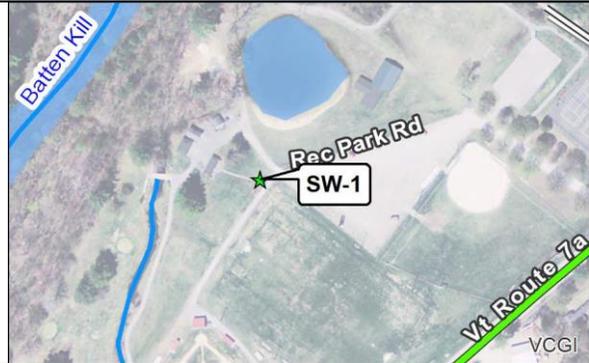


## **APPENDIX C**

**Problem Area Summary Sheets (8½"x11")**

**Project: SW-1** **Problem Area Summary**

<b>Date Observed:</b>	11/1/2018
<b>Location:</b>	Arlington Recreational Park
<b>Latitude:</b>	<b>43.0805 N</b>
<b>Longitude:</b>	<b>-73.1528 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** Runoff from the parking lot, lawn and soccer fields causes water to pool in a shallow swale beside the field (Photo 1). Culverts to convey flow are likely undersized. Runoff does not currently receive treatment in a stormwater feature that slows/ponds the water and flows into the Batten Kill.



**Photo 1:** Pooled water beside soccer field.



**Photo 2:** Green space on opposite side of path.

**BMP Description:** Retrofit green space near the former volleyball court to improve drainage near fields and infiltrate runoff (Photo 2). Design considerations include the locations of utilities and the future use of the area around the volleyball court, as well as the mapped FEMA floodplain. This site appears to be situated in a mapped floodway, which could make the project infeasible.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	3	2	5	17 (High)

**Additional Project Benefits Description:** The soccer fields experience periodic flooding after rain events. The retrofit would improve the performance of existing swales and treat approximately 0.5-1 acres of impervious runoff. The green stormwater infrastructure retrofit would be in a high visibility location.

**Project Comments:** The project is assigned a high priority due to the potential to treat runoff from up to an acre of impervious. The project will require permitting due to its location in the floodplain. **We estimate that total project costs may range be between \$15,000 and \$30,000.**

**Project: SW-2** **Problem Area Summary**

<b>Date Observed:</b>	11/1/2018
<b>Location:</b>	Route 7A & Carbonti Circle to the Arlington Dairy Bar
<b>Latitude:</b>	<b>43.0640 N</b>
<b>Longitude:</b>	<b>-73.1575 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** Drainage ditches with runoff from Route 7A and adjacent residential areas drain north to a first-order stream (Photos 1 & 2). Significant gravel deposits settle out in the ditch just north of Carbonti Circle.



**BMP Description:** Install check dams in the swale to provide pre-treatment for sediment. Treat runoff with an infiltration basin before it enters the stream.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
10	2	4	3	19 (High)

**Additional Project Benefits Description:** The retrofit would improve the performance of existing swales. The green stormwater infrastructure retrofit would be in a high visibility location and treat approximately 0.5-1 acres of impervious runoff.

**Project Comments:** The project is assigned a high priority due to the potential to treat runoff impervious surfaces that drains directly to a first-order stream. The project may require additional streams and wetlands permitting to construct the infiltration basin. **We estimate that total project costs may range between \$5,000 and \$20,000 depending on whether a basin can be installed at the end of the ditch.**

**Project: SW-3** **Problem Area Summary**

<b>Date Observed:</b>	10/9/2018
<b>Location:</b>	Fish Access Area of the Arlington Recreation Park
<b>Latitude:</b>	<b>43.0769 N</b>
<b>Longitude:</b>	<b>-73.1567 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** Runoff from the gravel parking lot and a portion of Route 313 drains directly into the Batten Kill. Some erosion is present along the stream bank.



**Photo 1:** A gravel parking lot that is adjacent to the Batten Kill.



**Photo 2:** A portion of the parking lot where runoff flows directly into the Batten Kill.

**BMP Description:** Corral water with a berm along the north and west end of the parking lot. Install a small infiltration basin on the north end of the parking lot in loamy soils that appear suitable for infiltration.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
8	1	5	2	17 (High)

**Additional Project Benefits Description:** The green stormwater infrastructure retrofit would be in a high visibility location and provide an opportunity to educate stakeholders using the river access about stormwater.

**Project Comments:** The project is assigned a high priority due to the sediment and nutrient loading from erosion of the parking lot that is conveyed directly into the Batten Kill. The project may require additional permitting to manipulate the parking lot in the river corridor. **We estimate that total project costs may range between \$10,000 and \$20,000, depending on the complexity of the basin.**

**Project: SW-4** **Problem Area Summary**

<b>Date Observed:</b>	11/1/2018
<b>Location:</b>	Fisher Elementary School
<b>Latitude:</b>	<b>43.0662 N</b>
<b>Longitude:</b>	<b>-73.1529 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** An eroded channel extends from the west end of the swale to the north, around the parking lot (Photo 1).



**Photo 1:** Eroded channel along the Fisher Elementary School Parking Lot.

**Photo 2:** Existing swale to retrofit.

**BMP Description:** Install a meandering naturalized channel with storage for small runoff events in the current swale location to slow and infiltrate water (Photo 2).

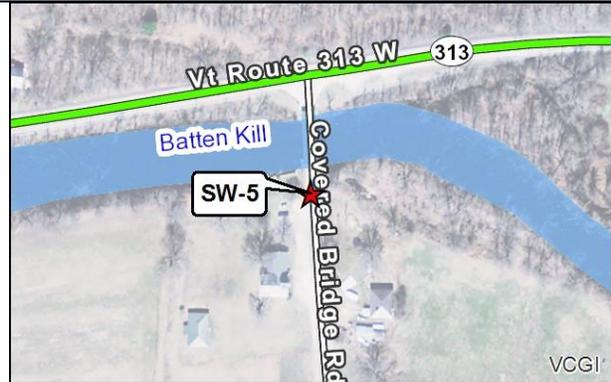
WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
8	3	3	4	18 (High)

**Additional Project Benefits Description:** The green stormwater infrastructure retrofit would improve the existing swale and is located in a high visibility location. The retrofit would provide an opportunity to educate students about stormwater.

**Project Comments:** The project is assigned a high priority due to the sediment and nutrient loading from erosion of the channel. The project should not require any additional permitting. **We estimate that total project costs may range between \$10,000 and \$20,000 depending on the complexity of the retrofit.**

**Project: SW-5** **Problem Area Summary**

<b>Date Observed:</b>	10/10/2018
<b>Location:</b>	Covered Bridge Road
<b>Latitude:</b>	<b>43.1041 N</b>
<b>Longitude:</b>	<b>-73.2203 W</b>
<b>Land Ownership:</b>	Town & West Arlington Methodist Church



**Site Description:** Runoff from the gravel parking lot for the church and river access as well as a portion of Covered Bridge Road drains into the Batten Kill (Photo 1).



**Photo 1:** Runoff from the road drains into the Batten Kill.



**Photo 2:** Green space near the parking lot may provide space for an infiltration basin.

**BMP Description:** Corral water with a berm along the north end of the parking lot. Install a small infiltration basin to the west near the picnic area (Photo 2).

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	2	5	1	15 (Moderate)

**Additional Project Benefits Description:** The BMP would be located in a high visibility area near a popular river access.

**Project Comments:** The project is assigned a moderate priority due to the proximity of the stormwater runoff from the parking lot to the Batten Kill. The project may require additional permitting for work in the river corridor and/or floodplain. **We estimate that total project costs may range between \$10,000 and \$20,000 depending on the complexity of the retrofit.**

**Project: SW-6** **Problem Area Summary**

<b>Date Observed:</b>	11/1/2018
<b>Location:</b>	Route 7A & Church Street
<b>Latitude:</b>	<b>43.0731 N</b>
<b>Longitude:</b>	<b>-73.1547 W</b>
<b>Land Ownership:</b>	State



**Site Description:** Stormwater from Route 7A opposite the Stewart’s gas station is directed by curbs into a catch basin with no treatment.



**Photo 1:** Runoff from the road drains into the Batten Kill.



**Photo 2:** Green space near the parking lot may provide space for an infiltration basin.

**BMP Description:** Install two curb cuts with stone swales down to greenspace/swale. If allowed to access this area, the grated drop inlet at the south end of the swale is slightly elevated above grade and would allow partial WQv treatment.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
6	2	5	4	17 (High)

**Additional Project Benefits Description:** The BMP would be located in a high visibility area in the center of Arlington. Slowing and infiltrating runoff in the greenspace and would reduce peak flows and thermal pollution.

**Project Comments:** The project is assigned a high priority due to the potential to treat runoff from impervious surfaces that drains directly to stormwater infrastructure. The project should not require any additional permitting; however, because the project is in the VTrans ROW it will require coordination with VTrans and the Town. **We estimate that total project costs may range between \$5,000 and \$10,000.**

<b>Project: SW-7</b>	<b>Problem Area Summary</b>
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<b>Date Observed:</b>	11/1/2018
<b>Location:</b>	Chittenden Drive & Munn Terrace
<b>Latitude:</b>	<b>43.0726 N</b>
<b>Longitude:</b>	<b>-73.1519 W</b>
<b>Land Ownership:</b>	Miles Lumber Company/ Railroad



**Site Description:** Runoff from Chittenden Drive, Munn Terrace, and a parking area drains to a former loading dock for Miles Lumber Company (Photos 1 & 2). May be within the railroad ROW. Runoff enters a standpipe and is diverted directly into the underground stream.



**Photo 1:** Runoff from Munn Drive and Chittenden Drive bypasses a paved berm and flows toward the loading dock during large rain events.



**Photo 2:** Runoff from large events infiltrates at the loading dock. Green space to the north may provide space for a BMP installation.

**BMP Description:** Provide treatment for WQv in grass to the north of the unused loading dock. There is space for a small feature to treat a portion of the adjacent parking lot, but not much of the roadway.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
4	1	2	3	10 (Low)

**Additional Project Benefits Description:** The project would provide an opportunity infiltrate runoff and reduce peak flows. The runoff that enters the large stormwater infrastructure drainage network starting in the Chittenden Drive area causes erosion problems downstream.

**Project Comments:** The project is assigned a low priority due to the low water quality impacts of the problem area and cost associated with developing further stormwater treatment. The project should not require any additional permitting. **We estimate that total project costs may range between \$20,000 and \$30,000 depending on the complexity of the retrofit.**

**Project: SW-8** **Problem Area Summary**

<b>Date Observed:</b>	11/1/2018
<b>Location:</b>	Chittenden Drive at Miles Lumber Company
<b>Latitude:</b>	<b>43.0720 N</b>
<b>Longitude:</b>	<b>-73.1521 W</b>
<b>Land Ownership:</b>	Miles Lumber Company/ Railroad



**Site Description:** Water from roads and Miles Lumber Company parking and rooftops drains to a catch basin (Photos 1 & 2). May be within the Vermont Railway ROW.



**Photo 1:** Runoff from Miles Lumber Company impervious surfaces drains to a catch basin.



**Photo 2:** Green space to the west may provide space for a BMP installation.

**BMP Description:** The grassy area south of storage sheds by railroad may have space for WQv treatment. Assess opportunities to reduce peak flows in the stormwater drainage network.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
5	2	2	2	11 (Low)

**Additional Project Benefits Description:** The project would reduce peak flows and thermal pollution by slowing and infiltrating runoff from impervious surfaces.

**Project Comments:** The project is assigned a low priority due to the low water quality impacts of the problem area and cost associated with developing further stormwater treatment. The project should not require any additional permitting, however if it's located in the railroad ROW it will require coordination with the Vermont Railway. **We estimate that total project costs may range between \$150,000 and \$200,000 depending on the complexity of the retrofit.**

**Project: SW-9** **Problem Area Summary**

<b>Date Observed:</b>	11/1/2018
<b>Location:</b>	Arlington American Legion
<b>Latitude:</b>	<b>43.0705 N</b>
<b>Longitude:</b>	<b>-73.1545 W</b>
<b>Land Ownership:</b>	American Legion



**Site Description:** Runoff from the gravel parking lot drains to a catch basin located in the middle of the lot (Photo 1). The catch basin outlets to an intermittent stream on a steep slope to the north and west.



**Photo 1:** Runoff from the gravel parking lot drains directly to a catch basin.



**Photo 2:** Green space in the northwest corner of the parking lot near a second catch basin may provide space for a BMP installation.

**BMP Description:** Cap the catch basin in the center of the parking lot and install a linear infiltration basin at northwest of the parking lot to treat runoff (Photo 2).

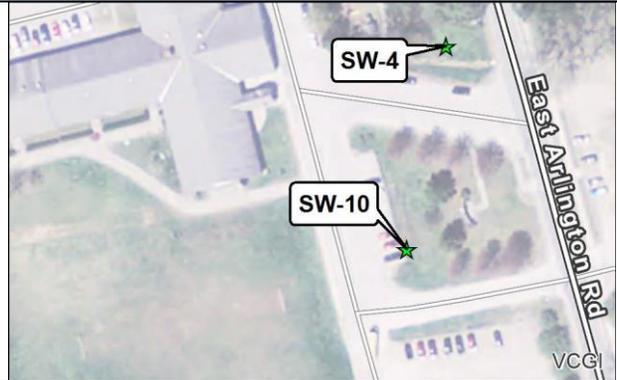
WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
8	2	3	4	17 (High)

**Additional Project Benefits Description:** The project treat runoff that flows directly from the parking lot into stormwater infrastructure. The project would be located in a high visibility area, near the tank and flags.

**Project Comments:** The project is assigned a high priority due to the potential to treat runoff with high sediment concentrations draining from the gravel parking lot directly to stormwater infrastructure. The project should not require any additional permitting. **We estimate that total project costs may range between \$11,000 and \$15,000.**

**Project: SW-10** **Problem Area Summary**

<b>Date Observed:</b>	11/1/2018
<b>Location:</b>	Fisher Elementary School
<b>Latitude:</b>	<b>43.0657 N</b>
<b>Longitude:</b>	<b>-73.1530 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** Runoff from the paved parking lot enters a catch basin in the adjacent greenspace (Photo 1). This runoff then drains south to an outfall located in a forested area adjacent to a first order stream.



**Photo 1:** Catch basin receives runoff from the paved parking lot at the school.



**Photo 2:** The green space and catch basin may be retrofitted to infiltrate more water.

**BMP Description:** Raise the grated inlet and grade the area to slow and infiltrate runoff (Photo 2). Size and configuration of basin will depend on the infiltration capacity of the soils, and other potential underground utility conflicts.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
8	2	3	4	17 (High)

**Additional Project Benefits Description:** The project treat runoff that flows directly from the parking lot into stormwater infrastructure. The project would be located in a high visibility area and provide an opportunity to educate students about stormwater.

**Project Comments:** The project is assigned a high priority due to the potential to treat runoff draining from the parking lot directly to stormwater infrastructure. The project should not require any additional permitting. **We estimate that total project costs may range between \$10,000 and \$20,000 depending on the complexity of the retrofit.**

**Project: SW-11** **Problem Area Summary**

<b>Date Observed:</b>	11/1/2018
<b>Location:</b>	Martha Canfield Library
<b>Latitude:</b>	<b>43.0653 N</b>
<b>Longitude:</b>	<b>-73.1529 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** Runoff from the library’s gravel parking lot drains to a catch basin located in the middle of the lot (Photos 1 & 2). This runoff then drains south to an outfall located in a forested area adjacent to a first order stream.



**Photo 1:** Runoff from the gravel parking lot drains directly to a catch basin. **Photo 2:** Gravel parking lot at the library.

**BMP Description:** Consider paving the parking lot to reduce fine sediment loading. A deep sump catch basin conveying runoff to a swirl separator or underground chambers may be installed to trap sediment.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	2	1	4	14 <b>(Moderate)</b>

**Additional Project Benefits Description:** The project treat runoff that flows directly from the parking lot into stormwater infrastructure. The project would be located in a high visibility area at the public library.

**Project Comments:** The project is assigned a moderate priority due to the potential to treat runoff with high sediment concentrations draining from the gravel parking lot directly to stormwater infrastructure. The project should not require any additional permitting. **We estimate that total project costs may range between \$15,000 and \$30,000 depending on which alternative is selected.**

Project: SW-12		Problem Area Summary		
<b>Date Observed:</b>	11/1/2018			
<b>Location:</b>	Arlington Memorial High School			
<b>Latitude:</b>	43.06556 N			
<b>Longitude:</b>	-73.1522 W			
<b>Land Ownership:</b>	Town			
<p><b>Site Description:</b> Runoff from the high school rooftop and paved parking/roadway is eroding a flowpath toward a catch basin located in the greenspace (Photos 1 &amp; 2). This runoff then drains south to an outfall located in a forested area adjacent to a first order stream.</p>				
<p><b>Photo 1:</b> Runoff from impervious surfaces at the high school is eroding a flowpath.</p>		<p><b>Photo 2:</b> Runoff flows to a catch basin near East Arlington Road.</p>		
<p><b>BMP Description:</b> Install a stone-lined ditch, check dams, and level spreader to dissipate energy and prevent erosion. If possible, raise the elevation of the existing catch basin inlet grate and establish a basin to treat runoff.</p>				
<b>WQ Benefits</b>	<b>Landowner Support and O&amp;M</b>	<b>Cost and Constructability</b>	<b>Additional Benefits</b>	<b>Total Score (Priority)</b>
7	3	1	4	19 (High)
<p><b>Additional Project Benefits Description:</b> The project treat runoff from up to one half acre of impervious surfaces that flows into existing stormwater infrastructure. The project would be located in a high visibility area at the high school in a chronic problem area requiring frequent maintenance.</p>				
<p><b>Project Comments:</b> The project is assigned a high priority due to the potential to treat runoff from up to a half acre of impervious that is causing erosion and currently flows directly into existing stormwater infrastructure. The project should not require any additional permitting. <b>We estimate that total project costs may range between \$10,000 and \$20,000 depending on the complexity of the retrofit.</b></p>				

**Project: RD-1** **Problem Area Summary**

<b>Date Observed:</b>	10/9/2018	
<b>Location:</b>	Ball Mountain Road	
<b>Latitude:</b>	<b>43.0465 N</b>	
<b>Longitude:</b>	<b>-73.1707 W</b>	
<b>Land Ownership:</b>	Town	

**Site Description:** A 30' L X 4' W X 1' H eroded channel with a 10% slope drains directly into Dry Brook (Photo 1). The conveyance receives 80' of runoff from the north side of the road. This road segment ranked 9<sup>th</sup> (top 3%) in the water quality prioritization based on REI data.



**Photo 1:** An eroded channel conveys runoff from Ball Mountain Road directly into Dry Brook.

**BMP Description:** Line the conveyance with at least 6-8" minus stone (12" minus stone recommended) to dissipate energy and prevent erosion. Consider adding a sediment trap to catch materials before they enter the stream. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
9	2	4	0	15 (Moderate)

**Additional Project Benefits Description:** N/A

**Project Comments:** The project is assigned a moderate priority due to the water quality impact of sediment and nutrients conveyed directly to Dry Brook via the eroded channel. The project should not require any additional permitting. **We estimate that total project costs should be less than \$2,000.**

**Project: RD-2** **Problem Area Summary**

<b>Date Observed:</b>	10/9/2018
<b>Location:</b>	Birch Grove Road Near Ball Mountain Road
<b>Latitude:</b>	<b>43.0465 N</b>
<b>Longitude:</b>	<b>-73.1739 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** The east side of Birch Grove Road has rill erosion along the roadway and at the intersection with Ball Mountain Road (Photos 1 & 2). 400' of ditch along the west side of the 9% slope road lacks stone. Segments associated with the site are rated very high and high priority by VTDEC for bringing up to MRGP standards. This road segment ranked 18<sup>th</sup> (top 6%) in the water quality prioritization based on REI data.



**Photo 1:** Unstable drainage ditches along Birch Grove Road.



**Photo 2:** Grader berms prevent water from sheeting off the road, causing rill erosion of the roadway.

**BMP Description:** Install minimum 6-8" minus stone in drainage ditches. Crown road to direct water into existing ditch to the east and remove grader berms to allow water to sheet flow to the west. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	2	3	0	12 (Low)

**Additional Project Benefits Description:** N/A

**Project Comments:** The project is assigned a low priority due to the relatively small drainage area addressed by the project and cost associated with developing further stormwater treatment. The project should not require any additional permitting. **We estimate that total project costs should be between \$8,000 and \$12,000.**

Project: RD-3		Problem Area Summary		
<b>Date Observed:</b>	10/10/2018			
<b>Location:</b>	Ball Mountain Road			
<b>Latitude:</b>	43.04687 N			
<b>Longitude:</b>	-73.17439 W			
<b>Land Ownership:</b>	Town			
<p><b>Site Description:</b> The road embankment is severely eroded (Photos 1 &amp; 2). The runoff and sediment are conveyed directly into Dry Brook. This road segment ranked 11<sup>th</sup> (top 3%) in the water quality prioritization based on REI data.</p>				
				
<p><b>Photo 1:</b> Eroded conveyance from Ball Mountain Road to Dry Brook.</p>		<p><b>Photo 2:</b> Significant erosion of the Ball Mountain Road embankment.</p>		
<p><b>BMP Description:</b> Stabilize the conveyance with large stone keyed in to an elevation at least 2 feet lower than the deepest part of the channel. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.</p>				
<b>WQ Benefits</b>	<b>Landowner Support and O&amp;M</b>	<b>Cost and Constructability</b>	<b>Additional Benefits</b>	<b>Total Score (Priority)</b>
9	2	4	1	16 (Moderate)
<p><b>Additional Project Benefits Description:</b> The erosion of the road embankment threatens existing road infrastructure.</p>				
<p><b>Project Comments:</b> The project is assigned a moderate priority due to water quality impact associated with erosion conveyed directly into Dry Brook. The project should not require any additional permitting so long as it does not result in fill/encroachment on the channel/floodplain; we recommend the project be reviewed with the VTANR River Engineer. <b>We estimate that total project costs should be between \$2,000 and \$4,000.</b></p>				

Project: RD-4		Problem Area Summary		
<b>Date Observed:</b>	10/9/2018			
<b>Location:</b>	Wilcox Road from Mountain View Drive to Route 313 Intersections			
<b>Latitude:</b>	43.0982 N			
<b>Longitude:</b>	-73.2017 W			
<b>Land Ownership:</b>	Town			
<p><b>Site Description:</b> Runoff from Mountain View Drive and Wilcox Road is causing rill erosion along the roadway (Photos 1 &amp; 2). The lower segments of Wilcox Road and Mountain View Drive are rated high priority by VTDEC for bringing up to MRGP standards. This road segment ranked 30<sup>th</sup> (top 9%) in the water quality prioritization based on REI data.</p>				
				
<p><b>Photo 1:</b> Rill erosion along Wilcox Road shoulder.      <b>Photo 2:</b> Rill erosion of the roadway.</p>				
<p><b>BMP Description:</b> Install 100' of ditches lined with minimum 6-8" minus stone along Mountain View Drive. Improve 300' of grass lined ditches along Wilcox Road. Remove grader berms and crown road to allow water to access ditches. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.</p>				
<b>WQ Benefits</b>	<b>Landowner Support and O&amp;M</b>	<b>Cost and Constructability</b>	<b>Additional Benefits</b>	<b>Total Score (Priority)</b>
5	2	4	0	16 (Moderate)
<p><b>Additional Project Benefits Description:</b> N/A</p>				
<p><b>Project Comments:</b> The project is assigned a moderate priority due to water quality impact associated with erosion of the roadway. The project should not require any additional permitting. <b>We estimate that total project costs should be between \$5,000 and \$10,000.</b></p>				

Project: RD-5		Problem Area Summary		
<b>Date Observed:</b>	10/9/2018			
<b>Location:</b>	Wilcox Road			
<b>Latitude:</b>	43.0992 N			
<b>Longitude:</b>	-73.1983 W			
<b>Land Ownership:</b>	Town			
<p><b>Site Description:</b> The existing stone lined ditch is somewhat unstable. Portions of the road lack stable ditches and grader berms present during road erosion inventories were causing rill erosion from water running down the road. The segments of Wilcox Road near Country View drive are rated very high priority by VTDEC for bringing up to MRGP standards. This road segment ranked 17<sup>th</sup> (top 5%) in the water quality prioritization based on REI data.</p>				
<p><b>Photo 1:</b> Rill erosion along Wilcox Road observed during road erosion inventories.</p>				
<p><b>BMP Description:</b> Remove grader berms. Install 80' of ditch where absent and stabilize 100' of ditch with minimum 6-8" minus stone. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.</p>				
<b>WQ Benefits</b>	<b>Landowner Support and O&amp;M</b>	<b>Cost and Constructability</b>	<b>Additional Benefits</b>	<b>Total Score (Priority)</b>
5	2	4	0	16 (Moderate)
<p><b>Additional Project Benefits Description:</b> N/A</p>				
<p><b>Project Comments:</b> The project is assigned a moderate priority due to water quality impact associated with erosion of the roadway. The project should not require any additional permitting. <b>We estimate that total project costs should be between \$5,000 and \$10,000.</b></p>				

**Project: RD-6** **Problem Area Summary**

<b>Date Observed:</b>	10/9/2018
<b>Location:</b>	Benedict Hollow Road near River Road Intersection
<b>Latitude:</b>	<b>43.0850 N</b>
<b>Longitude:</b>	<b>-73.1961 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** The road has an unstable drainage ditch and two areas where runoff drains via poor conveyances toward the adjacent stream (Photos 1 & 2). The lowest segment of Benedict Hollow Road is rated very high priority by VTDEC for bringing up to MRGP standards. This road segment ranked 23<sup>rd</sup> (top 7%) in the water quality prioritization based on REI data.



**Photo 1:** The high slope segment has unlined ditches with unstable eroding areas. **Photo 2:** Eroded conveyance toward stream.

**BMP Description:** Stabilize 100' of ditch with minimum 6-8" minus stone. Stabilize the two conveyances to the stream with stone or vegetation. Consider adding check dams along the conveyance to trap sediment. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
9	2	4	0	15 (Moderate)

**Additional Project Benefits Description:** N/A

**Project Comments:** The project is assigned a moderate priority due to water quality impact associated with erosion of the roadway and conveyances to an adjacent unnamed stream. The project should not require any additional permitting. **We estimate that total project costs should be between \$5,000 and \$10,000.**

Project: RD-7		Problem Area Summary		
<b>Date Observed:</b>	10/9/2018			
<b>Location:</b>	Benedict Hollow Road			
<b>Latitude:</b>	43.0800 N			
<b>Longitude:</b>	-73.2033 W			
<b>Land Ownership:</b>	Town			
<p><b>Site Description:</b> No culvert is present to convey water across the road, causing it to pool and erode the roadway and embankment. A 15' gully is developing down the embankment 50' from a stream (Photos 1 &amp; 2). This road segment ranked 100<sup>th</sup> (top 31%) in the water quality prioritization based on REI data.</p>				
				
<p><b>Photo 1:</b> Erosion from the roadway to the adjacent floodplain and stream.</p>		<p><b>Photo 2:</b> Eroded channel on slope adjacent to floodplain and stream.</p>		
<p><b>BMP Description:</b> Install a cross culvert to convey water under the road. Stabilize the outlet and road embankment with stone. Consider installing a sediment trap to prevent eroded sediment from entering the stream. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.</p>				
<b>WQ Benefits</b>	<b>Landowner Support and O&amp;M</b>	<b>Cost and Constructability</b>	<b>Additional Benefits</b>	<b>Total Score (Priority)</b>
8	2	3	1	14 (Moderate)
<p><b>Additional Project Benefits Description:</b> The erosion of the road embankment threatens existing road infrastructure.</p>				
<p><b>Project Comments:</b> The project is assigned a moderate priority due to water quality impact associated with erosion of the roadway and conveyances to an adjacent unnamed stream. The project should not require any additional permitting. <b>We estimate that total project costs should be between \$1,500 and \$5,000, depending on whether or not the sediment trap is installed.</b></p>				

**Project: RD-8** **Problem Area Summary**

<b>Date Observed:</b>	10/9/2018
<b>Location:</b>	River Road
<b>Latitude:</b>	<b>43.0975 N</b>
<b>Longitude:</b>	<b>-73.2103 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** 270' of road drains to an eroded conveyance draining directly to the Batten Kill. The conveyance is 1'-2' deep, 2'-4' wide, and 22' long with a slope of approximately 50% (Photos 1 & 2). This road segment ranked 35<sup>th</sup> (top 11%) in the water quality prioritization based on REI data.



**Photo 1:** Eroding conveyance to the Batten Kill.



**Photo 2:** Eroding conveyance to the Batten Kill.

**BMP Description:** Stabilize the conveyance and provide river access with infiltration steps. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
9	3	4	1	17 (High)

**Additional Project Benefits Description:** The erosion of the road embankment threatens existing road infrastructure.

**Project Comments:** The project is assigned a high priority due to water quality impact associated with significant erosion of the road embankment directly adjacent to the Batten Kill. The project should not require any additional permitting. **We estimate that total project costs should be between \$4,000 - \$5,000.**

<b>Project: RD-9</b>	<b>Problem Area Summary</b>
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<b>Date Observed:</b>	10/9/2018	
<b>Location:</b>	River Road	
<b>Latitude:</b>	<b>43.0822 N</b>	
<b>Longitude:</b>	<b>-73.1871 W</b>	
<b>Land Ownership:</b>	Town	

**Site Description:** A 15' long and 8' tall stretch of road embankment is eroding directly into a wetland alongside a Batten Kill flood chute (Photo 1). Flowing water from a spring emerging from the slope is undermining the road embankment (Photo 2). This road segment ranked 120<sup>th</sup> (top 38%) in the water quality prioritization based on REI data.



**Photo 1:** Eroding conveyance to a wetland.



**Photo 2:** Eroding road embankment.

**BMP Description:** Stabilize road embankment with large stone keyed in to an elevation at least 2 feet lower than base of the embankment. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards. Consider installing French mattress to provide drainage and prevent groundwater from undermining the road.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	2	2	1	<b>12 (Low)</b>

**Additional Project Benefits Description:** The erosion of the road embankment threatens existing road infrastructure.

**Project Comments:** The project is assigned a low priority due to high cost and maintenance requirements of installing an underdrain and new cross culvert. The project may require clearance from VTANR Wetlands due to the proximity to a likely Class 2 wetland. **We estimate that total project costs should be between \$12,000 - \$15,000.**

**Project: RD-10** **Problem Area Summary**

<b>Date Observed:</b>	10/9/2018	
<b>Location:</b>	West Mountain Inn Road	
<b>Latitude:</b>	<b>43.0748 N</b>	
<b>Longitude:</b>	<b>-73.1673 W</b>	
<b>Land Ownership:</b>	Town	

**Site Description:** Water runs down the middle of the road, eroding the roadway. No ditch is present on the west side of the road, causing erosion alongside the road. The ditch on the east side of the road is paved. At the end of the paved ditch, there is 100' of rill erosion from the stonewall to the stream (Photos 1 & 2). Erosion extends uphill to the private section of the road, which lacks ditches. This road segment ranked 16<sup>th</sup> (top 5%) in the water quality prioritization based on REI data.



**Photo 1:** Eroded roadway and ditch along West Mountain Inn Road.



**Photo 2:** Sediment deposits adjacent to the stream crossing.

**BMP Description:** Improve road drainage by installing stone-lined ditches and armoring existing ditches on the east side of the road. Cross culverts and driveway culverts should also be considered to minimize erosion. Consider adding a sediment trap to catch road materials before they enter the stream.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
10	2	3	1	<b>16 (High)</b>

**Additional Project Benefits Description:** The configuration of drainage ditches along the road and extent of erosion makes this road a chronic problem area for road maintenance.

**Project Comments:** The project is assigned a high priority due to significant water quality impacts of erosion of a long stretch of roadway and ditches. The project should not require any additional permitting. **We estimate that total project costs should be between \$25,000 and \$50,000.**

Project: RD-11		Problem Area Summary		
<b>Date Observed:</b>	10/10/2018			
<b>Location:</b>	Raven Rock Road			
<b>Latitude:</b>	43.1110 N			
<b>Longitude:</b>	-73.1440 W			
<b>Land Ownership:</b>	Town			
<p><b>Site Description:</b> This area has 115' of rill erosion on both sides of the road (Photo 1). An eroded conveyance 200' long on the south side of the road flows toward the adjacent stream (Photo 2). This road segment ranked 70<sup>th</sup> (top 22%) in the water quality prioritization based on REI data.</p>				
				
<p><b>Photo 1:</b> Eroded channel alongside Raven Rock Road.</p>		<p><b>Photo 2:</b> Eroded flow path extends to the adjacent stream.</p>		
<p><b>BMP Description:</b> Install a stone or grass-lined ditch and driveway culvert on the south side of the road. Consider adding a sediment trap at the conveyance on the south side of the road to catch road materials before they enter the stream. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.</p>				
<b>WQ Benefits</b>	<b>Landowner Support and O&amp;M</b>	<b>Cost and Constructability</b>	<b>Additional Benefits</b>	<b>Total Score (Priority)</b>
7	2	3	0	12 (Low)
<p><b>Additional Project Benefits Description:</b> N/A</p>				
<p><b>Project Comments:</b> The project is assigned a low priority due to the relatively low water quality impacts and small drainage area of the problem area. The project should not require any additional permitting. <b>We estimate that total project costs should be between \$5,000 and \$10,000.</b></p>				

**Project: RD-12** **Problem Area Summary**

<b>Date Observed:</b>	10/10/2018
<b>Location:</b>	Fisher Road
<b>Latitude:</b>	<b>43.1031 N</b>
<b>Longitude:</b>	<b>-73.1425 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** Grader berms along the road are causing water to run along the roadway and erode the road surface. Water exits the roadway via a poor conveyance that is eroding the road embankment near a cross culvert outlet. Sediment is accumulating in the ditch on the inside bend (Photos 1 & 2). This road segment ranked 13<sup>th</sup> (top 4%) in the water quality prioritization based on REI data.



**Photo 1:** Sediment accumulation in the ditch and at the culvert inlet.

**Photo 2:** Erosion along Fisher Road, with a secondary ditch forming.

**BMP Description:** Remove grader berms. Stabilize the conveyance with minimum 6-8" minus stone (12" minus stone recommended). Clean-out the drainage ditch and stabilize with stone where needed. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	2	4	1	14 (Moderate)

**Additional Project Benefits Description** The configuration of drainage ditches along the road and extent of erosion makes this road a chronic problem area for road maintenance.

**Project Comments:** The project is assigned a moderate priority due to the water quality impacts from the eroding gravel road draining to the adjacent stream. The project should not require any additional permitting. **We estimate that total project costs should be between \$3,000 and \$6,000.**

<b>Project: RD-13</b>	<b>Problem Area Summary</b>
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<b>Date Observed:</b>	10/10/2018		
<b>Location:</b>	Tory Lane		
<b>Latitude:</b>	<b>43.0968 N</b>		
<b>Longitude:</b>	<b>-73.1450 W</b>		
<b>Land Ownership:</b>	Town		

**Site Description:** This area has rill and gully erosion on the side of the road due to unstable and absent drainage ditches (Photo 1). There are multiple unstable conveyances directly to an ephemeral channel that runs alongside the road (Photo 2). Segments associated with the site are rated high and very high priority by VTDEC for bringing up to MRGP standards. This road segment ranked 2<sup>nd</sup> (top 1%) in the water quality prioritization based on REI data.



**Photo 1:** Steep sections of road lack stable ditches. **Photo 2:** Erosion of the road embankment.

**BMP Description:** Install a drainage ditch and stabilize all ditches with minimum 6-8" minus stone (12" minus stone recommended). Consider adding stone to the turnouts through the berm to prevent erosion and adding sediment traps where possible to catch road materials. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
10	2	3	2	<b>17 (High)</b>

**Additional Project Benefits Description** The configuration of drainage ditches along the road and extent of erosion makes this road a chronic problem area for road maintenance and the existing configuration conflicts with the intermittent stream running adjacent and separated with a berm and unarmored turnouts.

**Project Comments:** The project is assigned a high priority due to the water quality impacts of the gravel road draining to the adjacent intermittent stream. The project should not require any additional permitting. **We estimate that total project costs should be between \$15,000 and \$30,000.**

**Project: RD-14** **Problem Area Summary**

<b>Date Observed:</b>	10/10/2018
<b>Location:</b>	Tory Lane
<b>Latitude:</b>	<b>43.0911 N</b>
<b>Longitude:</b>	<b>-73.1501 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** Ditches are absent along both sides of a steep section of road, causing water to flow down the roadway and erode the road surface (Photos 1 & 2). This road segment ranked 36<sup>th</sup> (top 11%) in the water quality prioritization based on REI data.



**Photo 1:** Steep sections of road lack stable ditches. **Photo 2:** Road is slightly sunken and eroded where ditches are absent.

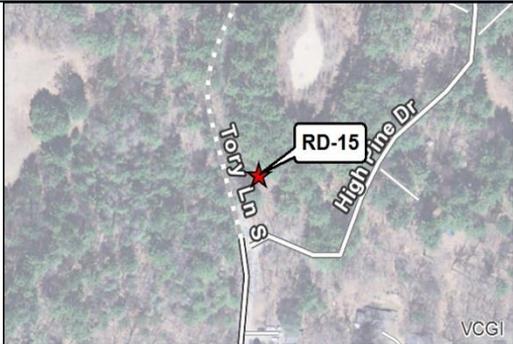
**BMP Description:** Install drainage ditches on both sides of the road and stabilize them with minimum 6-8" minus stone. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
4	2	3	0	9 (Low)

**Additional Project Benefits Description** N/A

**Project Comments:** The project is assigned a low priority due to the relatively low water quality impacts and small drainage area of the problem area. The project should not require any additional permitting. **We estimate that total project costs should be between \$15,000 and \$30,000.**

**Project: RD-15** **Problem Area Summary**

<b>Date Observed:</b>	10/10/2018	
<b>Location:</b>	Tory Lane	
<b>Latitude:</b>	<b>43.0781 N</b>	
<b>Longitude:</b>	<b>-73.1621 W</b>	
<b>Land Ownership:</b>	Town	

**Site Description:** Ditches are absent along both sides of a steep section of road, causing water to flow down the roadway and erode the road surface (Photo 1). The section of drainage ditch on the southwest side of the road segment is unstable and eroding (Photo 2). The segment associated with the site is rated very high priority by VTDEC for bringing up to MRGP standards. This road segment ranked 23<sup>rd</sup> (top 7%) in the water quality prioritization based on REI data.



**Photo 1:** An unstable drainage ditch.



**Photo 2:** Erosion is present on both sides of the road.

**BMP Description:** Install drainage ditches on both sides of the road and stabilize them with minimum 6-8" minus stone. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
4	2	3	0	9 (Low)

**Additional Project Benefits Description** N/A

**Project Comments:** The project is assigned a low priority due to the relatively low water quality impacts and small drainage area of the problem area. The project should not require any additional permitting. **We estimate that total project costs should be between \$5,000 and \$10,000.**

**Project: RD-16** **Problem Area Summary**

<b>Date Observed:</b>	10/10/2018
<b>Location:</b>	Crow Hill Road
<b>Latitude:</b>	<b>43.0619 N</b>
<b>Longitude:</b>	<b>-73.1634 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** This area has a severely eroded conveyance down a steep slope draining directly to the stream on the north side of the road (Photos 1 & 2). Rill erosion is present on the south side of the road due to shallow unstable drainage ditches. This road segment ranked 3<sup>rd</sup> (top 1%) in the water quality prioritization based on REI data.



**Photo 1:** Eroded conveyance along the road embankment.



**Photo 2:** Eroded conveyance along the road embankment.

**BMP Description:** Stabilize the conveyance with minimum 6-8" minus stone (recommended 12" minus stone). Line ditches on the north side of the road with stone. Consider replacing driveway culvert with a larger diameter pipe. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
8	2	3	1	14 <b>(Moderate)</b>

**Additional Project Benefits Description** Erosion of the steep road embankment threatens existing road infrastructure.

**Project Comments:** The project is assigned a moderate priority due to the water quality impacts of the eroding road embankment conveying sediment to the nearby stream. The project should not require any additional permitting. **We estimate that total project costs should be between \$5,000 and \$10,000.**

<b>Project: RD-17</b>	<b>Problem Area Summary</b>
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<b>Date Observed:</b>	10/10/2018
<b>Location:</b>	Lost Lake Road
<b>Latitude:</b>	<b>43.0541 N</b>
<b>Longitude:</b>	<b>-73.1677 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** Severe erosion is present at the culvert header and road embankment. Sediment from the eroding embankment is accumulating in the ditch (Photos 1 & 2). This road segment ranked 6<sup>th</sup> (top 2%) in the water quality prioritization based on REI data.



**Photo 1:** Eroded drainage ditch with accumulation of sediment.

**Photo 2:** Eroded conveyance along the road embankment.

**BMP Description:** Stabilize the road embankment and ditch with minimum 6-8" minus stone. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

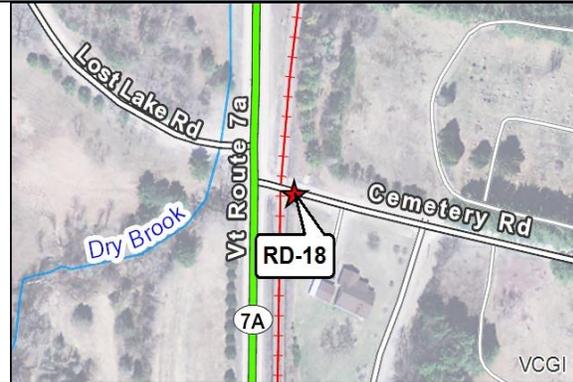
WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
5	2	3	0	<b>10 (Low)</b>

**Additional Project Benefits Description** N/A

**Project Comments:** The project is assigned a low priority due to the relatively low water quality impacts of the eroding road embankment as there are no adjacent streams or waterbodies. The project should not require any additional permitting. **We estimate that total project costs should be between \$1,500 and \$3,000.**

**Project: RD-18** **Problem Area Summary**

<b>Date Observed:</b>	10/10/2018
<b>Location:</b>	Cemetery Road and Route 7A
<b>Latitude:</b>	<b>43.0517 N</b>
<b>Longitude:</b>	<b>-73.1631 W</b>
<b>Land Ownership:</b>	Town, Railroad, State



**Site Description:** Ditches on both sides of the road near the intersection with Route 7A are eroding toward a culvert that crosses the highway (Photos 1 & 2). There are some rocks placed before the culvert inlet that have trapped some of the sediment. This road segment ranked 32<sup>nd</sup> (top 10%) in the water quality prioritization based on REI data.



**Photo 1:** Eroded roadside with accumulation of sediment.

**Photo 2:** Accumulation of road sediment near a culvert inlet.

**BMP Description:** Stabilize ditches with minimum 6'8" minus stone. If possible, expand stone lined area near the railroad to create a larger sediment trap. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	2	4	1	14 (Moderate)

**Additional Project Benefits Description** This is a chronic problem area requiring frequent road maintenance.

**Project Comments:** The project is assigned a moderate priority due to the water quality impacts of sediments from the erosion draining via cross-culverts to Dry Brook. The project should not require any additional permitting. **We estimate that total project costs should be between \$3,000 and \$5,000.**

**Project: RD-19** **Problem Area Summary**

<b>Date Observed:</b>	10/10/2018
<b>Location:</b>	Cemetery Road
<b>Latitude:</b>	<b>43.0513 N</b>
<b>Longitude:</b>	<b>-73.1610 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** Two 80' sections of ditch on the south side of the road are severely eroded (Photo 1). The eroding section of road has a slope of 8.5%. This road segment ranked 69<sup>th</sup> (top 22%) in the water quality prioritization based on REI data.



**Photo 1:** Eroded roadside ditch.

**BMP Description:** Enlarge ditches and stabilize with minimum 6-8" minus stone. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
5	2	4	0	11 (Low)

**Additional Project Benefits Description** N/A

**Project Comments:** The project is assigned a low priority due to the relatively low water quality impacts of the eroding ditches as there are no adjacent streams or waterbodies. The project should not require any additional permitting. **We estimate that total project costs should be between \$6,000 and \$10,000.**

**Project: DC-1** **Problem Area Summary**

<b>Date Observed:</b>	10/9/2018
<b>Location:</b>	Ball Mountain Road
<b>Latitude:</b>	<b>43.0467 N</b>
<b>Longitude:</b>	<b>-73.1732 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** Severe erosion is present at the cross culvert header and outlet, which is located 10' from Dry Brook (Photos 1 & 2). This road segment ranked 1<sup>st</sup> in the water quality prioritization based on REI data.



**Photo 1:** Erosion of the culvert header and outlet. **Photo 2:** Erosion is adjacent to Dry Brook.

**BMP Description:** Stabilize the downstream culvert header with stone and install a heavily armored splash pad at the outlet. Install a stone-lined conveyance to Dry Brook. Consider increasing the culvert slope when it is due for replacement to reduce outlet drop.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
10	3	4	0	17 (High)

**Additional Project Benefits Description** N/A

**Project Comments:** The project is assigned a high priority due to the water quality impacts of the erosion directly adjacent to Dry Brook. The project should not require any additional permitting so long as it does not result in fill/encroachment on the channel/floodplain; we recommend the project be reviewed with the VTANR River Engineer. **We estimate that total project costs should be between \$2,000 and \$5,000.**

**Project: DC-2** **Problem Area Summary**

<b>Date Observed:</b>	10/9/2018
<b>Location:</b>	Buck Hill Road
<b>Latitude:</b>	<b>43.0638 N</b>
<b>Longitude:</b>	<b>-73.1505 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** An eroded drainage ditch leads to a catch basin (by the barn) on Buck Hill Road (Photo 1). There is another catch basin on the other side of the road with a stable ditch. The catch basins are connected to an outfall with an eroded outlet channel (Photo 2). This road segment ranked 57<sup>th</sup> (top 18%) in the water quality prioritization based on REI data.



**Photo 1:** Eroded drainage ditch.



**Photo 2:** Eroding outfall channel.

**BMP Description:** Stabilize 50' of ditch on the southeast side of Buck Hill road with minimum 6-8" minus stone. Install a stone apron constructed of 12" minus stone at the outfall. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

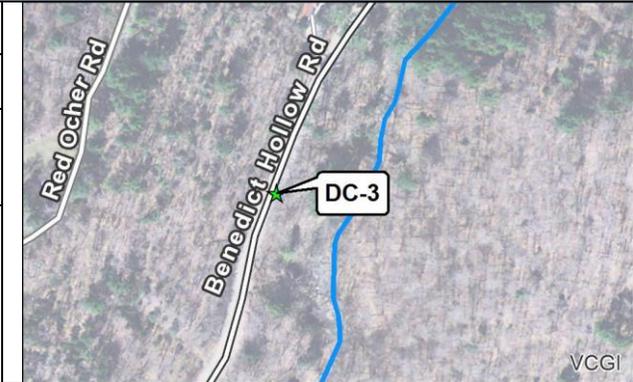
WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	2	4	1	13 (Low)

**Additional Project Benefits Description** The problem area is connected to existing stormwater infrastructure.

**Project Comments:** The project is assigned a low priority due to the relatively low water quality impacts of the stormwater, which receives some treatment in the adjacent forest. The project should not require any additional permitting. **We estimate that total project costs should be between \$1,500 and \$3,000.**

<b>Project: DC-3</b>	<b>Problem Area Summary</b>
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<b>Date Observed:</b>	10/9/2018
<b>Location:</b>	Benedict Hollow Road
<b>Latitude:</b>	<b>43.0825 N</b>
<b>Longitude:</b>	<b>-73.2003 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** A board along the base of the guardrail is concentrating runoff, which is causing severe erosion of the road surface and embankment near the outlet of a cross culvert (Photos 1 & 2). There is 30' of rill erosion on the road and 20' of gully erosion down the road embankment. Large amounts of gravel have accumulated at the culvert outlet. This road segment ranked 37<sup>th</sup> (top 12%) in the water quality prioritization based on REI data.



**Photo 1:** Rill erosion from concentrated runoff along the guardrail.



**Photo 2:** Erosion of the road embankment at the cross culvert.

**BMP Description:** Stabilize the road embankment with stone, beginning at the tail end of the board along the guardrail. Crown as much of the road as possible into the ditch opposite the guardrail. Consider installing a sediment trap in the forested area downslope of the road embankment.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	2	3	1	<b>13 (Low)</b>

**Additional Project Benefits Description** The problem area is connected to existing stormwater infrastructure.

**Project Comments:** The project is assigned a low priority due to the relatively low water quality impacts of the stormwater, which receives some treatment in the adjacent forest. The project should not require any additional permitting. **We estimate that total project costs should be between \$2,000 and \$5,000.**

<b>Project: C-1</b>	<b>Problem Area Summary</b>
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<b>Date Observed:</b>	10/9/2018	
<b>Location:</b>	Berwal Road	
<b>Latitude:</b>	43.1049 N	
<b>Longitude:</b>	-73. 2067 W	
<b>Land Ownership:</b>	Town	

**Site Description:** The smooth HDPE culvert conveys a first order stream with an approximately 72-acre drainage area. The culvert is undersized with a capacity estimated at 32.5 cfs, a flow that may be exceeded in the 25-year flood event. The culvert is perched and the channel downstream of the outlet is eroded (Photo 1).



**Photo 1:** Incised outlet channel downstream of the culvert outlet.

**BMP Description:** Consider installing a larger structure sized to convey the 25-year flow. Consider installing the new culvert with higher slope and a stone apron constructed of minimum 12" minus stone to minimize scour at the outlet. The recommended culvert size for an intermittent stream crossing of comparable drainage area is 48" in diameter. Follow VTANR/VTrans road stormwater management guidance to ensure consistency with MRGP design standards.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	3	3	0	13 (Low)

**Additional Project Benefits Description** N/A

**Project Comments:** The project is assigned a low priority due to the relatively low water quality impacts of the eroding channel. **We estimate that this project will cost \$5,000 to \$7,000, primarily based on the replacement culvert cost. Permitting requirements from ANR and/or USACE, such as AOP passage, may make this project more costly.**

**Project: C-2** **Problem Area Summary**

<b>Date Observed:</b>	10/9/2018
<b>Location:</b>	Old West Road
<b>Latitude:</b>	<b>43.0431 N</b>
<b>Longitude:</b>	<b>-73.1823 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** The corrugated metal culvert conveys a small channel with an approximately 21-acre drainage area. The culvert capacity is estimated at 14 cfs, a flow that may be exceeded in the 50-year flood event. The culvert is perched, and the outlet is severely eroded (Photos 1 & 2).



**Photo 1:** Eroded embankment downstream of the culvert outlet.



**Photo 2:** Eroded channel downstream of the culvert outlet.

**BMP Description:** Install a heavily armored splash pad at the culvert outlet constructed from minimum 12" minus stone to dissipate energy and halt erosion of the embankment. When the culvert is due for replacement, consider installing a larger structure. The recommended culvert size for an intermittent stream crossing of comparable drainage area is 30" in diameter.

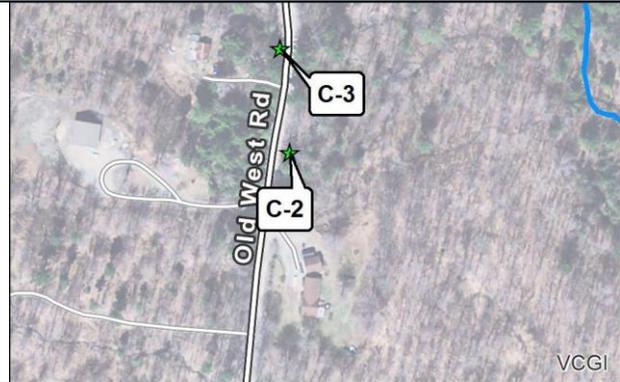
WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
9	3	3	0	15 (Moderate)

**Additional Project Benefits Description** N/A

**Project Comments:** The project is assigned a moderate priority due to the potential to reduce a significant source of sediment that drains to a second order stream. The project should not require any additional permitting. **We estimate that this project will cost \$2,500 to \$4,000, primarily based on the replacement culvert cost.**

<b>Project: C-3</b>	<b>Problem Area Summary</b>
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<b>Date Observed:</b>	10/9/2018
<b>Location:</b>	Old West Road
<b>Latitude:</b>	<b>43.0436 N</b>
<b>Longitude:</b>	<b>-73.1824 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** The corrugated metal culvert conveys a small channel with an approximately 26-acre drainage area. The culvert capacity is estimated at 34.3 cfs, a flow that is rarely exceeded. The culvert is perched, and the outlet is severely eroded (Photos 1 & 2).



**Photo 1:** Eroded embankment downstream of the culvert outlet.

**Photo 2:** Eroded channel downstream of the culvert outlet.

**BMP Description:** Install a heavily armored splash pad at the culvert outlet to dissipate energy and halt erosion of the embankment. When the culvert is due for replacement, consider installing a larger structure. The recommended culvert size for an intermittent stream crossing of comparable drainage area is 30-36" in diameter.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
10	3	3	0	16 (Moderate)

**Additional Project Benefits Description** N/A

**Project Comments:** The project is assigned a moderate priority due to the potential to reduce a significant source of sediment that drains to a second order stream. The project should not require any additional permitting. **We estimate that this project will cost \$2,500 to \$5,000, primarily based on the replacement culvert cost.**

**Project: C-4** **Problem Area Summary**

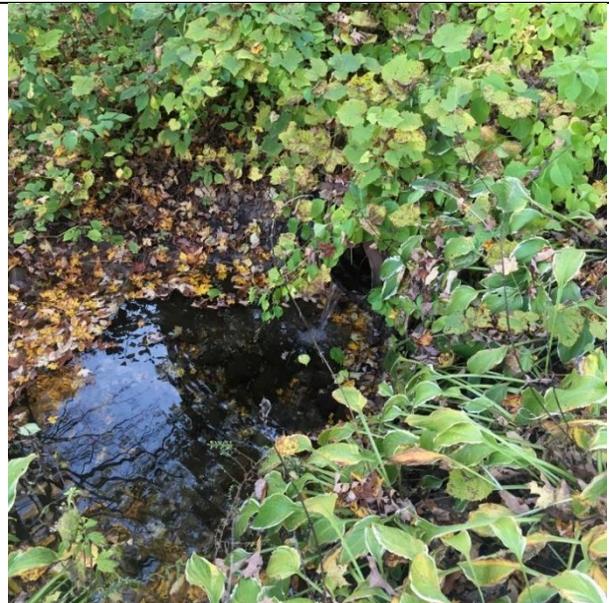
<b>Date Observed:</b>	10/9/2018
<b>Location:</b>	Old West Road
<b>Latitude:</b>	<b>43.0400 N</b>
<b>Longitude:</b>	<b>-73.1831 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** The corrugated metal culvert conveys a small channel with an approximately 19.5-acre drainage area. The culvert capacity is estimated at 17.9 cfs, a flow approximately equal to the 50-year flood event. The culvert is perched, and the downstream channel is eroded (Photos 1 & 2).



**Photo 1:** Old West Road culvert inlet.



**Photo 2:** Old West Road culvert outlet.

**BMP Description:** Install a heavily armored splash pad at the culvert outlet to dissipate energy and halt erosion of the embankment. When the culvert is due for replacement, consider installing a larger structure. The recommended culvert size for an intermittent stream crossing of comparable drainage area is 30" in diameter.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
7	3	3	0	13 (Low)

**Additional Project Benefits Description** N/A

**Project Comments:** The project is assigned a low priority due to the relatively low water quality impacts of the eroding channel. The project should not require any additional permitting. **We estimate that this project will cost \$3,000 to \$5,000, primarily based on the replacement culvert cost.**

**Project: C-5** **Problem Area Summary**

<b>Date Observed:</b>	10/9/2018
<b>Location:</b>	Old West Road
<b>Latitude:</b>	<b>43.0372 N</b>
<b>Longitude:</b>	<b>-73.1838 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** The corrugated metal culvert conveys a first order stream with an approximately 80-acre drainage area. The culvert capacity is estimated at 16.4 cfs, a flow exceeded in the 10-year flood event. The culvert is perched, and the upstream and downstream road embankments are eroded (Photos 1 & 2).



**Photo 1:** Erosion at the culvert inlet header.



**Photo 2:** Erosion at the culvert outlet.

**BMP Description:** Stabilize upstream and downstream culvert headers. Consider installing a larger structure with higher slope and a heavily armored splash pad at the culvert outlet to halt erosion. The recommended culvert size for an intermittent stream crossing of comparable drainage area is 48" in diameter.

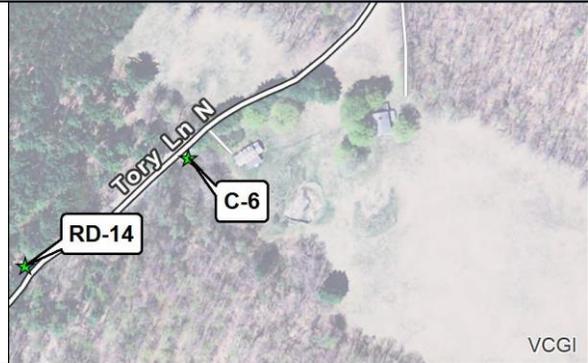
WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
9	3	3	0	15 (Moderate)

**Additional Project Benefits Description** N/A

**Project Comments:** The project is assigned a moderate priority due to the potential to reduce a significant source of sediment to this first order stream. **We estimate that this project will cost \$3,000 to \$5,000, primarily based on the replacement culvert cost. Permitting requirements from ANR and/or USACE, such as AOP passage, may make this project more costly.**

**Project: C-6** **Problem Area Summary**

<b>Date Observed:</b>	10/10/2018
<b>Location:</b>	Tory Lane
<b>Latitude:</b>	<b>43.0917 N</b>
<b>Longitude:</b>	<b>-73.1489 W</b>
<b>Land Ownership:</b>	Town



**Site Description:** The corrugated metal culvert conveys a small channel with an approximately 28.5-acre drainage area. The culvert capacity is estimated at 12.5 cfs, a flow exceeded in the 25-year flood event. Moderate erosion is present at the inlet and outlet (Photos 1 & 2).



**Photo 1:** Erosion at the culvert inlet header.



**Photo 2:** Erosion at the culvert outlet.

**BMP Description:** Install a larger structure with headers stabilized with stone. The recommended culvert size for an intermittent stream crossing of comparable drainage area is 30-36" in diameter.

WQ Benefits	Landowner Support and O&M	Cost and Constructability	Additional Benefits	Total Score (Priority)
6	3	3	0	12 (Low)

**Additional Project Benefits Description** N/A

**Project Comments:** The project is assigned a low priority due to the relatively low water quality impacts of the eroding channel. The project should not require any additional permitting. **We estimate that this project will cost \$3,000 to \$5,000, primarily based on the replacement culvert cost.**