Municipal Roads General Permit (MRGP)- Open Drainage Roads-
Road Erosion Inventory (REI) Supplement
2023 Field Season- DRAFT

(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 Open Drainage Roads (Not Class 4). For Closed Drainage Roads, use the inventory and app (link above). For hybrid paved roads, such as paved with ditches and catch basins, use this inventory template.

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

Survey 123 App Field Form Questions (* indicates required fields):

- **Name***
- **Organization***
- **Date of Assessment***
- **Municipality**
- **Assessment Reason*-** ***Initial assessment, Reassessment, Work Completed, Storm Damage***
- **Segment ID** *(auto populated)*
- **Segment length** *(auto populated)*
- **Road Name**
- **Town highway number**
- **Hydrologically-connected- yes or no*** (see discussion below)

Assessor Notes: Hydrologically-connected- evaluate all hydrologically-connected road segments that appear on the ANR Natural Resources Atlas (https://anrmaps.vermont.gov/websites/anra5/) at the time of that the REI is conducted. All hydrologically-connected municipal road segments depicted on the ANR Atlas shall be field visited, walked and evaluated using the DEC REI template. **"Drive-by" segment assessments are not acceptable**. 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. The ANR Atlas connected roads layer is a GIS-based proximity analysis and often will underestimate these types of connected segments. Please be sure to add these segments in the field if you find them, especially if adjacent to ANR Atlas connected mapped segments.

- 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.

- **Road Type*** ***Paved road with catch basin <u>or</u> Paved road with open ditches <u>or</u> Gravel road with open ditches <u>or</u> Class 4 roads***

- **ANR Atlas Slope** *(auto populated)*

- **Field determined percent slope***

Assessor Notes: Measuring road slope- measure road segment slopes in the field with clinometer/inclinometer, digital level, or equivalent (cell phone slope app is not appropriate). **Be sure to set your digital level to the correct units setting- in percent slope and not degrees**. Take 3 measurements of areas that are typical of the segment, take an average of those 3 measurements. If there is a very steep section of the segment longer than 65' in length, and likely over 8% slope, be sure to measure that slope as one of your 3 measurements, even if the rest of the segment is a lower gradient.

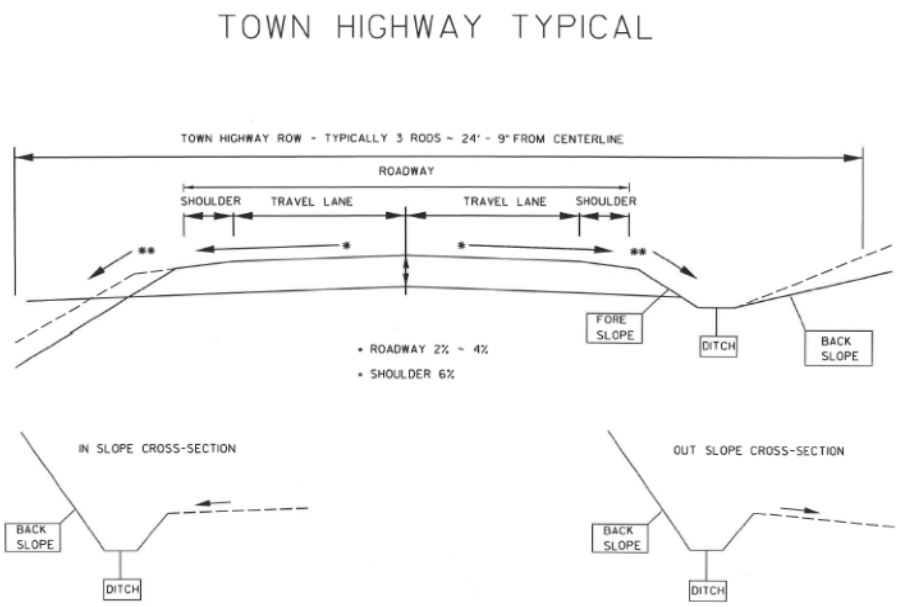
The Survey 123 form will automatically prompt you with Drainage questions based on the field slope measure entered, into 3 question categories: 0 to less than 5%, 5 to less than 8%, and 8% and greater.

Capture Photo

Erosion Types:

Rill Erosion= depth of 1"to <12"

Gully erosion= depth of 12"+



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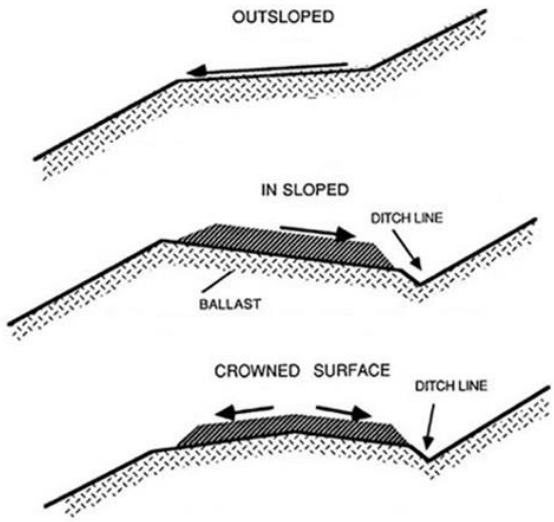
1. Roadway Crown/Travel Lane:* *(not applicable for paved roads)*

What percentage of the segment is properly crowned (2% or greater crown slope), in-sloped or out-sloped)?
Less than 90% Does Not Meet % (164-294') <u>or</u> 90-100% (295-328')

Erosion Type Present (within the travel lane)
Gully or Rill or Sheet Flow/none

Assessor Notes: Measure crown with digital level between the road center and edge of travel lane

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



Measuring road crown (can also use digital level)

2. Grader Berm/Windrow:* *(not applicable for paved roads)*

What percentage of the segment (both sides of the road 200 meter, 656') is the grader berm/windrow removed?
Less than 90 % Does Not Meet % (328-589') <u>or</u> 90-100% (590-656')

Erosion Type Present- Gully or Rill or Sheet Flow/none

Assessor Notes: MRGP language- "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. Shoulder berms may remain in place if the road crown is in-sloped or out-sloped to the opposite side of the road from the berm side of the road."

Grader berm

Secondary ditch

3. Road Drainage Standards:*

What percentage of the segments (both sides of the road, 200m, 656') is allowed to shed water in a distributed manner, when the shoulder is lower than the road, to a forested or vegetated filter area or ditch that is…

Less than 90% Does Not Meet <u>or</u> 90-100% (590-656') Fully Meets

Erosion Type Present- Gully <u>or</u> Rill <u>or</u> Sheet Flow or None

Distributed flow- If no back slope exists or the toe of back slope is outside right-of-way (more than 25' from the road center).

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

- For roads with slopes of 0% - <5% - Grass-lined ditch
- For roads with slopes of 5% - <8%:
  - Stone-lined ditch, *<u>or</u>*
  - Grass-lined ditch with stone check dams, *<u>or</u>*
  - Grass-lined ditch if installed with disconnection practices such as cross culverts and/or turnouts to reduce road stormwater runoff volume, at least **<u>two</u>** cross culverts or turnouts per segment disconnecting road Stormwater out of the road drainage network into vegetated areas or spaced every 164'.
- For roads with slopes ≥ 8%; Stone-lined ditch required.

Assessor Notes: MRGP language- "If appropriate, bioretention areas, level spreaders, armored shoulders, and sub-surface drainage practices may be substituted for the above Road Drainage Standards." Note that "***Document the following that would fully or partially impede standards implementation"*** objects are most likely to fully or partially impede this standard (see below).

Example of high road shoulder

Example of distributed flow, low shoulder

4. Conveyance Areas/Turn-out*:

Do drainage ditch outlets and conveyance areas shed water in a distributed manner?

If not, they must be stabilized as follows:

- ***Bank slopes <5% slopes stabilized with grass***
- ***Bank slopes 5% or greater stabilize with stone***

All areas meet standard <u>or</u> One or more areas Does Not Meet <u>or</u> None present

Erosion Type Present- Gully <u>or</u> Rill <u>or</u> Sheet Flow or None

First determine if turnout/conveyance area is a hydro bisect or hydro parallel

<u>Hydro bisect</u>- where the road bisects a water resource (i.e.. perennial or intermittent stream crossing) **<u>or</u>**

<u>Hydro parallel</u>- road is parallel to a water resource.

<u>For hydro bisect</u>- see diagram below. Evaluate each of the 4 possible areas where road runoff can enter the water resource to determine if each area meets this standard.

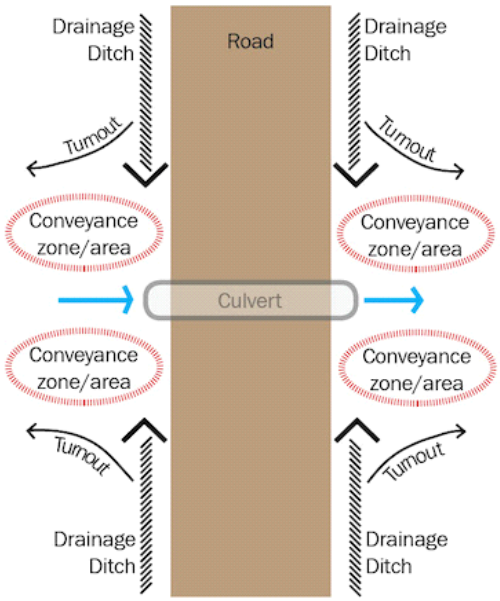
<u>For hydro parallel</u>- evaluate each turnout.

Assessor Notes: Measure bank slope if distributed flow is not in place-measure the bank where the ditch outlet/turnout is located (not road slope). Measure with digital level.

Standards will be met if one of the following conditions is met:

- Distributed flow <u>or</u>
- For conveyances with slopes of 0% - <5%, stabilize with grass <u>or</u>
- For conveyances with slopes ≥5%, stabilize with stone.

Example of an armored turnout at a Hydro bisect site



Conveyance Diagram

5. **and 6.** ***Are Driveway or Drainage (Cross Culverts) or Intermittent Stream (non-perennial) culverts Present or Absent or Needed*?*** (see graphics and Perennial stream characterizations below for more info)
Yes or No

If Yes- Complete an inventory for up to 5 driveway or drainage culverts (non-perennial streams) located within the road segment's municipal right-of-way. If more than 5 exist, prioritize culverts with erosion.

Type of Culvert (present or absent but needed)?
Drainage <u>or</u> Driveway or Intermittent Stream Culvert

Is erosion present?
No (Fully Meets) or Yes

If Yes, where in the culvert cross section is erosion present and is it rill or gully erosion? Refer to culvert cross section supplement pic.

Header or end treatment
Gully Erosion <u>or</u> Rill Erosion <u>or</u> Sheet flow or No Erosion

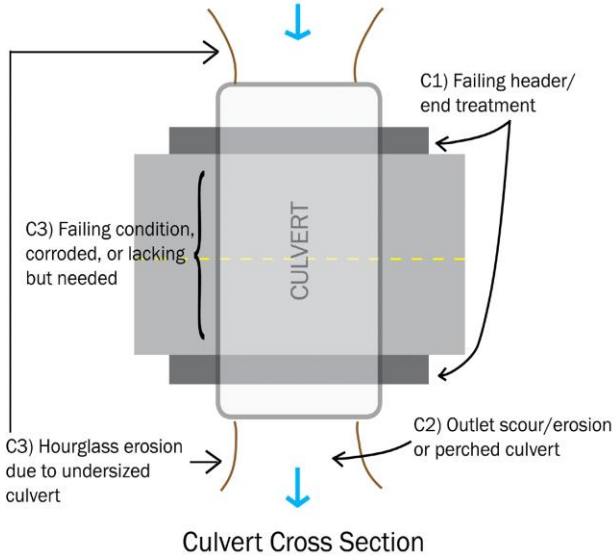
Outlet
Gully Erosion <u>or</u> Rill Erosion <u>or</u> Sheet Flow or No Erosion

Culvert Condition
Fully obstructed, failing, or Gully erosion (Does Not Meet) <u>or</u> 50% or more obstructed, failing or Rill Erosion <u>or</u> Less than 50% obstructed or failing (Fully meets)

Driveway culvert erosion example

Drainage culvert erosion example

Culvert potential erosion locations diagram



Perennial Stream Characterizations

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

- 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).

- 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

- Watershed size greater than 0.25 square miles, although some perennial streams may be located in smaller watersheds. (See DEC map layers)

- Presence of aquatic organisms (fish and macroinvertebrates) requiring uninterrupted flow for survival

- Base flows are primarily supported by groundwater recharge as indicated by bank seeps, springs or other indicators

- 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.

Document the following that would fully or partially impede standards implementation

- ***Historic stone walls (linear feet)***
- ***Historic large trees (linear feet)***
- ***Place listed on the Vermont Historic Register***
- ***Buried utilities (linear feet)***
- ***Wetland (linear feet)***
- ***Lakeshore vegetation (linear feet)***
- ***Excessive ledge (linear feet)***
- ***Public safety considerations of practice implementation (linear feet)***
- ***Other***

Assessor Notes: Note that the above reasons would most likely impact the Road Drainage Standard. For example- it may be difficult to fully construct a drainage ditch or lower road shoulders if there is a historic stone wall, large historic trees or buried utilities that would fully or partially impede the implementation of such projects. Please measure linear feet as indicated.

Assessment Notes *(optional)*

Work Needed so segment meets road standards *(optional)*

For Class 4 Roads:

Document all areas of gully erosion (1 foot or deeper) and where in the road cross section the erosion is taking place and take measurements of average depth, width and lenght :

- Travel lane
- Shoulder area
- Drainage ditches
- Culvert related (non-perennial streams)
- Turn out area