Better Back Roads Program Review

December 2015

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Montpelier, VT 05633

http://vtransengineering.vermont.gov/bureaus/mab/better-back-roads

Table of Contents

Introduction and History

The Better Backroads (BBR) Program, with financial support from VTrans and ANR DEC, has been working with municipalities since 1997 to provide both technical assistance and funding opportunities to promote the use of erosion control and maintenance techniques that save money while protecting and enhancing Vermont's rivers, lakes, and streams. The program had previously been under the direction of the Northern Vermont Resource Conservation and Development Council. In 2013 the program was brought in to VTrans for management and implementation in coordination with ANR DEC.

Efforts to improve water quality continue to be a focus for both agencies. Act 64 of the 2015 Legislative Session anticipates that funding through the Clean Water Fund, established in the Act, will be allocated in SFY17 for use within the Municipal Mitigation Program (MMP). MMP is the program in which the BBR Program currently resides. In addition to the funding that the MMP now receives from the Transportation Fund, additional funding will be forthcoming for municipal stormwater projects per Section 21a of Act No. 40 of 2015. In anticipation of this additional funding, a representative number of projects statewide were reviewed by a multidisciplinary team to assess the effectiveness of the BBR program to date.

In August and September of 2015, VTrans, ANR, and FHWA employees participated in a statewide field review of 23 grant recipient sites. Projects were selected throughout the state assess many different geographic locations, types of projects, different project ages, and even projects that hadn't been completed to get a good idea of what projects look like before they're built to confirm that the proposed solution is the best solution. The overall purpose was to determine if towns were getting the technical and financial support needed to complete financially responsible, environmentally beneficial, and lasting projects. The field review was also a great opportunity for professionals from different programs to learn from each other, ensure that consistent technical support is being given, better understand the competing needs that municipalities face, and in general, ensure that the relationships are in place to maximize assistance to municipalities for continued communication and collaboration can occur. VTrans participants included representatives from the Municipal Assistance Bureau (MAB) – where the program currently resides, the MOB and PDB Environmental Sections, MOB District technical staff, Vermont Local Roads, and Policy, Planning and Intermodal Development. ANR participants from the Department of Environmental Conservation included representatives from the VT Clean Water Initiative Program, the Stormwater Program and Rivers Program.

The team met in the field with municipal officials to gain their perspective on the program – in terms of financial support, technical support and whether or not the guidance on Best Management Practices (BMPs) was adequate for implementation. Municipalities were encouraged to articulate

both what worked well with the program and what could use improvement. It was evident that municipalities care greatly and do their best to responsibly maintain municipal roads, but that they are limited both in terms of financial and personnel resources.

State and federal participants were asked to provide input on what could be done at the program level to make the program better, what additional services/ training could be offered to municipalities and the adequacy of grant funding levels. At the project level they were asked to comment on the specifics of the various solutions – both in terms of being correct for the site and the execution of the work. They were also asked if any of the BMP guidance needed revisions or enhancements.

Summary of Findings and Plan for Implementation

Program Findings

The field visits and follow-up analyses provided an in-depth look at the program, associated guidance and other assistance that has been provided to towns. Throughout the visits, comments and feedback led to the following general findings:

- The Better Backroads Manual is in need of updating to both reflect the most current BMPs and more details on proper installation and implementation, and a heavy focus on proper maintenance practices and procedures. The last update of this manual was in 2009.
- The grant applications should be updated and the selection criteria modified to both clarify criteria and ensure that towns provide sufficient information so projects selected best meet the goals of the program.
- Consider awarding larger grants to appropriate projects and revising grant categories in anticipation of additional funding.
- More technical support and training is warranted – to assist municipalities with identifying solutions to problems, during construction, and undertaking proper maintenance. Proper installation of the right practices is almost as essential as maintenance of installed practices.

Implementation Plan

1. Update to the BBR Manual

While the basic BMPs still appear to be sound, the BBR Manual needs to be reviewed. This includes the consideration of BMP deletions and additions, and more implementation details – for example, ditching should start at the source of the problem instead of the output to maximize its effectiveness. More specificity on construction techniques should be considered as well. A parallel initiative being undertaken by the VT Department of Forests, Parks and Recreation is focused on roadside

vegetation management and enhancement with participation from VTrans and DEC staff. The documents may be cross referenced so that green infrastructure is enhanced in future guidance.

- **Recommended Action and Timeline**: A multi-disciplinary team led by VTrans MAB, which includes Alan May and Rachel Beauregard from MAB, Jon Armstrong, the Agency's stormwater engineer, Kevin Gadapee from Vermont Local Roads, Michaela Stickney from DEC Clean Water Initiative, Shayne Jaquith from the DEC Rivers Program, and Jim Ryan from DEC Stormwater Program, will meet over the winter to assess the manual and implement updates. MAB will also pursue funding opportunities to make a user friendly poster version of the most widely used BMPs for use by municipalities. Goal for completion – Spring 2016.

2. Increased Funding Levels and Enhanced Project Eligibility

The original BBR program focused mainly on gravel roads. Additional forthcoming funding for the MMP per Act 64 and Act 40 will allow for municipalities to make improvements on paved roads as well as replacing undersized culverts. The selection criteria need to be reviewed and refined to ensure that projects are selected that maximize the goals of the program.

- **Recommended Actions and Timeline**:
  - **Application -** Revamp application to include changes from two to four grant categories. Ask for more detail from applicants for the three implementation categories to include information such as the watershed, specifics on whether they received technical assistance on problem prior to application and from whom, source of the problem and readiness to implement. Receiving input from other VTrans staff as well as DEC staff, MAB staff will draft new application for review. Goal for circulating for review – December 15, 2015. Goal for completion – January 15, 2016.
  - **Scoring Criteria –** Review and implement new scoring criteria for various categories. Prioritize applications that have consulted with and received technical assistance prior to submission. Prioritize projects that have been identified as part of a Category A planning grant or other similar inventory. For paved roads and culverts, prioritize projects that have been identified as a need as part of Tactical Basin Plans or other similar inventories such as DEC's Stormwater Infrastructure mapping. As with application, MAB staff will draft for review and input from program partners. Goal for circulating for review – December 15, 2015. Goal for completion – January 15, 2016.
  - **Grant Amounts** – Review and adjust

In addition to the state funding noted above, there is federal funding for stormwater mitigation through the Transportation Alternatives Program. Federal-aid projects carry a significant administrative burden; thus the federal program should target more expensive projects.

The following thresholds and project categories are proposed, anticipating that approximately $3,000,000 will be available for grants in SFY17:

- **Category A for Road Erosion Inventory and Capital Budget Planning** – capped at $8,000 state with $2,000 local match for a maximum $10,000 project. Target at approximately 10% of total program.
- **Category B for Correction of a Road Related Erosion Problem and/or Stormwater Mitigation/Retrofit for both gravel and paved roads** – cap projects at $20,000 state with a $5,000 local match for a maximum $25,000 project. Ex. Stone or grass lining ditch, installing turnouts, stone check dams, splash pools, rain gardens, swirl concentrator devices, dry wells, gravel wetlands, level spreaders. Target at approximately 50% of total program.
- **Category C for Correction of a Stream Bank or Slope Related problem** – cap projects at $40,000 state with a $10,000 local match for a maximum $50,000 project. Ex. Stream bank stabilization or restoration, stone lined slopes. Stream and river/road conflicts must have consultation with an ANR River Management Engineer or Army Corps Engineer prior to submittal of application. Target at approximately 20% of total program.
- **Category D for Structure/culvert upgrades**– cap projects at $40,000 state with a $10,000 local match for a maximum $50,000 project. Ex. Culvert and structure upgrades and replacements, culvert headcut and gulley stabilization. Target at approximately 20% of total program.

3. Technical Assistance, Outreach, and Training

It was clear that more technical assistance, outreach and training are key to the success of the program. Towns receive a wide variety of trainings throughout the year, but it was discovered that many of the important trainings are either multi-day or are far away, so towns don't attend, or only attend one or two.

- **Recommended Actions and Timeline:** Identify trainings to be offered through VLR over the next year and assess if there are any shortcomings from a water quality perspective. Assess if training could be offered regionally or at a better time or location. In addition,

continued internal outreach occur regarding roles and responsibilities of the various groups within VTrans that provide technical assistance. Coordinate with VLR and DEC on planned trainings for 2016 and identify gaps in training needs by March 15, 2016.

- Proposed outreach activities to municipalities and regional planning commissions regarding program expansions, both funding and eligibility - is as follows: initial presentation to regional planning representatives through the regularly scheduled TPI meeting (January 2016), develop article/ program update for distribution through VLCT newsletter and VLR list serve by end of calendar year, MAB staff to coordinate with District staff at next available district project manager meeting, pursue MAB staff presenting program details at upcoming county road foreman meetings and update VTrans' website to provide more detail by end of calendar year.

Field Investigation Summary

23 site visits were conducted around the State over 4 days. Those present at the visits included representatives from VTrans (MOB Districts, Highways and MOB Environmental, MAB, VTTC, and Planning), ANR (DEC), and FHWA. Included below is a summary of what sites were visited.

Site Visits- Day 1 (VTrans Districts 5 & 8), August 3, 2015

Site 1
Williston, Avenue C & D Erosion Project (Federal Stormwater Earmark project)
Grant Year: 2011 Year Completed: 2011 Project Cost: $167,000
Work Description: Failed stormwater system caused bank erosion which leads into Class 2 wetland and an impaired stream (Allen Brook).
Work Completed: Installation of 3 basins that step flow down and reduce discharge velocity.

Before:
None available.

After:

Summary:
This project primarily used federal earmark funding to fix their site, but would be a good example for a Better Backroads or Transportation Alternatives project in the future as bank stabilization is covered in the Better Backroads manual and program.

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   Yes. Slope was stabilized and seeded and mulched.

2. Effectiveness of BMP
   Slope stabilization work was effective, although woodier vegetation could have been used to further stabilize slope.

3. Could additional funds be utilized at this site?
   No, this was a federal grant and did not have the same capped amount as a Better Backroads grant.

Site 2
Williston, East Hill Rd Erosion Project
Grant Year: 2014 **Year Completed: -----** **Project Cost: $68,000**
Work Description: Repair eroded ditch and stone line it to slow down water velocity and treat water that entered a tributary to the impaired Allen Brook.
Work Completed: Stone line approx. 2,000 feet of ditch.

Before:

After:
None. Project will likely be completed this year.

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   According to the manual, we recommend a grass ditch for under 5% slope, but with the flow at this site, the town adjusted and is placing a rock lined ditch. We agree with this method and suggest updating the manual to recommend ditch material type based on slope and runoff volume, but not make it a requirement to place a material based solely on these two factors.

2. Effectiveness of BMP
   N/A, project has not been constructed yet.

3. Could additional funds be utilized at this site?
   Yes, additional funds could have been used so the town didn't have to segment the project or wait for extra grant money to construct. We would also suggest if extra funds were available that the town look at off site attenuation/detention as this could be beneficial at this site.

Site 3
Underhill, Harvey
Grant Year: 2014 **Year Completed: 2014** **Project Cost: $32,000**
Work Description: Steep grades have caused approximately 1,300 feet of ditch and road bank erosion on both sides of the road.
Work Completed: Stone line ditches, armor banks, and install a few check dams and turn outs to slow speed of water.

Before:

After:

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were used properly, but better assistance from VTrans could have provided for a better fix. The town has good intentions placing stone in ditches and fixing the road to get it open for the public with limited resources and staff. Ditches could have been a bit deeper, and a different road surface material choice, if used could have enhanced the project as much of the material ended up in the ditch. However, the current program parameters don't allow for road surface gravel, so the town did the best with the money they had.

2. Effectiveness of BMP
   The BMP's were not 100% effective at this site as the rock used was smooth, allowing water to flow rapidly through the ditch. We suggest adding guidance in the manual on ditch depth, material size and type, and ditch roughness to slow down water. We also suggest aligning guidance in the manual with state specs and drawings.

3. Could additional funds be utilized at this site?
   Yes, if the grant program paid for surface material, a better material could have been laid on the roadway.

Site 4
Johnson, Foote Brook Rd Road Erosion
Grant Year: 2016 **Year Completed: -----** **Project Cost: $15,000**
Work Description: Gravel and sediment from roadway and shoulder continuously wash into VT 15 and Foote Brook, which leads to the Lamoille River. Rains cause pavement and shoulder washouts.
Work Completed: 300' of ditching, placement of stone check dams, erosion matting and seed, underdrains and stone lined ditch.
Before:

After:
Current award year grant. Project has not been completed yet.

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   Not all proposed BMP's will be used correctly as there was no outlet treatment planned, as suggested in the BBR manual to present outlet erosion and undermining. Upon mention to the town, they now plan on fixing this issue. This was caught by the selection committee, and we recommend continued stringent review of applications and ensuring that all applicable information is included so the committee gets a good idea of how the problem will be fixed. Other BMP's, such as stone lined ditches, will be used properly. When this project was awarded grant money, additional requirements were imposed by the selection committee for an overall better project. The town recognized the value of these additions and plans to implement these added BMP's.

2. Effectiveness of BMP
   N/A, project has not been completed yet.

3. Could additional funds be utilized at this site?
   Additional funds could have been used at this site to create a better project for add in more cross pipes for flow relief and additional stone lining of their ditches.

Site 5
Eden, East Hill Road
Grant Year: 2005, 2010, 2012, 2014 Year Completed: 2005, 2010, 2012, 2014
Project Cost: $20,000
Work Description: Roadway and ditch erosion due to steep grades leading into Boomhower Brook.
Work Completed: Stone line 640' of ditch.
Before:

After:

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   Yes, ditches were lined well and turnouts were used to control the flow of water on these sites.

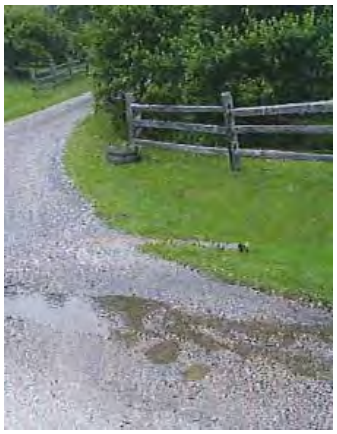
2. Effectiveness of BMP
   BMP's were effective as the foreman was cleaning ditches for the first time after 10 years of service. We would like to see larger stone in the ditches to slow the flow of water during high runoff events.

3. Could additional funds be utilized at this site?
   Yes, with more funding the town could have stone lined and ditched both sides of the road.

Site Visits- Day 2 (VTrans Districts 1 & 3), August 10, 2015

Site 1
Mendon, Journey's End
Grant Year: 2013 **Year Completed: 2013** **Project Cost: $14,000**
Work Description: Lack of appropriate ditches caused erosion and sediment entered into the Rutland City watershed.
Work Completed: Redefine and stone line ditches, replace culvert, create water turnout, stabilize bank.
Before:





After:


Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were used, but ditches could have been deeper, as the water didn't sheet flow off the downhill side of the road. A couple of passes with a grader to change the cross slope of the road would fix this situation.

2. Effectiveness of BMP
   BMP's were effective, but maintenance was not taken into consideration, especially with the placement of a catch basin on a dirt roadway.

3. Could additional funds be utilized at this site?
   It appeared that the funding available was adequate for this site.

Site 2
West Rutland, Clark Hill Rd
Grant Year: 2014 **Year Completed: ---** **Project Cost: $13,500**
Work Description: Repair eroded ditch and stone line it to slow down water velocity and treat sediment issues.
Work Completed: Stone line approx. 400 feet of ditch.
Before:

After:
None available. Project will start 8/17/2015.

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   The town intended to use BMP's, but as they had not received technical guidance from VTrans, and instead were receiving guidance from another town. The town originally planned to complete the project by starting at the bottom of the hill and working their way up, but upon suggestion from the group, the town will now be starting their work at the top of the hill as opposed to the bottom. This clearly shows a gap in education that VTrans needs to provide, as the town had the best intentions, but was missing VTrans technical support. We also suggest adding guidance to the manual regarding starting work at the highest point of a project as opposed to the lowest in case of storm events.

2. Effectiveness of BMP
   N/A, project has not been completed yet.

3. Could additional funds be utilized at this site?
   Yes, town was assembling project in parts and could have benefitted from a significantly larger amount of funding.

Site 3
Middletown Springs, Coy Hill Rd
Grant Year: 2016 **Year Completed: ---** **Project Cost: $11,250**
Work Description: Ditch, roadway, and bank erosion has caused issues on this road.
Work Completed: Stone line ditches, armor banks, install a few check dams and turn outs to slow speed of water, crown road.
Before:



After:
None available. Work has not been completed.

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   Some BMP's will be used properly such as check dams and turn outs, but some additional consideration for outlet protection would enhance the project.

2. Effectiveness of BMP
   N/A, project has not been constructed yet.

3. Could additional funds be utilized at this site?
   Yes. Town was completing project in segments, and while they were doing the work in the correct order, it would have been best to do the work all at once.

Site 4
Dorset, Lower Squirrel Hollow Rd
Grant Year: 2016 **Year Completed: -----** **Project Cost: $80,000**
Work Description: Nearby stream has caused shoulder and roadway erosion due to bedrock, leaving nowhere for the stream to go but the road.
Work Completed: Install at 100' retaining wall, drilled an anchored to ledge.
Before:



After:
Current award year grant. Project has not been completed yet.

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were not applicable to this project as it was a unique fix to a difficult situation. In the future we suggest adding guidance to the manual regarding retaining walls, weep holes, and stream alteration, including looking beyond the project when repairs are made and more consultation with river engineers.

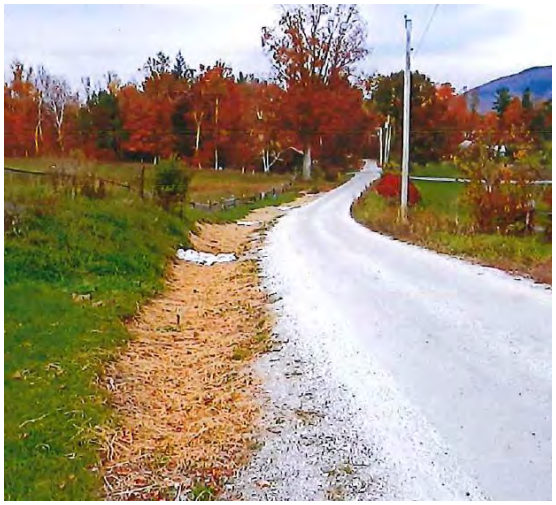
2. Effectiveness of BMP
   N/A as BMP's for this type of project are not available at this time.

3. Could additional funds be utilized at this site?
   Yes, town was using bad estimates, two funding sources, and there was question as to whether a VTrans Structures grant would have been more applicable for the entirety of the project. This did bring into question whether there was enough communication in the future about additional funding sources for a project and suggest modifying the grant applications accordingly to allow towns to provide this information.

Site 5
Danby, Easy Street
Grant Year: 2014 **Year Completed: 2014** **Project Cost: $32,000**
Work Description: Narrow roadway and ditches caused roadway erosion.
Work Completed: Install french drain and upsize culverts.

Before:
Pictures unavailable.

After:



Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were not used as there is no BMP for french drains in the Better Backroads manual. Consideration will be made to assess subsurface features such as this in the manual update.

2. Effectiveness of BMP
   While the work completed was effective, we believe maintenance will be an issue with this site in the future. Given the lack of ROW this may have been the best fix for this site with the grant funds awarded.

3. Could additional funds be utilized at this site?
   Yes, if ROW expenses are allowed in the future as they are currently not allowed in the program. With additional funding the town could have acquired additional ROW and used that space to place a properly sized ditch and driveway culvert.

Site Visits- Day 3 (VTrans Districts 7 & 9), September 14, 2015

Site 1
Orange, Preston & Brisson Rd
Grant Year: 2013 **Year Completed: 2013** **Project Cost: $15,500**
Work Description: Poorly shaped and unlined ditches cause erosion, sedimentation, and road washout issues.
Work Completed: Stone line ditches, stabilize banks, and reshape road shoulders.

Before:

After:

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were used properly, but as suggested previously, there should be some guidance in the Better Backroads manual regarding shape of stones placed in ditches. It is also suggested that some water turnouts of stone check dams be placed to dissipate the velocity of the water in the ditch.

2. Effectiveness of BMP
   BMP's were somewhat effective. We suggest modifying the Better Backroads manual to allow for grader maintenance on stone lined ditches. Stone on the roadway side of ditches should extend to just below the road bed so a grader blade may scrape off the berm without concern of hitting stone in the ditch. While many BMP's were used properly, the presence of berms was noted and some grader work to take the berms down would greatly reduce maintenance issues at this site. It is also acknowledged that berms occur on every roadway due to winter maintenance and may not be a realistic maintenance goal for every town.

3. Could additional funds be utilized at this site?
   Additional funds may have been used to create water turnouts of check dams in ditches.

Site 2
Groton, Ricker Mill Rd
Grant Year: 2015 **Year Completed: --** **Project Cost: $9,900**
Work Description: Repair eroded ditch and stone line it to slow down water velocity and treat sediment issues.
Work Completed: Grass line and stone line ditch, create stone lined turnout, culvert outlet apron/splash pad, and replace a driveway culvert

Before:

After:
None. Project not completed yet.

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's will be used at this site and while it is a quality project, upstream property owners need to be held accountable by the town or ANR for their contributions to water quality as well. The property owner upstream of this site has a wide open site that drains a dirt lot directly in the road. We suggest the town try to remedy this situation with the property owner as well to truly fix the issue.

2. Effectiveness of BMP
   N/A. Project has not been constructed yet.

3. Could additional funds be utilized at this site?
   No, we believe the fix is appropriate and additional money would not impact the repairs to be completed at this site.

Site 3
Barnet, Somerhill Rd
Grant Year: 2013 **Year Completed: 2013** **Project Cost: $20,000**
Work Description: Lack of cross pipe on hill causes ditch erosion and downhill culvert sedimentation and plugging.
Work Completed: Add cross culvert and stone line ditch.

Before:



After:


Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were used properly on this site and the outlet structure had an excellent splash pool that was working well.

2. Effectiveness of BMP
   BMP's were effective and the town did an excellent job of repairing this site and creating a quality and lasting fix. Check dams or another form of energy dissipation could have been used on this site and would have been a good idea to look into. The Better Backroads manual should also be edited to include suggested situations for using energy dissipation techniques on sites.

3. Could additional funds be utilized at this site?
   Yes, additional funding would have helped the town as they would have had to contribute less money to the project.

Site 4
Danville, Kittredge Rd
Grant Year: 2009 **Year Completed: 2010** **Project Cost: $26,000**
Work Description: Undersized pipe causes major roadway washouts.
Work Completed: Stream bank stabilization, installation of new box culvert

Before:


After:


Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were used properly on this site and stream alteration and hydraulic engineers were consulted.

2. Effectiveness of BMP
   BMP's have been effective at this site. The only recommendation would be to fill the baffles inside the box culvert to allow for aquatic passage.

3. Could additional funds be utilized at this site?
   Yes, a project like this would be ideal to provide additional grant funds for as it is a quality and lasting fix to a severe erosion problem.

Site 5
St. Johnsbury, Mooney Rd
Grant Year: 2013 **Year Completed: 2013** **Project Cost: $11,000**
Work Description: Steep grades cause ditch erosion and loss of roadway gravel.
Work Completed: Remove ledge, raise road grade, and reshape ditches.

Before:

After:

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were implemented well at this site, but road width and ROW constraints should be taken into consideration, as the project limited road width which could lead to safety issues for road users.

2. Effectiveness of BMP
   The work done on this site was effective and all BMP's used have held up well.

3. Could additional funds be utilized at this site?
   Yes, if ROW expenses were an eligible cost. If this were allowed in the future the town would be able to purchase ROW to increase road and ditch widths to enhance the safety of this roadway for all users.

Site 6
Glover, Phillips Rd
Grant Year: 2015 **Year Completed: ---** **Project Cost: $21,000**
Work Description: Sweeney Pond outlet has failed causing roadway erosion.
Work Completed: Repair wingwall and drop on the outlet.

Before:

After:
Project not completed yet.

Summary:

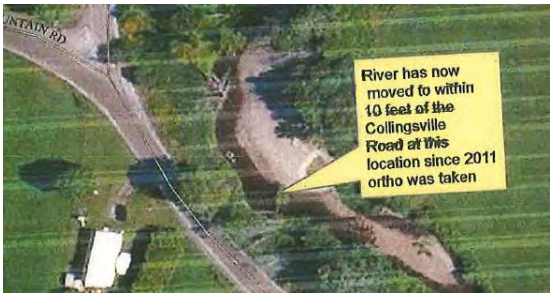
1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's will not be used as they were not applicable to this project. It is suggested that projects like these have continued coordination with river management engineers.

2. Effectiveness of BMP
   N/A. Project has not been constructed yet and BMP's are not applicable to this sort of project.

3. Could additional funds be utilized at this site?
   Yes, the limiting factor at this site is an undersized box culvert, and additional funds could have been used to replace this undersized structure.

Site 7
Craftsbury, Collinsville Rd
Grant Year: 2015 **Year Completed: ---** **Project Cost: $10,000**
Work Description: Unstable stream bank is threatening road.
Work Completed: Armor bank with stone (100'x6') making sure all rocks are keyed into slope.

Before:



After:
Project not yet completed.

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were not used at this site as there were not applicable to this type of project. It is suggested that there is continued coordination with river management engineers.

2. Effectiveness of BMP
   N/A. It is suggested that the town consider the project's impacts on downstream structures that are severely undersized and keep in working contact with river management engineers.

3. Could additional funds be utilized at this site?
   Yes, this project requires significant funding for a proper fix though as there are so many undersized structures downstream and the river is currently in motion and incising.

Site Visits- Day 4 (VTrans Districts 2 & 4), September 22, 2015

Site 1
Northfield, Forest Rd
Grant Year: 2013 **Year Completed: 2013** **Project Cost: $42,000**
Work Description: Improper ditches and undersized culverts are causing road and ditch erosion.
Work Completed: Rock line ditches and remove ledge where necessary, upsize culverts,

Before:

After:

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were used properly given the slope of the backside of the ditch. The grader operator did an excellent job cleaning up berms on this site and stone headwall work was done very well.

2. Effectiveness of BMP
   BMP's were effective, and while the ditches were having issues, this was due to a property owner dumping debris into the ditches. It is suggested that the town work with the property owner to remedy this situation.

3. Could additional funds be utilized at this site?
   Yes, additional funds would have allowed the town to spend less of their own funds and more grant funds on this project as well as complete a lower segment of the project.

Site 2
Randolph, Tatro Hill Rd
Grant Year: 2013 **Year Completed: 2013** **Project Cost: $20,500**
Work Description: Undersized 24" culvert causes erosion and sedimentation issues.
Work Completed: Replace undersized culvert with 5' squash culvert with header, 175' of grass lined ditch, 300' of stone lined ditch, 5 water turnouts

Before:


After:


Summary:

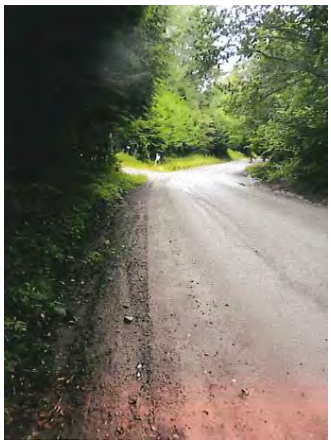
1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were used properly on this site. Stream alignment and aquatic passage should have been considered as there was a drop on the outlet end which doesn't allow for aquatic passage. The culvert also wasn't aligned well with the stream, causing it to make a turn to enter, which can cause erosion and flow issues during high flow events. It also could have benefitted the project to place wingwalls on the culvert header.

2. Effectiveness of BMP
   BMP's were effective, but alignment and passage should have been considered and the project may have benefitted from consultation with a river management engineer.

3. Could additional funds be utilized at this site?
   Yes, additional funds may have allowed for stream alteration.

Site 3
Barnard, East Barnard Rd
Grant Year: 2013 **Year Completed: 2013** **Project Cost: $21,500**
Work Description: Ground water is pushing the roadway bank into brook below.
Work Completed: Install curtain drain under stone lined ditch to effectively drain roadway.

Before:



After:

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were used. General and winter maintenance has created berms which channelizes the flow of water and has unintentionally created erosion issues. Upon review, the longevity of the solution may have been enhanced by stabilizing the slope rather than ditching. Proper grading could have eliminated the berm issue, and slopes should have been stabilized instead of trying to place a ditch. While not in the Better Backroads manual, it would be recommended to grade the road to sheet flow off and stabilize the slope issue.

2. Effectiveness of BMP
   BMP's used were effective, but a different fix to this project may have resulted in a better solution.

3. Could additional funds be utilized at this site?
   Yes, a proper fix at this site would require a significantly larger amount of funding.

Site 4
West Windsor, Knob Hill Rd (Multiple sites)
Grant Year: 2014 **Year Completed: 2014** **Project Cost: $12,000**
Work Description: Unlined ditch is causing erosion, stream bank is approaching and eroding road.
Work Completed: Shape and stone line ditch, place keyed in rip rap on eroding stream banks.

Before:


After:


Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were used properly, but we suggest consultation with a stream alterations engineer as the stream was constricted by stone and may cause flooding and road erosion during storm events.

2. Effectiveness of BMP
   BMP's were effective, but constricted the stream.

3. Could additional funds be utilized at this site?
   Yes, additional funds would allow for the project to be built without constricting the stream.

Site 5
Andover, Stiger Rd
Grant Year: 2013 **Year Completed: 2013** **Project Cost: $7,500**
Work Description: Ditches and culvert need stabilization.
Work Completed: Stone line ditch and rip rap around culvert.

Before:

After:

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's were used, and properly for ditching techniques. It is suggested that the town look at downstream impacts, place a splash pad, and support the end of the culvert.

2. Effectiveness of BMP
   The town had good intentions to use BMP's properly, and implemented several well with the knowledge they had, but with some guidance from VTrans, could have done a better job implementing others. One BMP of particular concern was outlet protection, where the outlet was protected, but there was still a drop from the culvert outlet to the stone pad below.

3. Could additional funds be utilized at this site?
   Yes, downstream impacts could have been mitigated with additional funding.

Site 6
Londonderry, West River St
Grant Year: 2016 **Year Completed: ---** **Project Cost: $18,500**
Work Description: 11 culverts are undersized for in poor condition and in need of erosion protection at inlets and outlets.
Work Completed: Upsize culverts, install headers, line and improve ditches where necessary.

Before:

After:
Project not completed yet.

Summary:

1. Were BMP's identified in the BBR manual proposed for the repair and were they properly applied?
   BMP's will be used used properly as culverts were properly sized and had splash pads, but it is suggested that culvert length be modified to better fit roadway widths.

2. Effectiveness of BMP
   N/A. Project is under construction.

3. Could additional funds be utilized at this site?
   Yes, this would allow the town to replace more culverts.

Findings and Proposed Changes

While it was known that the Better Backroads program has been an effective and valuable program for towns, the field visits verified the need for some changes to the Better Backroads granting process/application, the manual, training, and some interagency coordination should be done on a periodic basis to ensure the program is running effectively and efficiently.

Field Day Site Visit Reviews and Comments

Reviewers discovered that there were many good things happening at sites, which shows the program is effectively, but there was also room for improvement.

The positives:

Towns did an excellent job of finding creative solutions to difficult issues, especially given the space and financial constraints they were presented with. It is recognized that many towns are working with crews of 1-2 personnel per 50 miles of roadway and do not have town budgets that allow for large projects. Town crews have the best intentions in mind and try to complete the best fix with the knowledge they have.

Almost all sites had properly placed vegetation and had seeded and mulched sites after construction to allow for vigorous growth of vegetation. Most culverts that were replaced had well-built headwalls and were appropriately sized using VTrans hydraulic standards, especially those constructed post-Irene. Some towns had cut and angled the ends of culverts to better pass water through them during high volume events, a creative solution to a potentially disastrous situation. Towns seemed to have knowledge of when to stone line and when to grass line ditches, and did an excellent job using the Better Backroads manual as guidance for their projects.

The opportunities for change:

Ditching and Maintenance:

While all towns did the best work they could with the knowledge they had, there were some improvements to be made on sites. While sites were vegetated, some sites could have had a better vegetation choice, such as using rooting trees and shrubs to hold in a bank instead of grass. Some sites could have improved their ditching by using larger stone, as well as adding roughness instead of creating smooth ditches, adding check dams, turnouts, and cross pipes where appropriate. The Better Backroads manual should be updated to eliminate guidance showing grass between a ditch and roadway, and include stone types that correlate with state specs. A common theme at almost all of the sites was the presence of berms. While this is a never ending battle for maintenance crews, some grader training and guidance on the use of winter sand and what type may improve, but not eliminate this problem. We believe we can combat some of these issues by providing more guidance

before and during construction using District, VLR, and MAB forces as well as ANR Stream Alteration Engineers to aid the town in coming up with the best solution for the site. Many sites had also used fabric in their stone lined ditches. This older guidance in the Better Backroads manual will be altered in the near future, as in certain soil situations it creates a slip and slide for rocks during high flow events. One site used a French drain to eliminate seepage and ditch issues, and while it worked, the life expectancy of such a system on a dirt road is significantly shorter than on a paved road. Most towns don't use this sort of system, but it may be worth touching upon in the Better Backroads manual.

Culverts and Water Passage:

Some projects did not consider aquatic passage, which led to a discussion on getting towns more involved in Roads and Rivers trainings as well as giving them a general awareness of wildlife passage through bridges and culverts. It also appeared that some towns had an aversion to turnouts due to the ROW process to acquire turnout rights. One site had used a drop inlet on a dirt road with a stone lined ditch. While the drop inlet did a wonderful job of catching dirt and debris, it also filled up quickly and was in need of cleaning. There may be a need to advise town on placing drop inlets on dirt roads and the maintenance repercussions. Many crews were aware of stream encroachment, and while they tried to use best practices, consulting with a Stream Alterations Engineer would have changed the projects. Some towns had unknowingly constricted the stream and floodplain, while another town was missing weep holes on a retaining wall between the stream and road, which would have allowed for more sheet flow instead of concentrating it and then dumping it into the stream.

Program Changes

While the program as a whole is run very well and most towns are happy to accept grant money, we suggest several changes to the program. These changes are broken up into several categories: overall programmatic changes, grant program changes, manual changes, and program communication and coordination, and other technical guidance. Changes to the program and grant application will be completed before FY17 grant applications go out.

Inter and Cross Agency Coordination

The first suggested overall programmatic change is to provide better coordination between VTrans MAB, VTrans MOB Districts, VTrans MOB and PDB Environmental, VT Local Roads, and ANR DEC. Our steps to achieve this goal are outlined below:

- Send VTrans MOB and ANR DEC a list of approved grants annually soon after they are selected

- Hold quarterly meetings between VTrans and ANR- DEC to discuss relevant program issues and the newest guidance related to the program so all are giving the same guidance
- Create a list of grants available for towns and publish on VTrans website as a sort of one stop shopping to fund their projects
- Continue to conduct project reviews and generate a report on a +/- 5-year basis

Trainings

Towns receive a wide variety of trainings throughout the year, but it was discovered that many of the trainings that are important for towns are either multi-day or are far away, so towns don't attend, or only attend one or two the trainings that we believe are part of the key to success for these programs. Some of the training we identified as important are Roads and Rivers Training, Wildlife and Roads Training, and Construction Safety Awareness Classes. We recommend these three trainings be consolidated to fit into a one-day training for towns that are held regionally (7-9 classes statewide). Trainings must be focused on hands on work to keep people moving and demonstrate skills that are used in employee's everyday employment duties. One example of an important activity would be the Roads and Rivers model exercises, which get employees up and moving as well as teaches them the direct impacts of their actions on an accelerated timeline. It should also be noted that there is a desperate need for grader training classes as experienced road crew leave and newer operators take over and don't have the years of knowledge on use, proper operation, and best practices for grading roadways.

Grant Program Changes

Grant Project Eligibility

There seems to be some confusion with towns about what is and is not eligible for project funding. It would behoove us to further clarify eligible items in the grant application, as well as allow some items to be eligible that have not been in the past. One item that was brought up many times was the eligibility of gravel. In the past this has not been allowed, as a town could just buy a large quantity of gravel and use it on any road without the grantors knowing that it was not used where it was supposed to be. Unfortunately, this also means that many towns have to fund the gravel out of their own town budget. Many towns cannot afford this additional expense and are purchasing or using subpar gravel from their own pits instead of using gravel that compacts well and won't erode during storm events. This may require more oversight, but in the long run, will provide for better projects as the gravel won't erode during most storm events, clog up stone lined ditches, and end up in the rivers and streams we're trying to clean up.

It should also be noted in this section that we are not proposing funding any equipment purchases for projects. ANR plans to implement a grant program that will cover equipment purchases, and we feel there is no need to replicate programs if one already covers this item.

Grant Application Changes

As projects must have a direct impact on water quality, we plan on rewording the application to include items such as watershed size, how far the project is from a stream or river, and rewording application questions from broad topics such as "Define the project" to something more specific, such as "What is the issue with the site and how do you plan to fix it?" We also plan to rank based on ANR's road erosion risk inventory for roadways where this inventory is applicable and distance to the nearest waterway (wetland, stream, lake) from the end of the project.

The grant application should also include a line asking what groups or agencies the town has talked to for guidance on how to construct their project. Examples would include a River Management Engineer, VTrans District Tech or Project Manager, ANR DEC Basin Planner, or the Army Corps of Engineers.

Towns will still be able to apply for multiple grants in any year and with the addition of new grant categories, will have to provide information for each category. VTrans MAB staff will work to streamline the application and selection criteria as much as possible knowing that towns will likely apply for grants in multiple categories.

Grant Selection Committee

It was agreed upon, that the grant selection committee should continue to include members from both VTrans and ANR DEC as all of these individuals have a background in back roads and water quality as well as a maintenance perspective of these sites. After a discussion on committee members, we suggest the FY17 selection committee consist of Alan May and Rachel Beauregard from VTrans MAB, Kevin Gadapee (Vermont Local Roads), Jon Armstrong (VTrans Environmental), Jim Ryan, Michaela Stickney, and Shayne Jaquith (ANR DEC). These members all have a vested interest in Better Backroads projects as they either guide the program, provide training for it, or set roadway water quality standards that impact how these projects are built.

Timing of Grant Solicitation, Selection, and Project Awarding

As many towns much plan their budgets ahead of the construction season, it would be better for the program (and towns) to begin a shift of the grant program starting in FY17 and completing the shift in FY18 with a fall application deadline and a late spring/early summer award notice the following

year. This will allow towns to plan the work over the winter and take quality pictures in the fall for their grant applications, when snow is not on the ground.

Grant solicitation will be announced on the VTrans website and the VLR list server as well as through mail notification to every town. Annually, VTrans Municipal Assistance Bureau staff will attend regional foreman's meetings, or set up individual regional informational meetings if a region does not have an active foreman's group to present grant and program information. We will also continue to coordinate and share information with the regional planning commissions.

The grant schedule and project awarding for FY 17 and beyond is proposed as follows:

SFY17
Grant program applications sent out to towns-March 1st
Applications due back to VTrans-April 15
Grant money allocated by legislature-May
Notification of grant awards-June 1
Towns may begin work-July 1

SFY18
Grant program applications sent out to towns-October 1
Applications due back to VTrans-November 15
Grant money allocated by legislature-May
Notification of grant awards-June 1
Towns may begin work-July 1

Construction Oversight

With every project, it is important that the fix is something that is lasting, and is the best solution for the site while keeping finances in mind. We suggest on the application that towns contact ANR River Engineers and their VTrans District Technical Staff prior to completing the project, but are changing the application to have check boxes to see if towns actually contacted all necessary groups. For example, if a town has a project along a river, but has not checked the box for contacting the ANR River Engineer, we can then require that the town contact the engineer as well as have the engineer review the application prior to awarding their grant to make sure the town is putting in place the best solution fort this site, and that it isn't going to just push and exacerbate problems downstream. We also heard that Districts want to be move involved in the process with these grants. While we encourage towns to contact districts, we hope that by giving districts a list of towns that have received awards, the districts will then be able to contact towns they have not heard from previously to review their projects and aid them while under construction. Similar to the example above, grant reviewers will also be able to use districts to review questionable sites prior to funding the grant if they have not been visited already. We will encourage towns to continue to use BMP's during construction, such as seeding, mulching, and hydroseeding to stabilize portions of

work as they go and reduce the risk of erosion on their project. This will hopefully also prevent the funding of band-aid fixes and will allow towns to come up with good, quality, lasting fixes to problem areas.

Maintenance Considerations and Post-Construction Activities

One topic that is not covered in the grant application or manual yet is maintenance consideration. We witnessed some projects on the site visits which were great fixes for the situation, but if another fix had been implemented that worked just as well, it would have required less maintenance. We suggest that when reviewers are selecting applications they consider what maintenance may be involved with the project and whether there is another solution available that solves the same problem, but requires less maintenance. For example, some sites have stone lined ditches that had stone going right up to the edge of the roadway. While this protects the edge of the roadway during high flow events, it also causes maintenance problems down the road as the grader operator can't put their blade all of the way down to the ground, so are berm forms over time, preventing water from sheet flowing off the roadway and entering the ditch. This instead concentrates flow resulting in a break through and erosion once the flow concentrates itself enough to get through the berm. This simple design change will prevent issues before the project is constructed, and a change to add this information to the manual may prevent some of these issues in general maintenance projects as well.

Better Backroads Manual Changes

While the current manual addresses many topics related to Better Backroads best management practices, some practices are out of date, and some additional guidance should be added for situations that are frequently encountered out in the field, such as guidance on proper stone size and proper use of stone on projects.

New guidance to add to the manual

Throughout the field visits, it was evident that some towns were not aware of the importance of starting work at the highest point of a site and working their way down. This guidance should be added to the manual because if a storm were to occur and a town were working from the lowest point of a site up, it is likely much of their work would either erode or infill (especially stone lined ditches) due to the poor state of the site uphill.

Guidance should also be added on the appropriate use of catch basins and drop inlets. Towns should be aware of the maintenance implications when placing a catch basin on a dirt road, and that catch basins must be properly designed in order to function well. They should also be aware of the

importance of street sweeping, stabilizing catch basin outlets, and regularly cleaning out catch basins. Stacked walls and retaining walls should also be added in this section as they are commonly used on projects with slope issues and/or river-road conflicts. Current guidance does not address the importance of a driveway culvert policy. Culverts were a reoccurring topic throughout the site visits, and while many are aware of the need up upsize pipes to accommodate today's storm events, many are not aware of newer guidance that has been given to towns to continue to look downstream past the culvert outlet to see what impact this water may have on downstream conditions. Shayne Jaquith provides this sort of information in his Rivers and Roads class, and some of this guidance should be added into the manual as well as added stress on the importance of hydraulic studies to properly size culverts and structures.

While the manual heavily guides construction practices, much is left to the towns when it comes to maintenance of their sites. The manual should be reviewed to see if there are any opportunities to guide towns on proper maintenance of such site examples once they are constructed and additional technical support should be provided by VTrans.

Changes to current guidance

The current guidance in the manual is a great source of information for towns, but a few changes must be made to keep up with the newest information. The current guidance contains information on ditching, but information on proper ditch depths, especially when adding stone, is not addressed, and chinking techniques and proper stone sizing should be mentioned to add roughness to a ditch. There should also be some guidance added on check dams and their proper installation, as well as use of check dams as sediment and debris catches for maintenance purposes. There also should be some guidance on proper maintenance of these ditches once they are constructed, which goes along with leaving the upper road side of a ditch unlined to allow for this grader maintenance.

Most towns did a great job knowing that they should place vegetation on slopes to stabilize them after construction. Unfortunately, the manual does not cover selection of vegetation types and their purposes. This information should be added so towns can better choose what vegetation to use to extend the lives of their project. There will also be some additional guidance available to towns with the newest update to the Vermont Roadside Vegetation Manual.

Overall, the manual provides great guidance, but a thorough review must be completed to fully update the manual. Manual updates should occur periodically after this initial update to keep new guidance and information in an easily accessible place for towns to review. Initial manual update to occur in Spring 2016.

Conclusion

Program review and project field visits provided a clearer understanding to all participants of the needs of the program and the need for coordination with all groups involved. The proposed changes will make the program run more effectively and provide project improvements for all towns. It is understood that the program is constantly changing and evolving and the hope is to continue to periodically continue with evaluations to continue to provide the best support to towns and best projects for the grant program as possible.

Appendix

The VTrans Municipal Assistance site containing program documents may be accessed at the link below:

http://vtransengineering.vermont.gov/bureaus/mab/better-back-roads