



General Conditions for Waterway Crossings by Pipe/Cables by Utility and Public Authorities Where No Deviation of Waterways is Involved

These general conditions apply to any part of the waterway, either the bed and/or banks.

1. Directional boring (or similar) should always be used where possible in conjunction with the relevant conditions below.
2. Where the pipeline/cable crossing is installed under a waterway:
 - (a) a minimum cover of 300 millimetres shall be provided over the pipe/cable installed in the bank;
 - (b) Minimum cover over the pipe or cable below the bed of the waterway shall be one (1) metre. This cover should increase to two (2) metres for gas mains, as there are more severe consequences if the main is ruptured.

Where there is evidence of bed instability in the vicinity of the crossing, it is advisable to increase this cover, or alternatively, to control the erosion by suitable bed stabilisation works.

- (c) where water is flowing in the waterway, the material for backfilling the trench across the bed shall consist of granular material. The backfilling shall be finished level with the bed;
- (d) the material for backfilling of the trench across the bed (when there is no flow of water in the waterway) and banks of the waterway shall consist of selected clay or sandy clay loam. Such material shall be placed in the trench as close as practicable to the material's optimum moisture content, in layers not exceeding 200 millimetres in depth. The backfill shall be thoroughly compacted by mechanical means over the full width of the trench and the full length of the pipe/cable and finished level with the bed and surface of the banks;
- (e) all other areas of the banks, outside the limits of the pipe trench which have been excavated for access *etc.*, shall also be backfilled in accordance with (d) above;
- (f) 150 millimetres of sandy loam filling shall be placed on all backfilled areas of the banks and be sown with a seed mixture of locally occurring native species of grasses.
- (g) the above seeded filling shall be protected by a layer of straw mulch 25 to 50 millimetres in depth held in position with wire mesh pinned securely into the banks, or by other equivalent soil retention methods;
- (h) all surface runoff shall be diverted away from the pipe trench and other backfilled areas to avoid erosion.

3. Disturbance of the bed and banks of the waterway is to be kept to a minimum during construction.
4. Disturbed areas are to be reinstated with suitable native vegetation. The bank surfaces should be scarified across the slope to avoid channelling runoff and to aid the re-establishment of grasses. Areas below the overhead cables should be re-planted with low growing plant species.
5. Backfilling of the disturbed bank area shall be finished at least 100 millimetres above the adjacent undisturbed bank levels.
6. Vegetation that has been cleared for construction purposes and any heaps of excavated soil remaining after the completion of the works shall be removed from site. No material of any sort shall be pushed into the waterway or left in a manner where it can slip or be moved by floodwaters, into the waterway.
7. Use of construction equipment in streambeds is to be kept to a minimum.
8. Suitable conservation measures are to be implemented to prevent vegetation, silt, chemicals and spillages from construction activities entering the waterway and/or moving downstream. No discharge/dumping of wastewater or other materials to the waterway is permitted, unless specifically authorised by the Authority.
9. All surface run off shall be diverted from the pipe/cable trench along the shoulder of the bank in a suitable graded channel.
10. The waterway shall not be deviated in any manner for construction purposes. Construction should preferably be undertaken when flows are low to minimise local and downstream impacts. Provision should be made for continuous flows past the works site. If necessary the flow shall be pumped around the construction site or construction undertaken in stages with flow confined to one portion of the waterway
11. Any works in the bed of the waterway should be designed and constructed so as not to impede fish passage.
12. Logs and boulders removed from the waterway as a result of construction activity should be returned to the waterway and randomly distributed.
13. In sand bed streams the type of pipe laid under the stream should take into consideration the potential for bed movement. For this reason continuous pipes with welded joints are required in sand bed streams to mitigate failure of the pipeline and subsequent release of its contents into the waterway.
14. Cable-to-ground and cable-to-tree clearances should be in accordance with statutory requirements to ensure public safety and minimise the risk of fire hazard. Where waterways are navigable, additional vertical clearance will be required
15. The pipeline is to be designated with marker posts and have a marker plate with the name of the owner, contact details and cover to the pipeline. Overhead cables are also to be clearly marked.

The Authority also requires that close supervision be exercised at waterway crossing locations to ensure that the contractors observe the above requirements, which are aimed at protecting both the pipe/cable installation and the bed and banks of the waterway.