agriculture
& environmental affairs

Department:
Agriculture
& Environmental Affairs
PROVINCE OF KWAZULU-NATAL

	(For official use only)
EIA File Reference Number:	DC/
NEAS Reference Number:	KZN/EIA/
Waste Management Licence Number: (if applicable)	
Date Received:	

BASIC ASSESSMENT REPORT

Submitted in terms of the Environmental Impact Assessment Regulations, 2010 promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

This template may be used for the following applications:

- Environmental Authorization subject to basic assessment for an activity that is listed in Listing Notices 1or 3, 2010 (Government Notices No. R 544 or No. R 546 dated 18 June 2010); or
- Waste Management Licence for an activity that is listed in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) for which a basic assessment process as stipulated in the EIA Regulations must be conducted as part of the application (refer to the schedule of waste management activities in Category A of Government Notice No. 718 dated 03 July 2009).

Kindly note that:

1. This basic assessment report meets the requirements of the EIA Regulations, 2010 and is meant to streamline applications. This report is the format prescribed by the KZN Department of Agriculture & Environmental Affairs. Please make sure that this is the latest version.
2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with text.
3. Where required, place a cross in the box you select.
4. An incomplete report will be returned to the applicant for revision.
5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it will result in the rejection of the application as provided for in the regulations.
6. No faxed or e-mailed reports will be accepted.
7. The report must be compiled by an independent environmental assessment practitioner ("EAP").
8. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
9. The KZN Department of Agriculture & Environmental Affairs may require that for specified types of activities in defined situations only parts of this report need to be completed.

10. The EAP must submit this basic assessment report for comment to all relevant State departments that administer a law relating to a matter affecting the environment. This provision is in accordance with Section 24 O (2) of the National Environmental Management Act 1998 (Act 107 of 1998) and such comments must be submitted within 40 days of such a request.
11. Please note that this report must be handed in or posted to the District Office of the KZN Department of Agriculture & Environmental Affairs to which the application has been allocated (please refer to the details provided in the letter of acknowledgement for this application).

DEPARTMENTAL REFERENCE NUMBER(S)

File reference number (EIA):	**DC27/0010/2013**
File reference number (Waste Management Licence):	TBC

SECTION A: DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

1. NAME AND CONTACT DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Name and contact details of the EAP who prepared this report:

Business name of EAP:	WSP Environmental		
Physical address:	1 On Langford, 1 Langford Road, 3630		
Postal address:	PO Box 1442, Westville		
Postal code:	3630	Cell:	084 470 1932
Telephone:	031 240 8907	Fax:	031 240 8861
E-mail:	Rajay.Patel@WSPgroup.co.za		

2. NAMES AND EXPERTISE OF REPRESENTATIVES OF THE EAP

Names and details of the expertise of each representative of the EAP involved in the preparation of this report:

Name of representative of the EAP	Education qualifications	Professional affiliations	Experience at environmental assessments (yrs)
Rajay Patel	BSc (Hons): Environmental Science Zoology & Botany, University of KwaZulu-Natal, 2005	None	5.5
Kendyl Le Roux	MSc Environmental Consultancy, University of Plymouth BSc Marine Biology, University of KwaZulu-Natal	None	1.5

3. NAMES AND EXPERTISE OF SPECIALISTS

Names and details of the expertise of each specialist that has contributed to this report:

Name of specialist	Education qualifications	Field of expertise	Section/ s contributed to in this basic assessment report	Title of specialist report/ s as attached in Appendix D
Gavin Anderson	M.Phil. (archaeology and social psychology)	Heritage Impact Assessments with expertise status in rock art, Iron Age and Stone Age archaeology	Heritage Impact Assessment	Heritage Survey of the Jozini Ingwavuma Water Supply Project

SECTION B: ACTIVITY INFORMATION

1. PROJECT TITLE

Describe the project title as provided on the application form for environmental authorization:

Jozini Ingwavuma Bulk Water Supply Project: **Regional Water Treatment Works (RWTW)**

2. PROJECT DESCRIPTION

Provide a detailed description of the project:

As per the Jozini Local Municipality's Integrated Development Plan, 2012/13-1016/17, it is estimated that 35% of households in the Jozini Municipality do not have access to potable water. In order to improve service delivery within the Jozini Municipality, the uMkhanyakude District Municipality (UDM), via various national and provincial funding initiatives, has embarked on installing a comprehensive water supply system to the area i.e. the Jozini Ingwavuma Water Supply Project. This project as a whole, will comprise the construction / installation of the following components:

- Construction of the Regional Water Treatment Works (RWTW) (Figure 1) and
- Construction of bulk infrastructure and reticulation to serve the area in Figure 2. The bulk infrastructure included in this application is detailed below. No reticulation is included in this Application.

The current component of the project will consist of the construction of the Regional Water Treatment Works (RWTW) (Figure 1 below)

This component of the project will consist of the construction and installation of the following elements:

- Raw Water Abstraction Works – Two alternative options are under consideration for raw water abstraction i.e.: -
  I. A new raw water abstraction works capable of abstracting 40Ml per day (20Ml per day in Phase 1) is proposed to be constructed on the banks of the Pongola River; alternatively
  II. Abstraction of raw water from the existing pipe manifold supplying water to the irrigation canal on the south bank of the Pongola River. The main will be sized for 40Ml/day. This is the preferred option.
- Water Treatment Works (WTW) – The construction a new water treatment works (WTW) capable of handling 20Ml of water per day. Provision will be made during the land acquisition process for possible future expansion of the works. The site selected will make allowance for future expansion of the WTW when this is required.
- Storage Reservoir – A balancing / storage reservoir capable of storing 4.2Ml of treated water will be built at the water treatment works.
- Interconnecting pipelines – Interconnecting pipelines will be required between the abstraction point, and the RWTW and to the existing KwaNdlazi (Jozini Local) reservoir. The following pipelines will be installed to support / link the RWTW:
  I. Raw Water Rising Main (RWRM) (highlighted in Red on Figure 1) - A new raw water RWRM rising main to carry raw water from the abstraction works to the new treatment works (800mm diameter, 1760 m long steel pipe from the River Abstraction Works or 2960m long Raw Water Gravity Main (RWGM) to the new treatment works for abstraction from the irrigation pipe manifold.
  II. A Potable Water Rising Main (PWRM) (highlighted in yellow on Figure 1) - A new potable water rising main (600mm in diameter, 2620m long) from the new treatment works to carry potable water to the KwaNdlazi (Jozini Local) reservoir.

Please note: The reticulation system for the distribution of water to the surrounding household's does not form part of this application.

Over and above the bulk water abstraction, treatment and distribution infrastructure described above, the following supplementary undertakings will be incorporated as part of the project:

- The existing power supply to the raw water abstraction works site on the bank of the Pongola River will be upgraded (if this option is selected) and a new power supply will be installed to the new WTW.
- A short access road will be constructed from the existing District gravel road (D1836) to the water treatment works. An existing access road will be upgraded for access to the abstraction works for the option of abstracting raw water from the Pongola River.

There is currently a lack of basic services infrastructure within the Jozini Ingwavuma area. It must be noted that Pipeline routes will in all probability evolve to become local access routes after construction of the pipeline/s.

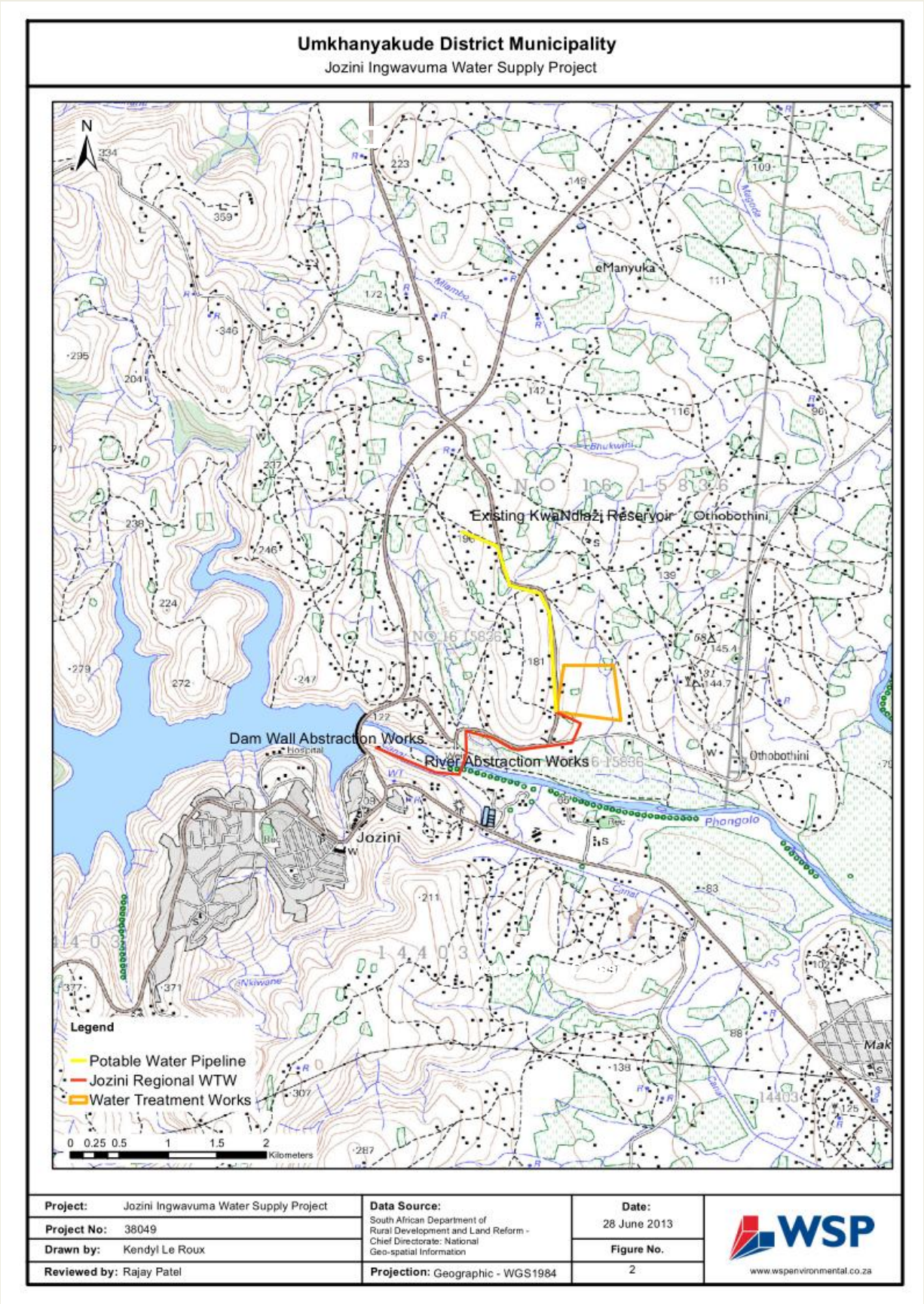


Figure 1: Locality of proposed Regional RWTW and associated pipeline routes.

3. ACTIVITY DESCRIPTION

Describe each listed activity in Listing Notice 1 (GNR 544, 18 June2010), Listing Notice 3 (GNR 546, 18June 2010) or Category A of GN 718, 3 July 2009 (Waste Management Activities) which is being applied for as per the project description:

Listed Activity Number and Description	**Project Relevance**
NEMA GN 544 (*Activities requiring a Basic Assessment*)	
9. The construction of facilities or infrastructure exceeding 1,000m in length for the transportation of water, sewage or storm water: i) with an internal diameter of 0.36m or more, or ii) with a peak throughput of 120 litres per second or more, excluding where: a. such facilities or infrastructure are for bulk transportation of water sewage or storm water or storm water drainage inside a road reserve, or b. Where such construction will occur with urban areas but further than 32 m from a watercourse, measured from the edge of the watercourse.	The rising main pipelines are proposed to exceed 1000m in length i.e. Raw Water Gravity Main (2 960m long) and Potable Water Rising Main (2 620m long). In addition, both these rising mains will have an internal diameter of 0.8m and 0,6m respectively Furthermore, the pipelines are not located within a road reserve, or urban area. Based on the above, listed activity 9 of GN: R544 is applicable to this project.
11. The construction of … ix) infrastructure or structure covering 50 m^2 or more Where such construction occurs within 32 m of a watercourse, measured from the edge of the watercourse, excluding where such construction will occur behind a development set back line.	The total area covered by the pipelines will be greater than 50 square metres, and will be within 32 metres of a watercourse in certain sections (e.g. WTW, abstraction point, pipeline route). As a result, listed activity 10 of GN: R544 is considered applicable to this application.
18. The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from: (i) a water course	The proposed Potable Water Rising Main and Raw Water Gravity Main pipelines will transverse 2 watercourses (non-perennial drainage lines) and 1 perennial watercourse (Pongola River) respectively.) In addition, it is likely, that an excess of 5 cubic metres of sand will be excavated within 32m of each watercourse crossing for the installation of the pipeline sections.
22. The construction of a road, outside urban areas i) with a reserve wider than 13.5 m, or ii) Where no reserve exists where the road is wider than 8m. iii) For which environmental authorisation was obtained for the route determination under GN 545.	The proposed construction will require the construction of an access road to the proposed RWTW. Should an abstraction works be constructed on the bank of the Pongola Rover, an existing access road will be upgraded. Although the access roads are not expected to be greater than 8 m wide and road reserves less than 13,5 m wide, a conservative approach has been adopted and this clause has been considered. ***Please note:*** that upon finalisation of the access

Listed Activity Number and Description	Project Relevance
	road specifications, this clause may be deemed as non-applicable and will be removed from the application.

4. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this report. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Sections B 5 – 15 below should be completed for each alternative.

Proposed Alternatives
The identification of alternatives provides the basis for choice among options available to the decision making authority, the National Department of Environmental Affairs (DEA) and is a requirement of the EIA Regulations. The following alternatives were considered and evaluated (where deemed reasonable or feasible) in the Basic Assessment Report:

I. Abstraction Works

- **Site Alternative (S1)**

The preferred alternative for raw water abstraction will be from the existing irrigation pipe manifold, which acquires water from the Pongolapoort Dam and will comprise an abstraction point immediately downstream of the existing Pongola Dam wall on the southern bank of the Pongola River (Figure 1).

- **Site Alternative (S2)**

The alternative is for the abstraction point to be situated upstream of the existing weir on the northern bank of the Pongola River (downstream of the dam wall). Currently, the site is clear, devoid of vegetation and houses a small pump house. The site is readily accessible via the existing informal rural roads. This abstraction point has been chosen due to its proximity to the weir, which will ensure the depth of water available is maintained for abstraction throughout the year. Furthermore, little to no clearing of riparian vegetation will be required as the area is already clear.

- **Alternative A1: Preferred technology (process):**

The raw water pipeline will be connected to the existing irrigation pipe manifold, which currently abstracts water from the Pongola Dam and delivers it to the irrigation canal immediately downstream of the dam wall.

This is the preferred option as raw water can be delivered to the proposed RWTW under gravity. Abstracting water from this point will eliminate the need for an abstraction pump station. This option will require a further (as compared to S2) 1 km of pipeline (as highlighted in Tan on Figure 1) extending from the Pongola River and will align parallel to the existing irrigation canal before crossing the Pongola River downstream of the weir and joining in to the preferred RWRM pipeline route.

Three options for crossing the river have been considered. As access to the river upstream of the weir is restricted due to the topography and the projected flood lines, the river crossing has been selected as immediately upstream of the weir, the following options of the river crossing have been considered : -

- Floating a pipe across the river upstream of the DWA gauging weir and sinking it on to the riverbed with precast concrete weights. This option has been rejected as the water upstream of the weir is shallow and the pipe on the riverbed could detrimentally affect the accuracy of the weir flow measurements.
- Laying the pipe across the river upstream of the weir in a trench excavated in the river bed within a coffer dam. This option has also been rejected as it will not be practical to divert the river flow around the coffer dam due to the presence of the weir downstream.
- Laying the pipe across the river immediately downstream of the weir. The pipe will be laid in a trench excavated within a coffer dam which will divert the river flow around the work face. This is the most practical and feasible solution and is the preferred option for the river crossing of the abstraction pipeline.

- **Alternative A2: Alternative technology (process):**

An alternative to the abstraction works is a pump house with associated infrastructure, that will be installed upstream of the existing weir (**Appendix A1**). The pump house will be a concrete structure with an aluminium cladding roof. This alternative has the potential to minimally impact upon the watercourse during both construction and operational phases (due to potentially impeding or diverting, as well as altering the flow of the river), in addition, the cost of pumping water from the river to the RWTW will add significantly to the operational costs of the scheme. These costs are avoided completely in Alternative A1. As a result, this option is not preferred from an environmental and cost perspective.

II. Water Treatment Works (WTW)

- **Site Alternative (S1)**

The selected site is positioned on the north of the existing rural road (D1836) adjacent to the Pongola River (**Figure 1**), and to the east of the P522-1 Provincial Road, immediately northeast of Jozini. The selected site's footprint covers the bulk of the valley, approximately 9ha to 10ha. This is to allow sufficient space to accommodate future developments or expansions to the WTW.

The currently proposed WTW will be located adjacent to the southern portion of the proposed WTW site and is considered adequate to house the proposed 20Ml/day WTW plant, sludge dams, storage reservoir, high lift pump station and housing for operators .

The site is characterised by open veld, with the exception of scattered aloes (*Aloe marlotti*) which will require relocation prior to the commencement of construction. The WTW site is practically devoid of any floral features and associated faunal species, and does not present any sensitivity to the proposed project; nor does the sites' ecological status constrain the proposed activity in any way. In addition, the preferred WTW site offers an optimum site topography to minimise excavation while meeting the hydraulic requirements i.e. allows water to gravitate from the abstraction works to the WTW and allows water to gravitate through the plant without pumping. There will therefore be no power consumption for water transfer to and through the plant. In addition, this site offers minimal disruption to local inhabitants, avoids burial grounds, and is situated close to a reliable source of raw water.

- **Site Alternative (S2)**

Alternative sites for the WTW were considered within predetermined site selection criteria. These included: -

- Proximity to a reliable raw water source;
- Good road access for future operation and maintenance;
- Suitable topography to avoid unnecessary pumping for process purposes;

- Acceptability to the community and their leaders;
- Sufficient space for future expansion;
- Minimal environmental impact;
- Minimal social impact (relocation of residents, presence of cemeteries);
- Avoid 1:100 year flood lines of rivers / watercourses.

The relevant alternative sites for the WTW were considered not feasible due to the following reasons:

- Undeveloped areas adjacent to the Pongola River are currently used for agriculture – use of this land will deprive residents of a valuable source of food from subsistence farming. It was therefore ruled out.
- The valley west of the proposed site, nearest the dam wall is more densely populated and the topography is steeper than desirable, thus ruling this area out.
- The southern bank of the Pongola River was ruled out as it is more highly developed. Construction of a WTW in this area will deprive Jozini of valuable land for commercial and residential development adjacent to existing developments and infrastructure.
- Land further east than the site currently proposed will increase capital development costs of the scheme as well as operational costs.

■ **Alternative A1: Preferred technology (process):**

A 20Ml/day WTW will be constructed in order to provide potable water for the study area, with a 30 year design horizon. The planning allows for increasing the capacity of the plant by the addition of modules each with a capacity of 10Ml/day. The site layout shows future expansion up to 40Ml/day. The site has the potential to accommodate expansion up to 90Ml/day. The general layout plan of the WTW is shown on drawing no. 130208/01/W/005/T/AO/A. The treatment technology will consist of chemical treatment, flocculation, sedimentation, filtration, disinfection and sludge drying beds

Design and construction will be undertaken in line with the Department of Water Affairs standard specifications where available and applicable. Otherwise best available practice technology will be applied for the design, construction and operation of the abstraction and water treatment works. The preferred construction methodology will include the following key elements:

- Vegetation / site clearing of area measuring approximately 50000 m²;
- Mechanized bulk earthworks / excavation will be required for foundation establishment;
- Foundation establishment, to accommodate the various buildings, flocculators, settling tanks, filters sludge beds, road works and staff housing associated with the WTW;
- Construction of the WTW and associated pipework, buildings and tanks;
- De-commissioning and de-establishment of the contractor's site camp.

■ **Alternative A2: Alternative technology (process):**

The raw water to be treated dictates to a large extent the treatment process that will be most suitable and cost effective. In addition, the locality of the WTW, access for operation and maintenance and availability of skilled personnel also contributes to the selection of suitable treatment processes. Alternative treatment processes can be applied but these will result in increased capital development costs and more importantly, increased operation and maintenance costs. The preferred treatment process will keep operation and maintenance costs to a minimum.

III. Pipelines

■ **Site Alternative (S1)**

- **Raw Water Rising Main (RWRM)**

The preferred RWRM pipeline route will extend from the proposed abstraction works, and follow the existing District road (D1836) for approximately 1800 m to the WTW site. In addition to traversing the Pongola river, the RWRM will also transverse a watercourse (non-perennial drainage line) en route to the WTW. Notwithstanding the above, this route presents ease of access and is already disturbed from an environmental

point of view as it follows adjacent to the existing rural road servitudes. The RWRM follows the northern side of the existing canal on the southern bank of the river before crossing the Pongola River. This area is also already served by an access road to the dam wall and vegetation has been disturbed.

- **Potable Water Rising Main (PWRM)**

The PWRM will extend from the WTW and will run parallel to the existing informal rural road, for approximately 2,6km aligned in a northwards direction towards the existing KwaNdlazi (Jozini Local) Reservoir. At this point, the pipeline will turn west for approximately 500m to tie into the existing reservoir. The pipeline will follow the western side of the existing rural road and will transverse a watercourse (non-perennial drainage line) en route to the reservoir.

- **Site Alternative (S2)**

The above-mentioned preferred routes were chosen due to:

- The ease of access for construction and operation and maintenance from the existing formal and informal rural roads;
- The shortest routes that can be selected, based on considerations such as inter alia topography, engineering restrictions and current developments; This will minimise development costs;
- The routes have already been disturbed from an environmental point of view (e.g. vegetation disturbances), thus minimising impacts to natural vegetation and potentially ecologically sensitive areas e.g. drainage lines;
- All drainage lines are already traversed by the existing formal and informal rural roads;
- The routes are aligned with plans by the UDM with regard to formalisation of the servitude and services.

Alternative routes for the water main involved laying the pipes through agricultural lands within the flood plain of the river. A maintenance road would then also have been required, increasing the capital costs for the pipeline. Based on the above, no alternative pipeline routes were considered reasonable or feasible and are not considered further within this report.

- **Alternative A1: Preferred technology (process):**

The pipelines will be installed in line with Department of Water Affair's standard specifications for pipeline installations where available and applicable. Otherwise, best available technology will be used for the design and construction. The construction process is proposed to consist of the following fundamental activities:

- Mechanical excavation of trenches (up to 3m deep) and stockpiling of excavated material until pipes have been laid and backfilled. The banks of excavations will be battered / shored for safe working practice;
- Importing and placing of granular bedding;
- Construction and installation of a 600mm and 800mm diameter steel pipeline and associated structures;
- General backfilling and re-instatement using excavated spoil from stockpiles (temporarily stored from excavation phase);
- Construction of permanent associated works, including, air valve chambers, scour valve chambers and isolating valve chambers;
- Hydrostatic testing of all permanent works upon completion;
- Provision of permanent and if necessary temporary cathodic protection during construction; and
- De-commissioning and de-establishment of the contractor's site camp.

- **Alternative A2: Alternative technology (process):**

The construction process outlined in Alternative A1 is considered to be "best practice" as it makes use of the most appropriate technologies available to install potable water pipelines. Alternative materials to steel for the pipelines can be considered but these will increase the capital costs of the works. HDPE pipe will be considered for crossing the Pongola River. No other alternative construction techniques have been

considered.

No Go Alternative:

In this case the construction of the RWTW will not occur, thus the status quo will remain. Consequently, the UDM will not meet the current and future water demands of the area. This alternative would result in the demand for bulk potable water exceeding the supply. This would result in development in the area being restricted, a lowering of living standards and negative social impact to the community. It is the professional opinion of the EIA team that the no-go alternative is undesirable and unrealistic in the face of great social and economic needs.

5. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. List alternative sites were applicable.

Abstraction works:

Alternative:	Latitude (S):			Longitude (E):		
Alternative S1[1] (preferred or only site alternative)	27°	25'	13.58"	32°	4'	21.47"
Alternative S2 (if any)	27°	25'	18.04"	32°	4'	50.95"
Alternative S3 (if any)	0	‘	“	0	‘	“

Water Treatment works:

Alternative:	Latitude (S):			Longitude (E):		
Alternative S1[2] (preferred or only site alternative)	27^{o}	25‘	5.66“	32^{o}	5‘	29.41“
Alternative S2 (if any)	0	‘	“	0	‘	“
Alternative S3 (if any)	0	‘	“	0	‘	“

In the case of linear activities:

Alternative:	Latitude (S):			Longitude (E):		
Raw Water Gravity Main (RWGM)						
Alternative S1 (preferred or only route alternative)						
• Starting point of the activity	27°	25'	13.84	32°	4'	16.72
• Middle point of the activity	27°	25'	10.47	32°	5'	48.9”

[1] “Alternative S..” refer to site alternatives.
[2] “Alternative S..” refer to site alternatives.

• End point of the activity	27°	25'	5.38	32°	5'	29.51

Potable Water Rising Main (PWRM)

Alternative S1 preferred or only route alternative)

• Starting point of the activity	27°	25'	5.79	32°	5'	32.78”
• Middle point of the activity	27°	24'	21.42	32°	5'	14.75”
• End point of the activity	27°	24'	2.41	32°	4'	49.99"

Alternative S3 (if any)

• Starting point of the activity • Middle point of the activity • End point of the activity	N/A

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 500m along the route for each alternative alignment.

6. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Abstraction Works

Alternative:	Size of the activity:
Alternative A1[3] (preferred activity alternative)	2500 m^2
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2

Water Treatment works:

Alternative:	Size of the activity:
Alternative A1[4] (preferred activity alternative)	100000 m^2
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2

or, for linear activities:

Raw Water Gravity Main (RWGM)

Alternative:	Length of the activity:
Alternative A1 (preferred activity alternative)	2960 m

[3] “Alternative A..” refer to activity, process, technology or other alternatives.
[4] “Alternative A..” refer to activity, process, technology or other alternatives.

Alternative A2 (if any)	m
Alternative A3 (if any)	N/A

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Potable Water Rising Main (PWRM)	Size of the site/servitude:
Alternative:	
Alternative A1 (preferred activity alternative)	2620 m
Alternative A2 (if any)	
Alternative A3 (if any)	

7. SITE ACCESS

Does ready access to the site exist?	YES ✓	NO
If NO, what is the distance over which a new access road will be built	N/A - existing access	

Describe the type of access road planned:

Site access exists for a large portion of the project as the project follows existing rural roads. However a short access road will be constructed from the existing gravel road to the water treatment works.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

8. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this report.

The site or route plans must indicate the following:

8.1. the scale of the plan which must be at least a scale of 1:500;
8.2. the property boundaries and numbers/ erf/ farm numbers of all adjoining properties of the site;
8.3. the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
8.4. the exact position of each element of the application as well as any other structures on the site;
8.5. the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
8.6. walls and fencing including details of the height and construction material;
8.7. servitudes indicating the purpose of the servitude;
8.8. sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
- rivers, streams, drainage lines or wetlands;
- the 1:100 year flood line (where available or where it is required by DWA);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation including protected plant species (even if it is degraded or infested with alien species);

8.9. for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and
8.10. the positions from where photographs of the site were taken.

9. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

10. FACILITY ILLUSTRATION

A detailed illustration of the facility must be provided at a scale of 1:200 and attached to this report as Appendix C. The illustrations must be to scale and must represent a realistic image of the planned activity/ies.

11. ACTIVITY MOTIVATION

11.1. Socio-Economic Value of the Activity

What is the expected capital value of the activity on completion?	R 203 million	
What is the expected yearly income that will be generated by or as a result of the activity?	R Nil	
Will the activity contribute to service infrastructure?	YES ✓	NO
Is the activity a public amenity?	YES	NO ✓
How many new employment opportunities will be created in the development phase of the activity?	100	
What is the expected value of the employment opportunities during the development phase?	R 50 million	
What percentage of this will accrue to previously disadvantaged individuals?	65%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	15	
What is the expected current value of the employment opportunities during the first 10 years?	R 15 million	
What percentage of this will accrue to previously disadvantaged individuals?	85 %	

11.2. Need and Desirability of the Activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

The area currently does not have sufficient potable water supply to provide for the current and future needs of the residents of Jozini Local Municipality. Currently 41.7% of Jozini residents do not have access to piped water, with 26% still sourcing water directly from streams and rivers. Thus, the Jozini Ingwavuma Water Supply Project proposes to ensure the provision of adequate potable water and improve service delivery within the study area.

Indicate any benefits that the activity will have for society in general:

The Project forms part of a larger undertaking by the Department of Water Affairs to meet the infrastructural needs and demands of the area in terms of the provision of sufficient potable water to residents. The project will improve sanitation and improve living standards for a number of previously disadvantaged areas, and support the future development of these areas. The provision of piped water will improve the overall standard

of living within Jozini area.

Indicate any benefits that the activity will have for the local communities where the activity will be located:

Residents of Jozini, and surrounds, will be provided with a reliable supply of potable water. This is likely to reduce reliance on abstraction from boreholes and surface water sources. The provision of this basic service is likely to contribute towards an improved quality of life and health, as it will ensure a secure, uninterrupted and safe water supply providing for the basic needs of the local community.

In addition to the above, employment opportunities and capacity building are likely to be provided to local communities. Job opportunities will be created though the employment of local low category contractors.

12. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline:	Administering authority:	Date:
Environmental Impact Assessment Regulations, 2010 (GN: R543; 544 & 546)	Department of Environmental Affairs	2010
National Environmental Management Act (Act No 107 of 1998)	Department of Environmental Affairs	1998
National Environmental Management: Air Quality Act (No.39 of 2004)	Department of Environmental Affairs	2004
South African National Standards (SANS): 10103 - The Measurement and Assessment of Environmental Noise with Respect to Land Use, Health, Annoyance and Speech Communication.	South African Bureau of Standards	2003
National Water Act (No. 36 of 1998)	Department of Water Affairs	1998
National Heritage Resources Act (No. 25 of 1999)	South African Heritage Resources Agency	1999
KwaZulu-Natal Heritage Act (No. 4 of 2008)	Amafa KwaZulu-Natal	2008

13. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

13.1. Solid Waste Management

Will the activity produce solid construction waste during the construction/initiation phase?	YES ✓	NO
If yes, what estimated quantity will be produced per month?	~20 m^3	
How will the construction solid waste be disposed of? (describe)		

Typical construction waste, consisting of rubble and general domestic waste will be produced and temporarily stored in on-site waste receptacles and removed by the contractor when necessary. Any excavated soil will be used for levelling of working areas and re-used as fill material during construction. Pipe off cuts will be gathered by the principal contractor for offsite disposal or donated to the community.

General waste from packaging and food containers will also contribute to the waste streams generated on the site. Organic waste will also result from site clearing activities and will be stored at a central collection area. The contractor will be responsible for the removal of the general and organic waste from the collection area to the KwaNgwanase landfill site.

Where will the construction solid waste be disposed of? (provide details of landfill site)

The construction solid waste would be removed and disposed of at the nearest landfill site (the KwaNgwanase landfill). The legal standing of this landfill site is not currently known.

	YES	NO
Will the activity produce solid waste during its operational phase?	✓	
If yes, what estimated quantity will be produced per month?	6 m^3	

How will the solid waste be disposed of? (provide details of landfill site)

Solid waste generated during the operational phase will consist largely of used water treatment chemical containers and sludge resulting from the operation of the WTW. These will be removed and disposed of at the nearest landfill site (the KwaNgwanase landfill).

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

N/A

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine the further requirements of the application.

	YES	NO
Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?		✓

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

	YES	NO
Is the activity that is being applied for a solid waste handling or treatment facility?		✓

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

13.2. Liquid Effluent

	YES	NO
Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?		✓
If yes, what estimated quantity will be produced per month?	0m^3	
Will the activity produce any effluent that will be treated and/or disposed of on site?	YES	NO ✓

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Will the activity produce effluent that will be treated and/or disposed of at another facility?	YES	NO ✓

If yes, provide the particulars of the facility:

Facility name: Contact person: Postal address: Postal code:	N/A		
Telephone:		Cell:	
E-mail:		Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

N/A

13.3. Emissions into the Atmosphere

Will the activity release emissions into the atmosphere?	YES ✓	NO
If yes, is it controlled by any legislation of any sphere of government?	YES	NO ✓

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

If no, describe the emissions in terms of type and concentration:

There will be limited vehicular emissions during the construction phase. There is also the potential for dust generation during the construction phase. This may be as a result of wind over exposed areas of cleared land. Dust can be relatively easily prevented through the implementation of air pollution mitigation measures contained in the EMPr (**Appendix F**).

Air Quality guidelines are provided by the ambient dust concentration limits prescribed by SANS 1929:2005. Whilst these guidelines are currently not enforceable they do serve as recommendations for good practice. SANS 1929:2005 sets out dust deposition rates, expressed in units of mg.m-2.day-1 over a typical 30-day averaging period. Dust deposition is evaluated against the four-band evaluation criteria as below.

Band Description Label	Dust Fallout Rate, D ($mg.m^{-2}.day^{-1}$)	Comment
Residential	$D < 600$	Permissible for residential and light commercial
Industrial	$600 < D < 1\,200$	Permissible for heavy commercial and industrial
Action	$1\,200 < D < 2\,400$	Requires investigation and remediation if two sequential months lie in this band, or more than three occur in a year
Alert	$2\,400 < D$	Immediate action and remediation required following the first incidence of dust fall rate being exceeded. Incident report to be submitted to relevant authority

13.4. Generation of Noise

	YES	NO
Will the activity generate noise?	✓	
If yes, is it controlled by any legislation of any sphere of government?		✓

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

The activity is only likely to produce noise during the construction process as a result of normal construction and excavation activities. Acceptable levels are prescribed by SANS 10103:2008 (The Measurement and Rating of Environmental Noise with Respect to Annoyance and to Speech Communication). It is the most relevant code of practice for environmental noise impact assessment in SA. The rating levels for suburban districts are applicable to the project. Typical rating levels for noise in districts (adapted from SANS 10103:2008):

Type Of District	Equivalent Continuous Rating Level for Noise ($L_{Req,T}$) (dBA)					
	Outdoors			Indoors (with windows open)		
	Day-Night ($L_{R,dn}$)	Daytime ($L_{req,d}$)	Night-time ($L_{req,n}$)	Day-Night ($L_{R,dn}$)	Daytime ($L_{req,d}$)	Night-time ($L_{req,n}$)
a) Rural	**45**	**45**	**35**	**35**	**35**	**25**
b) Suburban (with little road traffic)	50	50	40	40	40	30
c) Urban	55	55	45	45	45	35

- Categories of community/ group response (adapted from SANS 10103:2008)

Excess ($\Delta L_{Req,T}$)[a] dBA	Estimated Community/ Group Response	
	Category	Description
0 – 10	Little	Sporadic Complaints
5 – 15	Medium	Widespread Complaints
10 – 20	Strong	Threats of community or group action
>15	Very Strong	Vigorous community or group action

NOTE: Overlapping ranges for the excess values are given because a spread in the community reaction might be anticipated.

a. $\Delta L_{Req,T}$ should be calculated from the appropriate of the following:

1) $L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS $L_{Req,T}$ of the residual noise (determined in the absence of the specific noise under investigation);
2) $L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS the maximum rating level of the ambient noise given in Table 1 of the code;
3) $L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS the typical rating level for the applicable district as determined from Table 2 of the code; or
4) $L_{Req,T}$ = Expected increase in $L_{Req,T}$ of ambient noise in the area because of the proposed development under investigation.

14. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal	Water Board	Groundwater	River, Stream, Dam Or Lake ✓	Other	the activity will not use water

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

3,400,000 litres during construction and 40ML / day during operation. The operational use will start at approximately 3Ml/day and increase to 20Ml/day in the first phase. Consumption will increase to 40Ml/day with the development of the 2nd phase of the WTW.

Does the activity require a water use permit from the Department of Water Affairs?	YES ✓	NO

If YES, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this report.

The linking pipeline routes will transverse three watercourses (drainage lines) and may require the dewatering of trenches where pipelines are laid and alteration of beds / banks and the temporary diversion during construction. The necessary Water Use License applications (WUL) (in terms of Section 21, (i) and (c)) will be submitted to the Department of Water Affairs (DWA) in parallel to submission of the Final BAR.

15. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The shortest, most direct route was selected in order to minimise both construction materials as well as energy required to pump the water. In addition, for the most part a gravity-fed solution to transport the water will be implemented (where possible). This reduces the need for a pumping system. Where pumps will be required, they will include high efficiency motors in order to reduce energy consumption and optimise pumping time. During construction, general construction and site management procedures as defined in the EMPr will be implemented to minimise energy usage, such as switching off engines when not in use, Optimal planning and coordination of contractors and materials etc. (refer to Appendix F for EMPr).

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

The scheme is proposed to ensure that a gravity-fed solution can be used to transport the water as far as possible to allow for low energy draw during operation.

SECTION C: SITE/ AREA/ PROPERTY DESCRIPTION

Important notes:

- For linear activities (pipelines, etc.) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g. A):

The biophysical and social environment does not change significantly to require a separate description.

- Subsections 1 - 6 below must be completed for each alternative.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat ✓	1:50 – 1:20 ✓	1:20 – 1:15 ✓	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site (Please cross the appropriate box).

Alternative S1 (preferred site):

Ridgeline ✓	Plateau	Side slope of hill/ mountain ✓	Closed valley	Open valley ✓	Plain	Undulating plain/low hills ✓	Dune	Sea-front

Alternative S2 (if any):

Ridgeline	Plateau	Side slope of hill/mountain	Closed valley	Open valley	Plain	Undulating plain/low hills	Dune	Sea-front

Alternative S3 (if any):

Ridgeline	Plateau	Side slope of hill/mountain	Closed valley	Open valley	Plain	Undulating plain/low hills	Dune	Sea-front

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Has a specialist been consulted for the completion of this section?	YES ✓	NO

If YES, please complete the following:

Name of the specialist:	Mr. M Meyer – Engeolab c/c		
Qualification(s) of the specialist:	Pr.Sci Nat		
Postal address:	Po Box 521, Mtunzini		
Postal code:	3867		
Telephone:	035 3401108	Cell:	
E-mail:	engoelab@iafrica.com	Fax:	035 3401484

Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites?	YES	NO ✓
If YES, specify and explain:	The pipelines associated with the WTW will transverse three drainage lines. Thus, there is the potential for sensitive habitats such as riparian areas or wetlands to exist.	
Are there any special or sensitive habitats or other natural features present on any of the alternative sites?	YES ✓	NO
If YES, specify and explain:	The pipelines associated with the WTW will transverse three drainage lines and natural areas. Thus, there is the potential for sensitive habitats such as riparian areas or wetlands to exist.	
Are any further specialist studies recommended by the specialist?	YES ✓	NO
If YES, specify:	In order to appropriately limit potential impacts to the watercourses/ drainage lines and ecologically sensitive areas during construction, a watercourse functional assessment / rehabilitation plan as well as vegetation assessment will need to be commissioned. The results of which will be included in the Final BAR and EMPr.	
If YES, is such a report(s) attached in Appendix D?	YES ✓	NO

Signature of specialist: _____ Date: _____

Is the site(s) located on any of the following (cross the appropriate boxes)?

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	YES ✓	NO	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	NO ✓	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	YES ✓	NO	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO ✓	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	YES ✓	NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES	NO ✓	YES	NO	YES	NO
Any other unstable soil or geological feature	YES ✓	NO	YES	NO	YES	NO
An area sensitive to erosion	YES ✓	NO	YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

	YES	NO
Has a specialist been consulted for the completion of this section?		✓

If YES, please complete the following:

Name of the specialist:	N/A		
Qualification(s) of the specialist:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

	YES	NO
Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites?		✓
If YES, specify and explain:	The pipeline associated with the WTW will cross three watercourses / drainage lines. Thus, there is the potential for sensitive habitats such as riparian areas or wetlands to exist.	
Are there any special or sensitive habitats or other natural features present on any of the alternative sites?	✓	
If YES, specify and explain:	The pipeline associated with the WTW will cross two watercourses / drainage lines. Thus, there is the potential for sensitive habitats such as riparian areas or wetlands to exist.	
Are any further specialist studies recommended by the specialist?	✓	
If YES, specify:	In order to appropriately limit potential impacts to the watercourses/ drainage lines and ecologically sensitive areas during construction, a watercourse functional assessment as well as vegetation assessment has been commissioned. The results of which will be included in the Final BAR and EMPr.	
If YES, is such a report(s) attached in Appendix D?		✓

Signature of specialist: _____ Date:

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E]	Natural veld with scattered aliens[E] ✓	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	Cultivated land ✓	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. LAND USE CHARACTER OF SURROUNDING AREA

Cross the land uses and/or prominent features that currently occur within a 500m radius of the site and give a description of how this influences the application or may be impacted upon by the application:

Land use character			Description
Natural area	YES ✓	NO	The surrounding land comprises of rural settlement surrounded by natural vegetation that has been impacted on by anthropogenic sources such as subsistence farming and the construction of access roads and houses for numerous years. Impacts are anticipated to be low as the pipeline route remains primarily immedaitley adjacent to the road reserves and existing community access roads.
Low density residential	YES ✓	NO	Most housing situated along the route of the project is rural and informal; however rapid urbanisation in parts is resulting in some areas being potentially identified as low density residential areas.
Medium density residential	YES	NO ✓	
High density residential	YES	NO ✓	
Informal residential	YES ✓	NO	The area along the pipeline route is populated by rural homesteads situated sporadically throughout the landscape.
Retail commercial & warehousing	YES	NO ✓	
Light industrial	YES	NO ✓	
Medium industrial	YES	NO ✓	
Heavy industrial	YES	NO ✓	
Power station	YES	NO ✓	
Office/consulting room	YES	NO ✓	
Military or police base/station/compound	YES	NO ✓	
Spoil heap or slimes dam	YES	NO ✓	
Quarry, sand or borrow pit	YES	NO ✓	
Dam or reservoir	YES	NO ✓	
Hospital/medical centre	YES	NO ✓	
School/ creche	YES	NO ✓	
Tertiary education facility	YES	NO ✓	

Church	YES	NO ✓	Although no churches were identified along the route of the development, due to the nature of the area, the potential exists for the churches both formal and informal to occur.
Old age home	YES	NO ✓	
Sewage treatment plant	YES	NO ✓	
Train station or shunting yard	YES	NO ✓	
Railway line	YES	NO ✓	
Major road (4 lanes or more)	YES	NO ✓	
Airport	YES	NO ✓	
Harbour	YES	NO ✓	
Sport facilities	YES	NO ✓	
Golf course	YES	NO ✓	
Polo fields	YES	NO ✓	
Filling station	YES	NO ✓	
Landfill or waste treatment site	YES	NO ✓	
Plantation	YES	NO ✓	
Agriculture	YES ✓	NO	Subsistence farming is present at various locations along the pipeline route. The project is unlikely to have any impact on agriculture in the area as most of the development remains in or adjacent to the road reserve. However, where crops are to be lost, compensation will be prearranged. In addition, the installation of the pipeline will cause a negligible decrease in available grazing space. This impact is not anticipated to be significant.
River, stream or wetland	YES ✓	NO	The proposed pipeline will transverse two watercourses (non -perennial drainage lines) and one perennial river – as discussed above. Should adequate mitigation measure outline in the EMPr be implemented during the construction are unlikely to be significant.
Nature conservation area	YES	NO ✓	
Mountain, hill or ridge	YES	NO ✓	
Museum	YES	NO ✓	
Historical building	YES	NO ✓	

Protected Area	YES	NO ✓	
Graveyard	YES	NO ✓	
Archaeological site	YES	NO ✓	
Other land uses (describe)	YES	NO ✓	

6. CULTURAL/ HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or paleontological sites, on or within 20m of the site?	YES ✓	NO

If YES, contact a specialist recommended by AMAFA to conduct a heritage impact assessment. The heritage impact assessment must be attached as an appendix to this report.

Briefly explain the recommendations of the specialist:

- Archaeology

A continual scatter of stone tools from the Early, Middle and Late Stone Age is found throughout the area. These are however found to be of low significant and no further action is required. A permit for the partial damage of two sites identified will be applied for.

- Palaeontology

No paleontologically sensitive areas have been identified, thus no further management is required.

- Human Remains

Several graves have been identified along the route of the pipeline. A 20 m buffer zone must be delineated along the route of the development and all graves in this area demarcated to ensure they are not impacted upon. Local residents must be engaged during this process. Should an unmarked grave be uncovered along the route of the pipeline, work must cease immediately in the area and the police as well as AMAFA notified to ensure that appropriate action is undertaken.

Will any building or structure older than 60 years be affected in any way?	YES	NO ✓
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES ✓	NO

If YES, please submit the necessary application to AMAFA and attach proof thereof to this report.

SECTION D: PUBLIC PARTICIPATION

1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

(a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
  (i) the site where the activity to which the application relates is or is to be undertaken; and
  (ii) any alternative site mentioned in the application;
(b) giving written notice to—
  (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  (v) the local and district municipality which has jurisdiction in the area;
  (vi) any organ of state having jurisdiction in respect of any aspect of the activity (as identified in the application form for the environmental authorization of this project); and
  (vii) any other party as required by the competent authority;
(c) placing an advertisement in—
  (i) one local newspaper; or
  (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and
(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
  (i) illiteracy;
  (ii) disability; or
  (iii) any other disadvantage.

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:
(a) indicate the details of the application which is subjected to public participation; and
(b) state—
  (i) that an application for environmental authorization has been submitted to the KZN Department of Agriculture & Environmental Affairs in terms of the EIA Regulations, 2010;(ii)
  (iii) a brief project description that includes the nature and location of the activity to which the application relates;
  (iv) where further information on the application can be obtained; and
  (iv) the manner in which and the person to whom representations in respect of the application may be made.

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

4. DETERMINATION OF APPROPRIATE PROCESS

The EAP must ensure that the public participation process is according to that prescribed in regulation 54 of the EIA Regulations, 2010, but may deviate from the requirements of subregulation 54(2) in the manner agreed by the KZN Department of Agriculture & Environmental Affairs as appropriate for this application. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate.

Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before this application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations (regulation 57 in the EIA Regulations, 2010) and be attached as Appendix E to this report.

6. PARTICIPATION BY DISTRICT, LOCAL AND TRADITIONAL AUTHORITIES

District, local and traditional authorities (where applicable) are all key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of this application and provided with an opportunity to comment.

Has any comment been received from the district municipality?	YES	NO ✓

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

The UMkhanyakude District Municipality is the applicant as a result, no comment has been provided.

Has any comment been received from the local municipality?	YES	NO ✓

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

No comment has been received from the local municipality on the Basic Assessment Report (BAR). Comments are anticipated once the Draft BAR has been circulated.

Has any comment been received from a traditional authority?	YES	NO ✓

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

A meeting was held with the traditional authorities and key community leaders on the 20th of June 2013, during which the project was discussed. No written comments have been received thus far; however, the traditional authorities will have further opportunity to submit comments upon distribution of the Draft BAR.

7. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?	YES	NO ✓

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

No comment has been received from stakeholders thus far. All registered stakeholders will have an opportunity to comment on the DBAR. Comments received in response to the DBAR will be included in the FBAR.

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

Issues raised during the traditional authorities meeting included:

- The traditional leaders have reiterated the dire need for a potable water supply in the area and the
- Provision of temporary employment (during construction) for the local community members

Further issues are expected to be received pending distribution of the Draft BAR

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached as Appendix E to this report):

This requirement will be met when finalising the, BAR following receipt of comments and issues.

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

2.1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the planning and design phase:

Alternative S1 (preferred alternative)

Direct impacts / Indirect impacts / Cumulative impacts:

Planning and design entails limited, non-intrusive site survey and desktop design work, however walkover surveys and minor sampling may be required. Walkover surveys may result in disturbance to vegetation by trampling while geotechnical investigations may result in localised removal of soil which could potentially result in erosion. The impacts associated with the design and planning stage are anticipated to be negligible due to the limited scope of the surveys and geotechnical work that may be required.

Alternative S2 (if any)

N/A

No-go alternative (compulsory)

Direct impacts / Indirect impacts Cumulative impacts:

In this case, there will be no planning and design i.e. the status quo will remain, therefore no direct, indirect or cumulative 'site' related impacts are anticipated in the planning and design phase.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1	**Alternative S2**
None required	

b. Process, technology, layout or other alternatives

List the impacts associated with any process, technology, layout or other alternatives that are likely to occur during the planning and design phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

Direct impacts / Indirect impacts / Cumulative impacts:

Planning and design entails limited, non-intrusive site survey and desktop design work. However, minor intrusive investigations (e.g. Geotechnical) may be required. These will however be undertaken in line best practise guidelines. Accordingly, no direct, indirect or cumulative 'site' related impacts are anticipated.

Alternative A2 (if any)

Direct impacts / Indirect impacts / Cumulative impacts:

See alternative A1 above.

No-go alternative (compulsory)

Direct impacts / Indirect impacts / Cumulative impacts:

Should, In this case there will be no planning and design, therefore no direct, indirect or cumulative process,

technology or layout' related impacts are anticipated in the planning and design phase.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1 / Alternative A2

Best practices must be implemented during planning and design. This includes ensuring that any trenches or cores must be immediately backfilled to ensure that no erosion occurs or hazard remains on site. Furthermore, any machinery used on site is regularly serviced and does not pose a hazard to the environment.

2.2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the construction phase:

Alternative S1 (preferred site)

Direct Impacts:

The following environmental aspects associated with the construction phase have been considered.

Biological Environment

- Watercourses

The pipeline route is proposed to cut across three watercourses (drainage lines). In order to identify the extent and level of functioning with regard to ecological benefits of the watercourses that may be impacted by the proposed pipeline a watercourse assessment has been commissioned. The findings of which will be further assessed within the Final BAR.

- Flora

The site is situated in an area, which has varying levels of disturbance. The proposed pipeline route however remains adjacent to existing rural road reserves or on anthropogenically impacted land meaning that impacts on natural vegetation is not anticipated to be high (if care is taken to remain within the project footprint).

- Fauna

The site is situated in an area that is characterised by open access communal grazing. While the potential exists for wild life to occur in the area this is limited due to the population density. It is therefore it is unlikely that the project will result in any significant impacts on fauna.

Social and Economic

- Sense of Place

Sense of place relates to the nature of an area and the way in which those living there interact with their social and natural environment. There is a possibility that a change in the overall nature of the area during the construction period. Factors contributing to this will include a change in aesthetics (there is little existing aesthetic value associated with the proposed construction site), construction noise and an increase in car and foot traffic associated with the construction activities. Possible dangers associated with the presence of construction vehicles and construction related debris in informal areas where people, children and livestock are not prevented from entering may occur. However these are anticipated to be low negative impacts if the mitigation measures outlined in the EMPr are implemented.

This change in the sense of place will be transient in nature as it will be limited to the construction period (12 months). Provided that control measures are implemented that are outlined in the EMPr, it is unlikely that potential changes to the sense of place will result in significant impacts on surrounding receptors (e.g. neighbouring communities). Low negative impacts anticipated.

- Cultural and Heritage Resources

A heritage impact assessment has confirmed that heritage resources exist within the proposed route of the pipelines. These include a continual scatter of stone tools from the Early, Middle and Late Stone Age as well as human graves. The stone tools however are found to be of low significance and no further action is required. A permit for the partial damage of two sites identified will be applied for. Thus low impact significance is anticipated. Several graves have been identified along the route of the pipeline. However, they do not occur within the actual footprint of the site. Should appropriate measures outlined in the EMPr be followed, low impact is anticipated.

- Provision of Services

The proposed project will significantly improve service delivery in the form of the providing sufficient potable water to the local community whom have previously collected potentially unsuitable sources of water from rivers, streams and boreholes. The Jozini Ingwavuma Water Supply Project will have a highly significant positive impact on the lives of the local communities by providing safe and accessible drinking water.

- Employment and Social Upliftment

The anticipated duration for the construction period is 18 months. During this period a number of semi-skilled workers as well as a few skilled workers will be required. The proposed project pipeline and WTW will therefore provide a limited number of employment opportunities on a temporary basis. A low positive impact is anticipated. There will also be limited permanent employment opportunities offered during the operational stage of the project.

Indirect / cumulative impacts:

- Aquatic Environment

Uncontrolled runoff during construction can cause the pollution of the drainage lines as well as downstream catchments either through pollutants such as hydrocarbons or sediment entering the watercourses. This has the potential to lower the water quality of the area which will in turn impact on the abiotic and biotic environment. If uncontrolled the potential exists for this to have a highly significant impact on the Pongola River and its fauna and flora. However should mitigation measures outlined in the EMPr be implemented and strictly monitored the likelihood of this occurring can decrease to low significance.

No further indirect / cumulative activity / technology related impacts are anticipated in the construction phase.

Alternative S2 (if any)

The biophysical and social environment (of the different pipeline routings) does not change significantly to require a separate description or assessment. As a result, potential impacts are considered similar to those listed in S1.

No-go alternative (compulsory)

The no-go alternative would result in the *status quo* remaining and no impact on the environment will occur. This option is considered to have a significant negative socio-economic impact in that the current and future water demands of the area will remain unmet.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1 / Alternative S2

An EMPr (**Appendix F**) has been developed to address environmental issues related to the construction phase. In addition, a watercourse rehabilitation plan has also been commissioned. The recommendations of which will be incorporated into the EMPr. In summary the EMPr suggests the following:

Social and Economic

- Sense of Place

Construction phase traffic and aesthetic impacts to be kept to a minimum through adherence to the specific measures listed below and in the EMPr.

- Employment and Social Upliftment

Local labour / construction workers should be sourced from the local community where possible.

- Cultural and Heritage Resources

A 20 m buffer zone must be delineated along the route of the development and all graves in this area demarcated to ensure they are not impacted upon. Local residents must be engaged during this process. Should an unmarked grave be uncovered along the route of the pipeline, work must cease immediately in the area and the South African Police Service (SAPS) and AMAFA notified to ensure that appropriate action is taken.

- Aesthetics

The construction activities may look unsightly for a while; however, the construction phase of the project is temporary. The active work front must be kept clean, neat and orderly at all times. Rubble and litter must be collected on a daily basis and unsightly stockpiling of materials may not occur on site. Any stockpiling which does take place must look neat, and may only occur in designated areas (construction site). Any visual disturbances, which do occur, must be remedied as soon as possible after the fact (maximum 1 week).

- Traffic

All construction traffic (including during the rehabilitation phase) must adhere to speed limits and adopt the most cautious approach when using constricted local roads, which are often pedestrian walkways and crossings as well.

- Site Safety

Only individuals utilising construction gear and clothing (hard hats, boots, and vests) are permitted on the construction area. All construction activity, products and by-products are to be stored on site according to Health and Safety regulations. Danger tape must be used to deter trespassers. Fencing or barricading must be erected around all open trenches and excavations. Full site and off-site safety considerations are to be determined in the EMPr.

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the construction phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

The following environmental aspects associated with the proposed construction methodology have been considered. Whilst they will not result in “likely environmental impacts”, they have been documented for purposes of completeness.

Direct impacts:

Biological Environment

- Watercourses

Other than potential impacts to the three watercourses (drainage lines) already outlined in section 2.2(a) S1, no further impacts associated with the pipeline installation technology are anticipated during the construction phase of this activity.

Socio-economic Environment:

- Traffic and Access

There may be temporary inconvenience and minor delays to traffic along the D850 and D1837 during the construction phase due to the presence of construction machinery and trucks delivering construction materials. However, this impact is considered unlikely considering the proposed method of installation. These impacts will only be experienced in the short term and should the mitigation measures recommended in the EMPr be implemented, these impacts are not considered significant in nature.

- Aesthetics

There may be a visual impact along the pipeline route and at the WTW site due to vegetation clearing, the presence of construction materials and vehicles, storage areas for pipes, as well as ground excavation for pipeline installation. Due to the rural nature of the area and lack of major residential areas / receptors, and the short-term nature of the construction phase, the impact is likely to be low. Over and above this, should the recommendations made in the EMPr be implemented, the construction phase is not expected to have a significant long-term impact on the aesthetics of the area.

- Employment and Social Upliftment

The construction phase is likely to provide a positive impact by providing approximately 100 temporary employment opportunities. This short-term employment has the potential to have a positive impact on the local area through provision of income generating opportunities. Due to the short term nature of construction phase, the direct positive impact is however likely to be of low significance. Approximately 15 permanent employment opportunities will be offered arising from the project.

- Cultural Heritage

A heritage impact assessment has confirmed that heritage resources are present within the proposed route of the pipeline. These include a continual scatter of stone tools from the Early, Middle and Late Stone Age as well as human graves. The stone tools however are found to be of low significance and no further action is required. Thus low impact significance is anticipated. A permit for the partial damage of two sites identified will be applied for.

Physical Environment

- Surface Water

Aspects such as soil erosion and accidental spillage of chemicals during construction have the potential to contaminate surface water / stormwater runoff. Contamination of stormwater may in turn impact on the water quality of the watercourses along the route. The potential for contamination will be significantly reduced provided that soil erosion and surface water protection measures recommended in the EMPr (**Appendix F**) are implemented. The potential impact on surface water resources is likely to be of low significance.

- Ground Water Contamination

Accidental or negligent chemical spills to the environment can potentially contaminate both soil and groundwater rendering it dangerous for either human or ecological use. Provided that hazardous substances are stored and handled in the correct manner (as stipulated in the EMPr), the risk of spills will be reduced. In the event of accidental spills, the correct clean up procedures are stipulated in the EMPr (**Appendix F**). The likelihood of contamination impacts to soil and groundwater is low with the implementation of EMPr measures.

- Air Quality

I. Dust

During construction, localised air quality may be affected as dust and other particulate matter will potentially be released into the air because of construction activities (excavation etc.) including the movement of construction machinery and vehicles. Dust emissions have the potential to deteriorate local air quality, which may result in a nuisance factor to the local community, particularly during dry and windy conditions. It is however noted that no sensitive receptors occur for most part of the pipeline route therefore reducing the probability of the disturbance occurring. Potential dust impacts will be short term (i.e. limited to the construction period) in nature and can be managed through implementation of dust control measures within EMPr (**Appendix F**). The impact

of dust emissions is therefore likely to be of low significance.

II. Vehicular emissions

Emissions from vehicles transporting materials and labour may have an impact on local air quality. However, considering that the pipeline will be installed in close proximity to the road reserve, potential receptor areas in close proximity are already exposed to persistent vehicular emissions. Transportation of construction materials is not considered to significantly increase the volumes of traffic, and as a result is unlikely to impact on the current ambient air quality of the area. The impact of vehicular emissions is therefore likely to be of low significance.

- Noise

Noise emissions are likely to be generated from typical construction sources, such as construction plant and workforce. Noise emissions are not likely to have a significant impact as construction activities will be limited to normal working hours (i.e. Monday to Friday 700am to 5pm and Saturdays 7:00 to 13:00); in addition due to the pipeline route been adjacent to the road reserve, existing noise levels are considered to be elevated. It is however suggested that the recommendations made in the EMPr (**Appendix F**) should be followed in order to ensure minimal disturbance. Noise impacts are therefore likely to be of low significance.

- Geology and Soils

There is the potential for soil erosion to occur because of excavation activities and movement of construction vehicles. Probability for this impact to occur is increased during high rainfall periods, and due to the extent of temporary storage of soils and the proposed earthwork process. Soil erosion may also occur at areas designated for pipe storage due to required site clearing activities. The extent of soil erosion will be minimised through the implementation of stringent soil erosion control measures stipulated in the EMPr (**Appendix F**). The impact on soils and geology are therefore likely to be of low significance.

- Waste Generation

A small amount of solid waste will be generated during the construction phase and will include general waste such as food containers and plastics (generated by workforce), as well as aggregate materials from the construction itself, including excavated soil / rubble, and pipe offcuts. Pipe off cuts will be sold to scrap steel collectors. Any excavated soil will be used for levelling of working areas.

Portable chemical toilets will also be brought to site for the use by the construction workforce. These facilities will be serviced by an appointed service provider with all wastes removed off site. General domestic waste will be temporarily stored in on-site waste receptacles and removed by the contractor when necessary. Construction waste generated during the construction process and in the contractor's camp will be the responsibility of the contractor.

Provided that control measures outlined in the EMPr (for e.g. providing an adequate number of waste receptacles / ensuring that correct disposal procedures) are followed, it is unlikely that there will be any significant impacts as a result of improper waste management.

Indirect impacts / Cumulative impacts:

No indirect or cumulative impacts are anticipated as a result of the construction phase of this activity.

Alternative A2

N/A

No-go alternative (compulsory)

Direct impacts:

No direct process/technology/layout related impacts are likely with the no-go alternative, as the *status quo* will remain, i.e. no construction will take place.

Indirect impacts / Cumulative impacts:

- Employment and Associated Social Upliftment

Loss of temporary employment opportunities will lead to a short-term impact. In addition, water supply to the area will not be upgraded.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1:	**Alternative A2:**
An EMPr (**Appendix F**) has been developed to address environmental issues related to the construction phase.	N/A

2.3. IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the operational phase:

Alternative S1 (preferred alternative)

There are not expected to be any direct, indirect or cumulative site related impacts likely during the operational phase of the project.

Alternative S2 (if any)

N/A

No-go alternative (compulsory)

No direct, indirect or cumulative site related impacts are likely with the no-go alternative, as the *status quo* will remain.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1	**Alternative S2**
None required.	N/A

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the operational phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

Direct impacts:

Socio-economic Environment:

- Access to Services & Quality of Life

The provision of water supply to the area will impact positively on adjacent and downstream communities in

terms of access to a reliable supply of potable water, potentially improving quality of life and health of communities. This impact is long term and medium significant in nature.

- Aesthetics

No visual impacts for the pipelines are anticipated, as the pipelines will be constructed below ground, and the route will be appropriately rehabilitated. The impact of the WTW will be limited. The buildings will be typical of the these plants and will be constructed of reinforced concrete, brickwork, and painted buildings.

Indirect / Cumulative impacts:

No further direct, indirect or cumulative 'process, technology or layout' related impacts are likely to occur in the operational phase. However, potential impacts could include leaks which would result in clean water entering the below ground environment. This will present no risk to the environment but will be monitored, controlled and limited since it will represent a financial loss to the municipality as well as a waste of a limited resource.

Alternative A2

N/A

No-go alternative (compulsory)

Direct impacts:

No direct process/technology/layout related impacts are likely with the no-go alternative, as the *status quo* will remain.

Indirect / Cumulative impacts:

- Access to services

There are likely to be potable water supply shortages within the Jozini area should the *status quo* remain. This is likely to impact on health and other social aspects, as a lack of water supply affects quality of life and the health of communities. The lack of services is also likely to impact negatively on the development plan for the area, and contradict the aims of service delivery.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1	**Alternative A2**
An EMPr (**Appendix F**) has been developed to address environmental issues related to the operational phase.	

2.4. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING OR CLOSURE PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the decommissioning or closure phase:

Alternative S1 (preferred alternative)

Direct impacts / Indirect impacts / Cumulative impacts:

The proposed pipelines and WTW will be used for the foreseeable future (at least 30 years), and therefore the likely impacts of decommissioning cannot be accurately predicted at this stage. If the infrastructure were to be decommissioned, the likely impact would be similar to those discussed in Section 2.2.b (Construction phase impacts).

The decommissioning of the Jozini Ingwavuma Water Supply Project is an unlikely scenario, as the requirement

for a secure water supply within Jozini Municipality is unlikely to change.

Alternative S2

N/A

No-go alternative (compulsory)

In this case, there will be no decommissioning of the pipelines and WTW hence there will be no decommissioning or closure phase.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1	**Alternative S2**
None required.	N/A

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the decommissioning or closure phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

Direct impacts / Indirect impacts / Cumulative impacts   This pipelines and WTW will be used for the near future (30 years), and therefore the likely impacts of decommissioning this infrastructure cannot be accurately predicted at this stage. If the infrastructure was to be decommissioned and left *in situ*, no environmental impacts are likely to occur. If it is removed and replaced, the likely impact would be similar to those discussed in Section 2.2.b (Construction phase impacts).

Alternative A2

N/A

No-go alternative (compulsory)

Decommissioning of a project that was not constructed (no-go) cannot be assessed.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1	**Alternative A2**
None required	N/A

2.5. PROPOSED MONITORING AND AUDITING

For each phase of the project and for each alternative, please indicate how identified impacts and mitigation will be monitored and/or audited.

Alternative S1 (preferred site)	**Alternative S2**
Refer to the EMP in **Appendix F**. It is recommended that an Environmental Control Officer (ECO) be appointed during the construction phase to monitor potential impacts and to ensure that the	N/A

EMPr is implemented. Monitoring reports should be produced and submitted to the Department of Agriculture and Environmental Affairs (DAEA) Compliance Monitoring Department, the contractor, and the applicant for review and corrective action where necessary.	

Alternative A1 (preferred alternative)	**Alternative A2**
I. Construction Phase: An EMPr (**Appendix F**) has been developed to address environmental issues related to the construction phase. II. Operational Phase: An EMPr (**Appendix F**) has been developed to address environmental issues related to the operational phase. III. Decommissioning Phase: None required.	N/A

3. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative S1 (preferred site)

Impact Assessment Methodology

The following section comprises a summary table of potential environmental impacts identified in the preceding sections (i.e. how, where and when the proposed pipeline installation could interact and affect the environment), and summarises the mitigation measures that may be taken to ameliorate the significance of the identified impacts.

A qualitative rating of the significance of environmental issues has been included. The purpose of the significance rating is to highlight relevant an important issues, and to eliminate the insignificant issues from the investigation. Each category was divided into a number of different levels. These levels were then assigned various criteria, detailed in the table below.

Nature of the potential Impact		**Description of the effect, and the affected aspect of the environment**
Duration (time scale)	Short-term	Impact restricted to construction and early operation (e.g. 0-5 years)
	Medium-term	Impact restricted to operational phase (e.g. 5 years - closure)
	Long-term	Impact will cease after the operational life of the activity either by natural processes or by human intervention
	Permanent	Where mitigation either by natural processes or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability	Improbable	Possibility of the impact to materialize is very low, either

		because of design or historic experience
	Probable	There is a distinct possibility that the impact will occur
	Highly probable	Where it is most likely that the impact will occur
	Definite	Where the impact will occur regardless of any mitigation measures
Mitigation summary		Summary of recommendations for minimising or eliminating negative impacts
Overall Significance (Synthesis of the aspects produced in terms of their nature, duration, intensity, extent, and probability)	Low	Where the impact will not have an influence on the decision
	Medium	Where it should have an impact on the decision unless it is mitigated
	High	Where it would influence the decision regardless of any possible mitigation

Table 1: Evaluation of Potential Environmental Impacts Associated with the construction of the of the Nondubuya Pipeline

Alternative S1

Type of Impact	Duration	Probability	Mitigation Summary	Overall Significance
NEGATIVE				
Watercourses: There is the potential for watercourses along the pipeline route to be impacted on during the construction phase.	**Short term** (Construction phase only)	**Probable:** The pipeline route directly intersects with three drainage lines.	– Follow mitigation measures set out in the EMPr. – Wetlands must be rehabilitated immediately after construction as per recommendations of the wetland rehabilitation plan.	**Low to Medium:** Should the recommendations and mitigation measures in the EMPr be followed, this overall impact will be reduced to an acceptable level.
Flora Clearing of indigenous flora may impact surrounding biotic environment. Proliferation of Invasive Alien Plants may occur within areas disturbed during construction.	**Short term** (Construction phase only)	**Probable:** Limited vegetation clearing may be required along the pipeline route and WTW / Abstraction site.	– All activities must remain within the project footprint. – Care must be taken to avoid the spread of IAP. – Rehabilitation of construction footprint must occur.	**Low to Medium:** Should the recommendations and mitigation measures in the EMPr be followed, this overall impact will be reduced to an acceptable level.
Fauna Loss of wildlife or domestic livestock.	**Short term** (Construction phase only)	**Probable:**	– No domestic pets or livestock may be permitted on site. – Snakes found on site should be ignored where possible or removed from site and released into an area away from the site. – No persons shall be allowed outside demarcated work area unless otherwise permitted by the resident engineer.	**Low:** Should the recommendations and mitigation measures in the EMPr be followed, this overall impact will be reduced to an acceptable level.
Sense of Place Social impacts associated with changes to site aesthetic	**Short Term** (Construction phase only)	**Improbable:**	– Pipeline and WTW installation site must be suitably re-vegetated.	**Low:** Should the recommendations and mitigation measures in the EMPr be followed, this overall impact will be reduced to an acceptable level.

	Long Term (Operational Phase)	**Improbable:**	– Labour should be sourced locally wherever possible – Specific measures to ensure the facility blends with the environment must be implemented.	**Low:** Should the recommendations and mitigation measures in the EMPr be followed, this overall impact will be reduced to an acceptable level.
Cultural and Heritage Resources Impacts on cultural and heritage resources because of excavation. Impact of development on identified and unidentified human graves	**Short term** (Construction phase only)	**Improbable:**	– All graves within a 20 m buffer of the site must be appropriated demarcated to ensure their preservation prior to the commencement of construction. – The developer must cease all work immediately and notify Amafa KwaZulu-Natal should any heritage resources be discovered before appropriate action is taken.	**Low:** Should the recommendations and mitigation measures in the EMPr and HIA be followed, this overall impact will be reduced to an acceptable level.
Aquatic Environment Uncontrolled runoff can cause the pollution of the aquatic environment either through pollutants such as hydrocarbons or sediment entering the watercourses	**Short term** (Construction phase only)	**Probable:**	– Extra care needs to be taken when working near watercourses. – No storage of chemicals or hydrocarbons within 30m of a watercourse. – No refuelling of vehicles or machinery may occur near watercourses. – Banks must be continually monitored for erosion. – All work occurring on river banks must be undertaken by hand where feasible.	**Low:** Should the recommendations and mitigation measures in the EMPr and HIA be followed, this overall impact will be reduced to an acceptable level.
POSITIVE				
Provision of Services Positive social impact associated with the provision of water supply to the area, This is likely to impact positively on adjacent and downstream communities	**Long Term:** (Operational Phase)	**Definite:** The BWS will significantly improving service delivery in the form of the providing sufficient potable water to the local community	– None required	**High**

in terms of access to a reliable supply of potable water.				
Employment and Associated Social Upliftment There is the potential for local communities to receive employment opportunities during the construction phase.	**Short to Long Term**: (Construction and Operational phase)	**Probable:** Potential employment opportunities exist for semi-skilled and skilled workers in the construction sectors.	– Use local skilled workers as far as possible.	**Medium:** The construction phase will provide 20 employment opportunities.

Alternative A1 (preferred alternative)

Type of Impact	Duration	Probability	Mitigation Summary	Overall Significance
NEGATIVE				
Watercourses Three watercourses along the pipeline route have the potential to be affected on during the construction phase.	**Short term** (Construction phase only)	**Highly Probable**: The pipeline route directly intersects with seven wetlands.	– Follow mitigation measures set out in the EMPr. – Watercourses must be rehabilitated as per recommendations of the Watercourse Assessment and EMPr during and immediately after construction.	**Low - Medium:** Should the recommendations and mitigation measures in the EMPr and Watercourse Assessment be followed, this impact will be reduced to an acceptable level.
Traffic & access There is the potential for construction vehicles and site activities to impact traffic on the existing rural roads during construction.	**Short term:** (Construction phase only)	**Probable:** Construction vehicles will be present on site, and the pipeline route is in close proximity to the road reserves.	– Ensure that relevant traffic calming measures are in place (e.g. signage, flag men, etc.). – Construction activities and storage facilities must not obstruct roads or traffic flow as far as possible.	**Low:** Should the mitigation measures in the EMPr be followed, this impact will be limited to the construction phase (6 months) only.

Type of Impact	Duration	Probability	Mitigation Summary	Overall Significance
Aesthetics The aesthetics of the site are likely to be altered during the construction phase.	**Short term** (Construction phase only)	**Probable:** Vegetation clearing and site activities may impact aesthetics of the area.	– The construction area must be suitably screened, and vegetation rehabilitation of watercourses must occur immediately after construction, as per recommendations of the EMPr.	**Low:** Should the recommendations and mitigation measures in the EMPr be followed, this impact will be reduced to an acceptable level.
Surface water There is the potential for surface water to be contaminated by eroded soils and chemicals.	**Short term** (Construction phase only)	**Probable:** The construction of the pipeline proposed to transverse watercourses.	– Implementation of spillage management and safety procedures as per the EMPr. – Implementation of stormwater management recommendations as per the EMPr.	**Low:** Should the recommendations and mitigation measures in the EMPr be followed, this impact will be limited.
Ground water There is the potential for accidental spillages of fuel or other contaminants to occur during the construction phase, resulting in soil and groundwater contamination.	**Short term** (Construction phase only)	**Improbable:** Few potentially contaminating materials on site, therefore low risk of spillage	– Implementation of spillage management and safety procedures as per the EMPr.	**None – Low:** Should the recommendations and mitigation measures in the EMPr be followed, this impact will be limited.
Air Quality There is the potential for construction activities to deteriorate local air quality due to dust generation and vehicular emissions.	**Short term** (Construction phase only)	**Probable:** Dust generation may increase due to the presence of soil stockpiles. Vehicle emissions may also deteriorate air quality.	– Implementation of dust suppression techniques / recommendations as per the EMPr.	**Low:** Should the recommendations and mitigation measures in the EMPr be followed, this impact will be limited.
Noise There is the potential for construction activities to increase noise levels in the area.	**Short term** (Construction phase only)	**Highly probable:** Construction vehicles and workers may increase noise levels on site. The noise levels will be limited to normal working hours.	– Ensure that working hours are limited to between 7am and 5pm during the week.	**Low:** Based on the distance of the closest receptor, the frequency of exceedances and implementation of mitigation measures in the EMPr, this impact will be limited.

Type of Impact	Duration	Probability	Mitigation Summary	Overall Significance
Geology & Soils There is the possibility of some soil erosion occurring on site. Potential impacts relate to soil entrainment into surface water resources.	**Short term** (Construction phase only)	**Probable:** There is the potential for some soil erosion to occur on site during rain events.	– Minimising the area excavated for construction will limit the amount of exposed soil vulnerable to erosion. – Vegetation rehabilitation must commence immediately after construction to reduce the likelihood of erosion.	**Low:** Should the recommendations and mitigation measures in the EMPr be followed, this impact will be limited.
Waste Generation Waste generated during construction activities may include general domestic waste construction rubble and sewage from portable ablution facilities.	**Short term** (Construction phase only)	**Probable:** Waste is likely to be generated as part of construction activities – domestic and construction	– Waste receptacles need to be placed at the site and the staff trained regarding the correct storage and disposal of this waste Regular waste collection and disposal at suitable facilities – Suitable onsite storage facilities – Credited waste services providers will be appointed for the removal and servicing of the portable chemical ablution facilities.	**Low:** Should the recommendations and mitigation measures in the EMPr be followed, this impact will be limited.
POSITIVE				
Access to services & Improved quality of life The installation of the BWS will provide better access to services and improve quality of life.	**Long term** (Operational phase)	**Definite:** Improved access to potable water in rural areas is likely to improve quality of life.	– None required.	**High**: Improved quality of life will have a significant positive impact on local communities.

Type of Impact	Duration	Probability	Mitigation Summary	Overall Significance
Employment and Associated Social Upliftment There is the potential for local communities to receive temporary employment opportunities during the construction phase.	**Short to Long term** (Construction and Operational phase)	**Probable:** Potential employment opportunities exist for semi-skilled and skilled workers in the construction sectors.	– Use local skilled workers as far as possible.	**Medium**: The construction phase will provide 20 employment opportunities.
On the basis of the above evaluation, the overall negative impact of the proposed installation of the WTW and bulk water pipeline is deemed to be of low to medium significance. The proposed upgrade serves a basic need to surrounding communities and will increase the standard of living for the residents as well as ensuring easier access to services in the future (positive impact).				

No-go alternative (compulsory)

NEGATIVE				
Access to Services & Quality of life No upgrade of the water supply will occur. As a result this will reduce the potential for development and quality of life for local residents.	**Long term**	**Definite:** A lack of potable water is likely to reduce quality of life.	– None	**High:** Current conditions will deteriorate in the near future resulting in a significant decrease in quality of life, health and development potential for the area due to reduced access to a basic necessity.
Employment and Social Upliftment Loss of temporary employment opportunities	**Short term** (Construction phase only)	**Probable:** The possible employment opportunities for local communities would no longer be available.	– None	**High:** This is a significant negative/adverse impact in an area where employment opportunities are scarce, and one person may support an entire household.
On the basis of the above evaluation, the overall negative impact of the "no-go" option is deemed to be of high significance. Maintaining the status quo is likely to negatively affect the local communities in the long term.				

SECTION F. RECOMMENDATION OF EAP

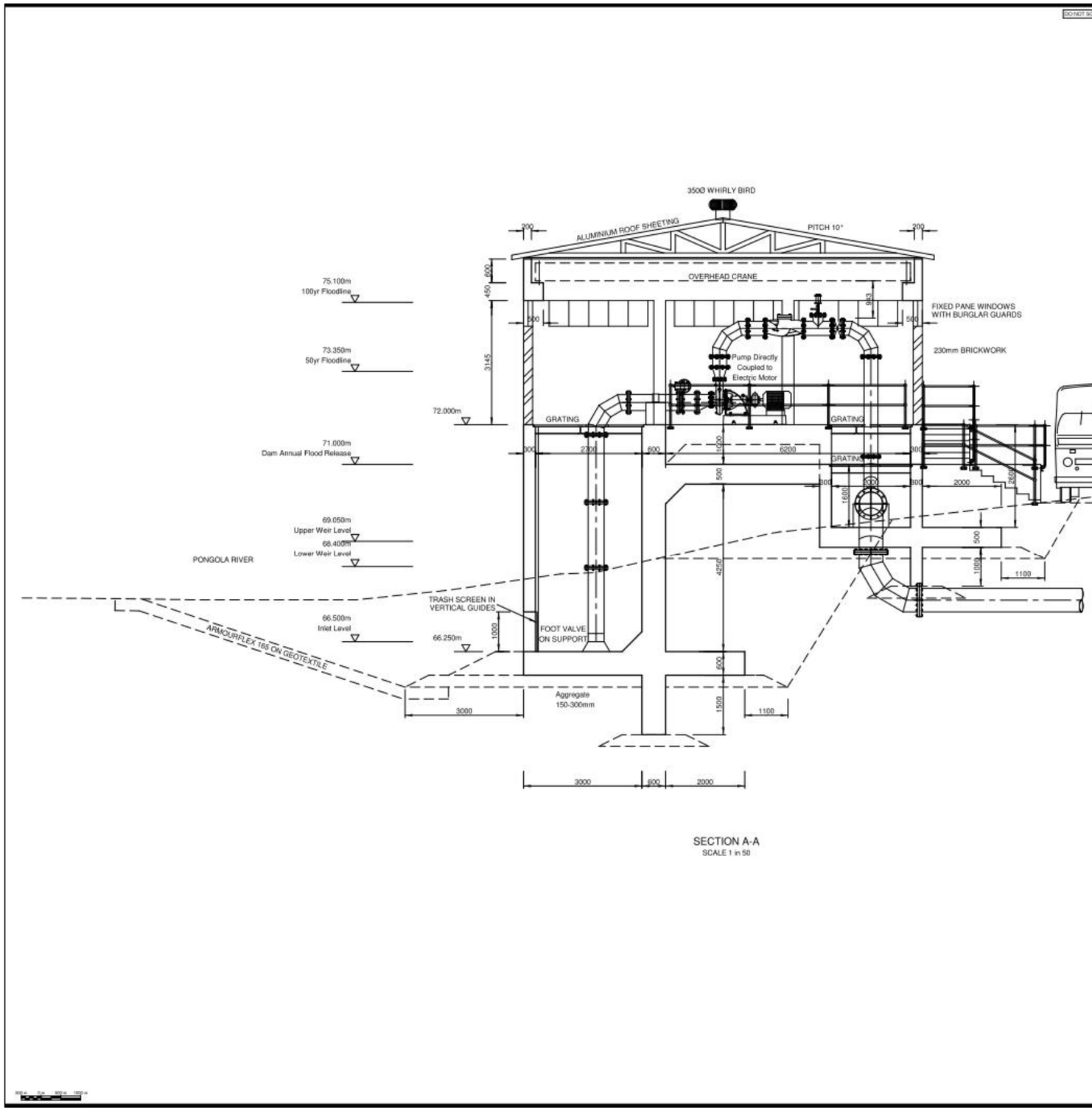
Is the information contained in this report and the documentation attached hereto in the view of the EAP sufficient to make a decision in respect of this report? If "NO", please contact the KZN Department of Agriculture & Environmental Affairs regarding the further requirements for your report.	YES ✓	NO

If "YES", please attach the draft EMPr as Appendix F to this report and list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

It is strongly recommended that the mitigation measures outlined in the EMPr (**Appendix F**), Watercourse Assessment, Vegetation assessment and associated rehabilitation plans are adhered to and that an ECO is appointed to ensure compliance with the EMPr. This should be a condition of the Record of Decision. Further to this, a compliance report should be compiled and submitted to the relevant environmental authority on completion of the project. Lastly, it is recommended that full implementation of the EMPr and training of supervisory staff and workforce to ensure understanding and compliance is enforced.

SECTION G: APPENDIXES

Appendix A: Site plan(s)



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PROJECT
JOZINI - INGWAVUMA:
PROVISION OF BULK WATER SUPPLY INFRASTRUCTURE AND PURIFIED WATER SUPPLY

ABSTRACTION PLANT
SECTION A - A

FOR REPORT

	NAME	SIGNATURE	DATE
DESIGNED	RH du Plessis		September 2009
DRAWN	RH du Plessis		September 2009
CHECKED	IWM Bokier		September 2009
APPROVED			

FILE NAME AND LOCATION

OFFICE / PROJECT No		DRAWING No	SHEET SIZE	REVISION
RB	090394	D502	A1	P01

SCALE: SCALE 1 in 50

CLIENT DRAWING No

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e-mail: richards.bay@pdna.co.za

PROJECT
CONTRACT MW 000219
JOZINI - INGWAVUMA WATER SUPPLY PROJECT
JOZINI WTW

TITLE
SITE LAYOUT
1:500

FOR TENDER

	NAME	SIGNATURE	DATE
DESIGNED	D. van SCHALKWYK		20/08/2013
DRAWN	F. MISPLON		26/08/2013
CHECKED	R. HEUNE		27/08/2013
APPROVED	G. de SWARDT		30/08/2013

PROJECT No	SECTION	DISCPL	DRG. NUMBER	STAGE	SHEET SIZE	REVISION
130208	01	W	003	T	A0	A

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CLIENT DRAWING No


KWANDLAZI RESERVOIRS
PROPOSED JOZINI WTW
PROPOSED DAM INTAKE
ALTERNATIVE RIVER INTAKE
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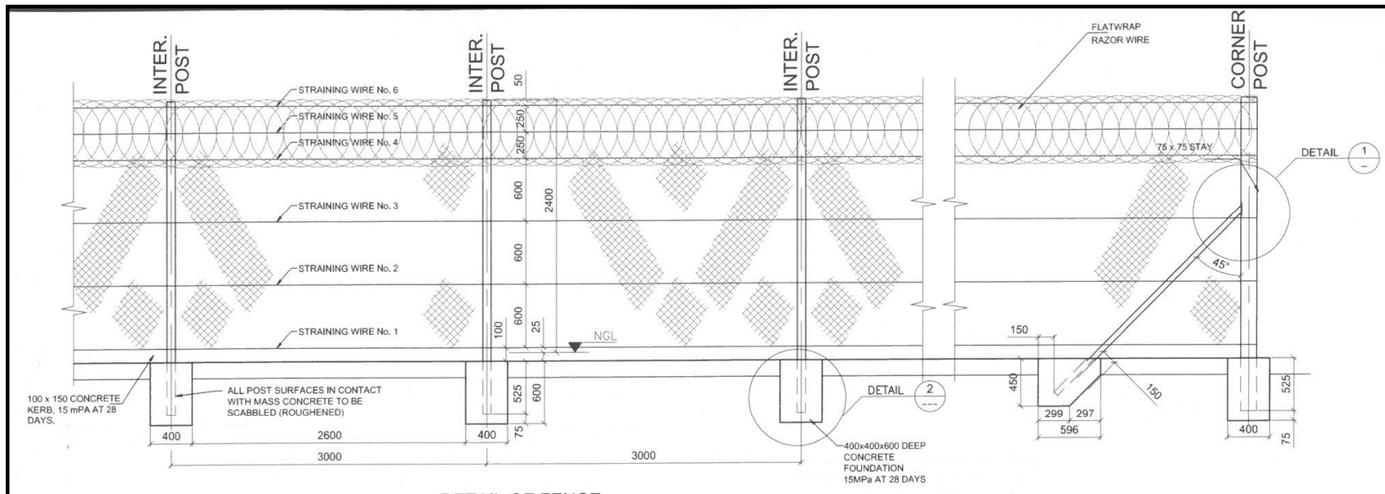
ALTERNATIVE DAM INTAKE
REV
DATE
DRAWN
CHECKED
DESCRIPTION
CLIENT
Department of Water Affairs & Forestry
CLIENT
Umkhanyakude District Municipality
CLIENT
Mhlathuze Water
CONSULTANT
PD Naidoo & Associates (Pty) Ltd
PROJECT
CONTRACT MW 000219
JOZINI - INGWAVUMA WATER SUPPLY PROJECT
JOZINI WTW
TITLE
PIPELINE LAYOUT 1:5000
FOR TENDER
NAME
SIGNATURE
DATE
DESIGNED
D. van SCHALKWYK
20/08/2013
DRAWN
F. MISPLON
20/08/2013
CHECKED
R. HELINE
27/08/2013
APPROVED
G. de SWARDT
30/08/2013
PROJECT No.
130208
SECTION
01
SHEET No.
W
DWG NUMBER
002
STAGE
T
SHEET SIZE
A0
REVISION
A
SCALE
1:500
CLIENT DRAWING No



DETAIL OF FENCE

NOT TO SCALE

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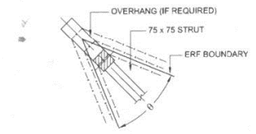
NOTES FOR FENCE:

1. INTER. POST:
   PRE-STRESSED CONCRETE POST 100SQ X 3000mm LONG
2. CORNER POST:
   100 SQ X 3000mm LONG PRE-STRESSED CONCRETE POST WITH 20 X 400mm RECESS AT RESPECTIVE HEIGHTS (AS PER DETAIL). COMPLETE WITH ALL THE NECESSARY FITTINGS.

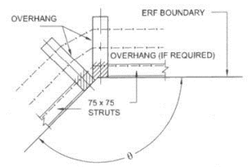
2.1. STAY:
   75 X 75 X 2750mm LONG PRE-STRESSED CONCRETE POST, COMPLETE WITH ALL THE NECESSARY FITTINGS.

3. FENCING
   a. 100 x 50 x 3,15mm GALVANIZED RAZOR WELD MESH 1800mm HIGH PANELS, SECURELY AND TIGHTLY WIRED WITH 2 Ø WIRE TO THE 4 STRANDS OF STRAINING WIRE.
   b. 700 Ø ROLLED FLAT WRAP RAZOR TAPE SECURED TO TOP OF WELD MESH PANEL WITH 2 Ø WIRE AND TO 3 STRANDS OF STRAINING WIRE.
4. STRAINING POSTS:
   STRAINING POSTS AT 30m SPACING
5. NUTS AND BOLTS:
   MILD STEEL GALVANIZED ACCORDING TO SABS 135/6 SPECIFICATION.
   NB : DRILLING, CUTTING OR WELDING ON MILD STEEL PARTS MUST BE DONE BEFORE GALVANIZING.



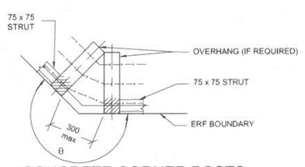
CONCRETE CORNER POSTS
(θ<45°)
PLAN

NOT TO SCALE



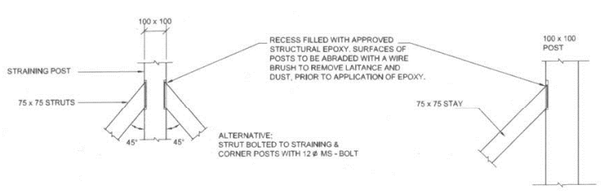
CONCRETE CORNER POSTS
(180°> θ>45°)
PLAN

NOT TO SCALE



CONCRETE CORNER POSTS
(θ>180°)
PLAN

NOT TO SCALE



DETAIL 1

TYPICAL STAY DETAIL

SCALE 1 : 10

1. WIRE

1.1 GENERAL

WIRE TYPE	* NOMINAL MEASUREMENTS (mm)		STANDARD SPECIFICATION
	GALVANIZED	PLASTIC COATED	
STRAINING WIRE	4,00Ø	4,00Ø	SABS 675
DIAMOND MESH	50 MESH x 2,50 - 2,80Ø	50 MESH x 2,95Ø	CKS 229
RAZOR MESH	100 x 50 x 3,15mm RAZOR WELD MESH 1,8m HIGH	NA	
FLAT WRAP	700Ø ROLLED FLAT WRAP RAZOR TAPE MANUFACTURED TO MIL 52489, P.J.S. MILITARY SPEC., MAXIMUM OPENING 175 AND +/- 20 SECURING CLIPS / METRE HORIZONTAL RUN. FLAT WRAP COIL JOINTS TO BE CRIMPED WITH HEAVY DUTY GALVANIZED CLIPS		CKS 229
TYING WIRE	2,00 MIN.Ø	2,95Ø	SABS 675
SPACER WIRE	4.00Ø	NA	SABS 675

* ALL WIRE MILD STEEL IN ACCORDANCE WITH SABS 675

1.2 GALVANIZED WIRE - HOT DIPPED, CLASS A COATING IN ACCORDANCE WITH SABS 675

1.3 DIAMOND MESH - TOP EDGE CLINCHED

2. POSTS

2.1 GENERAL

POST	NOMINAL MEASUREMENTS	
	MILD STEEL	PRESTRESSED CONCRETE
CORNER & STRAINING POSTS	100Ø x 3000 x 4 WALL THICKNESS REF. CKS 82	100 x 100 x 3000 WITH 4 No. 5Ø PRESTRESSED WIRES
GATE POSTS	150Ø x 3000 x 4 WALL THICKNESS REF. CKS 82	150 x 3000 WITH 4 No. 5Ø PRESTRESSED WIRES
INTERMEDIATE & STRUTS	75Ø x 2750 x 2,5 WALL THICKNESS - REF. CKS 82	75 x 75 x 2750 WITH 4 No. 5Ø PRESTRESSED WIRES
OVERHANG	TO SUIT	TO SUIT

2.2 PRE-STRESSED CONCRETE; CONCRETE CLASS 35/13

3. GATES

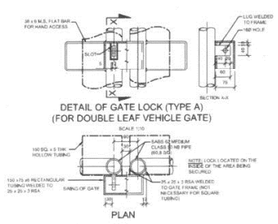
3.1 GENERAL
TYPE A; DOUBLE LEAF TYPE x 6m OVERALL WIDTH x 2m HIGH
TYPE B; SINGLE LEAF TYPE x 1,2m OVERALL WIDTH x 2m HIGH
TYPE C, etc; AS SPECIFIED ELSEWHERE

4. CONCRETE CLASS

4.1 GENERAL
KERB STONE : 15/19
FOUNDATIONS : 15/19

5. STEELWORK

5.1 ALL STEELWORK TO BE SHOT OR SANDBLASTED TO PROVIDE A DEGREE OF CLEANLINESS EQUIVALENT TO SA 2 1/2 OF SWEDISH STANDARD S.I.S. 05 - 5900 1967, HOT DIP GALVANIZED (BY SABS MARK HOLDER) TO COMPLY WITH SABS 763 HEAVY DUTY.



DETAIL OF GATE LOCK (TYPE A)
(FOR DOUBLE LEAF VEHICLE GATE)

NOTES FOR GATE:

1. ALL STEELWORK TO BE SHOT OR SANDBLASTED TO PROVIDE A DEGREE OF CLEANLINESS EQUIVALENT TO SA 2 ½ OF SWEDISH STD. S.I.S. 05 - 5900 1967, HOT DIP GALV. (BY SABS MARK HOLDER) TO COMPLY WITH SABS 763 (HEAVY DUTY).

2. DOUBLE LEAF VEHICLE GATES:
   6000 WIDE x 2400 HIGH, 50 NB STEEL PIPING BRACED AND SQUARE CORNERED AS SHOWN ON DWG. WITH 100 x 50 x 3,15 GALV. WELD MESH 1800 HIGH AND 700Ø FLAT WRAP RAZOR TAPE SECURED TO GATE OVERHANG. GATES TO BE HUNG ACCURATELY ON PURPOSE MADE PIVOT HINGES. TOWER BOLTS 150 x 25Ø LONG TO BE PROVIDED TO FIT 18 Ø PIPING SLEEVE 150 LONG SPLIT ON CENTRE LINE OF END SET IN CONCRETE.

3. EACH GATE SHALL BE SUPPLIED WITH SLEEVES TO SECURE IT IN THE OPEN POSITION.

4. ALL GATE LOCKS TO BE INSTALLED AT A HEIGHT OF 1200.

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PROJECT

JOZINI - INGWAVUMA WATER SUPPLY PROJECT

CONSTRUCTION OF WATER TREATMENT WORKS

TITLE

WIRE MESH FENCE AND DOUBLE LEAF VEHICLE GATE WITH RAZOR WIRE

FOR TENDER

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APPROVED	C. WARNER		30/08/2013

PROJECT No.	SECTION	DISCPL.	DRG. NUMBER	STAGE	SHEET SIZE	REVISION
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PROJECT
CONTRACT MW 000219

JOZINI - INGWAVUMA WATER SUPPL
PROJECT
JOZINI WTW

TITLE
100 YEAR
FLOOD LINE

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APPROVED	G. de SWARDT		30/08/2

PROJECT No	SECTION	DISCPL	SEC NUMBER	STAGE	SHEET SIZE
130208	01	W	005	T	A0

SCALE 1:500

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Appendix B: Photographs

Figure B1 .Abstraction point (A2)

Figure B2 Existing KwaNdlazi Reservoir

Figure B3 WTW proposed site.

Figure B4 Watercourse Crossing on the Raw Water Rising Main en route to WTW.

Figure B5 expected routing of the Potable Water Rising Main en route to KwaNdlazi Reservoir.

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix E: Comments and responses report

Appendix F: Draft Environmental Management Programme (EMPr)

Appendix G: Other information
Coordinates of the raw water gravity main and Potable water rising main

			Latitude (S)			Longitude (E)		
Gravity Line	Y	X	dd	mm	ss.ssss	dd	mm	ss.ssss
START	91833.7981	3034568.456	27	25	13.84	32	4	16.72
P1	91363.9983	3034739.593	27	25	19.51	32	4	33.78
P2	90950.6553	3034458.262	27	25	10.47	32	4	48.90
P3	90465.2754	3034578.288	27	25	14.49	32	5	6.54
END	89836.2464	3034293.412	27	25	5.38	32	5	29.51
Pumped Main	Y	X	dd	mm	ss.ssss	dd	mm	ss.ssss
START	89746.3302	3034305.201	27	25	5.79	32	5	32.78
P1	90061.5813	3033917.107	27	24	53.10	32	5	21.41
P2	90096.0303	3033418.295	27	24	36.89	32	5	20.29
P3	90251.7551	3032943.164	27	24	21.42	32	5	14.75
P4	90586.7686	3032571.995	27	24	9.28	32	5	2.65
END	90936.2326	3032362.967	27	24	2.41	32	4	49.99