

Method Statement for Construction of Roads across Water Courses and Drainage Lines

1. Introduction

This technical note covers the design and construction considerations and parameters for the construction of roads and pedestrian footways across watercourses and drainage lines for the Westfield Estate.

In the Westfield Development, there are three instances where a road crosses over a watercourse as can be seen on the development plan shown in Annexure A. These crossings will require 2 (Two) x 1 500mm diameter concrete pipe culverts each to transfer the stormwater flows under the road crossings. The pipes will be laid in accordance with the requirements of SABS 1200 and will have headwalls at both the upstream entrance and downstream exit.

This method statement has been prepared to fulfil the WULA requirement of any structure that is to be developed and falls within a 500m radius of an existing wetland must apply for a Section 21(c) and (j).

2. Planning of River/Stream and Wetland Crossings

In the planning for the design phase of the pipe crossing, cognisance is taken of the following reference documents;

- Red Book – Guidelines for Human Settlement Planning and Design;
- SABS 1200 – Standardised Specification for Civil Engineering Construction;
- Local municipal standards.

When planning or designing the crossings, a holistic approach that adheres to all the tenets of the reference or policy documents listed above will be adopted. The environmental sensitivity of wetland areas is acknowledged and designs undertaken will take full cognisance of the proposed impact to these areas.

This includes the impact on all, or any, matters relating to water quality, flooding, agricultural drainage, erosion, flora and fauna and any adjacent topographical features.

The approach to design and construction will encompass the following;

- Appropriate and adequate protection of the river/stream/wetland banks in the vicinity of the pipeline will be incorporated into the design.
- The existing river/stream bank structure will be maintained as far as is possible to reduce disturbance to the river flow.
- Where the roads cross stormwater channels and/or streams these will be designed to take into account both the normal dry weather flows, in the case of a stream crossing, as well as the full storm flows that will be generated by the catchment area above the position of the crossing point. Storm flows will be calculated using the Rational Method and the culvert under the road will be sized to ensure that the full 1:10 year storm flow can be safely accommodated without any overtopping of the road.
- For storms of return period greater than 1:10, the road crossing will be allowed to overtop and suitable bank protection in the form of gabions will be constructed to prevent erosion during these events.

- Headwall details for both the upstream and downstream culvert entrance will be as per the Department of Transport standard specifications.
- Suitable stone pitching and/or reno-mattress and gabion protection will be constructed in front of the apron slab on both the inlet and outlet to obviate any erosion that may be prone to occur at these points.
- In order to avoid any upstream deposition and downstream erosion, the pipe culvert will be laid at a slope that closely matches the existing slope of the stream/watercourse at the crossing point and the invert of the pipe or pipes, as appropriate, will be laid to match the existing stream bed level.

3. Construction Methodology

Construction methodology will differ slightly depending on the nature of the river/stream or wetland being crossed. Perennial streams will require the temporary diversion of water flow during construction, whereas non-perennial streams may not require flow diversion depending on the season. For small flow, which is the case on this project, the temporary diversion will take the form of a coffer dam placed upstream of the work area with a suitably sized diversion pipe to transfer the flow through the work area and to a suitable point downstream.

3.1 *A typical construction sequence is summarised hereunder:*

- Conduct a competent site investigation to build up an informed picture of the task.
- Conduct a topographical survey of the route.
- Adequate design of all the stages of construction.
- All Environmental and Health and Safety requirements and good practice to be adhered to.

3.2 *Plant and Resources required for the Construction may include, inter alia:*

- Dozer for clearing of the area affected by the crossing including clearing of vegetation and stockpiling of topsoil for future topsoiling and grassing of new road batters;
- Excavators;
- Crane of sufficient lifting capacity and reach for pipe laying of precast concrete pipes;
- Tipper trucks for the delivery of bedding material and road fill material to be placed over the pipes;
- Small Compaction equipment for pipe bedding and restricted fill around the pipe culvert;
- Heavy compaction equipment for compaction of the bulk fill for the road prism;
- On-site concrete batching plant for the concrete apron slabs for the pipe culvert;
- Concrete delivery vehicles for wet concrete;
- Formwork, reinforcing steel and the necessary equipment and tools for assembly;
- Equipment for the construction of the brick headwalls as detailed;
- Equipment and labour for the positioning and packing of gabion and reno-mattress baskets or stone pitching, as appropriate and as agreed with the Environmental Consultant, to control and obviate any erosion;
- Light equipment and labour to dress backfill, topsoil and re-vegetate all exposed areas;
- Road building equipment for the construction of road layers over the road prism (Fill) once it has been successfully placed and compacted to a predetermined level above the invert of the pipe culvert. Equipment for this final operation will include tippers, graders, rollers as well as necessary equipment for kerb laying and ultimately prime applicators and premix pavement laying equipment.

4. Conclusion

All design and construction work will be carried out in accordance with the relevant construction specifications and in compliance with the Construction Health and Safety Specifications as well as the Construction Environmental Management Plan.

Annexure A
Development Plan