

**VERMONT AGENCY OF TRANSPORTATION  
CULVERT & DITCH MAINTENANCE PROCEDURES  
Revised March 27, 2002**

**PROGRAM PURPOSE & NEED**

The Statewide Culvert and Ditching Program was created to address the problem of rapidly deteriorating culverts and plugged ditches on Vermont's highway system. The purpose of the program is to ensure that the existing highway infrastructure is properly designed and maintained so as to provide an adequate drainage system, while at the same time, respecting the natural environs that abut our roadways. The primary focus of this program is on maintenance of existing drainage systems within the limits of the original highway construction. Throughout the state, many metal culverts are reaching the end of their useful life and must be replaced. Many of these culverts are now failing due to corrosion, erosion, and insufficient maintenance.

Roadside ditches are also a vital component to the state's transportation system. In addition, to conveying runoff away from a highway, roadside ditches, particularly those which contain herbaceous vegetation, are an effective means of trapping road sands and filtering highway runoff pollutants to prevent them from entering the state's waterways. They function so well that over time, they fill in and must be restored to maintain their flow characteristics.

A lack of roadside ditches can result in unsafe traveling conditions from ice and water on the traveling surface and cause degradation of the roadway due to high water tables, allowing moisture and frost into the subbase. Neglecting to maintain culverts and ditches can result in surface failure and costly reconstruction projects. Neglect can also result in plugged systems that create localized flooding conditions that have the potential to erode away sections of the highway, and create unsafe traveling conditions.

Keeping roadside ditches and culverts in optimum condition is an on-going maintenance operation of the Transportation Agency. This maintenance must be done in an environmentally friendly manner that includes proper disposal of the surplus materials generated by the ditching operations and the control of erosion by seeding and mulching the ditch swales and culvert replacements.

## DEFINITIONS OF TERMS

The following terms are used in this document:

|                                   |   |
|-----------------------------------|---|
| <b>ANR</b>                        | Vermont Agency of Natural Resources   |
| <b>VTrans</b>                     | Vermont Agency of Transportation  |
| <b>Backroads Manual</b>           | This is the <u>Vermont Better Backroads Manual</u> , which was prepared by the <i>Windham Regional Planning Commission</i> (November 1995). |
| <b>COE</b>                        | U.S. Army Corps of Engineers  |
| <b>DHP</b>                        | VTrans Historic Preservation and Archeological Officers   |
| <b>DTA</b>                        | District Transportation Administrator   |
| <b>EPA</b>                        | U.S. Environmental Protection Agency  |
| <b>FHWA</b>                       | Federal Highway Administration  |
| <b>Intermittent Streams</b>       | Seasonal watercourses that do not flow year-round.  |
| <b>Large Culverts</b>             | Culverts larger than 48 inches in diameter.   |
| <b>Perennial Streams</b>          | Watercourses that flow year-round.  |
| <b>Roadside Ditches</b>           | Man made swales, which collect and convey runoff away from a transportation facility. Roadside ditches are not considered wetlands.         |
| <b>Similar Length</b>             | A change in length that is no greater than 20 feet.   |
| <b>Similar Type</b><br>for        | Optional types of metal, aluminum, plastic or other materials approved use by the VTrans.   |
| <b>Small Culverts</b>             | Culverts 48" and smaller in diameter.   |
| <b>Surplus Materials</b>          | Excess earthen matter generated during maintenance activities.  |
| <b>Temporary Erosion Controls</b> | Temporary Erosion Controls include those measures that follow VTrans Standards T-1 & T-2.*  |
| <b>USFWS</b>                      | U.S. Fish & Wildlife Service  |

## CULVERT AND DITCHING PROGRAM BACKGROUND

In response to changes in the availability of federal funding for maintenance operations, the VTrans Maintenance Division conducted a statewide survey of the condition of the culverts

and ditches throughout the nine transportation districts during 1996. Following that initial survey, a program was developed to address the maintenance needs of the state. The list indicates needs as well as priorities at both the district and the state level.

Shortly after the initial survey in 1996, and the development of the prioritized list, the AOT and the FHWA discussed the development of a procedure to expedite procurement of state and federal permits, relative to the expanded Statewide Culvert and Ditching Program. A Draft procedure was developed by the VTrans and was initially discussed at a September 1996 Resource Coordination Meeting with officials from the ANR, COE, EPA, FHWA, and USFWS in order to obtain preliminary comments.

A document reflecting recommendations from that meeting was approved and signed by Glenn Gershaneck, former Secretary of Transportation, on March 17, 1997. This document has since served as the guidance document for all culvert and ditch maintenance operation within the State of Vermont.

A five-year review of the 1997 Procedures was conducted in 2001 to update the Procedures to reflect the current program needs. This document was produced using comments received from the VTrans Environmental, Hydraulics, and District Staff, as well as officials from the ANR, COE, EPA, FHWA, and USFWS.

VTrans recognizes numerous benefits from the use of grass-lined ditches and is committed to their use wherever possible, to obtain the maximum treatment of stormwater runoff. In addition, wherever possible, VTrans is committed to eliminating paved ditches and replacing them with grass or stone-lined ditches, depending upon the grade. The rationale behind the elimination of paved ditches is due to the fact that they provide no treatment of stormwater runoff and at the same time accelerate flow velocities, thereby increasing the probability of erosion below the ditch.

## **GENERAL GUIDELINES FOR THE PROTECTION OF THE ENVIRONMENT**

Management of the Statewide Culvert and Ditching Program will reside at the District Level within VTrans. The following basic conditions will be followed for all culvert replacements and ditching operations so as to insure uniform permit compliance within the state:

- 1) Each DTA will provide a list of proposed culvert replacements to the VTrans Environmental Section. This list will identify each culvert location by route and mile marker. The list will also include the size and material of the existing culvert(s), the size and material of the proposed culvert(s), and a summary of any field identified hydraulic deficiencies and/or problems associated with sediment transport continuity, including adjustments of the channel plan form alignment or vertical bed profile. It will be the responsibility of the VTrans Environmental Section to review the list of proposed sites for compliance with the Procedures, and issue clearance for those that do not impact cultural and natural resources. Also, the Hydraulic Engineer will review the summary and notify the DTA of any suggested changes.
- 2) Every effort will be made to perform maintenance activities from the existing road surface. When it is necessary to have equipment and materials on roadway slopes or at the toe-of-slope, the ANR Stream Alteration Engineer and/or District Fisheries Biologist will be contacted to insure that proper measures are taken to minimize the impact on areas around the work site.
- 3) Every effort should be made by the VTrans to identify locations where surplus materials can be placed. However, it is recognized that this is not always possible. Surplus materials will not be placed within 50' of any wetlands or their buffer zones, or 100' from the top of bank of any river, stream, lake or pond. In addition, surplus materials will not be disposed of in areas, which contain known archeological sites. Wherever possible, it is recommended that each DTA identify several potential waste and borrow areas, and coordinate this effort with the VTrans Environmental Section to ensure that no cultural or natural resources will be impacted by site use.
- 4) It is VTrans policy to replace culverts under State Routes with a new culvert with a minimum dimension of eighteen inches (18") and culverts under access drives with a minimum dimension of fifteen inches (15").
- 5) It is VTrans policy to seed and mulch all disturbed soils upon completion of the maintenance operation. Temporary erosion control measures will be utilized until final control measures are established. Erosion control measures will be completed on each section at the end of each workday. In the event of heavy rains, seeding and mulching will be repeated as necessary until vegetation is established. Furthermore, in the event that the previous year's disturbed areas have not established a healthy vegetative cover, it will be necessary to re-seed and mulch the areas so as to stabilize the sites.
- 6) For side slopes steeper than 1:3, erosion matting should be used.
- 7) Every effort should be made to ensure that ditch maintenance projects are

completed and stabilized before September 15<sup>th</sup> of each year. Seeding before September 15<sup>th</sup> provides enough growing season for vigorous growth to occur. If seeding cannot be done prior to September 15<sup>th</sup>, the use of non-vegetative protection measures (i.e. erosion control matting) must be deployed.

- 8) For maintenance projects, which must, of necessity, extend past September 15<sup>th</sup> of any given year, all measures possible will be taken to limit exposure of soils. In addition, soil disturbance between October 15 and May 1 will require the inclusion of special winter erosion and sediment control measures. For those projects where winter construction would present an undue risk to water quality, it may be necessary to suspend maintenance efforts until the spring.

## **REPLACING CULVERTS**

### **Replacing Small Culverts on Intermittent Streams ( 48" or smaller)**

The replacement of culverts on intermittent streams does not generally pose a threat to the environment. Review of culvert replacements in this category, by the ANR or COE, is not required as long as they are replaced with a new culvert of similar type, length, and dimension.

Although resource impacts are not anticipated by replacement of culverts in this category, the following additional conditions will be followed to ensure that the culvert

replacements do not result in impacts to natural resources:

- 1) If it will be necessary to construct a detour around the culvert, a sketch plan will be submitted to the ANR Stream Alteration Engineer and the VTrans Environmental Section for approval. The COE also requires (at a minimum) a phone call.
- 2) If flows are present at the time of the culvert replacement, temporary sandbag check dams and a pump bypass must be utilized.
- 3) See also "General Guidelines for the Protection of the Environment."

### **Replacing Small Culverts on Perennial Streams**

In general, the replacement of small culverts on perennial streams will not require review by the ANR or COE as long as they are replaced with a new culvert of similar type, length, and dimension. However, the following additional conditions will be followed to ensure that the culvert replacements in this category do not result in impacts to natural resources:

- 1) All construction activities, on culverts carrying perennial streams, must not occur before June 1 or after October 1. Exceptions to this condition may be possible, but only after consultation with the ANR Stream Alteration Engineer.
- 2) A normal downstream flow will be maintained by means of temporary sandbag

check dams and a pump bypass system to conduct the water through the construction area, unless site conditions precludes such.

- 3) Headwalls are desirable erosion prevention features and should be considered, designed, and constructed whenever deemed desirable by the DTA.
- 4) If it is necessary to construct a detour around the culvert, a sketch plan will be submitted to the ANR Stream Alteration Engineer and the VTrans Environmental Section for approval. The COE also requires a phone call.
- 5) Small-corrugated culverts may be replaced with smooth culverts of similar dimension, but require a riprap splash pad for energy dissipation.
- 6) See also "General Guidelines for the Protection of the Environment."

### **Installation of New Small Culverts**

A new small culvert may be proposed, under a roadway or driveway, where the DTA determines it necessary to facilitate drainage. In addition, a new small culvert may be installed adjacent to a roadway in place of an existing man-made drainage ditch, if needed to improve safety. However, it is important to note that in terms of stormwater management, a grass-lined ditch is always preferred over the installation of a culvert. The DTA will provide a list of any proposed projects involving the installation of new small culverts to the VTrans Environmental Section and the COE for review. The list must include: a site description, the town name, route number, beginning and ending mile markers, the justification or need for the installation, photographs of the site, and location maps.

It should be noted that the ANR Stream Alteration Engineer does not need to review proposed installations of new small culverts (under 48") for the purpose of facilitating drainage under a road, driveway, or ditch which is adjacent to a road. However, for cases in which the installation of the small culvert involves the relocation or modification of a perennial stream, it will be necessary for the Stream Alteration Engineer to review the proposal.

### **Replacing, Repairing, and Lining of Large Culverts**

Culverts in this category require review prior to construction. The replacement of large culverts may result in impacts upon the environment if not properly constructed. It is imperative that the design, construction and maintenance of large culverts consider the effects of fish and wildlife passage. It should be noted that both the ANR and COE do not generally issue a permit to line a large culvert due to problems associated with fish passage.

Lists of projects involving replacement, repair or lining of large culverts will be submitted to VTrans Environmental Services Engineer for review. Following review by the

VTrans Environmental Staff, a determination will be made as to how to proceed. Projects involving full replacements of structures will need to be coordinated with the ANR Stream Alteration Engineer, the ANR Fisheries Biologist, and the COE. The lists shall contain a description of where the project is located (a town name, route number, mile marker, name of stream, and a location map), hydraulic information, and when the culvert replacement is scheduled to occur. The ANR Fisheries Biologist will provide comments to the Stream Alteration Engineer.

It will be the responsibility of the DTA to notify appropriate agencies of plans for culvert replacements in this category. At a minimum, the DTA will contact the VTrans Environmental Services Engineer, ANR Wetlands Office and Stream Alteration Engineer, and the COE whenever a large culvert needs to be replaced, repaired, or lined.

The notification will include, at a minimum, the location of each culvert in this category, (by town name, route number, mile marker, name of stream {if known}, and a location map). The list will also include hydraulic information, and the size of the culvert at the site. The notification should also contain a description of the proposed construction (how and where the culvert will be replaced). Plans must accompany the notification and will require the following information and inclusions:

- a. A location map
- b. Plans showing (at a minimum) existing road and drainage features
- c. Plans showing the size and location of the new culvert
- d. Photos of the existing conditions

Upon receipt of the above listed information, it will be the responsibility of the VTrans Environmental Section to coordinate, consolidate and distribute within VTrans, the comments and recommendations of the various departments within the ANR.

If permits are necessary, it will be the responsibility of the VTrans Environmental Section to obtain all of the necessary permits, to include those from the Corps of Engineers, the ANR, and the Division for Historic Preservation. The District Transportation Maintenance Technician, or representative, will coordinate with the VTrans Environmental Section to develop ways to minimize the effect on the environment as a result of these operations. The VTrans Environmental Section will coordinate with the appropriate resource agencies for approval.

## **MAINTENANCE AND CONSTRUCTION OF ROADSIDE DITCHES**

### **Existing Ditch Maintenance**

Although the maintenance of existing manmade ditches may pose a threat to the environment, erosion and sedimentation can be avoided by sound construction and maintenance practices. By the nature of their design, ditches can pose a threat to nearby wetlands and watercourses, since the flows they convey can also transport sediments. It is for this reason that

these procedures were developed and by adhering to these guidelines the maintenance of existing ditches will not require review by the ANR or COE as long as they are not enlarged. It should be noted that as a general rule, roadside ditches are not considered to be regulated wetlands, even in cases where the wetland plant species have become established.

In order to insure that ditches are stabilized against erosion, all temporary erosion control measures will be in place by the close of each construction day. Upon completion of the maintenance of each ditch, permanent erosion control measures will be installed. Permanent erosion controls measures will be dependent upon the slope of the ditch, as summarized below:

| <b><u>DITCH LININGS</u></b> |   |                                 |
|-----------------------------|---|---------------------------------|
| <b><u>Channel Slope</u></b> | <b><u>Lining</u></b>                        | <b><u>Minimum Thickness</u></b> |
| 0 - 1%                      | Seed & Mulch                                |                                 |
| 1 - 2.5%                    | Erosion Control Matting<br>and Seed & Mulch |                                 |
| 2.5 - 10%                   | Type I (stone)                              | 12"                             |
| > 10%                       | Type II (stone)                             | 24"                             |

As previously noted, in the event that heavy rains wash away seed and mulch placed during construction, the measure should be repeated as often as necessary to ensure the long-term vegetative stability of the ditches and prevent sedimentation.

See also the "General Guidelines for the Protection of the Environment."

## **New Ditch Construction**

The construction of new ditches will require review by both the VTrans Biologist and the VTrans Archeologist since the new ditch may result in new resource impacts. Therefore, it will be the responsibility of the DTA to notify the VTrans Environmental Services Engineer, in writing, of projects, which will require construction of new roadside ditches. The notification should include, at a minimum, the location of ditches to be constructed (by town name, route number, and mile marker), the length of the proposed ditches, and photos of existing site conditions.

Upon receipt of the above information, the VTrans resource staff will review proposed new ditch projects for potential impacts upon wetlands, watercourses, rare/threatened/endangered species and cultural resources (ie. archeological). A report will be furnished by the resource staff (or consultants) to the VTrans Environmental Section, the COE, the ANR Wetlands Office and DHP. If a potential for resource impacts is identified, survey plans and other additional information may be required in order to obtain clearances and/or necessary permits.

The VTrans Environmental Section will be responsible for obtaining permits necessary for the construction of new roadside ditches.

During construction of new ditches, all construction areas will be seeded and mulched by the close of each construction week. Temporary erosion control measures will be utilized and inspected, and repaired (if necessary) on a daily basis until final controls are established. In the event that heavy rains wash away seed and mulch, the measure should be repeated as often as necessary to ensure the long-term vegetative stability of the ditches.