

# BERKSHIRE PLANNING TOOLS



One in a series of “toolbox” items to accompany the Regional Plan for the Berkshires

June 2001

## Maintaining unpaved roads

### The Importance of Local Unpaved Roads

Unpaved roads are common across the Berkshire landscape, and their preservation is important to the character of the region. A familiar sight in most communities, unpaved roads offer a sense of timelessness, helping residents connect with the days of cart paths and carriage roads.

Aside from their value as a scenic and often historic resource, unpaved roads have the advantage of lower construction costs than paved roads, require less equipment and skilled operators, and generate lower speeds than their paved counterparts. Yet, like paved roadways, dirt and gravel roads require regular maintenance to keep them passable and safe. Well-maintained dirt and gravel roads can serve traffic very satisfactorily, and should be considered as a legitimate road surfacing option, not just something a community grudgingly maintains while it waits for paving.

### The Need for BMPs

Unpaved roads, if not properly managed, could contribute heavily to water quality problems. Erosion from unpaved roads and road related projects could contribute to polluted runoff, or nonpoint source pollution. This nonpoint source pollution is a major contributor to water quality problems throughout Massachusetts. Using structural BMPs and inexpensive routine and preventative maintenance practices outlined here (and in BRPC’s *Massachusetts Unpaved Roads*

*BMP Manual*, 2001) can improve overall water quality while potentially reducing the cost of maintaining unpaved roads.

### Nonpoint Source (NPS) Pollution

*Pollution of surface or ground water originating from land-use activities and/or the atmosphere, having no well-defined point of entry.*

### BMP Selection

How does one arrive at the point of knowing which BMP is best for any particular circumstance? Each BMP technology has certain limitations, and road managers should become familiar with the basics. Efforts to solve a road related problem without sufficiently evaluating the cause and properly designing a solution can result in failure and the waste of already limited funding. A systematic approach to BMP selection should be followed.

### Best Management Practice (BMP)

*Structural, nonstructural and managerial techniques that are recognized to be the most effective and practical means to prevent and reduce nonpoint source pollution.*

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### Nonstructural BMPs

The use of nonstructural approaches should precede the use of structural BMP controls for unpaved road management. Nonstructural BMPs are generally less expensive than structural practices, since they require comparatively less capital. Several common nonstructural BMPs that minimize the creation of new runoff, limit erosion, and protect the health of water resources are highlighted below and throughout BRPC's *Unpaved Roads Manual (2001)*. Such nonstructural approaches include:

*Plan projects carefully:* Good planning and site design is critical to managing unpaved roadways and nonpoint source pollution. It can decrease existing runoff, eliminate unnecessary increases in runoff, and reduce erosion and sedimentation problems. In addition, a well thought out site design will minimize the size and related material, construction, and maintenance costs of structural BMPs.

*Maintain structural BMPs:* The maintenance requirements for unpaved roadway BMP structures must be considered during the selection process, as BMPs must be maintained in order to function properly. Too often, BMPs are constructed without plans or obligations for long-term maintenance.

*Maintain natural buffers and drainageways:* Road runoff generally takes the path of least resistance. If drainageways are stable and well vegetated, they should be preserved. The natural buffer located between the road and waterbody or wetland will help infiltrate runoff, reduce the velocity of the runoff, and help remove some of the sediments in the runoff.

*Minimize the creation of steep slopes:* Steep slopes have a significant potential for erosion. Slopes steeper than 2H:1V should be avoided unless stabilization methods are employed.

*Maintain as much of the natural vegetation as possible:* Vegetation absorbs water, which will reduce the amount of stormwater runoff the road drainage system needs to handle. Large trees are especially important because their roots help to hold soil in place, and should be protected from damage during any planned roadwork.

### Factors Affecting the Life of an Unpaved Road

There are five major factors that affect the ability of an unpaved roadway to survive and serve the needs of the traveling public over a long and useful life.

- Traffic Loads
- Subgrade Quality
- Workmanship and Construction Practices
- Maintenance Program
- Water (*see drainage below*)

Unpaved roads require routine and preventative maintenance on a regular basis. The idea is to spot the “possible” problem before it gets to be a “real” problem. Spend a few dollars *now* to prevent major repair costs *later*.

### What About Drainage?

It is often said that the three most important factors affecting the life of any roadway are “drainage, drainage, drainage”, and this is certainly true of unpaved



roads. Without good drainage, even the best of construction methods and materials could be wasted. Understanding the fundamentals of good road components is imperative to

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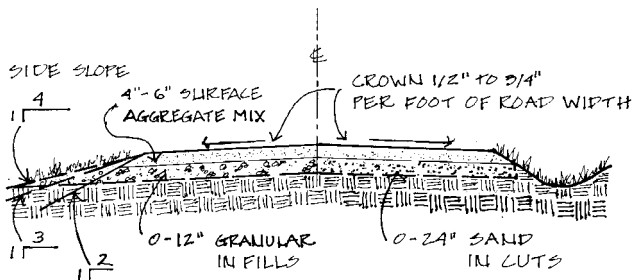
controlling drainage and maintaining good unpaved roads.

### Road Surfaces

Surface water that is not effectively conveyed from the road surface to a drainage channel can result in deterioration of the road surface, safety problems resulting from ice build up, and various erosion problems. Immediate removal of runoff from the road surface will prevent many of the problems associated with surface deterioration. This will lengthen the life of the road surface, as well as lessen maintenance frequency and costs. It will also decrease the amount of sediment carried by road runoff into waterways.

#### General Principles

- ☑ Preserve and maintain a proper road crown for good drainage (free water cannot be allowed to stand in ruts or potholes or it will soak into the surface.)
- ☑ Keep the road surface tight and impervious.
- ☑ Perform regular drainage maintenance and grading.

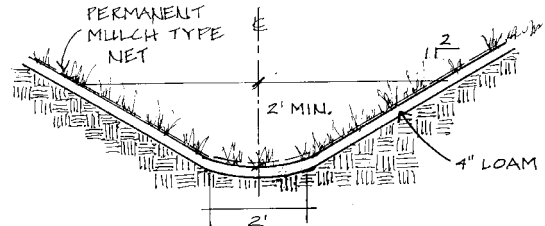


### Ditches

Well-designed ditches provide an opportunity for sediments and other pollutants to be removed from runoff water before it enters surface waters or groundwater. Ditches work by controlling, slowing and filtering road runoff through vegetation or rock lining. Efficient removal of runoff from the roadway will help preserve the roadbed and banks. In addition, a stable ditch will not become an erosion problem itself.

#### General Principles

- ☑ Ensure that the ditch is properly lined to prevent erosion.
- ☑ Perform regular maintenance to keep ditch clear and stable, and to maintain capacity of channel.

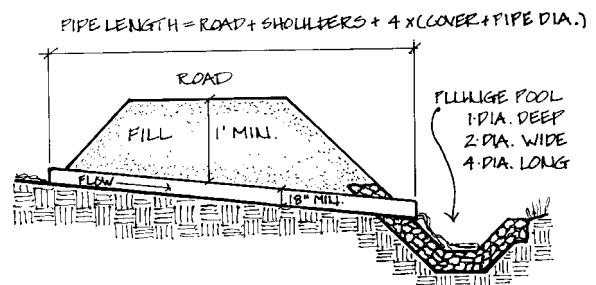


### Culverts

Properly placed culverts along unpaved roads will help alleviate ditch maintenance problems by outletting water in a timely manner. Significant erosion problems can develop at the outlets of culverts if they have not been properly designed or installed. Placing culverts and other outlets based upon road slope will control volume and velocity of discharges, reducing erosion and undermining and preventing sediment from entering surface waters.

#### General Principles

- ☑ Inspect on a regular basis.
- ☑ Protect inlets and outlets by marking their location, stabilizing entry and exit zones, and maintaining ditch linings to prevent erosion.
- ☑ Practice preventative maintenance to avoid clogging, washouts, and settlement.



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### Outlet Protection

Outlet structures reduce the velocity of water carried by road ditches and culverts, therefore helping to control erosion and limit sedimentation. After passing through an outlet structure, water should outlet to areas with moderate slopes and vegetative filter zones before entering surface waters. This type of outlet, often referred to as *daylighting*, will allow for most of the sediments and other pollutants to be removed before runoff enters surface waters. If these structures discharge to surface waters, a Notice of Intent filing will be required.

#### *General Principles*

- ☑ Install at all pipe, culvert, swales, or other water diversions where water velocity may cause erosion.
- ☑ Design and size outlet protection for anticipated water velocities.
- ☑ Perform regular maintenance and inspect periodically.

### BMP's in Action: A Local Example

The Town of Becket was a participant in a recent BMP pilot demonstration project to highlight the effectiveness of unpaved road BMP's.

**Problem:** The lack of adequate ditches and runoff outlet areas along Tyringham road led to annual washouts and road closings. The road crew used to spend a considerable amount of time in that area even after minor storms, patching washouts and regrading. The town had considered upgrading the road to improve safety for a number of years.

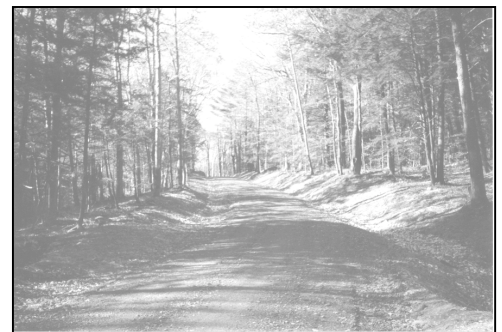
**Solution:** Bill Elovirta, the Highway Superintendent in Becket, utilized a number of the BMPs to solve the problems he was experiencing on Tyringham Road.

After obtaining the necessary permits, his crew widened the road, graded back the roadside banks, and improved the ditches along both sides of the road using 4 to 6 inch irregularly shaped stone, laid 10 to 12 inches thick. Culverts were laid at appropriate intervals to get the runoff from one side of the road to the other where it could be outleted properly. These outlet areas were designed to slow down the runoff and settle out sediments before the runoff reached the river. The road surface itself was improved using recycled asphalt giving the road a hard surface that is easy to crown and sheds water easily.



*BMP's used included rock lined ditches and new culverts with proper outlet protection*

*The completed road project improves safety and runoff quality.*



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*This publication is one in a series of "toolbox" items to support the Regional Plan for the Berkshires. If you would like to receive additional copies of this or other toolbox items, please contact the Berkshire Regional Planning Commission, 33 Dunham Mall, Pittsfield, MA 01201 or call (413) 442-1521. Copies of the toolbox items are also available on the web. Visit [www.berkshireplanning.org](http://www.berkshireplanning.org)*

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