

# DRAINAGE MANAGEMENT STANDARDS FOR TOWN HIGHWAY ACCESS POLICIES



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## Introduction

To help municipalities comply with requirements of the Vermont Department of Environmental Conservation (VTDEC) Municipal Road General Permit (MRGP), VLCT's Water Resources Assistance Program developed this guidance on drainage management best practices and sample standards for town highway access policies. You may use these standards to customize the Municipal Assistance Center's [Model Highway Access Policy and Model Access Forms](#) available on the VLCT website.

## MRGP Background

The MRGP was created in 2015 with the passage of Act 64, the Vermont Clean Water Act, to address stormwater runoff from municipal roadways, both paved and unpaved. Municipal roads represent approximately 70% of the state's total road miles and approximately three-quarters of these road miles are unpaved. The Department of Environmental Conservation has estimated that approximately 50% of all municipal road miles are hydrologically-connected to surface waters, and these road segments are the ones targeted under the MRGP.

On January 26, 2018 the VTDEC issued the final MRGP. The permit, response to comments, and support documents can be found on VTDEC's [Municipal Roads Program](#) webpage. All incorporated cities, towns, and villages with operational control over municipal roads are subject to the requirements of the MRGP. The Notice of Intent (NOI) for coverage with initial administrative processing and application fees are due on July 31, 2018. Annual operating fees are due by the end of fiscal year 2019. Under the MRGP, municipalities are required to bring all hydrologically-connected road segments up to the MRGP standards as soon as possible, but no later than December 31, 2036. Road erosion inventories and Implementation schedules to bring connected segments that do not fully meet the MRGP standards into compliance are due on December 31, 2020. Municipalities are required to revise the road erosion inventories and implementation tables every 5 years thereafter until the permit is finalized at the end of 2036.

## Why Driveway and Private Road Access is Important in this Context

Driveways and private access roads are important in the context of the MRGP because the jurisdiction of the new permit is limited to the municipal right-of-way. Therefore, it is up to individual municipalities to address the "run-on" from adjacent lands into the road drainage system.

Water running down a driveway or private access road directly onto the public highway can erode the shoulder and road surface. Improperly installed driveways and driveway culverts are a source of roadway stormwater damage. Driveway and private access road culverts that are too small, unstable, or improperly installed can impede the flow of water in a roadside ditch and can cause the road surface to wash out or driveway culvert to blowout resulting in damage to the town road. Poorly constructed

driveways and private access roads can be a continual source of erosion, clogging town ditches and culverts and contributing to the sedimentation of surface waters.

With the onset of the MRGP, it is particularly important for towns to review their highway access regulations - which may be through policies, ordinances, zoning bylaws, subdivision regulations and/or public works specifications - to see whether drainage into the public right-of-way is addressed. This document is intended to provide guidance to help towns accomplish the erosion requirements imposed by the MRGP.

## **Drainage Management Standards and How to Use This Document**

The sample drainage management standards were developed from information provided in several documents by state agencies and Vermont Local Roads Program before it became part of the Vermont Agency of Transportation (VTrans). The reference documents include:

- [Vermont DEC Municipal Roads General Permit](#) – VTDEC, January 2018
- [Intermittent Stream Culvert Sizing Guidance](#) – VTDEC, January 2018
- [Developing a Highway Access Policy](#) - Vermont Local Roads Program (VLR), 1997
- [Town Road and Bridge Standards](#) - VTrans Orange Book, Section 7, April 2017
- [Access Management Program Guidelines](#) - VTrans, 2005
- [Vermont Better Backroads Manual](#) – George D. Aiken & Northern Vermont Resource Conservation and Development Councils, 2009

These documents span several decades, and in some instances make similar recommendations. Due to the evolving nature of stormwater management and the MRGP implementation, new information and resources are often being updated by VTDEC, VTrans and others. Check [VLCT's Water Resources web page](#), and contact VLCT's Water Resources Coordinator for up-to-date information.

It is not possible to recommend best practices that will address the unique needs of municipal roads across the state. VLCT recommends selectboards consult with their highway supervisors about these sample standards to learn whether they would be helpful in managing drainage issues on local roads. Staff with technical expertise and knowledge of local conditions can determine which standards may be appropriate to incorporate into the municipality's access policy. VLCT's Water Resources Coordinator can provide information and help local officials assess how their municipality's current policies, regulations and or practices will meet the requirements of the MRGP.

The standards are presented by topic. In some cases, several options are listed since local circumstances can vary greatly depending on numerous factors (topography, soil type, drainage, etc.)



Please note that these standards are offered for informational purposes only. VLCT expresses no endorsement or opinion about the feasibility, suitability, or sufficiency of these standards.

## Sample Drainage Management Standards and Explanation

The sample standards and guidance information are organized by the following topics:

1. Culvert Size
2. Design and Installation of Culverts
3. Ditches and Slopes
4. Drainage Outlets and Turnouts
5. Surface Materials and Road Crowning
6. Approaches to Public Roads
7. Soil Disturbing Activities and Bank Stabilization

The guidance for each topic includes best practice information assembled from the reference documents noted for each topic.

### **1. Culvert Size**

Towns can specify a minimum culvert size with the understanding that the selectboard or road foreman may determine on a case-by-case basis that no culvert is necessary, or may require a smaller or larger culvert. Properly sized culverts alleviate ditch maintenance problems by channeling water efficiently, and sizing should be based on road slope and the size of the drainage area.

#### **Sample Standard:**

- *The legislative body or designee will determine the type, length and diameter of driveway and private access road culverts on an individual basis.*

The **VTrans Town Road and Bridge Standards** require all new driveway culverts to have a minimum diameter of 15 inches; access roads have a minimum culvert diameter of 18 inches. The **VTDEC MRGP** requires a 15-inch minimum diameter driveway culvert and an 18-inch minimum diameter road culvert for existing culvert upgrades if rill and/or gully erosion is present due to inadequate size or absence of the structure.

It is important to note that culverts conveying perennial waters are subject to state permitting. The MRGP recommends the VTDEC Intermittent Stream Channel Culvert Sizing Guidance referenced in this document.

**Sample Standards:**

- The minimum culvert diameter for a driveway is 15 inches.
- The minimum culvert diameter for access roads is 18 inches.
- Driveway and access road culverts conveying perennial waters are subject to coverage under the DEC Stream Alteration General Permit.

The **VTDEC Intermittent Stream Channel Culvert Sizing Guidance** includes an intermittent stream drainage area sizing table which recommends specific culvert sizes for drainage areas.

**Sample Standard:**

- Driveway and private access road culverts conveying intermittent streams shall be sized based on the Intermittent Stream Drainage Area Sizing Table found here: [Intermittent Stream Channel Culvert Sizing Guidance](#)

**Active Channel Culvert Sizing for Intermittent Stream Crossings**

Choose the drainage area closest to your crossing site drainage area

Drainage Area (Acres)	Minimum Diameter for Culverts on Intermittent Streams <i>(in inches)</i>
4	15
8	18
16	24
20	30
40	36
50	42
80	48
120	60
160	66
200	<i>Streams with drainage areas of 160 acres or greater are likely to be perennial. Adhere to the VTDEC Technical Guidance for Identification of Perennial Streams</i>
320	
350	
450	
640	

The **Vermont Better Back Roads Manual** suggests that culverts for drainage areas greater than 20 acres to be referred to a professional trained in hydrology for sizing and

design of the culvert. VTrans district engineers will do hydraulics studies to size large culverts at no cost to municipalities.

**Sample Standard:**

- *Culverts for watersheds greater than 20 acres should be referred to a professional trained in hydrology for sizing and design of the culvert.*

**2. Design and Installation of Culverts (culvert headers, culvert outlet stabilization)**

Headers, or headwalls, mark the location of a culvert, protect the culvert from damage during grading, plowing and ditch cleaning, increase the efficiency of the culvert to divert and channel water away from the road surface and prevent erosion around the culvert inlet. Header extensions (wingwalls) help direct the flow of runoff into the culvert, preventing water from flowing in undesirable directions.

The **VTrans Town Road and Bridge Standards** require culvert headers where there is erosion or undermining or where it is expected to occur.

The **VTDEC MRGP** requires culvert headwalls where rill and gully erosion is present due to the absence of the structure, and drainage culvert outlet stabilization in the form of a stone apron or plunge pool if rill or gully erosion is present due to absence or inadequacy of culvert outlet stabilization.

The **VLR Developing a Highway Access Policy** recommends that headwalls be required on all culverts greater than 36 inches in diameter.

**Sample Standards:**

- *Install culvert headwalls at the inlet and outlet of all culverts where there is erosion or undermining or where it is expected to occur, and on new construction on slopes 5% or greater*
- *Headwalls shall be placed on all culverts greater than 36 inches in diameter.*
- *Install culvert stabilization in the form of a stone apron or plunge pool if rill or gully erosion is present due to the absence or inadequacy of outlet stabilization. Stone aprons or plunge pools are required for new construction on slopes 5% or greater.*
- *A French Drain (also called an Under Drain) or French Mattress (also called a Rock Sandwich) sub-surface drainage practice may be substituted for a cross culvert.*

The **VTrans Access Management Program Guidelines** recommend that headwalls not be located in the "clear zone," which is the relatively clear and flat area beyond the edge of a roadway, important for the recovery of errant vehicles.

**Sample Standard:**

- *Care should be taken not to introduce non-traversable hazards in the clear zone. Cradle headwalls or cutoff walls (extending 3 inches below the pipe invert) may be used in the clear zone.*

**3. Ditches and Slopes (stone lined, grass lined, sheet flow)**

The slope of driveways and private access roads leading to public roads is critical for a number of reasons. Winter maintenance is more difficult on steep roads, requiring extra effort and more salt and sand. Water travels faster, causing potential erosion.

Driveway and private access road shoulders should be below the travel lane in order to allow runoff to flow in a distributed manner to grass or forested areas. If distributed flow is not possible, runoff from driveways and private access roads must enter a drainage ditch. The **VTDEC MRGP** defines the type of ditch stabilization required based on slope.

**Sample Standards:**

- *Driveway and private access road ditches with slopes 0% to 5% shall at a minimum be grass-lined with no bare soil. Geotextile and erosion matting may be used instead of seed and mulch.*
- *Driveway and private access road ditches with slopes 5% to 8% shall be stone-lined with 6" – 8" minus stone, grass-lined with stone check dams, or grass-lined with disconnection practices such as cross culverts for turnouts to reduce runoff volume.*
- *Driveway and private access road ditches with slopes greater than 10% shall be stone-lined with 12" minus stone or the equivalent.*

The **VTrans Town Road and Bridge Standards** calls for seeding and mulching all ditches with grades less than 5% and stone lining all new or reconstructed ditches with grades equal to and greater than 5%; alternatively installing stone check dams. These standards also require that erosion prevention and sediment control practices are installed and maintained during construction activities and until the ditch slope is permanently stabilized.

**Sample Standards:**

- *Ditches with slopes of less than 5% may be seeded and mulched.*
- *Ditches with slopes of 5% or greater must be stone lined or constructed with stone check dams.*
- *Soil exposed during ditch and slope construction must be treated immediately and temporary erosion prevention and sediment control*

*practices must be installed and maintained during construction activities and until the ditch or slope is permanently stabilized.*

The **VLR Developing a Highway Access Policy** recommends the maximum gradient of driveways and access roads not to exceed 10%, but suggests that some towns may want to lower that maximum gradient to 9% or 8%. Steeper grades may be allowed with more stringent erosion control measures.

**Sample Standard:**

- *The maximum gradient of driveways and access roads should not exceed 10%. Steeper grades may be allowed provided they are paved and ditched to prevent erosion.*

#### **4. Drainage Outlets and Turnouts**

The **VTDEC MRGP** requires that roadway drainage be disconnected from defined channels to avoid creating a stormwater conveyance into surface waters. Adequate outlet protection at the end of a turnout is based on the slope of the bank where the turnout is located.

**Sample Standards:**

- *All drainage ditches shall be turned out to avoid direct outlet to surface waters.*
- *Turnouts onto slopes 0% to less than 5% shall, at a minimum, be stabilized with grass.*
- *Turnouts onto slopes 5% or greater shall be stabilized with stone.*

The **VLR Developing a Highway Access Policy** recommends that ditches along driveway or access roads be turned out onto private property where water can be dispersed into vegetated areas.

**Sample Standards:**

- *Where possible, landowners shall "daylight" driveway ditches onto their own property before intersecting with the town right-of-way, directing water into vegetated areas before it reaches town road ditches.*
- *Ditches adjacent to private access roads and driveways shall be a minimum of six inches below the gravel sub-base or eighteen inches below the finished grade of the road.*

## **5. Surface Materials and Road Crowning**

The **VLR Developing a Highway Access Policy** notes that the base of the road carries the loads, and that the depth of the base will vary based on the anticipated traffic volume and vehicle weights.

### **Sample Standards:**

- *Driveways within the limits of the right-of-way shall have a minimum of 12 inches of subbase material.*
- *Access roads shall have a minimum of 15 inches of subbase material.*
- *Gravel drives shall have a minimum aggregate surface course of 6 inches.*
- *The legislative body or designee may require private access roads be paved with a minimum of two inches of bituminous concrete.*
- *The legislative body or designee may require a paved apron on a gravel access entering a paved road.*

The **VTrans Town Road and Bridge Standards** require crowning to promote sheeting of water away from the road. Berms created between the crown and the ditch preventing the proper sheeting of water must be removed.

### **Sample Standards:**

- *Driveways and private access roads shall be graded so water does not remain on the road surface. Private access roads and driveways shall be constructed with a crown of 1/4 to 1/2 inch per foot of road width to promote sheeting of water.*
- *Any berm created between the crown and the ditch preventing the proper sheeting of water shall be removed.*

## **6. Approaches to Public Roads**

The **VLR Developing a Highway Access Policy** includes recommendations for some safety issues such as sight distance, minimum distance between driveways, driveway width and turning radius, slopes and angles of driveways and private access roads, which can also control drainage.

### **Sample Standards:**

- *Entrances onto public roads should be constructed with no more than 3% grade away from the road for a distance of at least 20 feet.*
- *Culverts under driveway and private access roads should be placed away from the road as far as practical while maintaining good drainage.*

- *Driveways and private access roads should intersect the highway at a preferred angle of 90 degrees but no less than 60 degrees.*

## **7. Soil Disturbing Activities and Bank Stabilization**

Requiring soil stabilization following construction and along banks and slopes adjacent to driveways and private access roads is crucial for mitigating soil erosion and surface water siltation. The **VTDEC MRGP** requires revegetation following road construction.

### **Sample Standard**

- *Following construction and soil disturbance on driveways and access roads, all bare or unvegetated areas shall be revegetated with seed and mulch, hydroseeded, or stone lined within 5 days of disturbance of soils.*

Seeding and mulching is a minimum requirement, but steep banks will erode in spite of seeding and other methods will be necessary to stabilize soils. The **Vermont Better Backroads Manual** offers helpful bank stabilization instructions and diagrams.

### **Sample Standards:**

- *All banks and slopes adjacent to driveways and private access roads shall at a minimum be stabilized by seeding and mulching.*
- *In situations where banks will erode in spite of seeding the legislative body or designee may require other methods for stabilizing soils, such as the use of structural materials and woody plants.*