# SECTION 23 – PAVED SIDE DITCH AND RIPRAP

## 23.1 PAVED SIDE DITCH *(Rev. 10-05-09)*

If the grade of a ditch is such that erosion cannot be controlled by the use of sod, paved side ditches may be installed. Reinforcement is required for all paved side ditches, cut-off walls, and lugs as shown on the plans. A strip of sod should be placed along each side of paved side ditch to prevent erosion along the edge of the paved side ditch.

If paved side ditch is placed on a steep grade there is the possibility of surface drainage flowing parallel alongside the side ditch causing scour under it. When such condition is likely, lugs should be constructed as shown in the plans with the upstream edge of the lug lowered so that water will be diverted into the paved side ditch.

The spacing of these lugs will depend on the conditions encountered and intervals set out in the standard drawings. On steep grades it is necessary to lower the paved side ditch so that the slope from the pavement to the ditch is greater than the grade of the road. In exceptionally rough country, it may also be advisable to use sections of slopewall or rip rap to contain the water in the paved side ditch or to turn the water into the paved side ditch at the outlet end of a cross-pipe. A short section of flat bottom paved side ditch, at the outlet end of a cross-pipe, has also been successfully used as a settling basin to direct the cross-pipe water into the V shaped paved side ditch.

Compaction of the soil under the paved side ditch is something that should not be neglected. Without the proper compaction, the ground under the paved side ditch could settle and cause the ditch to break up. Any break in the ditch will allow water to flow under and around the paved section of the ditch and create severe erosion issues.

## 23.2 RIPRAP *(Rev. 10-05-09)*

Riprap is specified to protect a slope or ditch against erosion or scour where vegetation or other methods would be ineffective or impracticable. Prior to adding large quantities of riprap to a slope, future maintenance of the area to be ripraped should be considered.

There are a number of different types of riprap. The SS, SP, and plan details cover all the types and the material required for their construction. Occasionally, material such as broken concrete or stone is available from within the project right-of-way and may be used for dumped, revetment, class 1, or class 2 riprap. Payment for riprap that is not transported from offsite will be by the square yard and will only happen if the placement locations are not specified on the plans.

It is necessary to place riprap on a stable slope and over an appropriate geotextile for it to be effective. Careful investigation should be made prior to staking out the proposed riprap area to determine the exact locations where it must be placed to be most effective.

When placing geotextile on areas greater than the roll width, good practice is to place the narrow dimension of the geotextile vertically. Essentially the geotextile is rolled down the slope. If it is necessary to lap the geotextile between the top and bottom of the slope, the lower section of geotextile must be under the upper section of geotextile to prevent water

from being able to flow under the geotextile and erode the slope. When placing the geotextile on a stream bank or ditch the laps should be placed such that the upstream sections are over the downstream sections. This allows water to flow over the laps like a shingled roof. In order to keep the geotextile in place, the geotextile must be pinned as per the SS.

When placing riprap within the clear zone of a project, uniform riprap must be used and made as traversable as possible. If a potential for riprap to be thrown by vandals exists, grouted riprap should be considered.