

Service Crossings

The following services commonly cross rivers and streams:

- Telecommunication cables.
- Water mains and sewers (including irrigation pipes).
- Gas mains.
- Power cables (overhead or underground).
- Private services.

The methods of construction include:

- Directional boring.
- Open cut excavated conduits.
- Above ground conduits.
- Overhead cables.

Above ground conduits or pipe flumes are effectively a bridge. (See *Works on Waterways Notes – Bridges* for guidance.)

Potential Waterway Impacts

The potential impacts can include:

- Disturbance to bed and banks leading to erosion and sedimentation.
- Pipeline leakage discharging into the stream.
- Gas main rupture causing explosion.
- The loss of trees on the stream banks to cater for overhead cables.
- The loss of vegetation caused by fire as a result of overhead cables touching trees.

Assessment Criteria

Bored Conduits

Underground pipes and conduits are usually preferable, particularly if they can be bored under the stream. The advantages of boring include:

- There is no disruption to the bed and batters of a stream and therefore negligible risk of erosion at the site. The bore hole should terminate as far as practicable from the stream banks to avoid disturbance to the riparian zone.
- No effect on the hydraulic capacity of a stream.
- Provide functionality without affecting visual amenity.

Open Cut Excavation

Open cut excavated conduits across streams will cause greater environmental impacts during construction and therefore should be avoided wherever possible. They will be necessary, however, for larger diameter pipelines or in remote sites where directional boring equipment is unavailable.

The key issue for these works is managing the environmental impacts during construction, particularly in relation to methods of excavation and backfilling.

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.

Aerial Cables

Aerial cables over waterways generally have minimal impact on the waterway. The key criteria is the location of poles or towers in relation to the banks and existing trees.

Cover and Clearance Requirements

The minimum clearance between the lowest point of the bed and the pipeline or conduit should be in accordance with the relevant authority's requirements. Generally, a minimum 1 metre cover over underground conduits should be adopted under the bed and banks, which will allow for future deepening of the bed and avoid inadvertent excavation of the conduit. This cover should increase to 2 metres for gas mains, as there are more severe consequences if the main is ruptured.

The cover should be increased where site investigations show the downstream bed to be unstable and at risk of deepening. These investigations may include a longitudinal survey of the bed by the proponent. Alternatively, bed stabilisation works could be undertaken to minimise this risk. Such works must form part of the application.

For open cut excavation, the trench shall be backfilled with selected and compacted materials. The top 200mm of the trench shall be filled with stockpiled materials to re-instate the existing stream bed and banks.

Poles or towers, and support guys, should be located at least 5 metres from the top of the bank. This will minimise the impact to the waterway values of the stream. The width may need to be increased where there is a risk of bank retreat or an avulsion.

The 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.

Pipe Types

The type of pipe laid under streams should take into consideration the potential for bed movement, especially in sandy stream beds during floods. For this reason, continuous pipes with welded joints are required in sandy stream beds to mitigate failure of the pipeline and subsequent release of its contents into the waterway.

Environmental Impacts

The environmental impact is minimised where there is the least disturbance to the site. Tree clearing and lopping should be minimised to reduce the loss of habitat for birds and animals.

Disturbed areas are to be reinstated with suitable native vegetation. The bank surfaces should be scarified across the slope to avoid channelising runoff and to aid the re-establishment of grasses. Areas below the overhead cables should be re-planted with low growing plant species.

Marker Posts and Signs

The location of the underground service is to be clearly identified with suitable marker posts for future reference with contact details of the owner. Overhead cables are also to be clearly marked.