

## **Municipal Roads General Permit- Road Erosion Inventory (REI) Supplement**

(see MRGP website for additional info: <http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program>)

**Use:** for the assessment of Vermont DEC Municipal Roads General Permit standards for paved and gravel roads with drainage ditches (Not Class 4). For paved roads with catch basins, use the Paved Roads with Catch Basins inventory template (link above). For hybrid paved roads, such as paved with ditches and catch basins, use this inventory template.

**MRGP REI Coverage:** The MRGP standards and REI evaluation areas include:

- A. Town highways, class 1-4, and their rights-of-way.
- B. Municipal stormwater infrastructure associated with town highways, within and outside of the municipal right-of-way.

“Municipal stormwater infrastructure” refers to all stormwater conveyances and treatment and control systems, controlled by the municipality, that receive stormwater discharges from municipal roads.

**Inventory Timing:** Avoid conducting field inventory assessments during snow covered conditions through the end of mud season, as these conditions may skew assessment results.

### **Field determination of road hydrologic connectivity:**

Evaluate all hydrologically-connected road segments that appear on the ANR Natural Resources Atlas at the time of that the REI is conducted. All hydrologically-connected municipal road segments depicted on the ANR Atlas shall be field visited and evaluated using the DEC REI template. Additionally, the applicant may propose to add or remove road segments from its REI based on an evaluation of the following criteria:

- Municipal road within 100’ to a water of the state or wetland;
- Municipal road that bisects a water of the state or wetland or a defined channel;
- The municipal road segment is uphill from, and drains to, a municipal road that bisects a water of the state or wetland, or defined channel and should be included in the REI to accurately capture the extent of the stormwater watershed.
- If a road segment appears on the ANR Atlas and none of the above conditions are observed in the field, persons conducting inventories may propose to re-classify a segment as not connected. Alternately, if none of the above conditions are observed in the field, but the segment is likely to discharge to waters or wetlands, a permittee shall propose to add this segment to the inventory following a field evaluation.
- The addition or removal of any road segments not appearing on the ANR Atlas must be documented as part of the REI, and justification for the removal or addition shall be included in the MRGP Implementation Table.

- The Secretary may determine at any time that a road segment not identified on the ANR Atlas is hydrologically connected, based on the criteria listed above, as well as other site-specific factors that indicate the likelihood of a discharge, including slope, soil type, proximity to receiving waters, etc. When the Secretary determines that an unmapped road segment is hydrologically connected and informs the municipality of its determination, the permittee shall include the segment in its Implementation Table as part of the next annual report.

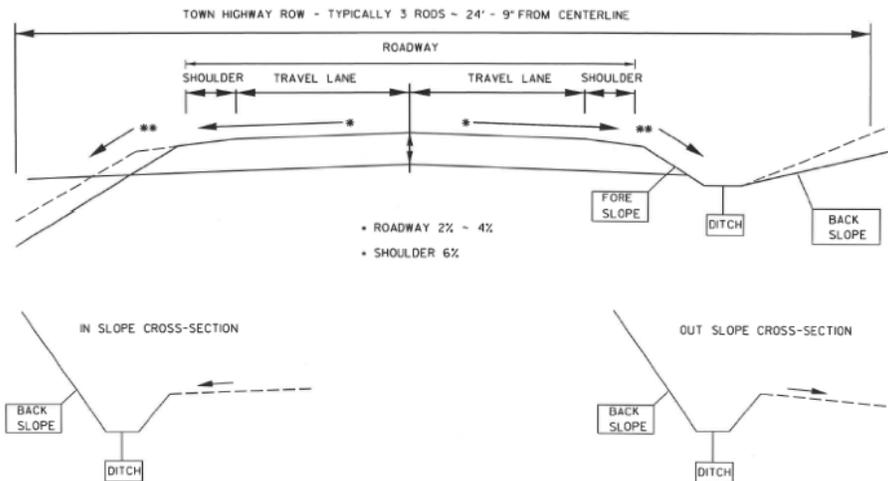
**Erosion Types:**

**Rill Erosion**= depth of 1”to <12”

**Gully erosion**= depth of 12”+



TOWN HIGHWAY TYPICAL

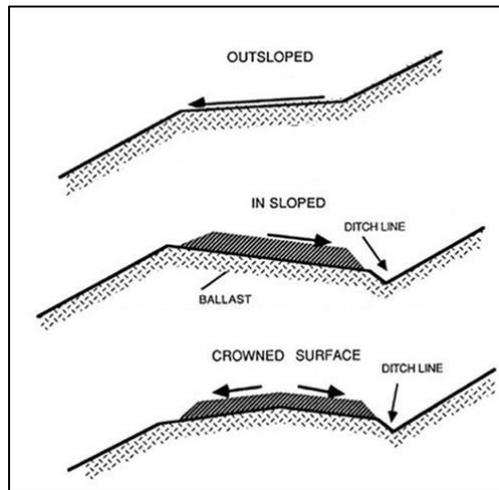


# Road Erosion Inventory Parameters

## 1. Roadway Crown

Applicability	Standard	Specification
Gravel Roads	Crowned, in-sloped or out-sloped	Minimum: 1/4"/ft. Recommended: 1/4"-1/2"/ft. or 2-4% and steeper for steep road grades
Paved/Ditched Roads	Crowned, in-sloped or out-sloped; Only applies during new construction or new pavement and removal of old pavement	Minimum: 1/8"/ft. or 1% slope Recommended: 1-2% slope

Out-sloped, in-sloped, and crowned diagram:



Measuring road crown (can also use digital level)



## 2. Grader Berm and plow berm

Grader and plow berms shall be removed to allow precipitation to shed from the travel lane into the road drainage. Roadway runoff shall flow in a distributed manner to the drainage ditch or filter area and there shall be no grader berms or evidence of a “secondary ditch”.

### Grader berm



### Secondary ditch



**3. Road Drainage Standards-** Measure road segment slopes in the field with clinometer/inclinometer, digital level, or equivalent (cell phone slope app is not appropriate).

**Distributed flow-** roadway runoff shall flow in a distributed manner to grass or a forested area by lowering road shoulders (examples below). Road shoulder shall be lower than travel lane elevation from edge of travel lane to end of right-of-way. No back slope exists or toe of back slope is outside right-of-way.

**Drainage ditch standards-** if distributed flow is not possible, roadway runoff may enter a drainage ditch, stabilized as follows:

- a. For roads with slopes of 0% - <5% - Grass-lined ditch
- b. For roads with slopes of 5% - <8%:
  - a. Stone-lined ditch, *or*

- b. Grass-lined ditch with stone check dams, *or*
- c. Grass-lined ditch if installed with disconnection practices such as cross culverts and/or turnouts to reduce road stormwater runoff volume, at least two cross culverts or turnouts per segment disconnecting road Stormwater out of the road drainage network into vegetated areas, or spaced every 164’.
- c. For roads with slopes  $\geq 8\%$ ; Stone-lined ditch required. If there is a road slope within the segment 8% or greater, longer than 65’ in length, stone is required for that length 8% or greater to ***Fully Meet*** this MRGP standard, even if the average road segment slope is less than 8%.
- d. If appropriate, bioretention areas, level spreaders, armored shoulders, and sub-surface drainage practices may be substituted for the above Road Drainage Standards.

**Example of high road shoulder**



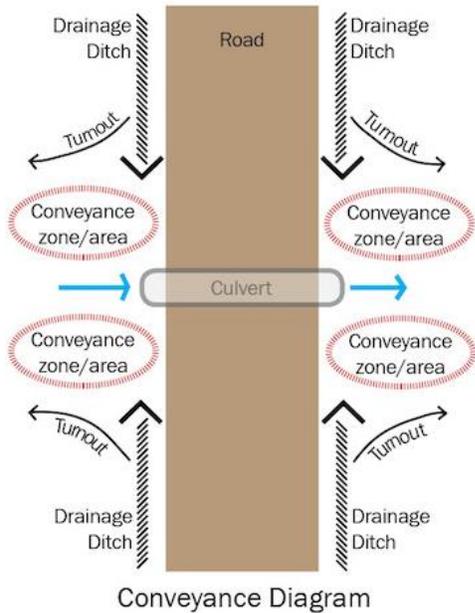
**Example of distributed flow, low shoulder**



**4. Conveyance Areas**-Turn-outs and outlets of drainage ditches to water resources

Roadway drainage shall be disconnected from waterbodies whenever possible and shall flow in a distributed manner to a grass or forested filter area (see *Distributed Flow* above), and turned out to avoid direct outlet to surface waters whenever possible. If this is not possible, drainage outlets and conveyance areas must be stabilized as follows:

- a. For conveyances with slopes of 0% - <5%, stabilize with grass.
- b. For conveyances with slopes  $\geq 5\%$ , stabilize with stone.



**5. and 6. Driveway and Drainage/Intermittent stream culverts-** Driveway culverts located within the municipal right-of-way and drainage culverts and all other non-perennial stream crossings within the right-of-way.

Intermittent streams are streams that do not flow for portions of the year. Intermittent streams and their related infrastructure associated with municipal roads are covered under this permit. Examples of MRGP standards to address culvert erosion include: culvert size upgrading, culvert headwalls, and culvert outlet stabilization. Perennial streams and related BMPs are not covered by this permit. The differences between perennial and intermittent streams are described below.\*

If rill or gully present near or around a drive, drainage, or intermittent stream culvert, document what type of erosion and where the erosion is located (see diagram). Erosion may also be present because the structure is needed but currently lacking. If culvert is completely plugged/blocked score as ***Does Not Meet***. Score partially plugged (greater than 50% plugged but not fully plugged) culverts as ***Partially Meets***.

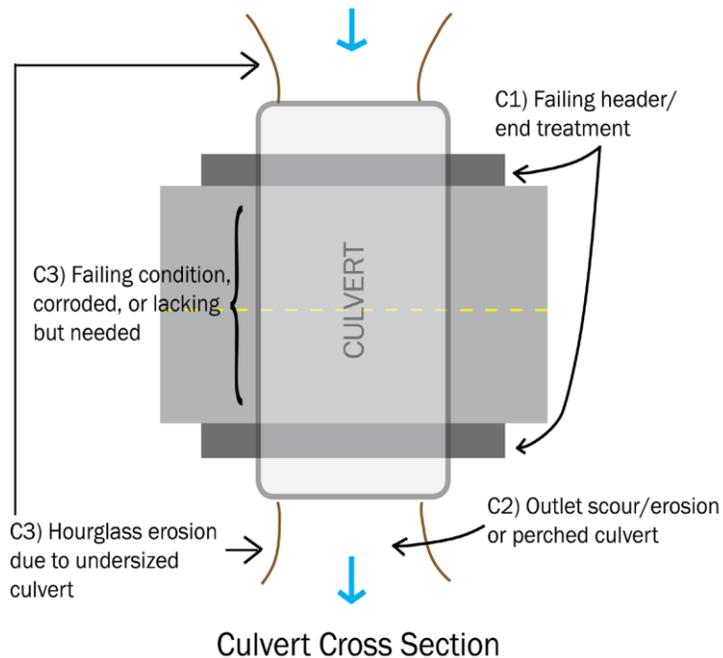
**Driveway culvert erosion example**



**Drainage culvert erosion example**



## Culvert potential erosion locations diagram



## \*Perennial versus intermittent streams

A perennial stream may be characterized by any of the following:

1. Direct observation or compelling evidence obtained that surface flow is uninterrupted (or flowing 10 months of the year flow or more, except during drought periods).
2. Presence of one or more geomorphic characteristics typically associated with perennial streams including:
  - a. Bed forms; i.e. riffles, pools, runs, gravel bars, other depositional features, bed armor layer
  - b. Bank erosion and/or bed scour
  - c. Indications of waterborne debris and sediment transport
  - d. Defined bed and banks in a valley setting
3. Watershed size greater than 0.25 square miles, although some perennial streams may be located in smaller watersheds. (See DEC map layers)
4. Presence of aquatic organisms (fish and macroinvertebrates) requiring uninterrupted flow for survival

5. Base flows are primarily supported by groundwater recharge as indicated by bank seeps, springs or other indicators
6. Disconnected surface flow within a singular channel; e.g. limited sub-surface flow

Any work to replace, retrofit or otherwise alter the streambank or bed of a perennial stream may require a DEC Stream Alteration Permit. Please contact the DEC Stream Alteration Engineer before undertaking any such project.

## Road Erosion Inventory- Segment Scoring

(Note: *Partially Meets* score for individual practice or segment score still does not meet MRGP standards, same with *Does Not Meet* score. BMP implementation will be required for both of these scored segments. For a road segment to meet MRGP standards, individual and segment score= *Fully Meets*).

**Baseline Practices- Individual Practice Scores-** Scores from MRGP Road Erosion Inventory Template numbers 1-3 based on % of practice in place

*Fully Meets (FM)*= 90-100% of practice in place within segment

*Partially Meets (PM)*= 50-89% of practice in place within segment

*Does Not Meet (DNM)*= 0-49% of practice in place within segment

1. **Crown:** DNM/PM/FM
2. **Grader Berm:** DNM/PM/FM
3. **Drainage ditch/distributed flow:** DNM/PM/FM
4. **Conveyance area/turn out** (not based on %): DNM/FM (no *Partially Meets* option)

## Erosion Triggered Practices- Individual Practice Scores

*Fully Meets (FM)*= No erosion observed

*Partially Meets (PM)*= rill erosion observed

*Does Not Meet (DNM)*= gully erosion observed

5. **Drive culvert-** size/lacking and/or end treatment MRGP standard: DNM/PM/FM
6. **Drainage/Intermittent stream culvert-** size/lacking and/or end treatment and/or outlet stability: DNM/PM/FM

## MRGP Overall Segment Scoring:

- Any standards that score *Does Not Meet* individual practice scores= *Does Not Meet* segment score (except for crown category)
- One or two *Partially Meets* individual scores= *Partially Meets* segment score
- Three or more *Partially Meets* individual practice scores= *Does Not Meet* segment score

- *Fully Meet* for all individual practice scores= *Fully Meets* segment score

Segment Scoring examples below

**MRGP Segment Scoring Table, Example score 1:**

Segment slope:	Fully meets	Partially Meets	Does Not Meet
1. Crown	✓		
2. Grader berm	✓		
3. Road drainage	✓		
4. Conveyance area/turn out	✓	-	
5. Drive culvert	✓		
6. Drainage culvert	✓		
<b>Overall Segment Score</b>	✓		

**MRGP Segment Scoring Table, Example score 2:**

Segment slope:	Fully meets	Partially Meets	Does Not Meet
1. Crown		✓	
2. Grader berm		✓	
3. Road drainage	✓		
4. Conveyance area/turn out	✓	-	
5. Drive culvert	✓		
6. Drainage culvert	✓		
<b>Overall Segment Score</b>		✓	

**MRGP Segment Scoring Table, Example score 3:**

Segment slope:	Fully meets	Partially Meets	Does Not Meet
1. Crown		✓	
2. Grader berm	✓		
3. Road drainage	✓		
4. Conveyance area/turn out	✓	-	
5. Drive culvert		✓	
6. Drainage culvert		✓	
<b>Overall Segment Score</b>			✓

**MRGP Scoring Table, Example score 4:**

Segment slope:	Fully meets	Partially Meets	Does Not Meet
1. Crown	✓		
2. Grader berm			✓
3. Road drainage	✓		
4. Conveyance area/turn out	✓	-	
5. Drive culvert	✓		
6. Drainage culvert	✓		
<b>Overall Segment Score</b>			✓