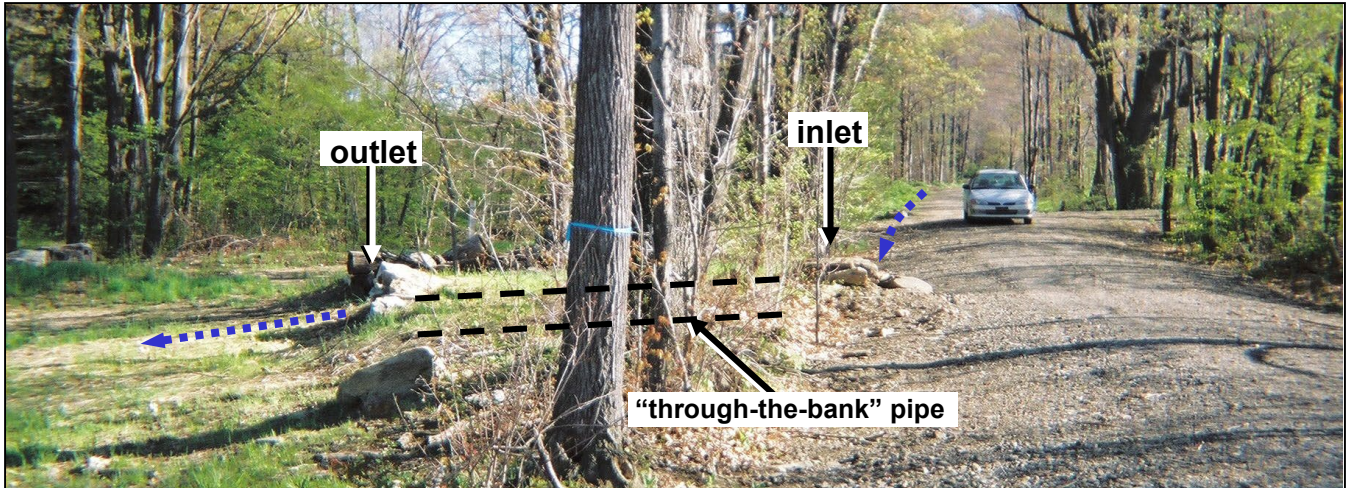


# Through-the-Bank Pipes

**Through-the-Bank Pipes** – Pipes placed in the down-slope road bank to carry ditch drainage through the bank and away from the road.



**Photo 1.** This Through-the-Bank Pipe provides an outlet for road drainage that is trapped within the road corridor by a bank along the downslope side of the road. The pipe inlet is in the road ditch, and the outlet is located where water can drain away from the road.

**PURPOSE** – A through-the-bank pipe can provide an outlet for ditch drainage on an entrenched road (a road that is sunken below the surrounding terrain) where traditional turn-outs aren't possible or practical. These pipes can be stand-alone outlets for downslope road ditch drainage, or they can be used in conjunction with traditional crosspipes or broad-based dips to provide flow relief for the entire road drainage system. Through-the-bank pipes capture ditch flow and direct it away from the road to a point of lower elevation. The water is discharged at the natural ground elevation where it can flow away from the roadway (Fig. B).

## BENEFITS

- Provides an outlet for road drainage that would otherwise be trapped in the road corridor.
- Provides an alternative to traditional turn-out trenches that require more soil disturbance to install and require more maintenance for routine cleaning.
- May be more acceptable to landowners from an aesthetic standpoint due to the ability to establish a permanent vegetative cover and the lack of cyclical earth disturbance common with the maintenance of turn-outs.

## WHERE TO USE

- On entrenched roads where raising the road profile to a level above the bordering road banks is impractical due to cost, an absence of suitable fill material, or other limitations.
- On entrenched roads where erosive drainage is trapped on the road and lower ground exists within a reasonable distance of the downslope road bank.
- Anytime lower ground exists within a reasonable distance of the downslope road bank but earth disturbance from a traditional turn-out is undesirable.
- Only where an appropriate and stable drainage area exists at the potential through-the-bank outlet location.

## IMPORTANT CONSIDERATIONS

### EQUIPMENT

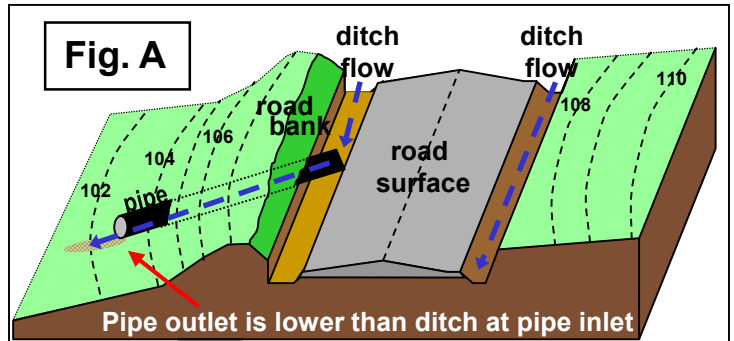
- A backhoe or small excavator can often be used to excavate the pipe trench from the edge of the roadway with minimal off right-of-way impacts.

### SITE SELECTION

- Always avoid outlets directly to a stream.
- A laser level or transit is required when locating and installing these pipes. At least 1% of fall is necessary for proper pipe function, but slightly steeper pipes will help to keep the pipe free of sediment and obstructions.
- To avoid the need for an outlet trench, bank pipes should outlet at natural ground elevation. Be sure that discharged water flows away from the road.
- A well vegetated, or otherwise stable, outlet area is important when selecting bank pipe locations. However, mature trees can be severely impacted by root disturbance. Look for pipe locations that will minimize impacts on beneficial plants.

### PIPE INSTALLATION

- Excavate the pipe trench through the bank so that the inlet of the pipe lays on the bottom of the downslope road ditch (Photo 2) and the outlet sits at ground level.
- Since they are not exposed to traffic, these pipes do not need the same amount of cover or compaction that crosspipes require. The excavated material can be re-used as cover over the pipes, which will help with vegetation reestablishment.
- Seeding and mulching of the disturbed soil is important to provide erosion protection. Native vegetation is desirable when possible, as these plants are adapted to the site conditions.
- Headwalls and Endwalls are important to direct flow, to protect the bank, and to visually identify the ends of the pipe. A rock outlet apron may be utilized at steep or unstable outlets, or when high flow volume or high velocity flow is anticipated.



Figures not drawn to scale.

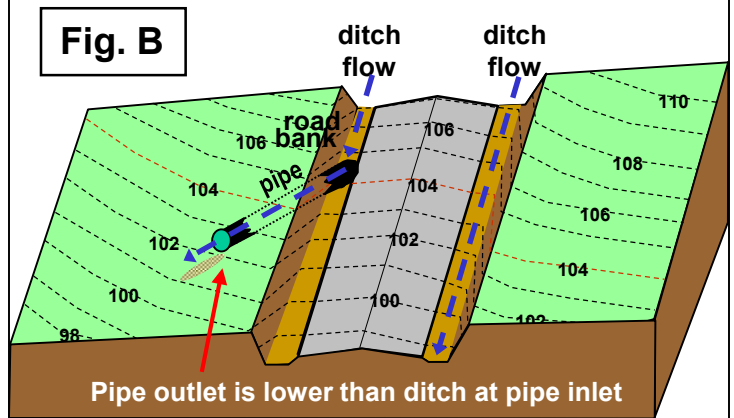


Figure A. shows a through-the-bank pipe being used to “punch a hole” in a downslope bank on a road that traverses across a hillside.

Figure B. is a less obvious scenario where the through-the-bank pipe is installed on an entrenched road which runs up and down a hillside. Here, using a level is a must, since the pipe may actually appear to run uphill with the naked eye, especially on steeper roads.

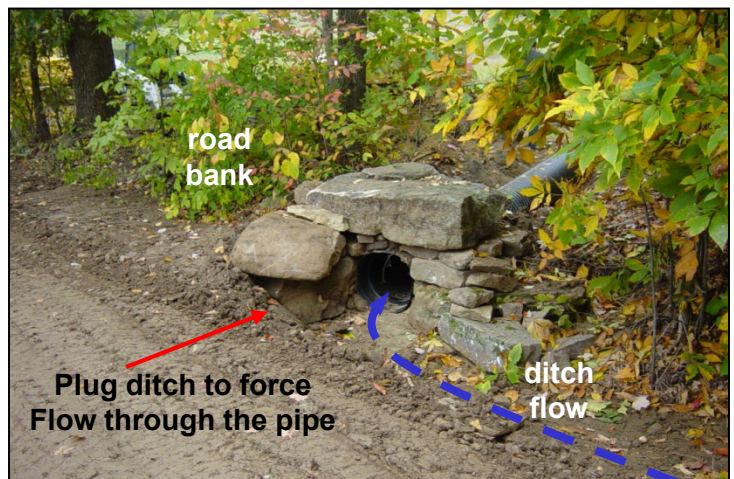


Photo 2. This is the inlet of the same through-the-bank pipe shown in Photo 1. The pipe has just been installed and is about to be covered.