



Emergency Nondabula Water Reticulation Project
Watercourse Crossings
Construction Work Method Statement
July 2015

ILEMBE DISTRICT MUNICIPALITY



Document Description

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Work Method Statement - July 2015**

QUALITY VERIFICATION

This Report has been prepared under the controls established by a Quality Management System that meets the requirements of ISO9001: 2008:

VERIFICATION	CAPACITY	NAME	SIGNATURE	DATE
Checked by	Project Manager			
Authorised by	Principal In Charge			

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1 DESCRIPTION OF ACTIVITY

The proposed Emergency Nondabula Water Reticulation project was initiated to improve the security of water supply to residents in the Nondabula area, located in Ward 9 of the Nodwengu Traditional Council in the Ilembe District Municipality (IDM), KwaZulu-Natal.

The IDM has appointed Royal HaskoningDHV to provide professional services on the Emergency Nondabula Water Reticulation Project for the proposed design, documentation and construction administration to connect the proposed system into the existing network at the Nondabula rural community located in Ward 9 within the Ndwedwe Local Municipality and Nodwengu Traditional Council.

The primary source of supply has been identified as boreholes as an interim measure. Ultimately the system would be sized for incorporation into the future Wartburg pipeline supply (not part of this application) both in terms of the capacity and hydraulic requirements.

It is proposed that a network of pipelines is constructed within the Nondabula rural community. The pipelines will link into the existing pipeline network and provide potable water to the community.

The original scope of the project, as assessed by the EAP and the team of specialists, was reduced due to a change in municipal boundaries (between the Ilembe- and uMgungundlovu District Municipalities) and under the revised scope includes only the alignment and facilities that fall within the IDM.

The project will consist of the construction of:

- a DN150 Steel / PVC rising main of 4.7 km with a throughput of 15 m³/h;
- a borehole with a yield capacity of 15 m³/h at 292 m;
- a 500 kℓ prefabricated steel reservoir (16 m diameter x 3.1 m height);
- a secondary booster pump;
- a 50 kℓ elevated prefabricated steel tank; and
- 110 mm to 32 mm reticulation pipelines of approximately 38 km in length and 568 m yard taps.

All watercourse crossings were assessed as per the *Wetland Ecological Assessment for the Proposed Emergency Nondabula Water Reticulation Project, Ilembe Municipality, KwaZulu-Natal* (C. Hooton and S. van Staden, June 2015).

The proposed Emergency Nondabula Water Reticulation project has potential impacts on nine (9) watercourse crossings that fall within the revised scope, with localities indicated in Figure 1 (below). Coordinates are summarised in Table 1.

The purpose of this document is to ensure competent execution of work described herein. This Construction Work Method Statement reflects general requirements according to accepted best practice codes and standards. The Contractor will adhere and observe all the requirements of the Water Use Licence issued for the proposed project, the National Water Act 1998 (Act 36 of 1998) and its regulations as promulgated by the Department of Water and Sanitation (DWS).

This Construction Work Method Statement describes the general field work sequence for crossing wetlands, drainage lines, streams and rivers (i.e. all watercourse crossings) on the proposed Emergency Nondabula Water Reticulation project.

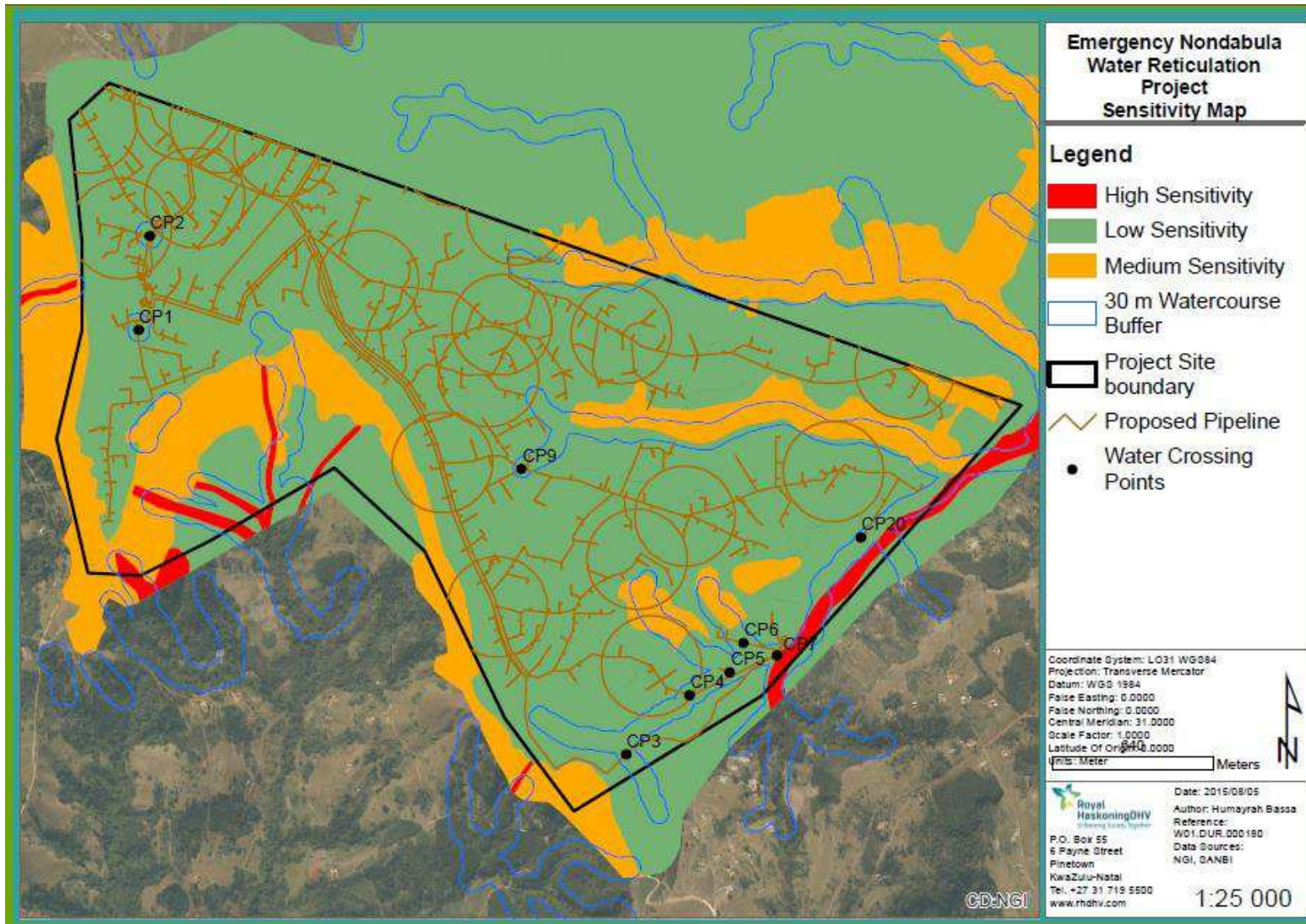


Figure 1: Overview of the localities of watercourse crossing sites within the proposed Emergency Nondabula Water Reticulation project

Table 1: Schedule of Crossings

No.	Coordinates		Wetland Type	River Name	Crossing Type
	Start	End			
WC1	29° 24' 45.4" S 30° 51' 6.1" E	29° 24' 45.5" S 30° 51' 3.1" E	Seep (Bench)		n/a
WC2	29° 24' 31.9" S 30° 51' 7.0" E	29° 24' 34.3" S 30° 51' 5.3" E	Seep (Bench)		n/a
WC3	29° 25' 39.9" S 30° 52' 17.9" E	29° 25' 41.6" S 30° 52' 15.9" E	Riverine	Nsuze River system	n/a
WC4	29° 25' 32.0" S 30° 52' 24.8" E	29° 25' 34.1" S 30° 52' 26.7" E	Riverine	Nsuze River system	n/a
WC5	29° 25' 29.5" S 30° 52' 29.2" E	29° 25' 30.8" S 30° 52' 33.2" E	Riverine	Nsuze River system	n/a
WC6	29° 25' 25.1" S 30° 52' 35.2" E	29° 25' 27.2" S 30° 52' 32.7" E	Riverine	Nsuze River system	n/a
WC7	29° 25' 26.2" S 30° 52' 39.4" E	29° 25' 29.7" S 30° 52' 40.9" E	Riverine	Nsuze River system	n/a
WC9	29° 25' 2.9" S 30° 52' 0.2" E	29° 25' 41.6" S 30° 52' 2.3" E	Channelled Valley Bottom		n/a
WC20	29° 25' 12.0" S 30° 52' 50.8" E	29° 25' 13.61" S 30° 52' 52.65" E	Riverine	Nsuze River system	n/a

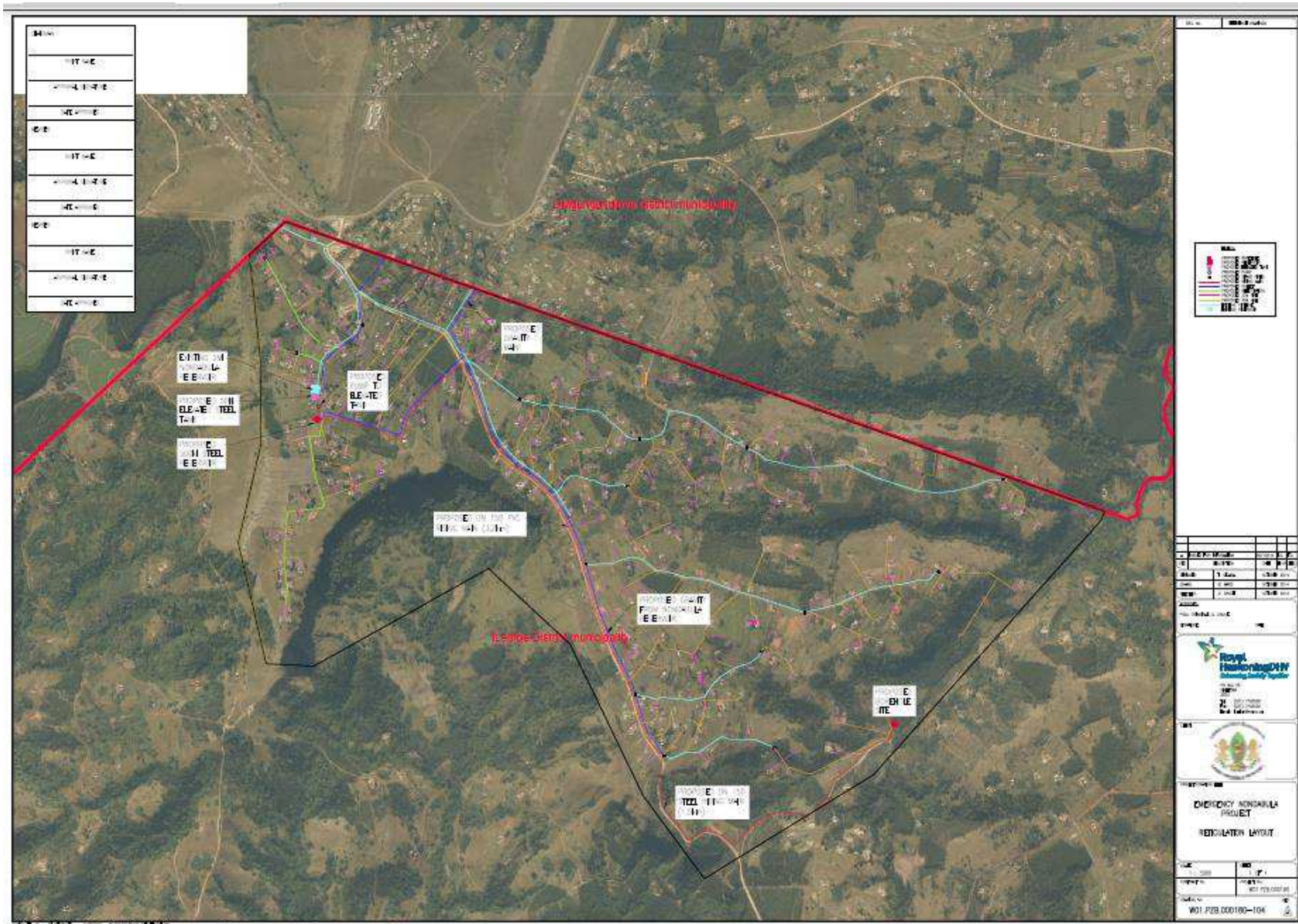


Figure 2: Overall layout for the proposed Emergency Nondabula Water Reticulation project

2 CONSTRUCTION PROGRAMME

The construction programme is *estimated* at this stage, depending on the receipt of Environmental Authorisation (EA), a Water Use Licence, procurement of a Contractor and the Contractor's plan of work.

Table 2: Estimated Construction Programme

No.	Coordinates	Wetland Type	Estimated Start Date	Estimated End Date
WC1	29°24'45.36"S 30°51'04.54"E	Seep (Bench)	19/05/2016	09/05/2017
WC2	29°24'33.19"S 30°51'06.21"E	Seep (Bench)	19/05/2016	09/05/2017
WC3	29°25'40.46"S 30°52'16.61"E	Riverine	19/05/2016	01/12/2016
WC4	29°25'32.80"S 30°52'25.99"E	Riverine	19/05/2016	01/12/2016
WC5	29°25'29.82"S 30°52'31.96"E	Riverine	19/05/2016	01/12/2016
WC6	29°25'26.04"S 30°52'34.02"E	Riverine	19/05/2016	09/05/2017
WC7	29°25'27.64"S 30°52'38.95"E	Riverine	19/05/2016	09/05/2017
WC9	29°25'03.44"S 30°52'01.22"E	Channelled Valley Bottom	19/05/2016	01/12/2016
WC20	29°25'12.42"S 30°52'51.39"E	Riverine	19/05/2016	01/12/2016

3 METHODOLOGY

The construction methodology adopted for each individual watercourse will be dependent on:

- ✿ the season within which construction arrives; and
- ✿ the permanent/ semi-permanent saturation status of the wetland.

At this stage, the Engineer (Royal HaskoningDHV) proposes that the construction methodologies applied to watercourses will depend on the above factors, and the approaching construction stage. Ultimately, the method to be adopted by the approaching construction stage will be dictated by the saturation status of the wetland (wet or dry), in order to protect and preserve existing hydrological functionality. At all times, the Contractor will take cognisance of the measures detailed within the *Wetland Ecological Assessment for the Proposed Emergency Nondabula Water Reticulation Project, Ilembe Municipality, KwaZulu-Natal* (C. Hooton and S. van Staden, June 2015), as well as the Environmental Management Programme (EMPr), Wetland Rehabilitation Plan and all other relevant documentation.

It has been noted by the Engineer that some mitigation measures are commonly applied to every watercourse crossing, as detailed in the wetland assessment study, and as such, becomes standard to all wetlands regardless of its saturation status. Only general mitigation measures for construction will be discussed in this Construction Work Method Statement. For site specific mitigation measures consult the above-mentioned wetland assessment study and EMPr as submitted as part of the Basic Assessment Study undertaken by the Environmental Assessment Practitioner (EAP), namely Royal HaskoningDHV, on behalf of the Developer.

The proposed infrastructure is aligned along existing roads where disturbance has already occurred and due to the scale of the construction works, can be limited to a 10 m wide construction servitude on either side of the pipeline (20 m total width) in low-medium sensitivity areas and a 5 m wide construction servitude on either side of the pipeline (10 m total width) in high sensitivity areas (refer to Figure 1).

General guidelines for construction of the wetland crossings are provided below, following which the sequence to be followed by the Contractor will be elaborated upon.

3.1 General Guidelines

The Contractor will, where applicable, flume ditches, canals, small streams and drains so as not to interfere with or cause pollution of the water flow and to avoid damage to stream banks.

Personnel, equipment and materials will be moved across or around all crossings, which may require the construction of temporary bridges. No ditches, canals, streams or drains will be allowed to be filled, bridged or otherwise obstructed without written approval of the Project Manager, Environmental Control Officer (ECO) and the relevant Competent Authorities having effective control over such watercourses.

The following principles will be observed:

- The Contractor will ensure that the construction footprint is kept to a minimum in these areas;
- River/ stream flow will be maintained at all times through fluming or damming/ over-pumping, with sufficient pump capacity available in case of flooding;
- Should water be pumped from the dry working space within any watercourses, this water must be pumped into a retention dam/silt lagoon (or similar structure) to ensure sediment settles and clean water is released back into the watercourse;
- All necessary material for silt and pollution control will be installed at the watercourse crossing, including, but not limited to, silt fences, filtering material, geotextile;
- Should there be any watercourse crossings within the wetland then soil/ topsoil stockpiles will be kept away from the banks to avoid silt run off. Soil/ topsoil stockpiles will be appropriately protected using silt fences, sand bag barriers and other methods as required;
- No refuelling or fuel storage will be allowed within 50 m of water bodies or wetland areas;

- Specific oil spill response equipment will be kept on site for intervention. Where required, bunds, grips and other measures will be implemented adjacent to watercourses to prevent silt/ pollutants ingress from the Construction Right of Way (CROW);
- Wherever possible, and in case work during the dry season cannot be achieved, work in stream channels will be carried out without the use of 'in-river' techniques, instead using techniques that divert the flow around the works through flumes or by damming and pumping. This will minimise sediment release;
- If wet cement and/or concrete works are necessary, ready-mix is to be preferred and care should be taken not to spill any product. All priming of hoses for concrete pours must be done away from sensitive areas in a manner that reduces environmental impacts to the bare minimum and can be cleared from site easily, for safe disposal to a licensed waste landfill site;
- Full reinstatement of the beds will be undertaken upon completion of the necessary works within any watercourses;
- The pre-construction profile must be restored, and the banks must not be steeper than at pre-construction;
- The pre-construction gradient of the drainage line must be reinstated as exactly as possible, without humping or hollowing over the CROW so as to limit erosion of replaced material and possible creation of knick-points;
- All surplus, and especially loose, materials must be removed from the watercourse to preserve water quality and avoid sedimentation of downstream riverine habitat;
- Banks must be re-vegetated as soon as construction works are completed. Standard grassing procedures must be used, except in wetland areas and if there is significant risk of fertilizer entering the channel;
- During site establishment, where watercourses will cross the CROW it may be necessary to minimise pollution by:
 - Temporarily diverting watercourses around the working area (i.e. over-pump);
 - Temporarily culvert the watercourse through the working area (i.e. flume through); and
 - Where site traffic has to cross watercourses, temporary bridges or culverts/ flumes retaining boards will be installed.
- Non-project related vehicles or persons will be prohibited from using the CROW; and
- Construction personnel will be made aware (through training) and reminded of all project-related environment requirements.

3.2 Preparation Activities

The method adopted during the preparation activities, specifically the CROW phase of construction, will depend on the saturation status of the wetland.

Prior to any construction activity, the boundary of each wetland crossed by the proposed works will be demarcated in the field by trained environmental personnel such as the ECO or else as stipulated within the EMPr.

A 30 m buffer area will be maintained around each watercourse that will not be directly impacted on by the development and for which a Water Use Licence (WUL) has not been granted, and will be dependent on site specific conditions, topography and construction requirements.

Within this 30 m buffer zone a setback buffer area shall be preserved where vegetation and root systems will remain undisturbed. Topsoil will only be removed from any temporary accesses (where applicable) and on the construction footprint (limited to the trench line).

The footprint of the construction area as it traverses wetlands will be kept as narrow as possible. During this phase protected species will be identified and relocated/removed if present, under the appropriate governmental permits as obtained by the Employer, or through a subcontracted ecological specialist.

Where the wetland is deemed to be permanent (written decision undertaken in agreement with the Wetland Specialist and/ or ECO present), or is encountered in a saturated state during the demarcation, topsoil stripping width will be minimised. The stripping operation will subsequently allow the installation of a

temporary load spreading access, and allow construction operations to proceed with limited damage to the topsoil or underlying soils.

However, if in the opinion of the site supervisor responsible for CROW preparation is that stripping the topsoil would hamper construction progress, the topsoil may remain in place. Only the CROW preparation crew would pass through the wetland, until a temporary access can be laid. Topsoil and vegetation left in situ would add structural integrity within the wetland, and support the temporary access. It is widely regarded that this aids reinstatement and avoids heavy disturbance to the wetland.

Topsoil stripped from the CROW will be windrowed on the opposite side of the CROW to the storage of subsoil arising from stripping operations (if applicable), and suitably protected from washout and compaction through soil retention curtains and sandbags where necessary.

Planning of crossings will incorporate the location of all environment and pollution prevention devices and equipment. This includes: location of parking and refuelling areas (if any), location of environment equipment storage where appropriate, of spill response equipment, silt control measures, retention dams (silt lagoons), etc.

It is envisaged that the working width with regards to topsoil, subsoil, temporary access (running track) and general construction can be maintained within a 20 m corridor (10 m on either side) or less where specified by the ECO (i.e. High sensitivity areas).

3.3 Construction Activities

3.3.1.1 Site Establishment

This will include the establishment of the Contractor's site camp, including site offices, services and amenities. The project team will ensure that work is competently supervised with respect to managing environmental impacts, as well as health, safety and quality aspects. A detailed environmental risk assessment will be produced and construction monitored accordingly.

The site camp will be securely fenced to prevent unauthorised access and will have:

- Approval from the ECO for the location and layout of the site camp;
- A designated, bunded plant refuelling area situated a minimum of 50 m away from any watercourse; and
- Emergency spill kits will be available and maintained at all times.

In addition to this all plant will be inspected on a daily basis for fluid leaks and will not be allowed to be used if a leak is identified until it is repaired.

All other requirements contained in the EA, EMP, and all other relevant permits and licenses (where required), related to site establishment, shall be adhered to at all times for the duration of the project.

3.3.1.2 Access

Access to the works areas are required for the transport of plant, machinery and materials during construction and will be via a temporary load spreading access (see Appendix A – Typical Drawing).

Where machinery is to be used, the necessary precautionary mitigation measures need to be implemented to minimise their environmental impact, especially when this involves entering a watercourse. Vehicles with tracks (as opposed to tyres) are preferable – the wider the track the more load spreading and therefore less compaction there is.

Clearing and grubbing works (if required) will be undertaken over the trench line and access roads only. This will require the removal of vegetation, topsoil and sods, all of which must be used for the sole purpose of rehabilitation.

The method adopted during this phase of construction will depend on the saturation status of the wetland.

The temporary access in a saturated wetland will comprise a geotextile, which will underlie an amount of locally sourced stone-material appropriately wide to allow subsequent construction operations to proceed in a safe manner, providing a safe stable working platform to support plant during construction. Alternatively the Contractor may consider gaining access to saturated wetland areas *via* suitable bog-mats.

Where a dry wetland is encountered, topsoil stripping will also be minimised and stored in a similar manner to protect it from vehicular compaction and washout. In this situation, no locally sourced stone-material will be laid to complement the temporary access, as a safe working platform can be provided on the dry stable underlying strata.

If precipitation is encountered, access through such areas may be restricted, to prevent compaction of soils. Access will be restored once the soil conditions permit. Furthermore, if access is urgently required, or rainfall is encountered during a vital phase of construction, the method employed for a saturated wetland will be implemented to protect the underlying soils and permit construction to proceed in a safe manner.

3.3.1.3 Excavations

Where material is excavated from the works area at a saturated wetland, the excavations will be side dug from the temporary access, with careful separation of soil types/ strata as identified. Where a previously dry wetland is saturated, a temporary access will be installed to prevent rutting and degradation of the exposed subsoil, to permit construction to proceed.

Where excavating operations arrive at a dry seasonal wetland, the excavation will be dug on-line, creating a much narrower excavation, with less subsoil removed as a result, and at a greater speed. The soils will be removed in such a way that they can be easily reinstated (if required) in the reverse order as detailed below.

A common approach is to be applied to all wetlands, with regard to removal of excavated material, whether side dug or on-line. The soil that is removed from the excavation at its deepest point will be laid closest to the excavation. The first layer of topsoil will be laid furthest away from the excavation. This will ensure that soil layers (strata) are well separated and can be more successfully re-used for rehabilitation elsewhere.

Subsoil will not be stored on geotextile, but instead will be laid directly on the un-stripped topsoil.

As a result of the standard approach to excavations, whereby separate strata as identified are removed and stored to one side in the order in which they were removed, rehabilitation operations elsewhere are somewhat simplified.

Where special conditions occur, such as the presence of an impermeable clay layer, the foreman will be advised accordingly on site by an Environmental Representative of the Contractor, and may be instructed via signage at the entrance to the wetland area to ensure it is clearly returned to the same depth and compaction as the surrounding layer.

Where trench breakers are required, these will be imported appropriately and installed by a suitably experienced crew, as instructed by the Engineer, using information provided in the relevant specialist reports.

However, if a saturated wetland is encountered, it will be important to ensure that any backfill (where required) to excavations is not overly compacted, such that it creates a subsurface dam. In these areas, the Engineer proposes that mechanical compaction should be minimised as far as possible. The principal aim will be to restore the backfilled material to a compaction resembling that of the trench walls and existing strata (where possible).

Where a dry wetland is encountered, backfill (where required) will be done to the standard specification using mechanical aids, if and when practicable.

Depending on the type of material removed from the excavated area, it may be necessary to import amounts of layering material. This is typically defined by the Engineer according to the Clients specifications.

Any large boulders encountered during excavations will likely not be returned to the excavation, but rather removed off site and disposed of according to the requirements outlined in the EA and EMPr.

Excess soil material will be temporarily windrowed and used within the rehabilitation phase elsewhere on site.

During excavation, or any other relevant works, the watercourse and its banks will be continually monitored.

3.3.1.4 Stream/River Crossings

It is envisaged that temporary restriction of watercourses may be required during the construction of the pipelines. As per the proposed programme much of the works could take place in the dry season (if possible) which would result in reduced risk and associated impacts on the watercourse because of the substantially lower flow. In the event of a storm during the dry season, overtopping of the working platform will permit the storm flow to be contained within the normal stream profile. River/ stream flow will be maintained at all times through fluming or damming by constructing a cofferdam and over-pumping, with sufficient pump capacity available in case of flooding.

Only non-erodible material may be used to create any cofferdams (if required), this to divert waters away from the works area.

Wherever possible, and in case work during the dry season cannot be achieved, work in stream channels will be carried out without the use of 'in-river' techniques, instead using techniques that divert the flow around the works through flumes or by damming and pumping. This will minimise sediment release.

Should water be pumped from the dry working space within the watercourse, this water must be pumped into a retention dam/silt lagoon (or similar structure) to ensure sediment settles and clean water is released back into the watercourse.

No fuel may be stored within the (dry) bund area inside the stream/river, or anywhere else within 50 m of a watercourse.

The onus is on the Contractor to routinely check weather forecasts (on a daily basis) to prepare for inclement weather conditions, including possible flood events. All tools, equipment and machinery that could potentially have an adverse effect of the environment must be removed from the floodlines before the arrival of inclement weather with the potential for flooding. Appropriate spill response material must be available on site.

All petrochemical, cement and/or concrete and other hazardous spillages must be reported to the ECO, the Project Manager and any of the relevant authorities. Incidents are to be captured on the environmental incidents register when they occur and must be closed-out by the ECO following corrective action, where applicable, by the Contractor.

Prefabricated elements will be used where practicable in order to minimise construction duration and potentially environmental impacts associated to fabricating elements on site.

If wet cement and/or concrete works are necessary, ready-mix is to be preferred and care should be taken not to spill any product. All priming of hoses for concrete pours must be done away from sensitive areas in a manner that reduces environmental impacts to the bare minimum and can be cleared from site easily, for safe disposal to a licensed waste landfill site.

Waste management and house-keeping must be maintained at all times during construction. Sufficient waste receptacles must be available in the laydown area/s for containment of all waste produced on site. As a minimum requirement, general and hazardous waste must be separated and kept within sealed receptacles which do not allow for the ingress of water.

No material may be stored for longer than 24-hours within the working area within streams/rivers. Material sufficient for the day's work may only be allowed within the working area within the stream/river.

Where the Contractor wishes to deviate from this prescribed construction method statement, he must draft a site specific method statement for the approval of the Project Manager and ECO, and must ensure the method statement complies in its entirety with the Environmental Authorisation, EMPr and all applicable licenses and permits for the project.

Monitoring will be undertaken as per the requirements stipulated in the Environmental Authorisation, EMPr and all applicable license and permits, including the Water Use Licence.

3.4 Rehabilitation Activities

As soon as backfilling is complete, and the construction crew has vacated the watercourse, reinstatement of the construction footprint including dewatering areas (if required), can commence subject to appropriate site conditions.

Where a saturated wetland is encountered, all machines will work on the temporary access. The access will be removed in the reverse order in which it was laid.

Machines will remove the stone material which may be transported to another location and re-used if it is required (dependent upon the progress of construction), removed correctly to a licensed facility, or offered to the landowner. The geotextile base material is also removed during this operation, which ensures that no foreign material is left behind in the watercourse. Following the removal of these materials, the area below can be ripped to an appropriate depth to remove any minor compaction suffered by the preceding construction operations, and topsoil replaced. The pre-construction landscape profile will be restored, matching as closely as possible to the original land form prior to the distribution of the topsoil. This includes the re-distribution of any remaining windrowed material.

Where a dry wetland is encountered, there is no temporary access material to remove. The process of reinstatement will be similar to that described above. Machines will enter the area, and rip the subsoil area to a depth sufficient to fully reverse compaction from the preceding construction operations. All foreign materials, including boulders which may have arisen from the excavations, will be removed completely. Working out of the watercourse, the topsoil will be replaced in the same position as it was originally sited and de-compacted where necessary in preparation for seeding.

For all watercourses, reinstatement will be implemented through continued liaison with a Wetland Specialist and/or the ECO, and both the Employer and Contractor environmental teams. Local wetland plants may be transplanted into the reinstatement area. Where possible, plants will be relocated during CROW preparation. However, the Contractor considers that rates of survival following transplantation of plants out of a watercourse and into a nursery-type area are often poor and involve increasing the footprint of the construction in the watercourse, and as such this is not the preferred method.

Transplantation of plants from one part of the undisturbed portion of the watercourse into the reinstated area can often prove far more successful in terms of survival rates, and this will be the preferred method for reinstatement, bolstered with the original seedbank within the replaced topsoil. Sourcing of wetland plants for transplanting will be scattered so as to limit impact on the source areas.

Mineral fertilizers and organic material (manure, compost, chicken litter etc.) will not be used in re-vegetation of wetland areas, and reliance will be chiefly on transplanting (as above).

All efforts will be taken to reverse compaction wherever it has occurred by loosening the soil to its original texture and restoring the natural soil profile of the affected area.

Special mitigating measures such as drainage, riprap, sediment and silt traps, diversion berms and gabions will be used throughout where required to mitigate soil erosion as per design by the Employer. Information in the wetland database, experience and judgment of the terrain will be used to inform the location of such measures.

Regular inspections of the reinstatement efforts are to be carried out by the Contractor's Environmental Representative and ECO to monitor the progress of the reinstatement and to determine when such efforts are deemed to be successful. Such inspections will be undertaken throughout the duration of the contract period. Should additional measures be required within this period, the Contractor will implement these on instruction.

Rehabilitation of disturbed watercourses will be completed to the satisfaction of the ECO.

The content of this Construction Work Method Statement will be brought to the attention of all persons associated with the undertaking of these activities and such measures as necessary will be taken to bind such persons to the requirements herein. A copy of the Construction Work Method Statement and all applicable documents as set out in the EMPr will be on site at all times.

4 ENVIRONMENTAL MANAGEMENT STRATEGY

4.1 Environmental Impact Management

This Section must be read in conjunction with the EMPr prepared by Royal HaskoningDHV. The EMPr sets out the specific actions and protocols for environmental management on site.

Changes and impacts to hydrology at landscape level, alteration of stream flow, increased erosion and deterioration of water quality (turbidity) are addressed within the *Wetland Ecological Assessment for the Proposed Emergency Nondabula Water Reticulation Project, Ilembe Municipality, KwaZulu-Natal (C. Hooton and S. van Staden, June 2015)* and other referenced documentation.

Nevertheless, certain activities and aspects associated with the actual construction, according to these designs, may still cause impacts as a result of how these activities are undertaken, where, when and the duration thereof. These include:

- Clearing of the construction footprint (including extending activities beyond the maximum impact foot print)
- Establishment and management of the construction camp/s
- Management of construction materials (movement, storage, preparation/handling)
- Management of machinery (movement, storage, maintenance)
- Management of sanitation and waste (movement, storage)
- Management of stormwater
- Management of sediment (structures and containment)
- Rehabilitation

Possible impacts associated with these activities have been assessed in the Basic Assessment Study along with environmental significance ratings pre- and post-mitigation (i.e. indicating effectiveness of the mitigation measures set out). Mitigation measures are therefore provided according to activities and aspects described in the Environmental Aspects Register contained within the EMPr.

4.2 Monitoring and Review Strategy

Monitoring and reporting will be undertaken as set out in the Environmental Authorisation, EMPr and WUL.

Steps for non-compliance are set out in the EMPr.

5 RESPONSIBILITIES

Various stakeholders responsibilities are as follows:

- The Employer, as the holder of the EA, will be responsible for compliance to the requirements contained within the Final BAR, EA, EMPr, WULA and all relevant legislative requirements.
- The Design Engineer (Royal HaskoningDHV), as the Employer's Representative, manages the project on behalf of the Employer. The Design Engineer shall thus employ one (or more) Project Managers.
- The Contractor is responsible for overseeing and ensuring all prescribed activities as detailed by applicable project plans, method statements and statutory documents are executed accordingly on site; and reports to the Design Engineer.
- The Contractor's Safety Manager is responsible for advising on all safety aspects of construction activities. He reports to the relevant Project Manager.
- The Contractor's Environmental Manager is responsible for advising on all environmental aspects of construction, and reports to the relevant Project Manager.
- The Environmental Representative/s of the Contractor, are responsible for ensuring all construction teams adhere to the appropriate environmental project plans, method statements and statutory documents. They report to the Contractor's Environmental Manager.
- The Environmental Control Officer (ECO) is an independent appointment. An ECO will be responsible for identifying and demarcating wetlands on the ground, following training from an appropriate Specialist, and auditing Contractor construction team performance against stipulations as outlined in the EA and EMPr. The ECO reports to the Employer and/or Design Engineer and the relevant Competent Authority according to the conditions of the EA, EMPr and WUL.

6 DECLARATIONS

6.1 Declaration of Understanding of EMPr

A Declaration of Understanding of the EMPr as presented below must be signed by a representative of each Developer, Engineer, Contractor and ECO and kept within the Site Environmental File on site.

DECLARATION OF UNDERSTANDING OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

I, _____
Representing _____

declare that I have read and understood the contents of the Environmental Specifications (which include the Environmental Authorisation, Environmental Management Programme, the Project Specifications and this guideline document) for Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness 2: _____

6.2 Declaration of Understanding of Construction Work Method Statement

6.2.1 *Design Engineer*

The work described in this Work Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm.

Signed

Print Name

Date

6.2.2 *Construction Manager (Contractor)*

I understand the contents of the Work Method Statement and the scope of works required from me.

Signed

Print Name

Date

6.2.3 *Environmental Control Officer*

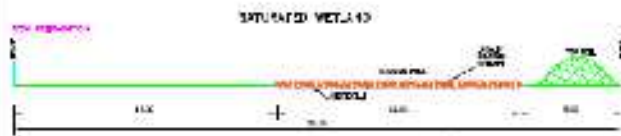







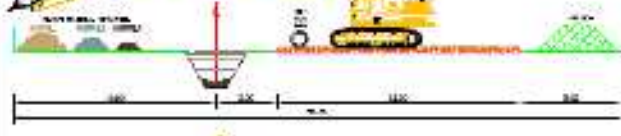
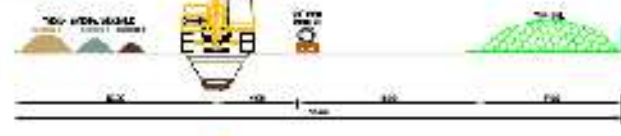
The works described in this Work Method Statement are approved.

Signed

Print Name

Date

APPENDIX A

SATURATED WETLAND		DRY WETLAND																															
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		 <p>Royal HaskoningDHV Enhancing Society Together</p> <p>PO Box 55 1701 CB 5600 Tel: (011) 7144400 Fax: (011) 7145500 Email: info@haskoningdhv.com</p>																															
																																	
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