

# **THE PROPOSED WELDED STEEL GRAVITY MAIN IN ZWELIBOMVU, ETHEKWINI MUNICIPALITY.**

DRAFT BASIC ASSESSMENT REPORT

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**THE PROPOSED WELDED STEEL GRAVITY MAIN IN ZWELIBOMVU,  
ETHEKWINI MUNICIPALITY.**



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THE PROPOSED WELDED STEEL GRAVITY MAIN IN ZWELIBOMVU, ETHEKWINI MUNICIPALITY.

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## EXECUTIVE SUMMARY

Qajana Trading (Pty) Ltd was appointed to represent eThekweni Metropolitan, Engineering Unit: Water and Sanitation as their independent Environmental Assessment Practitioner (EAP) to undertake the environmental services required for the proposed steel welded gravity main in ward 100 of the eThekweni Municipality. The proposed development requires an Environmental Authorisation prior to construction commencing. The application does not require a water use license (WUL) application as the proposed activity does not fall within 32m of a water source.

The proposed Ofudu to Inwabi steel gravity main entails of the construction of a 9 km Welded Steel Gravity Main. It will contain no off-takes as it is intended on increasing the water capacity at Inwabi Reservoir. The pipe diameter is 300 mm and more than 300  $m^2$  of vegetation will be cleared to make way for the proposed pipeline. The majority of the pipeline will fall within the road reserve and a DOT approval has been granted.

A vital part of the BA process is the public participation process, where residents, neighbours and relevant organisation that may be interested in or affected by the proposed activity are notified of the proposed activity and afforded an opportunity to expression their comments and concerns throughout the BA process. The identification of key and critical stakeholders that are associated with the project, which includes government departments, non- governmental organisations (NGO), civic bodies, ward councillors and other relevant personnel. A Notification sheet was sent out on the 24<sup>th</sup> of May 2021 to the identified stakeholders, as part of making them aware of the proposed activities. An advertisement was placed in a newspaper that covers the local municipal region and Isolezwe on the 21<sup>st</sup> of May 2021. The particulars in the advertisement included the project details, contact numbers, a call to register as part of the IAP and the company undertaking the impact assessment. Ensuring the local residents were aware of the proposed project, six (6) signs of the stipulated size were placed strategically in the proximity of the proposed development site on the 26<sup>th</sup> of July 2021. They provided the project description and the processes of registering as an IAP. Furthermore, a public meeting was convened with the Councillor and the Traditional authority on the 18<sup>th</sup> of May 2021 to introduce the project and allow for comments and approvals. A Background Information Document (BID) was circulated to the pre – identified IAP on the 6<sup>th</sup> of August 2021. These included the EDTEA, DoT, Amafa and eThekweni Metropolitan among others.

The significant impacts are associated with the biological and ecological aspect as the proposed project intends to clear more than 300 square meters of vegetation as well as alter an area of significant biodiversity considered as DMOSS. This is, however, a temporary impact, the duration of which it is anticipated to last for the construction period only and the area will be rehabilitated accordingly. In addition, should the mitigation measures included in this report and the EMP<sub>r</sub> be implemented, then this impact is anticipated to be minimal.

## ABREVIATIONS

- BAR – Basic Assessment (Report)
- BID – Background Information Document
- CA – Competent Authority
- CB – Coastal Belt
- D'MOSS – Durban Municipal Open Space System
- DEA – Department of Environmental Affairs
- DWS – Department of Water and Sanitation
- EA – Environmental Authorization
- EAP – Environmental Assessment Practitioner
- ECO – Environmental Control Officer
- EDTEA – Department of Economic Development Tourism and Environmental Affairs
- EIA – Environmental Impact Assessment
- EKZNW – Ezemvelo KwaZulu Natal Wildlife
- EMPr – Environmental Management Programme
- ES – Environmental Score
- GNR – Government Notice Regulation
- IAP – Interested & Affected Parties
- IAPS – Invasive Alien Plant Species
- KZN – KwaZulu Natal
- NEMA – National Environmental Management Act (107 of 1998)
- NFEPA – National Freshwater Ecosystem Priority Area
- NGO – Non Governmental Organization
- NWA – National Water Act (Act 36 of 1998)
- PPP – Public Participation Process
- RIAM – Rapid Impact Assessment Matrix
- SG – Surveyor General
- SWMP – Storm Water Management Plan
- WUL(A) – Water Use License (Application)

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# 1. BACKGROUND

Qajana Trading (Pty) Ltd was appointed to represent eThekweni Metropolitan, Engineering Unit: Water and Sanitation as their independent Environmental Assessment Practitioner (EAP) to undertake the environmental services required for the proposed steel welded gravity main in ward 100 of the eThekweni Municipality. The proposed development requires an Environmental Authorisation prior to construction commencing.

Water is an important resource for human beings and poses a significant developmental issue in South Africa. The area of Zwelibomvu has portable water supply. However, the reticulation does not allow water to reach the lower lying Inwabi reservoir so that it may supply water to the lower communities. Therefore, the steel gravity main will not include any off-takes as its mandate is to ensure adequate water supply in the Inwabi reservoir so that the lower communities are able to access water like the rest of the community that does.

As per GN R326 of the Environmental Impact Assessment (EIA) Regulations (2014), as amended (2017), a Basic Assessment (BA) Process must be undertaken in a manner that the environmental outcomes, impacts and residual risks of the proposed activities are assessed accordingly by the EAP. In light of the above, the requirements of the BA Process are noted in the EIA Regulations (2014) as amended (2017).

The outcome of the BA Process is to provide the Competent Authority; the KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA), with sufficient information to provide a decision on the Application in terms of an Environmental Authorisation, to avoid or mitigate any detrimental impacts that the activity may inflict on the receiving environment.

## 1.1 DETAILS OF THE EAP

The table below provides the details of the EAP; the full CV is attached in the annexures.

Details of the EAP	
<b>Name of the Company</b>	Qajana Trading
<b>Contact Person</b>	Muziwandile Khuzwayo
<b>Education</b>	BSS Geography & Environmental Management (UKZN) MA Development Studies (UKZN) – Currently Finalizing Research Report.
<b>Contact Details</b>	<a href="mailto:muziwandilek@qajanagroup.co.za">muziwandilek@qajanagroup.co.za</a>

Table 1: Details of the EAP

## 1.2 DESCRIPTION

The proposed Ofudu to Inwabi steel gravity main entails of the following specification/works:

- 9 km Welded Steel Gravity Main;
- No off-takes will be connected;
- The pipe diameter is 300 mm; and
- More than 300 m<sup>2</sup> of vegetation will be cleared.

## 1.3 PROJECT LOCATION

The pipeline is to be located adjacent to Road D1011 between Ofudu and Inwabi Reservoir within the Zwelibomvu area, outer west of Durban. It traverses within a district gravel road, and some private properties. Access to the site is via N3 Freeway west, Henry Pennington Road (formerly Richmond Road), MR468 and MR489 Provincial Roads, and Road D1011. The approximate Latitude and Longitude coordinates for the starting point of the pipeline are 29°53'59.08"S and 30°42'52.16"E and end point are 29°55'06.80"S and 30°46'11.28"E.

The landowner details, 21-digit Surveyor General (SG) code and erf details are as follow:

Oid	9092714
Uniqueid	F92714
Proprc	Farm
Sg Code	N0ET0000000046760000
Minreg Frmm	UMLAZI LOCATION
Maj Region	ET
X	30.735284
Y	-30.011509



Oid	9668431
Uniqueid	P468431
Proprsrc	Farm Portion
Sg Code	N0FT00000000467602199
Minreg Frmmn	Null
Maj Region	FT
X	30.809572
Y	-29.942276

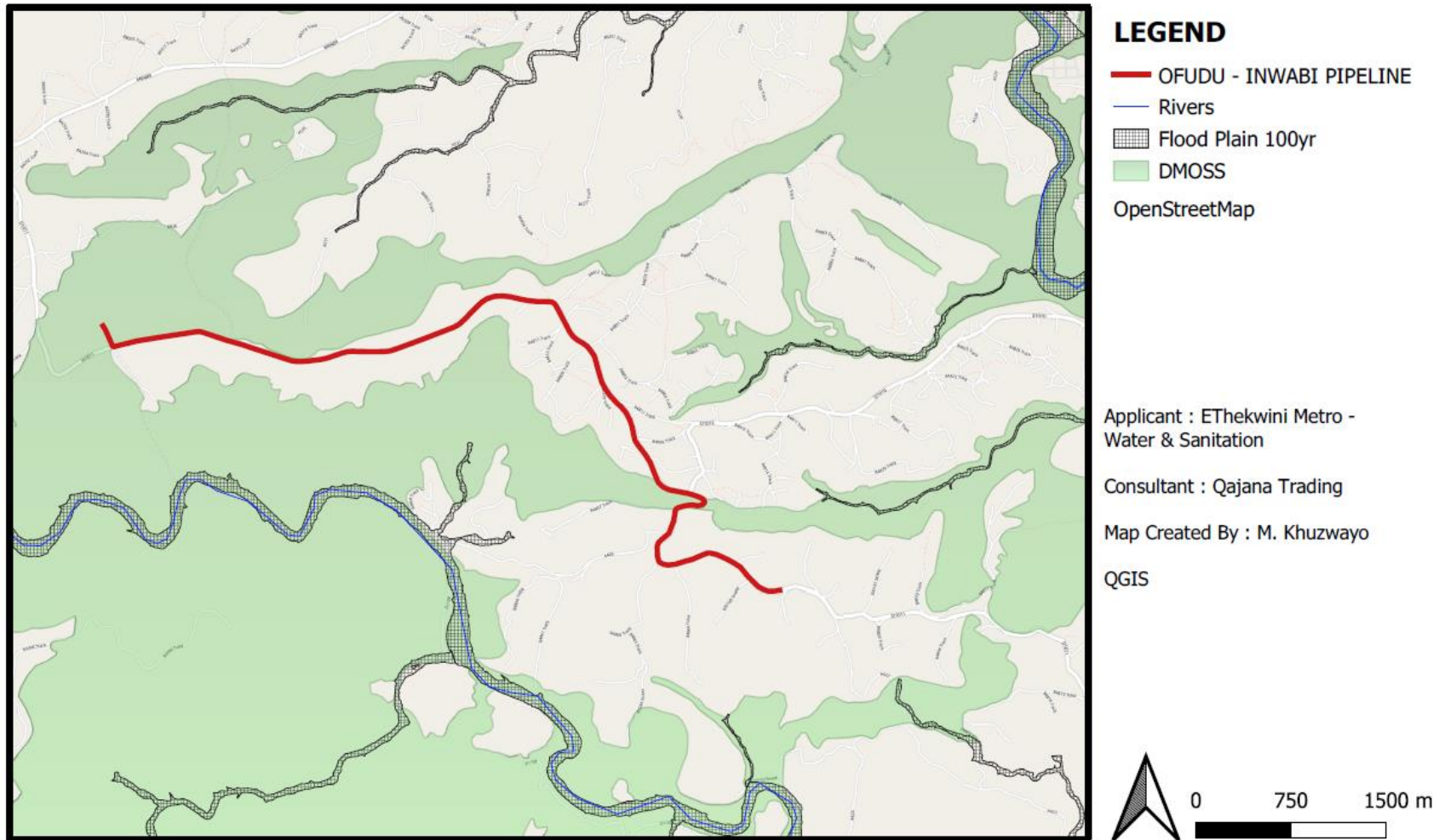
Table 2 : Land Details

The linear co-ordinates for the proposed development are as follow:

LATITUDE	LONGITUDE
29°53'59.46"S	30°42'52.41"E
29°54'4.77"	30°42'55.39"E
29°54'1.21"S	30°43'20.85"E
29°54'8.76"S	30°43'49.60"E
29°54'7.99"S	30°43'58.28"E
29°54'6.18"S	30°44'4.38"E
29°54'6.02"S	30°44'17.20"E
29°54'0.10"S	30°44'35.56"E
29°53'52.20"S	30°44'46.32"E
29°53'52.18"S	30°44'52.23"E
29°53'53.72"S	30°45'4.85"E
29°54'2.87"S	30°45'11.44"E
29°54'5.02"S	30°45'14.94"E
29°54'7.23"S	30°45'16.75"E
29°54'14.17"S	30°45'19.04"E
29°54'18.98"S	30°45'23.25"E
29°54'21.51"S	30°45'26.06"E
29°54'28.64"S	30°45'28.85"E
29°54'39.17"S	30°45'35.51"E
29°54'41.16"S	30°45'38.46"E
29°54'43.73"S	30°45'48.59"E
29°54'45.20"S	30°45'48.17"E
29°54'46.21"S	30°45'40.95"E
29°54'52.44"S	30°45'38.40"E
29°54'55.49"S	30°45'35.24"E
29°54'59.42"S	30°45'35.82"E
29°55'0.36"S	30°45'39.88"E
29°54'57.42"S	30°45'50.42"E
29°55'0.58"S	30°45'58.75"E
29°55'6.91"S	30°46'7.40"E
29°55'6.80"S	30°46'11.28"E

Table 3: Linear Co-Ordinate for the Proposed Development

# THE PROPOSED OFUDU TO INWABI GRAVITY STEEL MAIN













#### 1.4 NEED & DESIRABILITY

The Zwelibomvu area contains portable water reticulation, with numerous stand pipes and household connections. Nonetheless, when the current reticulation was designed; it intended to fill the Inwabi Reservoir and provide the Zwelibomvu area with portable water. This has proven to be difficult as the pressure is insufficient to provide Inwabi reservoir with adequate water in order to supply the communities in the lower regions with access to portable water.

Therefore, the proposed project aims to address the water scarcities in lower communities through the construction of a Steel gravity main within the road reserve; which will not contain any off-takes as the pipe is intended to increase the water capacity in the Inwabi Reservoir. The proposed project aims to expand the service delivery mission delegated to the Ethekwini Metropolitan for the communities within the jurisdiction.

Furthermore, temporary job opportunities will be created during the construction phase. The implementation of the proposed development will ease some of the developmental challenges confronted by the Municipality, as a result of population growth. These challenges include the improvement of living conditions for the community involved, as well addressing the backlog of infrastructure service provision in terms of sustainable sanitation services.

As the pipeline will fall within the road reserve, the Department of Transport was consulted and the continuation of the project was granted. The letters are attached in the annexures as supporting documents.

The proposed pipeline has a portion of it that falls within the Durban Municipal Open Space System (D'MOSS). However, the department responsible for the DMOSS has been consulted and exceptions have been made and the continuation of the project has been granted. The DMOSS consists of environmental assets that include rivers, wetlands, estuaries, grasslands, forests and coastal zone resources. During construction, it will be stressed that great care is taken when working within the area due to its significant environmental composition.

The images below show the current make-up of the site along D1011. The area consists of grass lands as well as pockets of thick forests with shrubs and thickest in other areas. There are no formal structures that are built within the road reserve or the road itself. Therefore, it is anticipated that no community member will be agitated or oppose the development, as it will not be within any community members' private property.









Figure 1: Current Site Pictures

## 1.5 PREFERRED SITE

The preferred site is the most feasible option because the pipeline will be within the road reserve. Additionally, the purpose of the pipeline is to augment the water levels in the Inwabi reservoir and the proposed pipeline will go directly to the reservoir without any off-takes. The rationale for the pipeline being within the road reserve is that it will coincide with the gravitational flow of the road and allow for the water to run without any interruptions.

There is an mPVC existing pipeline that contains off-takes and is within the road reserve. The proposed steel pipeline will run adjacent to the existing one, which has been fully functional to date. This proves that the preferred method will be the most feasible one and cost effective whilst ensuring that water levels in Inwabi reservoir are adequate for the provision of the lower communities with potable water.

## 1.6 ALTERNATIVES

The alternative is to continue pumping water and using the existing pipeline and attempt to fill Inwabi reservoir with adequate water. However, this has not been possible because of the pressure being insufficient to service off-takes whilst ensuring that the water capacity in Inwabi reservoir is sufficient for the lower community.

The proposed route has been backed by calculations that ensure minimal efforts employed by municipality to transport water. Additionally, the environmental interruptions are minimal as the route will be within the road reserve.

## 1.7 NO-GO AREA

The no-go alternative would be the failure to implement the proposed activity. This would mean that lower communities will continue to live with limited to no water supply because of the low water capacity levels in Inwabi reservoir. Furthermore, this will drag the developmental ambitions and obligations of the municipality.

One of eThekweni Municipality's mandate is to manage the physical environment and the provision of potable water, amongst other priorities. This must be conducted in a responsible manner that considers the receiving community's health, infrastructure and environmental integrity. The proposed construction of the Ofudu to Inwabi steel main meets the criteria, as well as those stipulated in the eThekweni Municipality's IDP. On this basis, the no-go alternative should not be considered.

## 1.8 PREFERRED TECHNOLOGY

The preferred technology includes the establishment of the water main with minimal impact to the receiving environment while still implementing service delivery. It is proposed that the steel main will be within the road reserve, this ensures that the environmental disturbances are kept to a minimal. Whilst it is understood that pedestrian walkways and some drive-ins may be disturbed during the construction phase, they will be replaced following the laying of the steel pipeline.

This technology alternative has been proposed by the eThekweni Municipality's Engineering Unit as the most suitable and efficient technology given the physical attributes of the site. As a result, this is the only technology alternative considered that meets the need and desirability of the application.

## 2 LEGISLATION & POLICY

South Africa is governed by the constitution, and Section 24 covers the right to an environment that does not affect a respectable life. Section 24 of the constitution gave rise to the National Environmental Management Act (NEMA), which is the principal legislation that administers the aspects of environmental management in the country. In ensuring sustainable development, the custodians of the legislation and the environment have developed regulations that provide activities that require an assessment and approval prior to execution. The most recent regulations (GNR 324, 325 & 327), as amended in 2017, of NEMA specify conditions that require an Environmental Authorization (EA) issued by the National Department of Environmental Affairs (DEA) or the provincial department. In this case, the KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA) oversees most of the applications that require approval. The Department of EDTEA may consent or reject the application based on the evidence submitted together with the proposal.

The issuing of the EA follows after the information specific to the activity has been reviewed by the competent authority (CA), together with the required investigation and the undertaking of the public participation process (PPP). The PPP affords the opportunity to various stakeholders, such as the neighbouring community, general public and other authorities, to comment or object on the proposed development. The process is regulated by various items stipulated in the Regulations and a specified period is provided for interaction with interested and affected parties (IAP) including the relevant authorities. The figure (2.1) below briefly provides the basic assessment process and the relevant periods for comments and consenting or rejecting the application.

### 2.1 LIST NOTICES & ACTIVITIES OF THE PROJECT

The proposed Ofudu to Inwabi reservoir steel main is the motivation for the application, as the project intends to clear vegetation to make way for the pipeline. The proposed activity will require an Environmental Authorization (EA) in terms of the EIA Regulations, 2014 (as amended in 2017) as the proposed activity intends to clear more than 300 square meters of indigenous vegetation, which is considered as a critical biodiversity support area. The application for an EA will undergo the Basic Assessment process in terms of List Notice 3 (GNR327) of the EIA Regulations, 2014 (as amended in 2017).

<i>GNR No &amp; List</i>	<i>Triggering Activity</i>	<i>Description</i>	<i>Stimulus</i>
<i>GNR 324 Listing Notice 3</i>	<i>Activity 12</i>	<p><i>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</i></p> <p><b><i>(b) In KwaZulu-Natal:</i></b></p> <ul style="list-style-type: none"> <li><i>i. Trans-frontier protected areas managed under international conventions;</i></li> <li><i>ii. Community Conservation Areas;</i></li> <li><i>iii. Biodiversity Stewardship Programme Biodiversity Agreement areas;</i></li> <li><i>iv. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</i></li> <li><i>v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</i></li> <li><i>vi. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;</i></li> <li><i>vii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning;</i></li> <li><i>viii. A protected area identified in terms of NEMPAA, excluding conservancies;</i></li> <li><i>ix. World Heritage Sites;</i></li> <li><i>x. Sites or areas identified in terms of an International Convention;</i></li> <li><i>xi. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;</i></li> <li><i>xii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or</i></li> <li><i>xiii. In an estuarine functional zone.</i></li> </ul>	<i>The project seeks to remove vegetation to make way for the proposed steel main.</i>

Table 4: Showing the triggering activities as per the list notices.

Legislation	Description
National Water Act (1998)	The proposed project should adhere to the act and ensure that water resources are not contaminated at any point of the development.
NEMBA (2006)	The act relates to the disturbance of fauna and flora found within and in close proximity to the site. It considers the ecological significance of the proposed site location.
National Forest Act (1998)	The act regulates the use and disturbance of forest organisms in the country. This report gives due consideration below to the proposed project and Section 7 of the Act which relates to the disturbance of protected species and the clearance of natural forest. Alien tree species will have to be removed to cater for the sports field.
National Heritage Resources Act (1999)	The act governs the heritage resources that are in South Africa. Any pieces of significance to heritage or graves found within the site will cause the development to pause until clearance has been provided by the specialist. No feature of heritage exists within the preferred site.
CARA (1983)	The act administers the control and prevention of veld fires, weeds and invader plants, which relate to the proposed activity. The removal of alien tree species will be of benefit to make way for the sports field.
Veld and Forest Fires Act (1998)	Encompasses the prevention of unauthorised veld and forest fires and such will have to be considered for project due to the location.
Occupational Health & Safety Act (1993)	The act prescribes health and safety measures necessary to adhere to for all construction works.
By – Laws and Planning Policies	The development will have to consider the various municipal by – laws that affect the development. As well as the consideration of planning policies in place.

Table 5: Relevant Legislation

# BASIC ASSESSMENT PROCESS

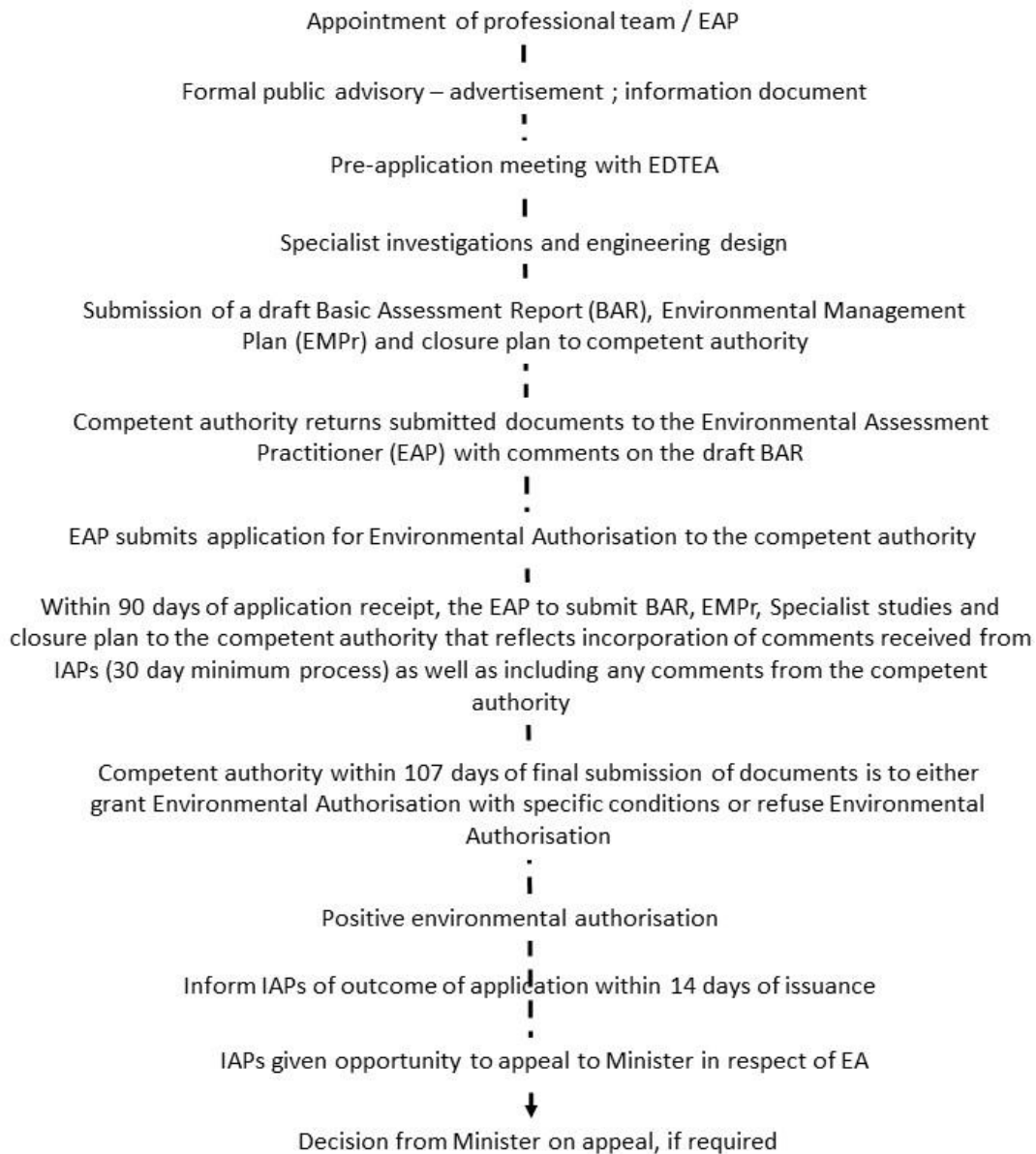


Figure 2: The BA Process

## 2.2 EDTEA PRE-APPLICATION MEETING

A Pre-Application Meeting was held with Ms Natasha Brijlal and Nasreen Asmal of the Department of EDTEA, eThekweni District on the 05<sup>th</sup> of May 2021. The minutes are attached in the Annexures. The purpose of the Pre-Application Meeting was to introduce the project to the Competent Authority, present and confirm the relevant Listed Activities and identify the required Specialist Studies to be conducted. EDTEA confirmed the applicability of the identified Listed Activities and agreed that the geotechnical report needed to form part of the Basic Assessment Report, including the Vegetation study.



## 3 PROJECT DESCRIPTION

### 3.1 DESCRIPTION

The proposed Ofudu to Inwabi steel gravity main entails of the following specification/works:

- 9 km Welded Steel Gravity Main;
- No off-takes will be connected;
- The pipe diameter is 300 mm; and
- More than 300  $m^2$  of vegetation will be cleared.

### 3.1 SITE ACCESS

Access to the site is via N3 Freeway west, Henry Pennington Road (formerly Richmond Road), MR468 and MR489 Provincial Roads, and Road D1011. Additionally, the site may be accessed through the M30 highway from Umlazi and enter through D1011.

### 3.2 SITE CAMP

The proposed site camp should be the Inwabi reservoir area with the co-ordinates: 29°53'58.1"S 30°42'50.8"E. The Inwabi reservoir area is secured with fencing all-round the vicinity and contain security personnel throughout the night. The area belongs to the municipality and will not contain any issues pertaining to permission to occupy the area. The environmental impacts of a portion of the area being a camp site, are minima as there should be no disturbances to the environment as the area is ready for occupation.

Post construction, all necessary infrastructure contained within the site camp will be removed and rehabilitation measures, including re-grassing where necessary, should be implemented. Should any indigenous vegetation be found within the site camp, it should not be tampered with / cut down unless completely necessary. Should this vegetation be removed, it should be replaced with two specimens of the same species, for every item cut down.

### 3.3 CONSTRUCTION PERIOD

The following activities will be undertaken during construction of the steel main infrastructure:

- ✚ Excavation of trenches and preparation for placing pipes;
- ✚ Laying of pipes and consequent filling of trenches; and
- ✚ Rehabilitation of the site and site camp on completion of the project.

### 3.4 POST-CONSTRUCTION

Once construction is complete, the working area will be rehabilitated. If necessary, paving will be replaced and the road surface will be reinstated. The area occupied by the site camp will have be re-grassed. Should any indigenous flora need to be removed during the construction process, then this will be replaced with two specimens of the same species, during the rehabilitation phase.

## 4 BIOPHYSICAL ENVIRONMENT

Durban is richly endowed in terms of natural capital given its location being at the centre of the Maputaland-Pondoland-Albany Region<sup>1</sup>. The area is described as being rich in biodiversity. Therefore, Durban's natural assets are abundant and need to be continuously protected and sustainably utilised to ensure their availability for future generations. In terms of topography, the proposed pipeline route is described as steeply to moderately undulating hillsides and valleys in the south eastern portion becoming gentle to flat lying plateau features toward the western portion of the route. The natural topography of the site consists of grasslands, forest pockets and various plantations. The surrounding area consists of formal and informal housing structures with various roads and pathways that makes accessing the area easier.

The Natal Group Sandstone sequence and its related subsoils entirely underlie the western and central sections of the proposed pipeline route. The sequence is approximately 250 to 490 million years old and has been exposed to a multitude of different environmental and geological conditions<sup>2</sup>. Additionally the site consists of the Mapumulo Metamorphic Suite Granite and its related subsoils in the easternmost section of the proposed pipeline route.

The vegetation of the proposed development area falls within the KwaZulu-Natal Coastal Belt (CB 3) which is classified as endangered, with approximately 50% of the original extent having already been transformed and the KwaZulu-Natal Sandstone Sourveld (SVs 5) which is characterised by short, species-rich grassland with scattered low shrubs and geoxylic suffrutices<sup>3</sup>. The grassland areas are disturbed to some extent and are considered to be of medium sensitivity. The forest areas are largely intact and consistent with the natural vegetation type in these areas. Some of the forest vegetation is situated on very steep slopes making it susceptible to erosion. These areas are considered to be of medium to high sensitivity. The Eucalyptus plantations are dominated by invasive alien species (IAP). A portion of the pipe route falls within the Durban Metropolitan Open Space System (D'MOSS) and an approval has been solicited from the relevant department for provisions to allow the project to continue. The D'MOSS is a system of open spaces incorporating areas of high biodiversity value composed of a variety of habitat types linked together in an ecologically viable network<sup>4</sup>.

The proposed development falls within a built-up area that is dominated by formal and informal housing. Pockets of vegetation exist with open hilly fields, which are dominated by alien and indigenous vegetation. There are various roads that provide access to properties in and around the area.

The EIA as an environmental management tool attempts to contribute to sustainable development, by taking into consideration the potential environmental and socio-economic

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<sup>1</sup> Ethekwini Municipality, Integrated Development Plan Review, 2020/2021.

<sup>2</sup> Report To Ethekwini Municipality Water And Sanitation On The Results Of A Geotechnical Investigation For The Proposed Pipeline From Ofudu To Inwabi Reservoirs, 2021.

<sup>3</sup> Vegetation impact assessment: proposed pipeline along road d1011, Ethekwini municipality, KwaZulu-Natal.

<sup>4</sup> Durban: State of Biodiversity Report 2018/2019.

impacts of an activity during the decision-making process<sup>5</sup>. The universal developmental goal is creating a better and just life for society and advocate for collaborative partnership in order to alleviate all humanity from poverty traps and various socio-economic ills whilst ensuring environmental sustainability.

The socio-economic impacts of the proposed project contain significant impacts. The negatives are limited and are outweighed by the benefits of the proposed pipeline project. The negatives directly affect the community during the construction phase as it will affect access to drive-ins, partial road disturbance and pedestrian walkways as the pipeline is being trenched, laid and back-filled. There will be employment opportunities associated with the project. However, they will be short-term as they will be directly linked to the construction phase of the project duration.

The benefits associated with the proposed project include job creation, stimulation of the informal economy (through purchasing from traders in and around Zwelibomvu) and the improvement in the provision of service delivery. At the end of construction, the project will result in an overall benefit for the community and with limited environmental impacts.

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<sup>5</sup> Ethekewini Municipality, Integrated Development Plan Review, 2020/2021.

## 5 SPECIALIST STUDIES

### 5.1 GEOTECHNICAL STUDY

Davies Lynn and Partners (Pty) Ltd (DLP) were appointed by eThekweni Municipality Water and Sanitation to undertake a geotechnical investigation for the proposed new 9.2km 300mm diameter continuously welded steel pipeline from Ofudu to Inwabi Reservoirs. A site reconnaissance was undertaken from the 26th to 28th July 2021. The report is attached in the annexures as well as the details of the specialist.

#### 5.1.1 GEOTECHNICAL RECOMMENDATIONS

The Inspection Pits excavated along the pipeline route by Hand and extended to 2.5m by Hand Auger encountered materials that are predominantly classified as Intermediate to Hard excavation (Ie to He) in terms of SANS 1200D, within a depth range of approximately 0.0m up to 2.4m below existing ground levels (approximately 80% of the proposed route alignment will encounter Intermediate to Hard excavations within a depth 2.5m below existing ground levels). However, Soft Excavation (Se) to a depth of at least approximately 1.5m below existing ground levels is anticipated for approximately 50% of the proposed pipeline route.

In general, it has been noted that the site is predominantly dominated by relatively shallow bedrock conditions with a relatively thin overlying soil profile (approximately 80% of the proposed pipeline route). The bedrock generally consists of siltstones and fine to medium-grained sandstones (western and central sections) and massive granites (eastern sections) indicative of intermediate to hard excavation classes (Ie to He) for the majority percentage of the route.

Significant portions of the route comprise relatively shallow colluvial and residual soils overlying weathered very soft to hard bedrock and/or large boulders in the areas underlain by sandstone bedrock. In these locations hard excavation class is anticipated below approximately 0.0m to 2.4m depth. Along portions of the route where loose sandy soils and / or potentially unstable boulder horizons are encountered to depths of 1.5m and greater, trench sidewalls may require to be shored or battered back to 1 vertical in 1½ horizontal to maintain stability of the sidewalls during excavation.

Additionally, soil samples taken from IP1, IP6 and IP10 (SS1, SS4 and SS5) indicate that the existing colluvial material in these areas is most suitable for re-use as general backfill. If the quantity of colluvial material proves to be insufficient for re-use as general backfill along the entire pipeline route, it is recommended that suitable granular material for use as “bedding” material be sourced from recognized local quarries.

The founding materials should comprise undisturbed in-situ materials. All fill material must therefore be removed from the base of the excavations. The bottom of the excavation should always be free from standing water. Where this is not possible, it will be necessary to stabilize the trench bottom and to avoid disturbance and further softening of the founding materials. This may be achieved by placing suitable granular material, crushed stone, and crusher run or concrete on the excavation base immediately excavation has been completed. Where

compressible subsoils are encountered, it is recommended that the depth of the excavation be increased below the particular unsuitable founding horizon to a level where competent soils and/or bedrock occur subject to approval by the Engineer. A requirement for founding of the thrust and anchor blocks is to ensure excavations are taken through all disturbed materials and creep zones to key adequately (150 to 200mm) into competent weathered bedrock.

It is likely that unsuitable materials will be encountered at various points along the pipeline route as confirmed by the laboratory results. These are most likely to comprise deeply weathered, residual Sandstone and Granite materials characterized by variable proportions of particularly soft, incompetent materials (including unforeseen organic and fill materials at isolated locations). If such materials are encountered at trench level, the unsuitable materials should be removed and replaced with 19mm stone, wrapped on all sides with geofabric. A bedding cradle should be emplaced evenly on top of the 19mm stone on which would rest the pipe surrounded by its bedding blanket.

Although no surface / near surface water was encountered along the pipeline route, at the time of the geotechnical investigation, should trench excavations intercept subsurface water, or crosses valley axes, etc. pipes should be installed as cross-drains beneath the excavation to divert any natural active drainage line. Temporary cut-off ditches or stone-filled drains could be efficiently constructed in these areas. Alternatively, where this is not possible, pumping operations from a local sump will be required.

All construction activities need to be carried out in accordance with SANS 1200. Allowance should be made for suitable dewatering of excavations to engineers' detail in areas where there is a high risk of frequent soil saturation. Special measures are to be considered necessary at any proposed drainage course crossing and road crossings.

## 5.2 VEGETATION ASSESSMENT

The proposed project involves the clearing of vegetation to make way for trenches that will contain the pipeline for the sewer reticulation. A vegetation impact assessment was crucial for the proposed project. A field visit was conducted on the 6<sup>th</sup> of August 2020 to ground-truth the proposed construction footprint and confirm the present vegetation assemblages which exist within this area. The report is attached in the annexures as well as the specialist details.

### 5.2.1 VEGETATION ASSESSMENT RECOMMENDATIONS

The study area was considered highly modified and transformed to such an extent whereby little to no natural vegetation exists within the study area (with exception of gardens and roadsides). The proposed development area falls within one (1) vegetation unit, namely KwaZulu-Natal Coastal Belt (CB 3) which is classified as endangered, with approximately 50% of the original extent having already been transformed. Based on the outcome of this assessment, there are no evident fatal flaws that would prevent this development from being authorised, nor being conducted in a sustainable manner.

However, if any protected plant species are found during the construction phase of the development, they must first be protected and the correct procedure followed. Should

destruction / removal be an unavoidable option, then the prescribed process must be followed. All areas earmarked to be cleared, must be adequately staked and inspected by the ECO to ensure that no vegetation has been overlooked. Unnecessary vegetation clearance must be prohibited and indigenous vegetation must remain intact where and for as long as possible (erosion reduction, maintain habitat and surface roughness). It is recommended that the pipeline route is installed along previous disturbed routes and pathways where practically possible. The Installation of the pipeline within close proximity to the watercourse should be done using labour intensive methodology where practically possible as opposed to large plant (excavators and TLBs) to limit the construction footprint within the any watercourse system. Furthermore, where practically possible the design engineer should investigate horizontal drilling and/or the use of a pipeline pier when crossing any watercourse.

The identified impacts on the specialist studies summarised above, will be incorporated into the Environmental Management Programme (EMPr) and assigned mitigation measures and responsible personnel. The EMPr will assist the Environmental Control Officer (ECO) to effectively identify and execute mitigation measures against any pre-determined impact, as well as in cases of emergencies.

## 6 IMPACT ASSESSMENT

The socio-economic, bio-physical and relevant significant factors have been accounted for above, including the associated impacts for the proposed Ofudu to Inwabi steel main, Ward 100 of eThekweni Municipality. An integrated approach has been assumed in determining the environmental impacts associated with the project. Mitigation measures will be allocated to issues that are seen to have negative impacts, so as to reduce the intensity of the identified impacts to a considerable threshold for the environment and the development alike. Alternatives will be explored in cases where no mitigation assists in reducing the associated impacts to considerable measures, be it in the planning, design or implementation stages. In the event of significant and catastrophic impacts, it is advised that the withdrawal of the development must be considered.

The figure below specifies the various steps taken to assess the diverse sectors that affect the proposed development. The sectors were evaluated as per the information provided above. The figure depicts the process of on-going assessments considering the feasibility of the preferred site and assuming an integrated approach, as seen below.

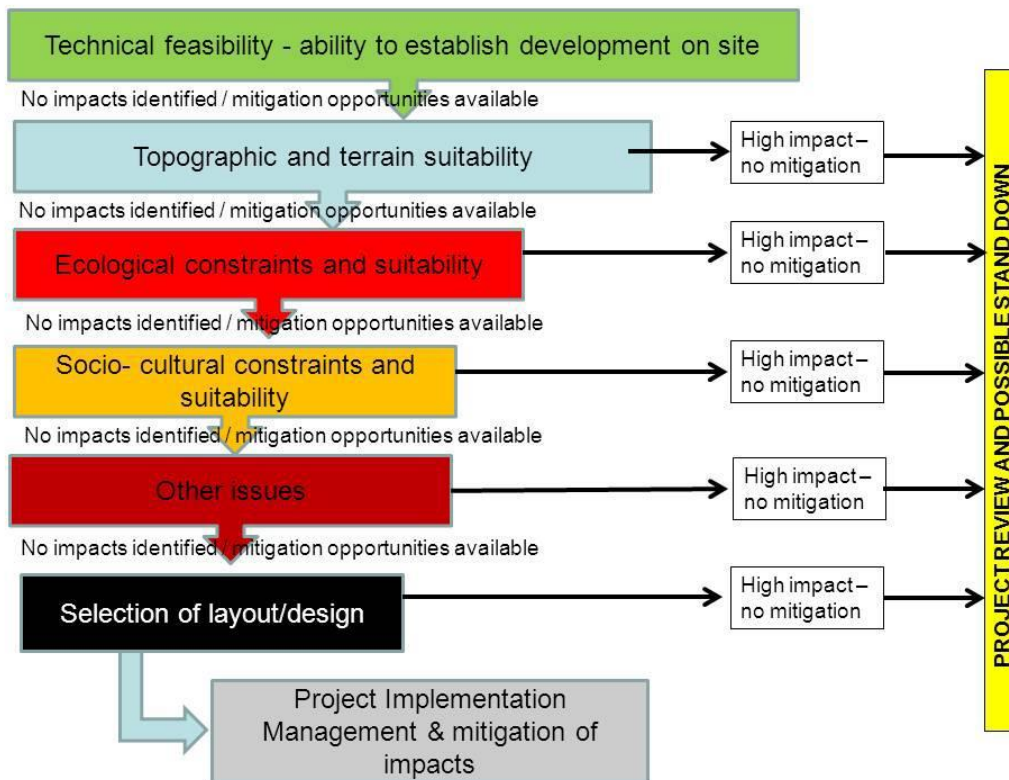


Figure 3: Integrated approach to site determination & impact assessment

## 6.1 METHODOLOGY

The assessment will adopt the Rapid Impact Assessment Method (RIAM) in compiling the impact assessment matrix. The RIAM is considered as a tool that assists in the integrated process of reaching a decision about the impact of a project. It uses a grading system that translates to a matrix that assists in decision making, using the information that has been provided by various holistic and integrated assessments. The scores of the matrix are grouped into ranges that describe the degrees of positive and negative impacts of the proposed projects. Therefore, the RIAM is best suited as a matrix and decision supporting method to assist in determining the impact of a proposed development.

The RIAM is constructed from a set of defined environmental and general impacts, which are identified as per the assessments conducted on identifying the possible impacts. The indicators are chosen as per the potential impacts. They are then categorized by components that are rated on the criteria provided on the table (6.1) below. The sum of the impact scores are further calculated to produce the Environmental Score (ES) that provides clarity on the impact and should aid the CA in concluding a decision.

Environmental Score	Impact Class	Description
+72 to +108	+E	Major positive change/impact
+36 to +71	+D	Significant positive change/impact
+19 to +35	+C	Moderately positive change/impact
+10 to +18	+B	Positive change/impact
+1 to +9	+A	Slightly positive change/impact
0	N	No change/status quo/not applicable
-1 to -9	-A	Slightly negative change/impact
-10 to -18	-B	Negative change/impact
-19 to -35	-C	Moderately negative change/impact
-36 to -71	-D	Significant negative change/impact
-72 to -108	-E	Major negative change/impact

Table 6: The table depicts the scores and associated impacts.

The formula for RIAM is:

$$\begin{aligned} (A1) \times (A2) &= (AT) \\ (B1) + (B2) + (B3) &= (BT) \\ (AT) \times (BT) &= (ES) \end{aligned}$$



The formula to calculate the score is as follows:

Evaluation Criteria	Scores	Description
A1- Importance of impact & effect	4	Important to national/international interests
	3	Important regionally
	2	Important to areas immediately outside the local context
	1	Important only in the local context
	0	No geographical or other recognized importance
A2- Magnitude of change and effect	+3	Major positive benefit
	+2	Significant improvement in status quo
	+1	Improvement in status quo
	0	No change in status quo
	-1	Negative change to status quo
	-2	Significant negative disadvantage or change
	-3	Major disadvantage or change
B1 - Permanence of the impact-causing activity	3	Permanent: The project or activity causing impact is meant to be a permanent one.
	2	Temporary: The project or activity causing impact is temporal.
	1	No change applicable.
B2 - Reversibility of impact	3	Irreversible impact: The impact is irreversible, if the original state is not restored after the activity is finished. Such activity has changed the environment permanently or for a long period of time. Such as roads and buildings
	2	Reversible impact: The impact is reversible, if the original state will be restored after the activity is finished. Such as nature trails and camping.
	1	Not applicable: Targeting the impact is impossible.
B3 - Accumulation of impact	3	Impact is cumulative or synergistic. The project or activity probable has combined impact with other projects or activities in the same area. Examples are noise pollution, air pollution and wastewater emissions.
	2	Impact is non-cumulative
	1	No change/not applicable

Table 7: The table depicts the associated components and the scores.

## 6.2 IDENTIFIED IMPACTS

The preferred site is the establishment of a 9km Ofudu to Inwabi steel main in Zwelibomvu. The site is considered favourable given that it will service a community in need. Furthermore, it will be within the road reserve. The anticipated social and environmental disturbances are extremely minimal given the nature of the project.

Construction impacts of the proposed pipeline are therefore the focus of assessment. These include:

- ✚ Waste management;
- ✚ traffic;
- ✚ Air quality and noise;
- ✚ Surface water quality and quantity;
- ✚ Vegetation;
- ✚ Soil;
- ✚ Visual;
- ✚ Socio-economic; and
- ✚ Health, safety and security impacts.

IMPACT	DESCRIPTION	MITIGATION
<p><b>WASTE MANAGEMENT</b></p>	<ul style="list-style-type: none"> <li>✚ Accumulation of construction rubble and litter at the site during construction activity;</li> <li>✚ Solid waste will be generated by construction activities and may include: <ul style="list-style-type: none"> <li>– Solid waste - plastics, metal, wood, concrete, stone, asphalt;</li> <li>– Chemical waste- petrochemicals, resins and paints; concrete washout; and</li> <li>– Sewage as may be generated by employees.</li> </ul> </li> </ul> <p>If not properly managed and contained, these items may accumulate on site and blown into the surrounding tributaries where they will cause pollution.</p> <ul style="list-style-type: none"> <li>✚ Contaminated waste may result from accidental spillage of fuels, oil, cement, cement-laden water, paints and other chemicals. This will be transported as contaminated runoff into the surrounding streams or occur via seepage, which pollutes the soil and groundwater.</li> </ul>	<ul style="list-style-type: none"> <li>✚ No litter, refuse, waste, rubbish, rubble, debris and builders waste generated on site may be placed, dumped or deposited on adjacent or surrounding properties including roads, verges, pedestrian walkways etc.;</li> <li>✚ All solid waste generated on-site during the construction processes must be placed in a designated waste collection area within the construction camp and must not be allowed to blow around the site or placed in piles adjacent the waste skips/bins;</li> <li>✚ All construction/solid waste shall be disposed off-site at a registered landfill site. Safe disposal certificates must be obtained and kept on site for the duration of the construction phase;</li> <li>✚ Separate waste skips/bins for the different waste must be available;</li> <li>✚ Regular surveys of the four streams within the site must be undertaken and any accumulation of waste removed and disposed of at an appropriate disposal facility;</li> <li>✚ All hazardous waste must be carefully stored in appropriate hazardous waste receptacles and disposed of offsite at the licenced hazardous landfill site;</li> <li>✚ Any significant spills on-site must be reported to the relevant Authority (e.g. EDTEA, Department of Water and Sanitation and eThekweni Municipality etc.) and must be remediated immediately, in accordance with the Environmental Management Programme (EMPr);</li> <li>✚ Refuse bins are to be provided throughout the construction footprint;</li> <li>✚ Adequate sanitary and ablution facilities must be provided for construction workers. These facilities are to be cleaned regularly to prevent public nuisance. Workers are to be encouraged to use these facilities. All sanitary facilities are to be placed outside of 32m of the watercourse or outside of the 1/100 year floodline;</li> <li>✚ Spill kits must be made available for use wherever necessary; and</li> <li>✚ On completion of the project, the appointed contractor shall ensure that all waste rubble generated during construction is removed.</li> </ul>

IMPACT	DESCRIPTION	MITIGATION
<b>TRAFFIC</b>	<ul style="list-style-type: none"> <li>✚ Increase in number of construction vehicles in the area;</li> <li>✚ Possible traffic delays and congestion during construction;</li> <li>✚ Possible temporary closure of driveways to properties;</li> <li>✚ Damage to residents driveways during the placing of the pipeline;</li> <li>✚ If not properly maintained, increased road use, incorrect parking etc. may cause damage to the existing infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>✚ Complete construction activities along the roads in the shortest possible time;</li> <li>✚ The Contractor is to provide a Traffic Management Method Statement clarifying how traffic will be managed;</li> <li>✚ Employ flag personnel to regulate the traffic;</li> <li>✚ Residents will be notified by the Applicant of the potential impacts to their driveways when the design drawings have been finalised and when the construction contract is going to tender;</li> <li>✚ The owners of the driveways will be notified prior to the digging of their driveways and the reinstatement will be done soonest after completion;</li> <li>✚ Ongoing and timeous consultation with home owners regarding the possible loss of access to driveways;</li> <li>✚ Implement appropriate traffic control measures to alleviate traffic congestion;</li> <li>✚ Suitable construction sign boards must be clearly displayed in areas affected by the proposed project; and</li> <li>✚ Only designated areas are to be utilised for loading/unloading/turning.</li> </ul>
<b>AIR QUALITY &amp; NOISE POLLUTION</b>	<ul style="list-style-type: none"> <li>✚ Air quality impacts from construction vehicle emissions; and</li> <li>✚ Noise impacts from construction activities: <ul style="list-style-type: none"> <li>– May present a nuisance to residents.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>✚ All construction machinery and vehicles are to be maintained in good working order to prevent air quality and noise nuisance impacts;</li> <li>✚ The appointed Contractor shall be familiar with and adhere to any local by-laws and regulations regarding the generation of noise and hours of operation. The contractor shall avoid construction activities outside of normal working hours;</li> <li>✚ No sound amplification equipment such as sirens, loud hooters are to be used on site except in emergencies and no amplified music is permitted on site; and</li> <li>✚ A complaints register is to be kept at the construction site to record all complaints received from the community.</li> </ul>

IMPACT	DESCRIPTION	MITIGATION
<p><b>SURFACE WATER QUALITY</b></p>	<p>✚ Construction activities which might contaminate watercourses within the area:</p> <ul style="list-style-type: none"> <li>• Contamination of the watercourses from hazardous building material (e.g. hydrocarbons). Improper management of hazardous building materials may result in the pollution of the watercourses through surface and subsurface drainage.</li> <li>• Lack of ablution facilities for construction workers. Pollution of the watercourses through surface and subsurface drainage.</li> </ul> <p>✚ Contamination of the streams by runoff is to be avoided at all costs.</p>	<ul style="list-style-type: none"> <li>✚ The site must be managed in a manner that prevents pollution of stormwater resulting from suspended solids, silt or chemical pollutants;</li> <li>✚ Provision of adequate sanitation facilities;</li> <li>✚ Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and working areas;</li> <li>✚ Potential hazardous substance must be stored on an impervious surface in a designated secure area, able to accommodate 110% of the total volume of material stored at any given time;</li> <li>✚ Training of on-site personnel regarding the correct handling of spills should be done, as well as precautionary measures that need to be implemented to minimise potential spillages;</li> <li>✚ Any contaminated water associated with construction activities must be captured and contained in waterproof drums or similar and disposed of appropriately;</li> <li>✚ The contractor is to exercise strict care in the disposal of construction waste; proof of disposal at an approved site must be provided after offloading each waste load;</li> <li>✚ Refuse and litter is to be removed from the site continuously;</li> <li>✚ On completion of the project, the appointed contractor must ensure that all structures, equipment, materials, waste, rubble used during construction are removed from site;</li> <li>✚ Concrete mixing is to take place on an impermeable surface;</li> <li>✚ No mixing of concrete shall take place within the watercourses;</li> <li>✚ No equipment / plant used for concrete mixing is to be washed on site / within the watercourses;</li> <li>✚ All concrete spills must be collected from site and disposed of in accordance with the EMPr;</li> <li>✚ A post-construction monitoring programme must be set in place and must include the following: <ul style="list-style-type: none"> <li>▪ Rehabilitation of the pipeline trenches</li> <li>▪ Rehabilitation of the working servitude</li> <li>▪ Soil erosion</li> <li>▪ Alien weed invasion</li> <li>▪ Leaks from the new pipeline</li> </ul> </li> </ul>

IMPACT	DESCRIPTION	MITIGATION
VISUAL	<ul style="list-style-type: none"> <li>✚ Construction activity;</li> <li>✚ Increase in littering on site from labour force and construction activities; and</li> <li>✚ The presence of heavy duty vehicles, equipment, and temporary structures on site and material stockpiles may result in temporary impacts on the general aesthetic and landscape character of the area.</li> </ul>	<ul style="list-style-type: none"> <li>✚ Storage areas should be properly fenced off;</li> <li>✚ Provide waste disposal facilities and enforce the collection of litter;</li> <li>✚ Monitor housekeeping, littering and illegal dumping; and</li> <li>✚ Construction impacts will be short term.</li> </ul>
SOIL	<ul style="list-style-type: none"> <li>✚ Hydrocarbon spillages onto soil from construction vehicles; and</li> <li>✚ Should a large storm event occur during the construction phase, improperly managed storm water may scour the banks and deposit potential pollution loads into the watercourses;</li> <li>✚ Potential disturbances include compaction, physical removal and potential pollution;</li> <li>✚ The exposed soil surfaces have the potential to erode easily if left uncovered which could lead to the loss of vegetation and additional loss of soil and soil quality;</li> <li>✚ Potential loss of stockpiled topsoil and other materials if not protected properly;</li> <li>✚ Physical disturbance of the soil and removal of flora may result in soil erosion/loss; and</li> <li>✚ Erosion and potential soil loss from cut and fill activities.</li> </ul>	<ul style="list-style-type: none"> <li>✚ The extent of earth works must be minimised and restricted to the required areas only. Flora may not be removed, damaged or destroyed unless necessary for carrying out the works;</li> <li>✚ Should any remain, then vegetation and topsoil is to be cleared where site camp is proposed and utilised post construction for rehabilitation purposes;</li> <li>✚ No material is to be stored beyond the boundaries of the site camp;</li> <li>✚ All invasive species identified within the study area should be removed from the development footprint;</li> <li>✚ Disturbed areas must be immediately rehabilitated to prevent erosion;</li> <li>✚ Bank slopes must be graded to the lowest possible angle and must be well below the slip angle of the soil at the site;</li> <li>✚ Banks must be planted with indigenous grasses and the following mix is suggested: <ul style="list-style-type: none"> <li>▪ Kweek grass: <i>Cynodon dactylon</i></li> <li>▪ Buffalo Grass: <i>Stenotaphrum secundatum</i></li> <li>▪ Bahia Grass: <i>Paspalum notatum</i></li> </ul> </li> <li>✚ The above grasses are suited to the climate and are tolerant of grazing pressure from domestic livestock;</li> <li>✚ No surplus soil or other such material may be disposed of in the channels;</li> <li>✚ Where necessary use must be made of gabions, rock packs, or other such hard stabilising structures. However, the use of retaining walls constructed of bricks, blocks, or concrete, is not recommended as such structures are often ineffective and can even accelerate erosion processes in some cases;</li> <li>✚ No vehicle maintenance or refuelling of vehicles is to occur within the watercourses or within 32m of the watercourses;</li> <li>✚ Ensure that contractors and staff are well managed and adhered to the mitigation and management measures listed in the EMPr;</li> </ul>

- |  |  |   |
|--|--|---|
|  |  | <ul style="list-style-type: none"><li>✦ Any hydrocarbon spills and or polluted loads identified within the construction footprint are to be removed immediately, together with the contaminated soil / sand and disposed of in a dedicated, impermeable container;</li><li>✦ Construction vehicles are to be monitored for hydrocarbon leakages daily. Any vehicles found to be leaking are, under no circumstances, permitted to drive within 32 of the watercourse (should this be required) until repaired; and</li><li>✦ The soil excavated from the trenches must be retained, and be returned in the reverse order to which it was removed so as to re-establish the original soil profiles as best possible;</li><li>✦ Berms/silt fencing are to be installed above and below cleared areas to capture surface run-off, promote infiltration and prevent siltation of the watercourses;</li><li>✦ Existing on-site drains are to be cleared of any materials that may have accumulated within;</li><li>✦ Measures must be taken to manage stormwater on exposed areas during high intensity rainfall events;</li><li>✦ Stockpiled topsoil must be covered during times of high wind to prevent dust; and</li><li>✦ All areas impacted by earth-moving activities must be re-shaped post-construction to ensure the natural flow of runoff and to prevent ponding. All exposed earth must be rehabilitated promptly with suitable vegetation to stabilize the soil.</li></ul> |
|--|--|---|

IMPACT	DESCRIPTION	MITIGATION
VEGETATION	<ul style="list-style-type: none"> <li>✚ Impact on the remaining indigenous vegetation during construction; and</li> <li>✚ Unnecessary removal of indigenous vegetation during the construction of the sewerage reticulation pipelines.</li> </ul>	<ul style="list-style-type: none"> <li>✚ A rigorous programme of alien weed control must be implemented and sustained until the vegetation (grass) cover over the trenches is well established and complete.</li> <li>✚ Indigenous grass species suitable for the rehabilitation of the trenches are as follows: <ul style="list-style-type: none"> <li>– Kweek grass: <i>Cynodon dactylon</i></li> <li>– Buffalo Grass: <i>Stenotaphrum secundatum</i></li> <li>– Bahia Grass: <i>Paspalum notatum</i></li> </ul> </li> <li>✚ The above grasses are suitable in the coastal climate and are resistant to overgrazing by goats or other livestock.</li> <li>✚ The remaining vegetation on the site is only to be removed immediately before construction commences to reduce the period of exposure to bare soil. Where vegetation has been removed, exposed soils must be re-vegetated as soon as possible with indigenous creeping vegetation; and</li> <li>✚ Vegetation is only to be cleared where required and the extent of the disturbed area must be minimised.</li> </ul>
MATERIAL HANDLING & STORAGE	<ul style="list-style-type: none"> <li>✚ The incorrect storage and handling of hazardous materials can result in the contamination of the receiving environment; and</li> <li>✚ The incorrect stockpiling of excavated materials and construction materials can result in sedimentation of the stormwater system.</li> </ul>	<ul style="list-style-type: none"> <li>✚ Areas for temporary stockpiling of excavated and imported material and other construction material shall be agreed to by the RE and ECO;</li> <li>✚ Any hazardous or dangerous goods utilised during construction must be stored on an impermeable surface that is fenced, locked and covered;</li> <li>✚ A spill kit must available on site at all times;</li> <li>✚ Suitable fire-fighting equipment shall be stored and easily accessible at the site camp;</li> <li>✚ Drip tray shall be provided for stationery plants;</li> <li>✚ Any accidental leak / spilling of hydrocarbons is to be reported to the Residential Engineer or ECO immediately so that remediation methods can be quickly implemented.</li> </ul>



IMPACT	DESCRIPTION	MITIGATION
<b>SOCIO-ECONOMIC</b>	<ul style="list-style-type: none"> <li>✦ Creation of job opportunities for skilled personnel (e.g. engineers, specialists etc.) and non-skilled personnel (e.g. construction labourers, points men, flag bearers etc.);</li> <li>✦ Social anxiety may arise should the surrounding community not be adequately notified of the proposed activity; and</li> <li>✦ Economic benefits to local suppliers of building materials as goods and services may be purchased from these entities during the construction phase.</li> </ul>	<ul style="list-style-type: none"> <li>✦ Inform the surrounding communities and public of the proposed activity as soon as possible. This will serve to ease potential social anxiety;</li> <li>✦ Provide clear and realistic information regarding employment opportunities and other benefits to prevent unrealistic expectations;</li> <li>✦ Make use of local labour, material, goods and services as far as possible;</li> <li>✦ Training of labours to benefit individuals beyond completion of the project; and</li> <li>✦ Monitor complaints by the general public.</li> </ul>
<b>HEALTH, SAFETY AND SECURITY</b>	<ul style="list-style-type: none"> <li>✦ Construction personnel / construction vehicles – movement of construction personnel and vehicles may pose a potential health and safety risk to road users and residents; and</li> <li>✦ Theft of construction materials should sufficient security not be put in place.</li> </ul>	<ul style="list-style-type: none"> <li>✦ Excavated trenches are to remain open for as short a duration as possible;</li> <li>✦ All excavations are to be cordoned off and safety signage is to be established;</li> <li>✦ Undertake appropriate waste management practices;</li> <li>✦ Implement good housekeeping practices at the construction camp;</li> <li>✦ Construction workers / construction vehicles must take heed of normal road safety regulations, thus all personnel must obey and respect the law of the road. A courteous and respectful driving manner should be enforced and maintained so as not to cause harm to any individual;</li> <li>✦ Cordon off the construction site and construction camp. If possible, a security guard or night watchman is to be placed on site;</li> <li>✦ Care is to be taken to ensure that any bulky or dangerous materials are secured when transporting;</li> <li>✦ No fires are permitted on site. Fire extinguishers are required;</li> <li>✦ Control traffic and pedestrian movement in the vicinity of construction, should it be required; and</li> <li>✦ Implement signage, speed control and designated walkways to reduce health and safety risks.</li> </ul>

### 6.3 IMPACT MATRIX

Evaluation Criteria	A1	A2	AT	B1	B2	B3	BT	ES
<b>Bio-Physical and Geographical components</b>								
Geological substratum	3	0	0	2	2	1	5	0
Soils	3	-1	-3	2	2	1	5	-18
Morphology	3	0	0	2	2	1	5	0
Surface water	2	0	0	2	2	3	7	0
Sedimentation / siltation	1	-1	-1	2	2	3	7	-7
Compaction / subsidence	1	0	0	2	2	1	5	0
Land stability	1	-1	-1	3	3	2	8	-8
<b>Total Bio-Physical Geography ES</b>								-33

<b>Evaluation Criteria</b>	<b>A1</b>	<b>A2</b>	<b>AT</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>BT</b>	<b>ES</b>
<b>Socio-Cultural &amp; Land Use Components</b>								
Land use	1	0	0	3	3	2	8	0
Open spaces	1	-1	-1	3	3	2	8	-8
Health & Safety	4	3	12	3	3	2	8	96
Historical and archaeological sites	1	0	0	3	3	2	8	0
Aesthetics	1	1	1	3	3	2	8	8
Landscape quality	1	-1	-1	2	2	2	6	-6
<b>Total Socio-Cultural &amp; Land Use ES</b>								90

<b>Evaluation Criteria</b>	<b>A1</b>	<b>A2</b>	<b>AT</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>BT</b>	<b>ES</b>
<b>Biological &amp; Ecological Components</b>								
Grasslands	3	-1	-3	3	3	2	8	-24
Agricultural land	3	0	0	2	2	2	6	0
Flora	3	-1	-3	3	3	2	8	-24
Indigenous plant species	2	-1	-2	3	2	2	7	-14
Terrestrial Ecology	3	-1	-3	2	2	2	6	-30
Aquatic Ecology	3	0	0	3	2	2	7	0
<b>Total Biological &amp; Ecological ES</b>								<b>-92</b>

<b>Evaluation Criteria</b>	<b>A1</b>	<b>A2</b>	<b>AT</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>BT</b>	<b>ES</b>
<b>Economic &amp; Operational Components</b>								
Unemployment	1	1	1	2	2	2	6	6
Local Economic Development	3	1	3	2	2	2	6	18
Waste management	2	-1	-2	2	3	2	6	-12
Anthropogenic structures	1	1	1	3	3	2	8	8
Residential Areas	1	1	1	3	3	3	9	9
<b>Total Economic &amp; Operational ES</b>								28

## 6.4 MATRIX OUTCOMES

The outcomes of the matrix scoring have the following Environmental Score (ES):

- Biophysical & Geographical Components (-33);
- Socio-Cultural & Land Use Component (90);
- Biological & Ecological Components (-92); and
- Economic & Operational Component (28).

Therefore, the total ES is -7 and is considered as slightly negative change. The greatest impacts are associated with the biological and ecological aspect as the proposed project intends to clear more than 300 square meters of vegetation as well as alter an area of significant biodiversity considered as DMOSS. This is, however, a temporary impact, the duration of which it is anticipated to last for the construction period only and the area will be rehabilitated accordingly. In addition, should the mitigation measures included in this report and the EMPr be implemented, then this impact is anticipated to be minimal.

## 7 ENVIRONMENTAL STATEMENT

Considering that the conditions stated in the EMPr are adhered to, it is believed that the impacts associated with the proposed construction will have extremely minimal significant, adverse environmental impact on the surrounding environment.

Positive impacts associated with construction include the following:

- ✚ Improved water supply to the community of Durban, specifically the lower Zwelibomvu area;
- ✚ Provide health services to the receiving community whilst ensuring the right to a healthy environment is maintained;
- ✚ Employment opportunities and skills development for the local community; and
- ✚ Adherence to service delivery implementation by the eThekweni Municipality.

These positive impacts will be both short and long-term, and will have sustainable benefits to the community of Zwelibomvu.

In terms of negative impacts, general construction related activities pose a risk to the surrounding environment and the residents of the community. The significance ratings associated with the construction phase are significantly low provided the EMPr and requirements listed in the specialist studies are implemented. The proposal is therefore considered to be sustainable.

### 7.1 EAP RECOMMENDATIONS

The proposed development should not result in impacts on the natural or social environment that are highly detrimental, or result in undue risks to the natural environment. The nature and types of negative impacts identified do not outweigh the potential benefits of this project, provided that the localised impacts of the construction phase are adequately mitigated. Additionally, an EMPr has been compiled and is attached to this report. It is recommended that external EMPr monitoring takes place by an independent ECO during the construction phase to ensure that the requirements of the EMPr are being correctly implemented, thus ensuring the protection of the surrounding environs.

As per the requirements of the EIA Regulations 2014, GNR 326: the EAP is to provide any Conditions of Authorisation that were identified during the assessment. In this regard, the following Conditions of Authorisation are provided:

- ✚ All waste generated is to be separated and re-used or recycled where feasible. No waste is to be allowed to collect on site. General waste is to be disposed to a registered waste disposal site. Hazardous waste such as oil spillages are to be prevented through the maintenance of vehicles and use of drip trays. Refuelling is to take place over drip trays at all times and not within any watercourses;

- ✚ Should there be a need to clear/disturb a group of indigenous trees with interlocking crowns, the relevant Department should be consulted prior to any activity commencement;
- ✚ The working servitude that will no longer be used post installation of the pipeline should be vegetated using 100% indigenous species which are endemic to the area;
- ✚ Housekeeping is to be maintained, safety and warning signage is to be erected throughout the construction footprint and all excavations are to be clearly demarcated and cordoned off;
- ✚ No concrete is to be mixed in any watercourses or stormwater drains;
- ✚ After construction, reinstatement of the environment is to be implemented to the standard equal to or exceeding the present status. All indigenous vegetation is to be replaced should it be removed and regrassing is to take place at the site camp;
- ✚ Residents are to be notified timeously of the commencement of the construction phase and the impact to their property e.g. driveways;
- ✚ Reinstatement of resident's property will be completed immediately following construction;
- ✚ All of the conditions listed in the Vegetation Assessments and Geotechnical Investigation are to be implemented on site; and
- ✚ The applicant is to timeously inform the residents within the area to be affected of the proposed date of commencement of construction.

With regards to Environmental Monitoring, the following is recommended:

- ✚ An independent, external ECO must audit the construction site during the construction phase of the project on a monthly basis, unless otherwise specified by the Department of EDTEA; and
- ✚ A monthly construction Environmental Audit Report is to be drafted and submitted to the Department of EDTEA: Compliance, Monitoring and Enforcement for the duration of the construction period.

Based on the above, it is the opinion of the EAP that the Applicant be granted a positive Environmental Authorization to construct a steel gravity main from Ofudu to Inwabi Reservoir, eThekweni Metropolitan.

## 7.2 CONSTRUCTION PERIOD

It is envisaged that construction will be completed within 18 months. It is requested that the Environmental Authorization, if issued by the Competent Authority, be valid for a period of ten (10) years from the date of signature.

## 7.3 SUBMISSION & CONSIDERATION

It is to be noted that in terms of the EIA Regulations (2014), GNR 326 43(2) as amended, all State Departments that administer a law relating to a matter affecting the environment, specific to the Application, must submit comments within 30 days to the EAP as per the request of the



EAP. Should no comment be received within the 30-day commenting period, it will be assumed that the relevant State Department has no comment to provide.

All comments received in response to the draft BAR will be summarized and responded to in a final version of the BAR, which will be submitted to the Competent Authority, (EDTEA) for consideration in terms of issuing an Environmental Authorization.

## 8 PUBLIC PARTICIPATION

The PPP is an integral approach that is crucial in the impact assessment process. As identified in Figure 2.1 (BA Process), the identification of IAP associated with the project is of critical significance. A public participation report is found in the Annexures that gives the necessary details of the public participation employed in the time of compiling the impact assessment document and includes the following:

1. The identification of key and critical stakeholders that are associated with the project, which includes government departments, non- governmental organisations (NGO), civic bodies, ward councillors and other relevant personnel.
2. A Notification sheet was sent out on the 24<sup>th</sup> of May 2021 to the identified stakeholders, as part of making them aware of the proposed activities.
3. An advertisement was placed in a newspaper that covers the local municipal region and Isolezwe on the 21<sup>st</sup> of May 2021. The particulars in the advertisement included the project details, contact numbers, a call to register as part of the IAP and the company undertaking the impact assessment.
4. Ensuring the local residents were aware of the proposed project, six (6) signs of the stipulated size were placed strategically in the proximity of the proposed development site on the 26<sup>th</sup> of July 2021. They provided the project description and the processes of registering as an IAP. Furthermore, a public meeting was convened with the Councillor and the Traditional authority on the 18<sup>th</sup> of May 2021 to introduce the project and allow for comments and approvals.
5. A Background Information Document (BID) was circulated to the pre – identified IAP on the 6<sup>th</sup> of August 2021. These included the EDTEA, DoT, Amafa and eThekweni Metropolitan among others.

## 9 ANNEXURES

9.1 EAP CV & DECLARATION

9.2 21 DIGIT SURVEYOR GENERAL CODE

9.3 PRE – APPLICATION MINUTES

9.4 PUBLIC PARTICIPATION REPORT

9.5 SPECIALIST STUDIES