METHOD STATEMENT FOR CROSSING WETLANDS AND STREAMS FOR THE LUTHULI WWTW PROJECT

DOCUMENT CONTROL AND APPROVAL

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1 Introduction

The Thembisile Hani LM is applying for a WULA for the construction of a WWTW and outfall sewer, as detailed in the WULA documentation.

The purpose of this method statement is to detail how the wetland- and watercourse crossings along the extent of the outfall sewer would be approached and managed to ensure preservation of the natural environment, prevention of pollution to the watercourse, and reinstatement of the natural ground to the original extent.

This plan will serve as a draft format that may be developed further during the detailed design of the project for construction purposes, as well as during planning and implementation of the construction phase works.

In addition, the method statement may be applied for future phases of the project.

2 Drawing References and Rationale

2023/05/01-L05 (Layout of the WWTW)

2023/05/01-L06 (Master Layout Plan)

2023/05/01-LS06 – LS19 (Longitudinal sections of the outfall sewer)

The outfall sewer for Phase 1 of the project is planned to convey waterborne sewage from the current oxidation pond treatment systems at Kwamhlanga A and B to the WWTW. The outfall sewer route was optimised to avoid crossing of wetlands and watercourses; however, some crossings were unavoidable and were kept as short as possible.

3 Scope of Work

The watercourse crossings are detailed on the Master Layout Plan as follows:

Water Use No:	Water Use Name	Description	Watercourse	Point ref.	Latitude	Longitude	Length of Crossing (m)	Total Length of Crossing (m)
1	Outfall sewer crossing Tributary CVB2	Outfall sewer lines PE3 and PD8 will cross a watercourse	Tributary CVB2	WCC0101 Start	S25° 24' 43.44"	E28° 41' 36.18"	36.72	603.46
				WCC0102	S25° 24' 42.32"	E28° 41' 35.72"	100.00	
				WCC0103	S25° 24' 39.07"	E28° 41' 35.75"	154.12	
				WCC0104	S25° 24' 34.50"	E28° 41' 33.51"	273.55	
				WCC0105	S25° 24' 26.02"	E28° 41' 36.47"	22.98	
				WCC0106	S25° 24' 25.49"	E28° 41' 35.90"	16.10	
				WCC0107 End	S25° 24' 25.07"	E28° 41' 36.24"		
2	Oufall sewer crossing Seep 2	Outfall sewer line PD8 will cross a watercourse	Seep 2	WCC0201 Start	S25° 24' 16.12"	E28° 41' 30.39"	8.41	89.22
				WCC0202	S25° 24' 15.97"	E28° 41' 30.14"	80.82	
				WCC0203 End	S25° 24' 13.38"	E28° 41' 29.65"		
3	Outfall sewer crossing Seep 2	Outfall sewer line PD8 will cross a watercourse	Seep 2	WCC0301 Start	S25° 24' 07.96"	E28° 41' 30.29"	190.74	190.74
				WCC0302 End	S25° 24' 01.78"	E28° 41' 30.92"		
4	Outfall sewer crossing Tributary CVB1	Outfall sewer line PD9 will cross a watercourse	Tributary CVB2	WCC0401 Start	S25° 23' 14.73"	E28° 41' 26.01"	120.97	264.29
				WCC0402	S25° 23' 11.11"	E28° 41' 24.33"	143.32	
				WCC0403 End	S25° 23' 09.94"	E28° 41' 19.37"		
5	Outfall sewer near Stream	Outfall sewer line PE2 will be located ±13m from the Stream buffer	Stream	RA1	S25°25'23.78"S	E28°41'26.21"		
6	Outfall sewer near Seep 3	Outfall sewer line PD8 will be located ±3m from the Seep 3 buffer	Seep 3	RA2	S25°23'51.28"	E28°41'32.05"		
7	Oufall sewer near Seep 1	Outfall sewer line PD9 will be located ±200m from the Seep 1 buffer	Seep 1	RA3	S25°23'16.48"	E28°41'17.67"		
8	WWTW near Enkeldoringspruit CVB and Tributary CVB1	The WWTW will be located within the Enkeldoringspruit CVB buffer, ± 30m from the Tributary CVB1 buffer and ±200m from Seep 1	Enkeldoringspruit CVB Tributary CVB1 Seep 1	RA4	S25°23'10.98"	E28°41'1.01"		
9	Effluent released	Effluent from the WWTW will be released in the Enkeldoringspruit	Enkeldoringspruit	ER1	S25°23'6.07"	E28°41'2.17"	69.4l/s or 0.0694 m3/s or 6,000 m3 per day	

WCC: Watercourse Crossing | RA: Regulated Area | ER1: Effluent Release

The descriptions of the pipeline and the nature of the crossing are as follows:

Water Use Number	Description of the Pipeline	Nature of Crossing
1	**WCC0101S – WCC0107E (603.46 m long)**	**2023/05/01_LS10_RevA 2023/05/01_LS11_RevA**
	MH1.45 to MH1.46 (100m): 250mm dia Class 34 uPVC	Below ground trenching
	MH1.46 to MH1.49 (254.12m) 450mm dia Class 34 uPVC	Below ground trenching
	MH1.49 to MH1.50 (100m): 450mm dia Class 34 uPVC	Below ground trenching
	MH1.50 to MH1.51 (90m): 500mm dia Class 34 uPVC	Below ground trenching
	MH1.51 to MH1.52 (83.55m): 560mm dia HDPE PN12	Below ground and below watercourse trenching and 500mm concrete encasement
	MH1.52 to MH1.54 (39.08m): 560mm dia Class 34 uPVC	Below ground trenching
2	**WCC0201S – WCC0203E (89.22m)**	**2023/05/01_LS12_RevA**
	MH1.60 – MH1.61 (100m): 560mm dia Class 34 uPVC	Below ground trenching
3	**WCC0301S – WCC0302E (190.74m)**	**2023/05/01_LS13_RevA**
	MH1.63 – MH1.66 (222.56m): 560mm dia Class 34 uPVC	Below ground trenching
4	**WCC0401S – WCC0403E (264.29m)**	**2023/05/01_LS17_RevA 2023/05/01_LS18_RevA**
	MH1.82 – MH1.83 (74.45m): 560mm dia Class 34 uPVC	Below ground trenching
	MH1.83 – MH1.84 (75.52m): 630mm dia HDPE PN12 uPVC	Below ground and below watercourse trenching and 500mm concrete encasement
	MH1.84 – MH1.86 (200m): 630 mm dia Class 34 uPVC	Below ground trenching
5	**RA1**	**2023/05/01_LS06_RevA**
	MH1.25 – MH1.26 (97.81m): 250mm dia Class 34 uPVC	Below ground trenching
6	**RA2**	**2023/05/01_LS14_RevA**
	MH1.69 – MH1.70 (62.51m): 560mm dia Class 34 uPVC	Below ground trenching
7	**RA3**	**2023/05/01_LS18_RevA**
	MH1.85 – MH1.86 (100m): 630mm dia Class 34 uPVC	Below ground trenching
8	**RA4**	**2023/05/01_L05_RevA 2023/05/01_L06_RevD**
	WWTW	Below ground trenching, reinforced concrete structures.
9	**ER1**	**2023/05/01_L05_RevA**
	WWTW Effluent Release	Below ground trenching to daylight.

4 General Condition of the Site

The location of the Site, biophysical description of the Site, the environmental context and the delineation of the wetlands are described in the additional documentation to the IWWMP.

5 Construction Methodology (Step-by-Step)

5.1 Pre-Construction:

- The approved layout plan must be implemented with regards to the location of watercourse crossings.
- The sewer line footprint area (10m on either side) must be clearly demarcated and all construction must be limited to this area.
- The wetland boundaries and wetland buffers as identified by Venter and Niemand (2024) must be clearly marked in the field with signs and/or highly visible flagging until construction-related activities are complete.
- The wetlands located outside of the footprint area must be clearly demarcated as NO-GO AREAS.
- Identify and set out crossing for extent of 1: 100-year flood line or the opposite ends of the wetland buffers, whichever is greatest.
- Peg extent of pipeline section to be constructed (i.e. footprint area).
- Demarcate section with at least high-visibility netting, but preferably suitable temporary fencing that will keep people and livestock out of demarcated footprint area.
- Repeat process if more than one section will be constructed consecutively.
- Only one access road into/across wetlands.
- Only cross wetlands at designated points.
- Identify the requirement to provide an access/running track for construction machinery, based on the topography of the stream- or wetland cross-section as well as the dryness of the site. Shape the access to the crossing site as necessary and stockpile any excavated soil near to the site to enable reinstatement of the site after excavation.
- A dump rock access track may be laid and rolled / compacted within the footprint area, with the river diversion pipeline below the access track, where necessary.
- The running track must be in place for the shortest period possible (i.e. less than a month; must not exceed 2 months).
- Do not permit vehicular or pedestrian access into natural areas or into seasonally wet areas during and immediately after rainy periods, until such a time that the soil has dried out.

5.2 Water Diversion Plan:

- All watercourse crossings should be prioritised to take place during the dry season to minimise the risk of flooding and reduce the volume of water to be managed by coffer dams and/or diversions.
- If crossing is wet (streamflow visible), block off streamflow with a temporary cofferdam by means of commercially available temporary coffer dam (inflatable / fillable synthetic material), or by placing a soil berm with a geomembrane- and dump rock lining. The coffer dam/soil berm should be located as close to the crossing as possible to minimise the footprint area.
- Provide drainage / diversion by means of submersible pumps and flexible hosing diverted around the construction area to the downstream side of the watercourse. Flexible hosing may be sleeved and / or buried for protection.
- Diverted water should be released downstream, and over temporary energy dissipaters such as temporary geo-mattresses / geomembrane with dump rock / midstream, parallel

to the streamflow, to avoid erosion and sedimentation of the watercourse as much as possible.

- Changes to water flow must be minimized.
- Construct a subsoil drain directly downstream of the cofferdam, and upstream of the crossing, or if the construction site is dry, only a subsoil drain instead of a coffer dam, complete with a geomembrane lining, aggregate filling and perforated drainage pipe, and with a submersible pump drainage point. Subsoil drainage may be pumped into the cofferdam for settling and diversion.
- Remove subsoil drainage and coffer dam on completion of crossing.
- Ensure to reinstate soil in the correct order and shape surfaces to original.

5.3 Excavation and Pipe Laying:

- Machine-excavate the extent of the crossing to the required distance below the pipe barrel (i.e. the main body or longitudinal section of the pipe from top to bottom).
- The vegetation and alluvial soil/topsoil must be stockpiled and maintained separately from the subsoil in a demarcated area outside the 30m wetland buffer. Remove and stockpile remainder of excavation for backfill.No excavated material may be stored within the wetlands and associated 30m buffer.
- Place excavated material well away from the watercourses to minimize erosion back into the wetland/watercourse.
- Place and compact bedding to specification.
- Place and secure pipeline to specification.
- Trench breakers will be installed at suitable intervals along the length of the crossing, according to the installation details to be issued, to ensure that sub-surface erosion and scouring does not take place and that the wetland is not drained or subsidence of the outfall sewer line occurs.
- Backfill and compact selected fill material next to pipeline.
- Place selected fill material over pipeline and compact.
- Reinstate the excavated soils in 150mm thick layers and compact.
- The soil must be reinstated in the watercourse in the correct order. The subsoil must be replaced first with the topsoil and / or alluvial soil placed on top.
- Reinstate topsoil and alluvial soil and lightly compact to suit natural surrounds.
- Reinstate natural vegetation as per the approved Rehabilitation Plan.
- Spread any remaining material over natural ground and / or fill possible eroded areas.

5.4 Encasement:

- Where necessary for concrete encasement, prepare trench bedding and compact.
- Place mass concrete foundation under manholes.
- Place concrete cradle and embed and secure pipeline and manholes. Install a concrete pipe cradle of at least D/4, place the pipe onto the cradle, and fill concrete to at least D/4, according to SANS specification. Let the concrete set before completing the remainder of the concrete encasing.
- Where manholes are required in the crossing, the manholes shall extend to some 500mm above the 1:100-year floodline level and sealed to prevent ingress of water into the manhole.
- Place concrete encasement around and over pipe in layers, securing proper placement and compaction around pipeline.
- Ensure proper curing of encasement.
- Place selected fill material over pipeline and compact.
- Reinstate the excavated soils in 150mm thick layers and compact.

- The soil must be reinstated in the watercourse in the correct order. The subsoil must be replaced first with the topsoil and / or alluvial soil placed on top.
- Reinstate topsoil and alluvial soil and lightly compact to suit natural surrounds.
- Reinstate natural vegetation as per the approved Rehabilitation Plan.
- Spread any remaining material over natural ground and / or fill possible eroded areas.

6 Resource Quality & Impact Mitigation

6.1 Erosion Control:

- During construction, appropriate soil conservation and storm water management measures to be provided in order to prevent soil erosion and loss of topsoil. Increased run-off during construction/excavation must be managed using contour berms and other suitable structures (e.g. geo-textile silt fences, gabions, placement of bales or the use of sandbags) to ensure flow velocities are reduced.
- The contractor must ensure that excessive quantities of sand, silt and silt-laden water do not enter the Enkeldoringspruit CVB or Tributary CVB1 wetlands.
- A temporary silt curtain or silt filtration system should be installed downstream of the watercourse crossing before construction commences, consisting at least of a vertical geotextile curtain that allows diverted subsurface- and surface water to slowly filter and settle any silt without creating undue turbidity in the watercourse. The Contractor shall propose a suitable system for approval by the Environmental Practitioner.
- Monitor for erosion and intervene and/or rehabilitate where necessary.

6.2 Pollution Prevention:

- Drip trays (minimum of 10cm deep) must be placed under all vehicles that stand for more than 24 hours and generators used within wetland habitat.
- Suitable hazmat kits shall be obtained to manage fuel or oil spillages.
- No portable toilets to be located within the 1: 100 year floodline and watercourse/wetland buffers.
- All equipment should be parked overnight at the construction site office and refuelled at least 100 meters from any wetland.
- If any soil or surface water contamination is noted, appropriate remediation measures must be implemented immediately.
- If on-site concrete mixing will take place the Contractor shall designate a suitable mixing area for mixing of concrete. The mixing area shall be broken up on completion of the project and disposed of at a suitable landfill site as building rubble.

7 Rehabilitation Plan

The rehabilitation plan compiled by Venter and Niemand (2024) and included in the IWWMP must be implemented.

8 Monitoring and Compliance

The monitoring and control measures provided in Sections 5 and 6 of the IWWMP must be implemented.