Town.

Will the town road crew complete this work? Yes, No, Some (if "some" please explain further).

Yes, with the exception of using a Tree Service Company to do climbing work, and crane work if required. The Highway Dept. clears the debris with our equipment and chipper.



Describe how the grant funds will be spent and/or attach a project budget:

Attached

How do you plan to meet the required 20% match on this grant?:

Our match would consist of monies from the Culvert Reserve Fund, Town Highway Maintenance Budget for tree work, and the Class 3 Road Fund. Additional match in all labor and equipment provided by Town.

Requested Grant Amount (\$20,000 max Category B, \$40,000 max Categories C & D): \$ 20,000.00

Estimated Total Project Cost (including 20% local match): \$ 25,000.00

Estimated Completion Date: _____

REQUIRED ATTACHMENTS:

- Itemized Cost Estimate (labor, equipment, materials)
(For assistance, call Better Backroads at 802-828-4585)
- Project Location Map
(Please show location of affected water; 1:12,000 USGS map, if possible)
- Sketch of proposed erosion control measures, including:
 - Distances (ft.)
 - Estimate of waste & borrow quantities
 - Approx. location of town/other right-of-way and/or property lines
- Photo(s) of the project area.
- Agreement for Entry and/or Deed of Easement (if project is outside Town ROW).
- If project involves stream or river/road conflict, include documentation of consultation with a River Management Engineer.
- Other appropriate supporting documents.

By signing this application I certify that all the information provided is accurate to the best of my knowledge. We will comply with all the requirements of the grant including making our books available for audit if required.

SIGNATURE OF APPLICANT: (Must be Town Administrator/Manager or Select Board Chair)

Name: David [Signature]

Title: Town Administrator

Town of Shaftsbury

Drainage Improvements and Capital Budget for Shaftsbury Hollow Road, Shaftsbury, Vermont

Prepared For:

The Town of Shaftsbury

in cooperation with:

The Better Backroads Small Grant Program

prepared by:



SUMMIT ENGINEERING, INC
Engineers + Surveyors + Planners + Landscape Architects

1233 Shelburne Road C-2
South Burlington, VT 05403

INTRODUCTION

The following report has been developed using the methodology described in *Road Drainage and Erosion Control* published by the Vermont Better Backroads Program, October 1999. Remedies to particular problems are based on the *Vermont Better Backroads Manual* published by the George D. Aiken & Northern Vermont Resource conservation and Development Councils.

The Town Road Foreman, Steve Washburn and David Kiernan, Town Administrator, provided identification of the current drainage problems pertaining to this program. Steve and an individual from Summit Engineering visited each of the sites identified to locate, describe and discuss the problems. Following this initial site visit, Summit Engineering returned to measure, photograph and further investigate the problem areas of Shaftsbury Hollow Road. Additional investigations using USGS and town highway maps were done to further augment the field measurements.

The following general conclusions can be made about virtually all problem roadway drainage sites, including all of those described for Shaftsbury Hollow Road:

The first conclusion is that the acts of erosion and sedimentation always work together in moving material from where it is placed or occurs naturally, to where it conflicts with the continual function of roadway drainage. Once it is eroded, the material doesn't have to travel far before it becomes contaminated and useless as roadway material turning it into a waste product in need of removal and disposal. The most effective solution to most erosion/sedimentation problems is the stabilization using vegetation or erosion resistant materials.

The second conclusion is that the complete elimination of roadway erosion is virtually impossible. Even in the best of conditions, the use of roads for the purpose that they were put there is an erosive force. In Vermont, this is compounded by their common steepness, frost action, the occurrence of intense rainfall and winter plowing. Erosion control measures must be kept in the perspective that they have a design life, there is always the risk of reoccurrence and that "control" usually refers to the limiting of impact.

The principles applied to Shaftsbury Hollow Road involve those basic to all roadway erosion control plans:

1. Divert runoff from entering roadway from outside R.O.W.
2. Remove water from the roadway surface quickly.
3. Design to reduce velocity of runoff.
4. Stabilize disturbed areas promptly.
5. Divert runoff from waterways and sensitive areas.

Roads in the Town of Shaftsbury are well maintained with both contracted and town owned equipment. The general character of Shaftsbury Hollow Road is flat to and rolling. 7% maximum grade. The problems noted as presented by the Town are continual with seasonal variations caused by frost, plowing, rainfall and the combination of conditions that generate mud

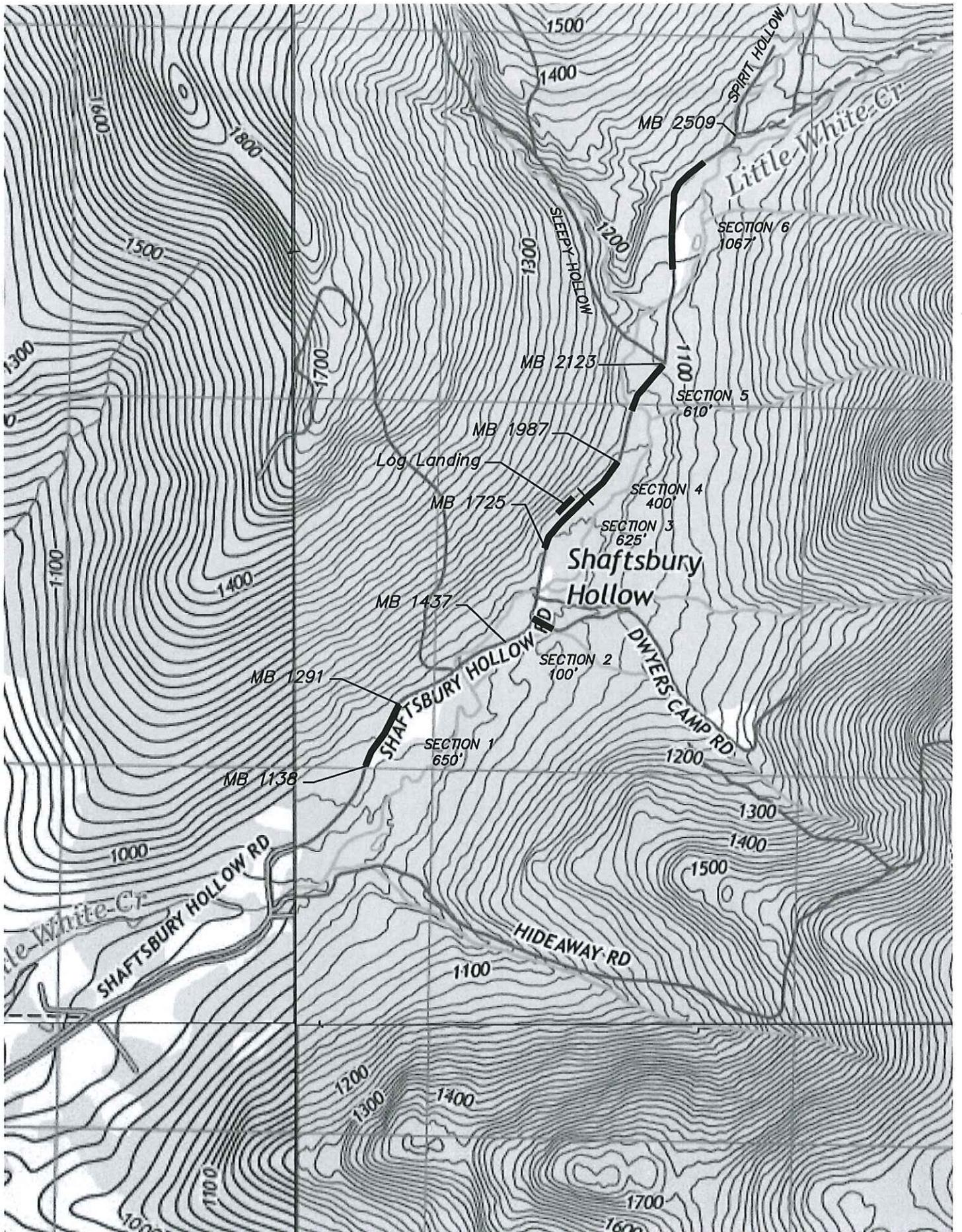
season. The conditions of Shaftsbury Hollow road, the review and suggestions made, can also be applied to other roads within the Town.

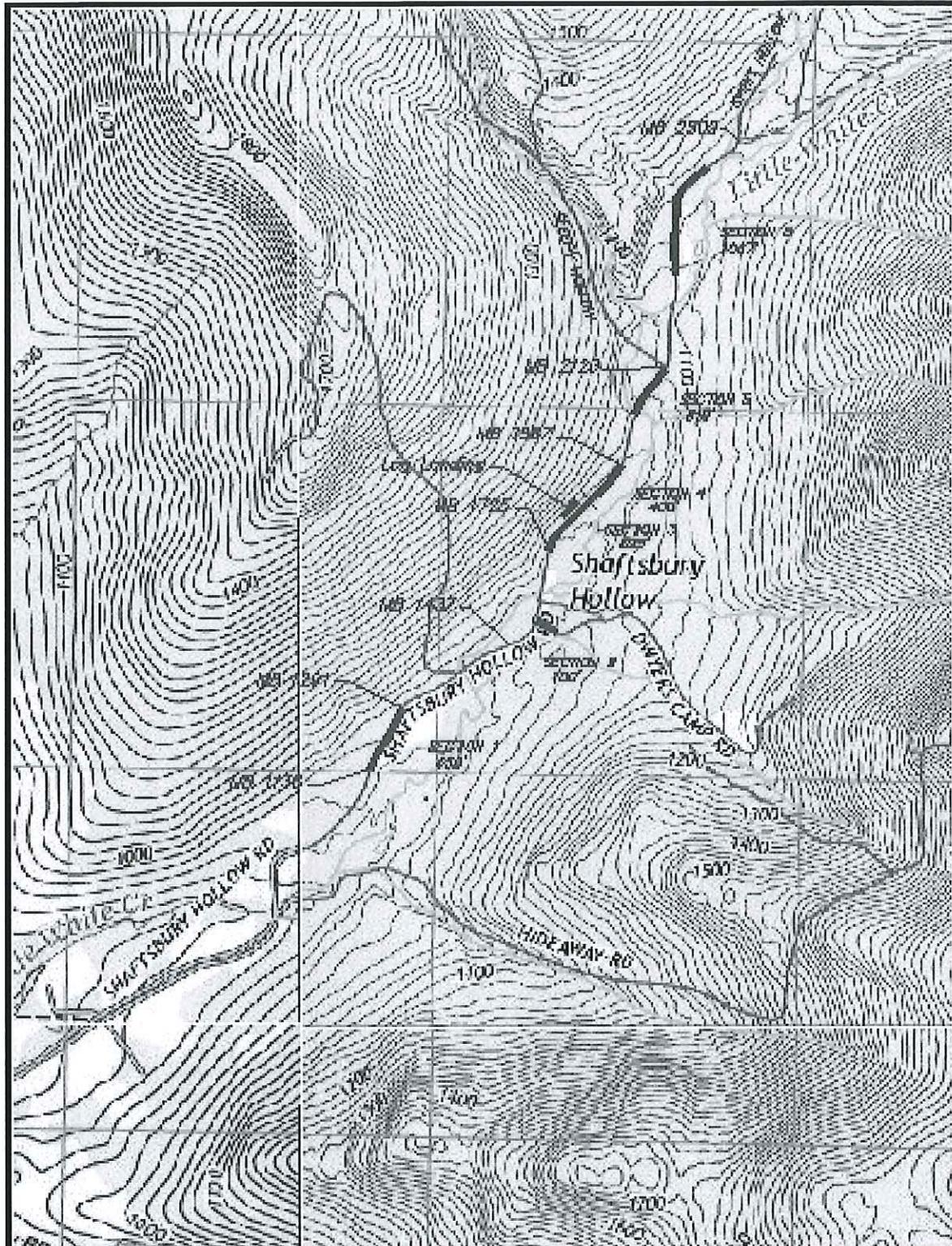
Typically the roads have minimal ditching and abundance of leaves in ditches and on roadway shoulders. Vegetation is mature trees and brush with little grass. This is viewed as problematic with respect to erosion in that it limits the ability to establish good vegetation in many areas.

For each of the problem areas addressed, there is provided a general description of the site with photographs, site inventory prepared from a field visit, description of current maintenance, suggested solution, design standard and cost estimate. Design Typical and Details are provided at the end.

Cost estimates are based on material costs VAOT bid history prices from January 2014 to December 2015 and adjusted where appropriate to reflect the cost of doing work in southwest Vermont. In review of the cost analysis of each site, certain intangibles may be noted that have not been accounted for in terms of Capital Budget. These include: safety and inconvenience of closed roadways. It also must be noted that regardless of the remedy presented periodic maintenance will continue to be necessary.

Quantities are approximate based on measurements made with a measuring wheel along the roadway. Work may need to be adjusted in the field.





Section Location Map

SITE ANALYSIS

Shaftsbury Hollow Road is a dead-end road that extends approximately 2.5 miles from its intersection with Murphy Hill Road. The analysis, discussion and remedy included in this report is the upper 1.4 miles beginning at the mailbox for 1138 Shaftsbury Hollow Road. The width varies from 14 to 16 feet. It generally follows Little White Creek. The road was found to be generally well maintained, with a light mud season recently ended. Spring maintenance operations were underway on the day of the site visit and included the lower section of the road.

For this review the roadway has been broken down into six particular sections with similar problems and opportunities for solution. The sections have been labeled 1 through 6 with their particular locations identified using mailboxes with E911 address numbers as reference points (example: MB 2509). Note that the first two digits of E911 addresses refer to the distance in miles and tenths from the previous cross road. In this case Murphy Hill Road. The project beginning at MB 1138 (1.1 miles) and ending at MB 2509 (2.5 miles) accurately defines the 1.4 mile project area. Cross roads are also used as reference. Refer to **Section Location Map** on previous page.

Section 1 - Insufficient Roadway Drainage

Description:

Drainage problems are associated with the erosion of the roadway surface and ditches resulting from little depth or lack of ditching. Adjacent mature trees and stone walls present problems for improving of drainage adjacent to roadway.

Erosion of the roadway occurs as result of no proper ditches along the majority of the road side. Small ditches are present in some places but have been filled in with debris and winter plowing of the road. Runoff entering the ditch/gutter is not directed away from the roadway due to absence of culverts.



Site Inventory: Section 1

Road Name or Designation: **Shaftsbury Hollow Road**

Location: From **MB 1138** To Distance **650'**

Approximate Roadway Grade: **Flat** Approximate Roadway Width: **16'**

Distance to Nearest Waterway: **> 500'** Name of Waterway: **Little White Creek**

Ditch drains most directly to: **Stream via overland flow**

Inspected By: **DFH**

Description of Problem:

- Insufficient road crown
- Other cross-section problem
- Erosion of ditch Erosion of roadway parallel to alignment
- Erosion of roadway perpendicular to alignment
- Other **No ditch for most of section**

Sedimentation: light moderate severe

Bank Erosion: stream bank

 roadside bank: foreslope backslope

Culverts:

 Inlet

 Outlet

 Distance to problem area

Potential for roadway failure/closure:

none low moderate high

Frequency of problem: **with runoff events**

Comments:

Section without proper cross-section elements of crown and ditches.

Shallow to non-existent ditches

Flat crowns and high adjacent causing erosion parallel to alignment

Ditch construction will require cutting mature trees

Outlet of culvert problematic due to terrain

Environmental Impact from 1 (Low) to 10 (High) 2

Environmental Comments:

Distance from surface waters reduces impact of sedimentation

Suggested Solution:

Installation of ditches on west side with seed and mulch.

Construction of cross-culvert to serve ditch.

Best Management Practices:

Improve Ditches

Direct runoff from roadway

Current Maintenance:

Roadway Grading

Removal of sediment and debris from roadway edges.

Suggested Solution:

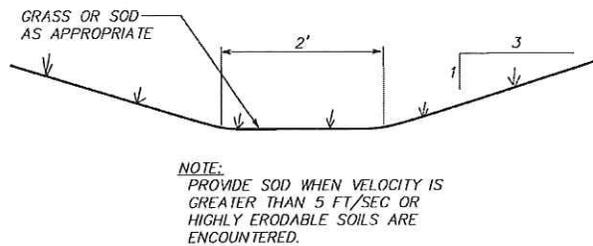
The construction of proper ditches to drain road base and increase roadway base and crown to increase surface runoff. The ditches are to be vegetated. Installation of a roadway cross-culvert from the west to the east. Outlet of a culvert is problematic due to the grade and surrounding terrain. It will involve work outside of right of way to daylight. A precise design location will need to be determined to reduce impact.

An alternative to the cross culvert is to direct to an infiltration basin to the west side of the roadway. The basin would be to collect first flush from storm events.

Suggested Design Standards:

Roadway typical to be maintained to VT Agency of Transportation Agency of Transportation A-21 Standards. With the width to match the existing roadway.

Materials and their placement methods are to meet the specifications of the VT Agency of Transportation Standard Specifications for Construction.



GRASS DITCH TYPICAL
N.T.S.

Erosion control practices to follow *Vermont Handbook for Soil Erosion and Sediment Control on Construction Sites*.

Cost Estimate:

Roadway Drainage Improvement

Item	Quantity	Unit Cost	Cost
Removal of Trees	8 hours	\$240/hr	\$1920. ⁰⁰
Excavation and Shaping of Ditch	14 hours	\$120/hr	\$1680. ⁰⁰
Seeding and Topsoil	1300 LF	\$1.80/LF	\$2340. ⁰⁰
Gravel for Road Base/Grading	192 CY	\$35/CY	\$6720. ⁰⁰
Total			\$12,660.⁰⁰

Culvert Installation

Item	Quantity	Unit Cost	Cost
18" CPEP Culvert	30 LF	\$62/LF	\$1860. ⁰⁰
Ditch Work for culvert	4 hours	\$120/hr	\$480. ⁰⁰
Total			\$2340.⁰⁰

Section 2 – Dwyers Camp Road, Ditch Erosion and Sedimentation

Description:

Dwyers Camp Road is a private road that intersects the town road. It is initially steep. The drainage problem consists of ditch erosion/sedimentation that has blocked the cross culvert. The blocked culvert needs to be cleaned to avoid overtopping of the roadway in a storm event.

The instability of the roadway base is generated by the surrounding topography that sheds its surface and groundwater toward the road. The natural areas adjacent to the problem area is well vegetated with little slope.

The ditch erosion is typical for a steep section of roadway



Site Inventory: Section 2 Ditch Erosion and Sedimentation of culvert in R.O.W.

Road Name or Designation: **Shaftsbury Hollow Road – Dwyers Camp Road intersection**

Location: From **Intersection** To Distance **100'**

Approximate Roadway Grade: **+ -10%** Approximate Roadway Width: **15'**

Distance to Nearest Waterway: **>100'** Name of Waterway: **Little White Creek**

Ditch drains most directly to: **Stream**

Inspected By: **DFH**

Description of Problem:

- Insufficient road crown
- Other cross-section problem **Erosion of backslope of ditch**
- Erosion of ditch Erosion of roadway parallel to alignment
- Erosion of roadway perpendicular to alignment
- Other **Sedimentation of culvert**

Sedimentation: light moderate severe

Bank Erosion: stream bank

 roadside bank: foreslope backslope

Culverts:

- Inlet
- Outlet
- Distance to problem area

Potential for roadway failure/closure:

none low moderate high

Frequency of problem: **with runoff events**

Comments: **Dwyer Camp Road, good private road, with eroding ditches entering Town Road**

Environmental Impact from 1 (Low) to 10 (High) 7

Environmental Comments: **Plugging of Town Culvert at intersection has limited its ability to function in periods of high flow.**

Suggested Solution:

**Stabilize the ditches on Dwyer Camp Road with stone fill.
Clean sediment from culvert**

Suggested Best Management Practices:

Stone fill ditches for grades steeper than 5%.

Current Maintenance:

Periodic cleaning of town culvert and repair of eroded roadway.

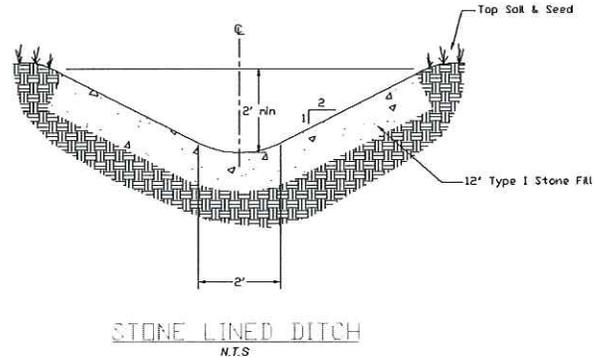
Suggested Solution:

The construction of a stone lined ditch and vegetation of the backslope where eroded on both sides of Dwyer Camp Road from the intersection to the first drive top of the hill (approximately 100').

Suggested Design Standards:

Roadway typical to be maintained to VT Agency of Transportation Agency of Transportation A-21 Standards. With exception made to the 20-foot width that it calls for.

Materials and their placement methods are to meet the specifications of the VT Agency of Transportation Standard Specifications for Construction.



Erosion control practices to follow *Vermont Handbook for Soil Erosion and Sediment Control on Construction Sites*.

Cost Estimate:

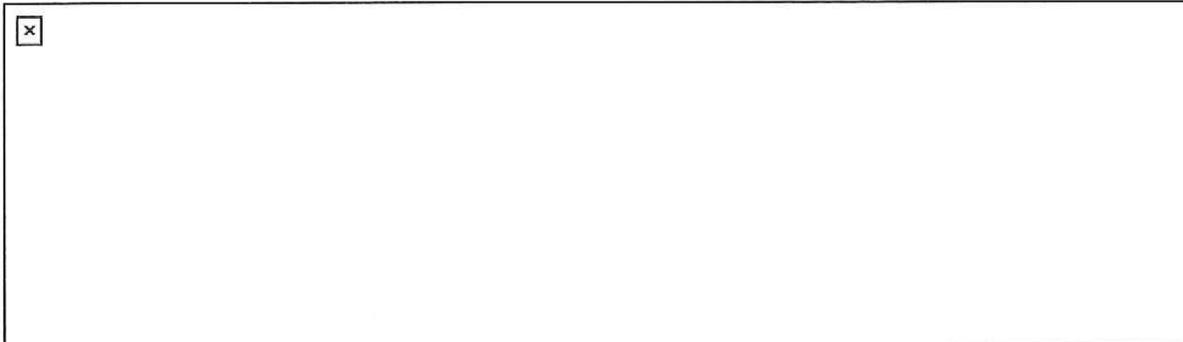
Item	Quantity	Unit Cost	Cost
Excavation and Shaping of Ditch and Cleaning of Culvert	4 hrs	\$120/hr	\$480. ⁰⁰
Stone Fill	30 CY	\$44/CY	\$1320. ⁰⁰
Permanent Erosion Matting	40 SY	\$6/SY	\$240. ⁰⁰
Total			\$2040.⁰⁰

Section 3 Insufficient Roadway Drainage

Description:

Drainage problems are associated with the erosion of the roadway surface parallel to roadway resulting from little depth or lack of ditching. Adjacent mature trees and stone walls present problems for improving of drainage adjacent to roadway.

Erosion of the roadway occurs as result of no proper ditches along the majority of the road side. Small ditches are present in some places but have been filled in with debris and winter plowing of the road. Runoff entering the ditch/gutter is not directed away from the roadway due to absence of culverts. Grades are very flat. The west/uphill side of the road is a moderately steep hillside that drains to the back of a stone wall where it collects and infiltrates, saturating the road bed.



Landing for logging operation

Site Inventory: Section 3

Road Name or Designation: **Shaftsbury Hollow Road**

Location: From **MB 1725** To Distance: **625'**

Approximate Roadway Grade: **Flat** Approximate Roadway Width: **15'**

Distance to Nearest Waterway: **>200'** Name of Waterway: **Little White Creek**

Ditch drains most directly to: **Stream**

Inspected By: **DFH**

Description of Problem:

- Insufficient road crown
- Other cross-section problem **Poor/non-existent ditches**
- Erosion of ditch Erosion of roadway parallel to alignment
- Erosion of roadway perpendicular to alignment
- Other: **Logged Hillside on west draining to roadway w/stone wall & minimal ditching**

Sedimentation: light moderate severe

Bank Erosion: stream bank

roadside bank: foreslope backslope

Culverts:

Inlet

Outlet

Distance to problem area

Potential for roadway failure/closure:

none low moderate high

Frequency of problem: **with runoff events**

Comments:

Old stone wall and trees dams water behind that collects and enters roadway at point.

Opportunity to improve ditch on east requires cutting.

East side high ridge is not continuous.

Log landing on west has no culverts and offers opportunity to help problems with improvements.

Environmental Impact from 1 (Low) to 10 (High)

Environmental Comments:**Suggested Solution:**

Cut trees and excavate ditches.

Improve drainage at log landing, including the narrowing of access and installation of culverts at logging access.

Work outside R.O.W. to improve drainage into public road.

Suggested Best Management Practices:

Improve Ditches

Direct runoff from roadway

Current Maintenance:

Current efforts to maintain the road consist of periodic re-grading of the roadway surface and addition of base material with grading when it becomes impassible. Some work has been done outside of R.O.W. in vicinity of log landing to control runoff into road.

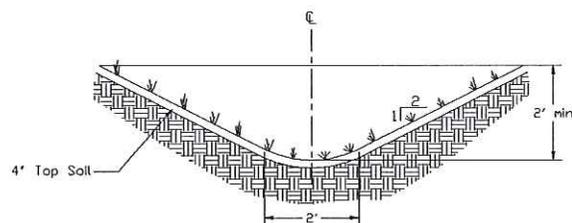
Suggested Solution:

The construction of a vegetated ditch where eroded on both sides of the road.

Roadway to be re-graded with Subbase of Crushed Gravel.

Suggested Design Standards:

Roadway typical to be maintained to VT Agency of Transportation Agency of Transportation A-21 Standards. With exception made to the 20-foot width that it calls for.



GRASS LINED DITCH

N.T.S.

Materials and their placement methods are to meet the specifications of the VT Agency of Transportation Standard Specifications for Construction.

Erosion control practices to follow *Vermont Handbook for Soil Erosion and Sediment Control on Construction Sites*.

Cost Estimate:

Roadway Drainage Improvement

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Removal of Trees	8 hours	\$240/hr	\$1920. ⁰⁰
Excavation and Shaping of Ditch	12 hours	\$120/hr	\$1440. ⁰⁰
Seeding and Topsoil	1250 LF	\$1.80/LF	\$2250. ⁰⁰
Gravel for Road Base/Grading	185 CY	\$35/CY	\$6475. ⁰⁰
Total			\$12,085.⁰⁰

Culvert Installation for Log Landing Access

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
15" CPEP Culvert	40 LF	\$58/LF	\$2320. ⁰⁰
Ditch Work for culvert	4 hours	\$120/hr	\$480. ⁰⁰
Total			\$2800.⁰⁰

Section 4 – Insufficient Roadway Drainage and Ditch Sedimentation

Description:

This is a continuation of Section 3 that varies by the increase in slope and some ditching with turn-outs with an existing culvert. There Drainage problems are associated with the erosion of the roadway surface parallel to roadway resulting from little depth or lack of ditching. There are fewer mature trees and no stone walls as with Section 3.

Erosion of the roadway occurs as result of no proper ditches along the majority of the road side. Small ditches are present in some places but have been filled in with debris and winter plowing of the road. Runoff entering the ditch/gutter is not directed away from the roadway due to absence of culverts where the roadway is flat. Grades are very flat. The west/uphill side of the road is a moderately steep hillside that drains directly to the roadway.



Site Inventory: 4 – Insufficient Ditching and Roadway Drainage

Road Name or Designation: **Shaftsbury Hollow Road**

Location: From To **MB 1987** Distance **400'**

Approximate Roadway Grade: **Flat to 3%** Approximate Roadway Width: **14'**

Distance to Nearest Waterway: **>200'** Name of Waterway: **Little White Creek**

Ditch drains most directly to: **Stream** Other: **woods**

Inspected By: **DFH**

Description of Problem:

 Insufficient road crown

 Other cross-section problem **No ditches**

 Erosion of ditch Erosion of roadway parallel to alignment

 Erosion of roadway perpendicular to alignment

 Other

Sedimentation: light moderate severe

Bank Erosion: stream bank

 roadside bank: foreslope backslope

Culverts:

 Inlet

 Outlet

 Distance to problem area

Potential for roadway failure/closure:

none low moderate high

Frequency of problem: **with runoff events**

Comments: **This section begins at uphill terminus of Section 3**

Environmental Impact from 1 (Low) to 10 (High)

Environmental Comments:

Suggested Solution: **Opportunity to install ditch on West side. Existing ditch upstream of culvert needs cleaning.**

Suggested Best Management Practices: **Install ditches and crown roadway, remove sediment. Ditches to be seeded and mulched to establish vegetation. Erosion matting installed for less than 5% and stone fill greater than 5%.**

Current Maintenance:

Current efforts to maintain the road consist of periodic re-grading of the roadway surface and addition of base material with grading. Sediment is removed from edge of roadway and culvert.

Suggested Solution:

The construction of a vegetated ditch on both sides of the road and regrading of the roadway surface with addition of gravel.

Suggested Design Standards:

Roadway typical to be maintained to VT Agency of Transportation Agency of Transportation A-21 Standards.

Materials and their placement methods are to meet the specifications of the VT Agency of Transportation Standard Specifications for Construction.

Erosion control practices to follow *Vermont Handbook for Soil Erosion and Sediment Control on Construction Sites*.

Cost Estimate:

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Excavation and Shaping of Ditch	8 hours	\$120/hr	\$960. ⁰⁰
Seeding and Topsoil	800 LF	\$1.80/LF	\$1440. ⁰⁰
Gravel for Road Base/Grading	104 CY	\$35/CY	\$3640. ⁰⁰
Total			\$6,040.⁰⁰

Section 5 – Insufficient Roadway Drainage

Description:

Erosion of the roadway occurs as result of no proper ditches along the majority of the road side. Small ditches are present in some places but have been filled in with debris and winter plowing of the road. Runoff entering the ditch/gutter is not directed away from the roadway due to absence of culverts where the roadway is flat.



Site Inventory: Section 5 – Insufficient Road Drainage

Road Name or Designation: **Shaftsbury Hollow Road (Adjacent to yellow house and yard)**

Location: From To **Sleepy Hollow** Distance **610'**

Approximate Roadway Grade: **Flat to 7%** Approximate Roadway Width: **15'**

Distance to Nearest Waterway: **>200'** Name of Waterway: **Little White Creek**

Ditch drains most directly to: **Stream via overland flow**

Inspected By: **DFH**

Description of Problem:

- Insufficient road crown
- Other cross-section problem **No ditches with steep banks into road gutter**
- Erosion of ditch Erosion of roadway parallel to alignment
- Erosion of roadway perpendicular to alignment
- Other **Gutter flow with debris and gravel build-up**

Sedimentation: light moderate severe

Bank Erosion: stream bank

 roadside bank: foreslope backslope

Culverts:

 Inlet

 Outlet

 Distance to problem area

Potential for roadway failure/closure:

none low moderate high

Frequency of problem: **seasonal and with runoff events**

Comments: **Road bed is saturated in spots. The flat section drains to the steeper section where ditches ultimately appear and runoff is diverted away from the road. The adjacent neighbor to the east has done extensive ditching to dry their yard from hillside runoff.**

Environmental Impact from 1 (Low) to 10 (High) 3

Environmental Comments:

Suggested Solution:

Opportunity to improve the existing ditching on west side of the steeper section.

Suggested Best Management Practices:

Improve ditches

Direct runoff from roadway

Stone line ditches where grade >5%

Current Maintenance:

Grading to provide crown, addition of gravel and removal of material buildup on edge of roadway.

Suggested Solution:

The construction of a vegetated ditch on both sides of the road and regarding of the roadway surface with addition of gravel. Install stone-lined ditches with Type I Stone Fill where grade is greater than 5%.

Suggested Design Standards:

Roadway typical to be maintained to VT Agency of Transportation Agency of Transportation A-21 Standards.

Materials and their placement methods are to meet the specifications of the VT Agency of Transportation Standard Specifications for Construction.

Erosion control practices to follow *Vermont Handbook for Soil Erosion and Sediment Control on Construction Sites*.

Cost Estimate:

Roadway Drainage Improvement

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Removal of Trees	4 hours	\$240/hr	\$960. ⁰⁰
Excavation and Shaping of Ditch	12 hours	\$120/hr	\$1440. ⁰⁰
Seeding and Topsoil	1220 LF	\$1.80/LF	\$2196. ⁰⁰
Gravel for Road Base/Grading	170 CY	\$35/CY	\$5950. ⁰⁰
Stone Fill Type I	15 CY	\$44/CY	\$660. ⁰⁰
Total			\$11,206.⁰⁰

Section 6 – Insufficient Roadway Drainage and Ditch Sedimentation

Description:

Erosion of the roadway occurs as result of no proper ditches along the majority of the road. Small ditches are present in some places but have been filled in with debris and winter plowing of the road. Runoff entering the ditch/gutter is not directed away from the roadway due to absence of culverts where the roadway is flat. Grades are flat to 5%. This section terminates at the 60” metal culvert and Little White Creek.



Site Inventory: Section 6 – Insufficient Roadway Drainage

Road Name or Designation: **Shaftsbury Hollow Road (near brown house)**

Location: From To Distance **1067'**

Approximate Roadway Grade: **5% to Flat** Approximate Roadway Width: **14-16'**

Distance to Nearest Waterway: **100'** Name of Waterway: **Little White Creek**

Ditch drains most directly to: **Stream via overland flow**

Inspected By: **DFH**

Description of Problem:

Insufficient road crown

Other cross-section problem **No ditches – runoff enters roadway.**

Erosion of ditch Erosion of roadway parallel to alignment

Erosion of roadway perpendicular to alignment

Other

Sedimentation: light moderate severe

Bank Erosion: stream bank

roadside bank: foreslope backslope
Accumulation of sediment on edge of road.

Culverts:

Inlet

Outlet

Distance to problem area

Potential for roadway failure/closure:

none low moderate high

Frequency of problem: **with runoff events**

Comments: **Logging operation to west. Side roads entering without drainage control.
Sediment accumulates on edge of road**

Environmental Impact from 1 (Low) to 10 (High) 3

Environmental Comments:

Suggested Solution:

Suggested Best Management Practices:

Current Maintenance:

Suggested Solution:

The construction of a vegetated ditch on both sides of the road and regrading of the roadway surface with addition of gravel. Gravel added to raise the grade and increase the effective depth of ditching.

Suggested Design Standards:

Roadway typical to be maintained to VT Agency of Transportation Agency of Transportation A-21 Standards.

Materials and their placement methods are to meet the specifications of the VT Agency of Transportation Standard Specifications for Construction.

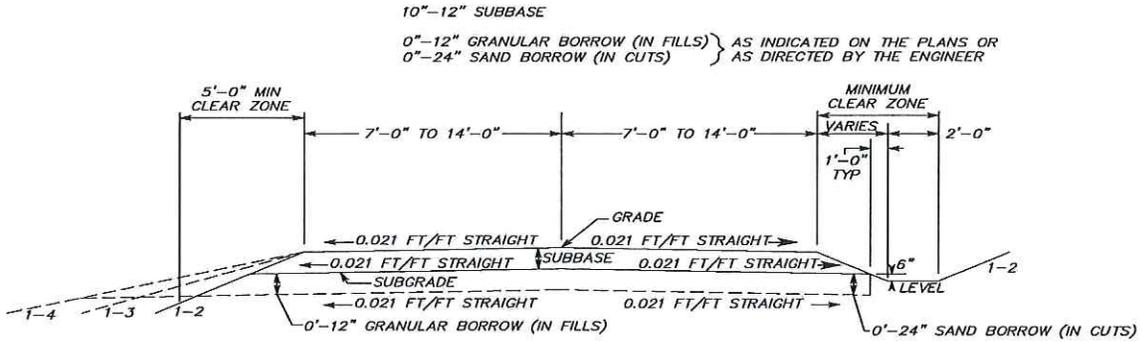
Erosion control practices to follow *Vermont Handbook for Soil Erosion and Sediment Control on Construction Sites*.

Cost Estimate:

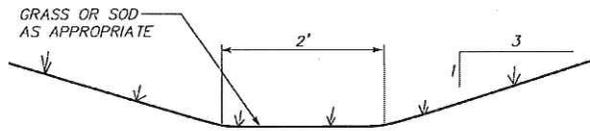
Roadway Drainage Improvement

Item	Quantity	Unit Cost	Cost
Removal of Trees	16 hours	\$240/hr	\$3840. ⁰⁰
Excavation and Shaping of Ditch	12 hours	\$120/hr	\$1440. ⁰⁰
Seeding and Topsoil	2000 LF	\$1.80/LF	\$3600. ⁰⁰
Gravel for Road Base/Grading	296 CY	\$35/CY	\$10360. ⁰⁰
Total			\$19,240.⁰⁰

TYPICAL DETAILS



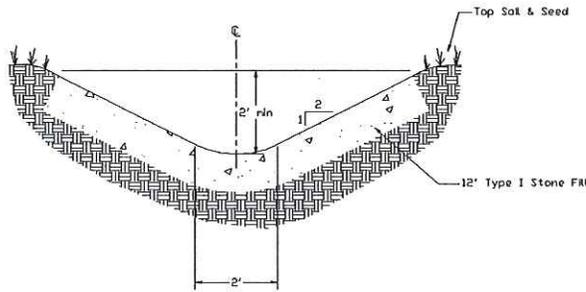
RURAL HIGHWAY TYPICAL SECTION
 (TOWN HIGHWAY, CLASS 3)
 STANDARD A-21



NOTE:
 PROVIDE SOD WHEN VELOCITY IS
 GREATER THAN 5 FT/SEC OR
 HIGHLY ERODABLE SOILS ARE
 ENCOUNTERED.

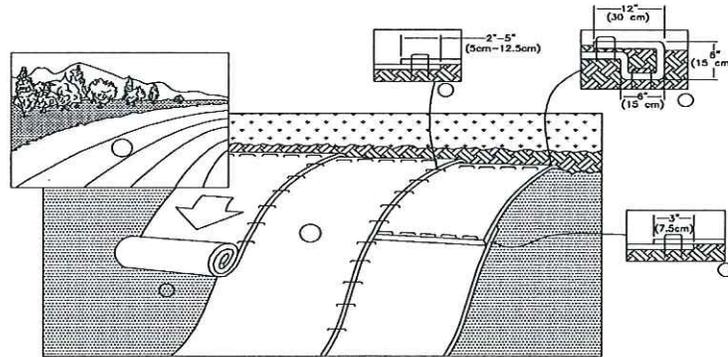
GRASS DITCH TYPICAL

N.T.S.



STONE LINED DITCH

N.T.S.

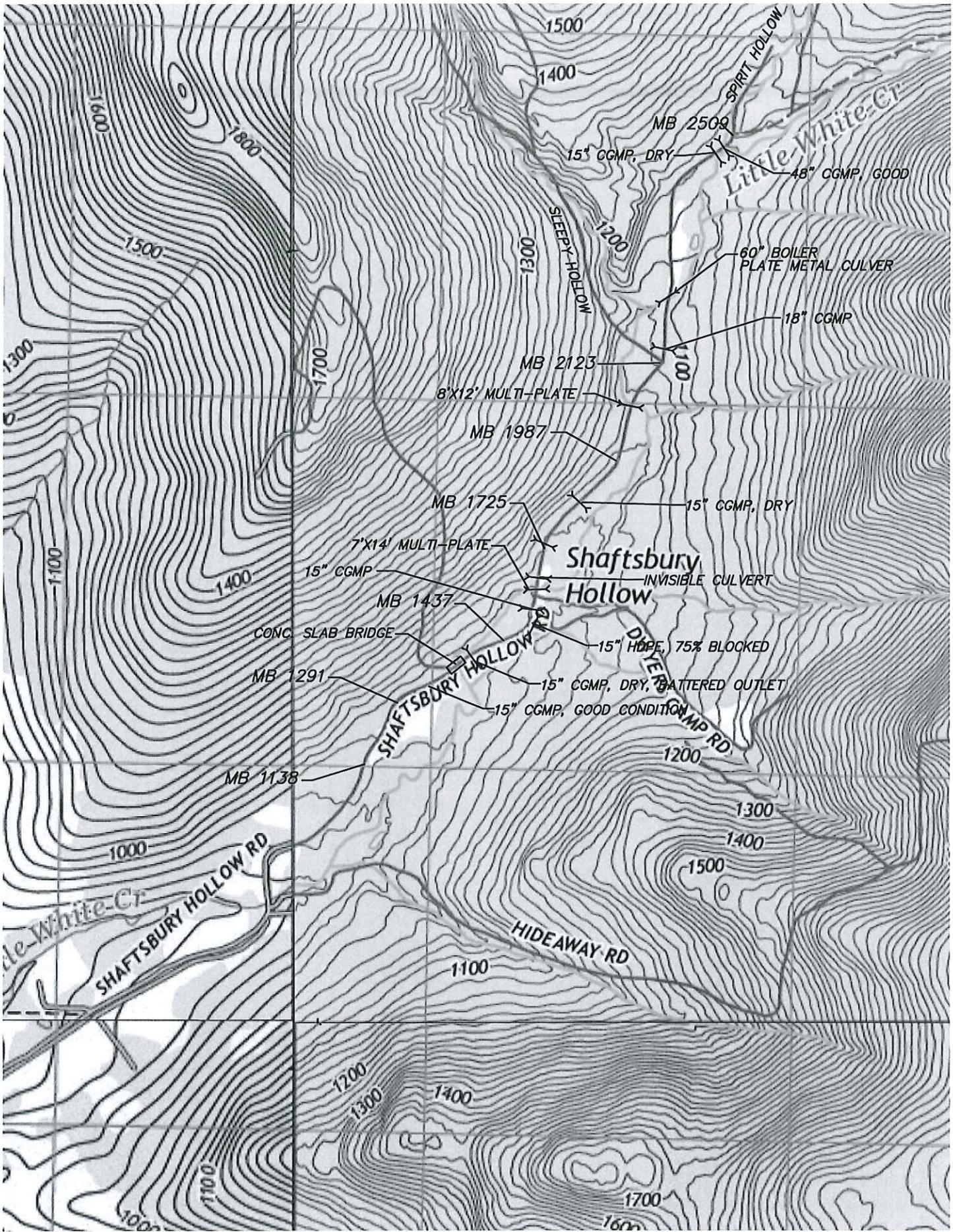


1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCT (RECP'S), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF SLOPE BY ANCHORING THE RECP'S IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30 CM) OF RECP'S EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR RECP'S WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) OF RECP'S APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP'S BACK OVER SEED AND COMPACTED SOIL. SECURE RECP'S OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF RECP'S.
3. ROLL THE RECP'S (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP'S WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP'S MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECP'S MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5CM - 12.5CM) OVERLAP DEPENDING ON RECP'S TYPE.
5. CONSECUTIVE RECP'S SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ENTIRE RECP'S EDITH.

NOTE:
IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE RECP'S.

EROSION CONTROL MATTING - SLOPE INSTALLATION

N. T. S.



1500

1400

SPIRIT HOLLOW

MB 2509

15" CGMP, DRY

48" CGMP, GOOD

Little White Cr

60" BOILER PLATE METAL CULVER

18" CGMP

SLEEPY HOLLOW

MB 2123

8'x12' MULTI-PLATE

MB 1987

MB 1725

15" CGMP, DRY

7'x14' MULTI-PLATE

Shaftsbury Hollow

INVISIBLE CULVERT

15" CGMP

MB 1437

CONC. SLAB BRIDGE

15" HOPE, 75% BLOCKED

MB 1291

15" CGMP, DRY, BATTERED OUTLET

15" CGMP, GOOD CONDITION

DEYERS CAMP RD

1200

MB 1138

1300

1400

1500

Little White Cr

SHAFTSBURY HOLLOW RD

HIDEAWAY RD

1100

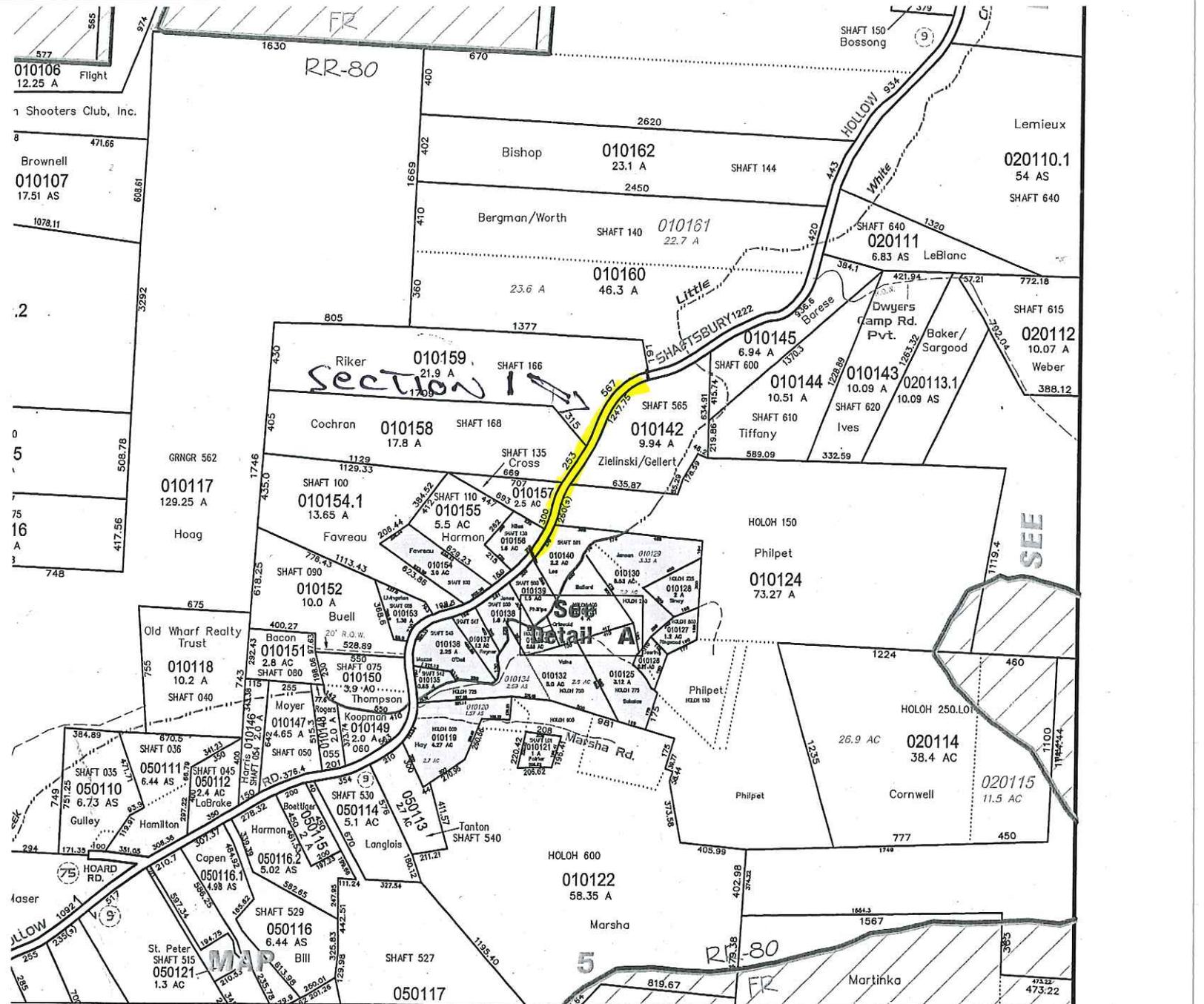
1200

1300

1400

1700

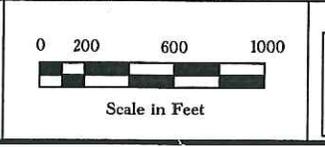
1600



Map Legend:

- Map Forest
- Common Ownership
- Land Plotted
- Private R.O.W.

NORTH



Map Index

	Arlington
New York	2
	5 6

PROPERTY MAP OF
SHAFTSBURY
 VERMONT

JAN. 2012
 MAP **1**

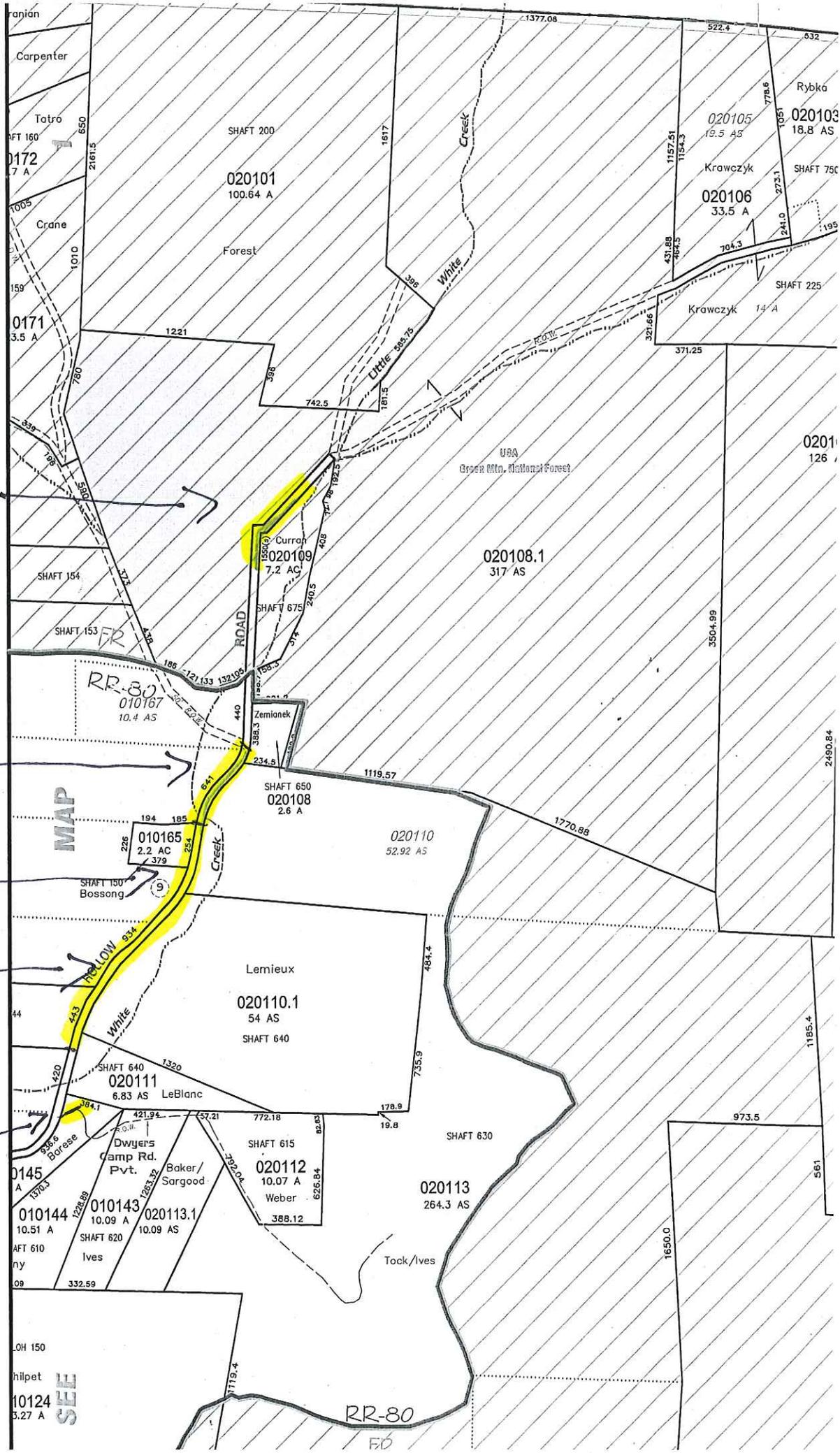
SECTION 6

SECTION 5

SECTION 4

SECTION 3

SECTION 2



MAP

SEE

RR-80
FD



Bennington County Conservation District

Promoting rural livelihoods and protecting natural resources in southwestern Vermont

April 13, 2016

Board of Supervisors

Ken Leach
Chair
(Rupert)
325-2514

Jim Henderson
Vice-Chair
(Sandgate)
375-9461

Josh Carvajal
(Bennington)
490-6163

Debbie Johnson
(Shaftsbury)
442-5945

Joe Nolan
(Arlington)
733-2143

Partners/Staff

Philip Rivara
Natural Resources
Conservation
Service Soil
Conservationist

Shelly Stiles
District Manager

Mr. Alan May
Municipal Assistance Bureau
Vermont Agency of Transportation
1 National Life Drive
Montpelier, VT 05633

RE: Town of Shaftsbury Better Roads application

Dear Alan,

The Bennington County Conservation District is pleased to support the 2016 application for a Vermont Better Roads program grant by and for the Town of Shaftsbury. If awarded, the grant would make possible many of the improvements recommended for Shaftsbury Hollow Road by a recently completed 2015 Category A Better Back Roads engineering study. We encourage the review committee to look kindly on the Town's worthy request for support.

Sincerely,

Shelly Stiles, district manager



Natural Resources Atlas
Vermont Agency of Natural Resources

vermont.gov



LEGEND

Road Erosion Risk Ranking

- Low Risk, 0.5 - 4
- Moderate Risk, 4.5 - 6
- High Risk, >= 6.5
- Town Boundary

1: 12,638
April 14, 2016

NOTES

Map created using ANR's Natural Resources Atlas

642.0 0 321.00 642.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 1053 Ft. 1cm = 126 Meters

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DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.



Bennington County Regional Commission

111 SOUTH STREET • SUITE 203 • BENNINGTON, VERMONT 05201 • (802) 442-0713 OR 442-0682 • FAX
(802) 442-0439

Alan May
Agency of Transportation
Municipal Assistance Bureau
1 National Life Drive
Montpelier, Vermont 05633

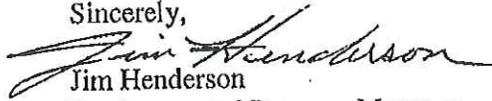
April 14, 2016

Dear Alan,

Please accept this letter expressing BCRC's support of The Town of Shaftsbury's proposal for funding through the Vermont Better Roads Grant Program to replace several undersized, deteriorated culverts connected by new stone lined ditches. BCRC staff have visited the sites and feel that the proposed project will help eliminate erosion and sediment deposition in Little White Creek.

Thank you for your consideration of these important projects.

Sincerely,


Jim Henderson
Environmental Program Manager