

Culvert Installation

<b>Facility:</b>	<b>Written By:</b>	<b>Approved By:</b>	<b>Date Created:</b>	<b>Date of Last Revision</b>

<b>Hazards Present:</b>	<b>PPE or Devices Required:</b>	<b>Additional Training Required:</b>
Flying Debris	Steel toed boots	Operator training
Rocks, Branches, Poles, Culverts	Safety glasses	
Vehicle/Machine damage	Hand protection	
Steep Inclines, Rollover	Hard hat	

**Safe Work Procedure:**

- 1) The installation of all culverts should comply with the specifications prescribed by the manufacturer of that product, particularly in regard to pipe zone bedding material quality, degree of compaction, and minimum or maximum pipe cover for design loadings.
- 2) All work involving minor alterations to the stream channel to permit culvert placement should be carried out at a time of low flow conditions. It is prudent however to be prepared for increased flows by scheduling work according to the weather forecast and to have a contingency plan for unexpectedly large runoff from a sudden storm.
- 3) In-stream excavation can cause considerable siltation and pollution of watercourses. If excavation of bed material or other extensive in-stream work is necessary, to make a level bed for the culvert for example, all flow should be diverted or confined to a section to allow the work to be carried out in the dry.
- 4) Stream flow may be controlled in any of a number of ways in order to provide a dry working area. Four methods which may be used include the following: A temporary diversion channel, a temporary culvert(s), pumping or confining flow to a channel section by use of cofferdams
- 5) The gradient of all culverts as far as possible should follow the stream channel gradient and should be placed in line with the direction of the main flow.
- 6) In multiple (gang) culvert installations, one culvert should be set at an elevation lower than the others to provide adequate flow depth and velocity for fish passage during low flow conditions.
- 7) Culverts should be placed at such an elevation that there is no ponding of water at the upstream inlet of the culvert and there is drop or hydraulic jump created at the outlet of the culvert. Similarly, outlets should not be submerged.
- 8) Large culverts may be countersunk into the channel bed. This also permits some gravel deposition in the culvert which creates a natural type of bed within the culvert.
- 9) Suitable material of good quality should be used in backfilling culverts to ensure a good culvert installation. A compactable granular material "Granular Class B" quality or better is suitable for most installations. Cohesive soils or material containing large amounts of sand, fine silt or clay should not be used, because erosion of the material may result. Well graded granular material also provides better load carrying capability than poorly graded material or cohesive soils. Small culverts may be backfilled with the same material used to construct the road. Provided that the material meets road construction standards. Larger culverts should be backfilled more carefully, using select material if necessary.
- 10) Backfill material placed under the haunches of the pipe should be in intimate contact with the entire bottom surface of the structure. Pre-shaping the bedding material to match the culvert curvature may assist in this regard. Backfill material should be placed in layers not exceeding 300 mm in thickness and compacted with suitable hand operated compacting equipment. Backfilling should be done in a manner that will prevent any deformation or displacement of the culvert. Proper compaction is necessary to provide adequate load bearing capacity above the culvert, and is necessary to reduce the voids which can cause "piping effect". The soil compaction around the culvert should achieve 90% standard Proctor density or better. The major factors which influence soil compaction and which should be taken into consideration include the following:
  - i. moisture content of the soil,
  - ii. nature of the soil, its gradation and physical properties,
  - iii. Type and amount of compaction effort required.
- 11) Large diameter culverts are often shipped with bracing to prevent deformation of the culvert during transport and installation. These braces should be removed upon completion of the work as they may contribute to blockages by debris or ice.

***If an emergency situation occurs while conducting this task, or there is an equipment malfunction, engage the emergency stop and follow the lock out procedure***

**REPORT ANY HAZARDOUS SITUATIONS TO YOUR SUPERVISOR**

<p align="center"><b>Guidance Documents/Standards:</b></p> <p>MB Workplace Safety &amp; Health Act &amp; Regulations:                  4 General Workplace Requirements                  6 Personal Protective Equipment                  16 Machines, Tools and Robots                  22 Powered Mobile Equipment</p>	This Safe Work Procedure will be reviewed any time the task, equipment or materials change and at a minimum of every three years
	Reviewed By WSH Committee:  Date: