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DRAFT BASIC ASSESSMENT REPORT

UPGRADE OF THE NSEZI WATER TREATMENT PLANT AND THE CONSTRUCTION
OF A NEW DN1500 RAW WATER RISING MAIN

MHLATHUZE WATER

MHLATHUZE LOCAL MUNICIPALITY



EVP1378

**This report was prepared by EnviroPro Environmental Consulting in terms of
Appendix 1 to GNR 982**

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Executive Summary

Mhlathuze Water proposes to upgrade the Nsezi Water Treatment Works (WTW) within Ward 26 in the uMhlathuze Local Municipality, King Cetshwayo District Municipality, KwaZulu-Natal. The primary purpose of the Nsezi Water Treatment Plant is to provide high quality water to MONDI for the manufacture of paper and to supply various local authorities with potable water for domestic and industrial use. The plant also supplies clarified water to Mhlathuze Municipality for industrial use by Foskor for the manufacturing of phosphoric acid and fertilizer.

The plant will be upgraded from 205 ML/d to 260 MI/d potable water capacity, of which 25MI/d will be supplied to FOSKOR; the balance will be further treated by dissolved air flotation, rapid gravity filtration and disinfection to achieve an excellent water quality to satisfy the stringent requirements of MONDI for paper making and for potable water distribution.

A new 3.98km DN1500 pipe line is also being proposed. This pipeline will be used to increase the volume of raw water being pumped to the Nsezi WTW, which is vital if the plants potable water capacity is to increase. The pipeline will run from the Shooting Range Pump Station to Nsezi WTW along the existing cleared servitude adjacent to the existing DN1200 pipeline on land owned by uMhlathuze Local Municipality. The upgrade of the WTW will require the construction of 18 317.44 m² of new facilities within the WTW but as this entire area has been classified as transformed by the biodiversity specialist, there will be no clearance of indigenous vegetation. Therefore, only the DN1500 pipeline will require Environmental Authorisation through a Basic Assessment for the following reasons:

- The construction of a 3.98 km long bulk raw water pipeline with a diameter of 1.5m (Listing Notice 1, Activity 9).
- The clearance of 56 687m² indigenous vegetation for the DN1500 pipeline construction within Kwambonambi Hygrophilous Grassland ecosystem type and on land zoned as conservation according to the City of uMhlathuze town-planning scheme; please refer to Section 2 for more detail as to the site's biodiversity characteristics (Listing Notice 3, Activity 12).
- Infilling and removal of 1 567m³ of material within the three identified watercourses on site (WC1, WC2 and WC3); please refer to Section 2 for more detail as to the site's water resources (Listing Notice 1, Activity 9).
- Construction of 1 891m² infrastructure within 32m of the identified watercourses on site which also includes land zoned for conservation; please refer to Section 2 for more detail as to the site's water resources and to Figure 3 (Listing Notice 1, Activity 9).

The following key impacts and mitigation measures have been assessed:

- **Clearance of vegetation within the construction footprint**
This site is located partially within the endangered Kwambonambi Hygrophilous Grasslands ecosystem type. Clearance of vegetation within the ecosystem is unavoidable as a 24m working corridor is required for the installation of the DN1500 pipeline. The significance of these impacts can be reduced if all mitigation measures are implemented. The key mitigation identified is to restrict construction only to the working corridor, implementing an extensive Invasive Alien Plant Programme and undertaking a progressive rehabilitation plan.
- **Damage to the wetlands and watercourses at RC1, RC2 and RC3 from the construction activities**
The DN1500 pipeline route is required to cross a number of identified watercourses and wetlands and as such, this impact is unavoidable. The significance of these impacts can be reduced if all mitigation measures are implemented. The key mitigation measure identified is to restrict construction only to the working corridor, adhere to the recommended 15m buffer and ensure that only activities are necessary take place within the watercourses.
- **Encroachment of alien vegetation into areas disturbed during the upgrade**
Alien vegetation must not be allowed to encroach onto the site and must be continually removed during construction. Construction must not promote further alien plant disturbances in the surrounding area. An extensive Invasive Alien Plant Programme must be implemented and followed during the lifecycle of the project.
- **Improved access and connectivity**
The construction of DN1500 will ultimately increase the potable water supply in the region.

These impacts can be mitigated by following the recommendations in this report. EMPr. Construction activities will be monitored and controlled through the implementation of the Environmental Management Programme (EMPr).

No additional site alternatives were considered as the preferred site for the new DN1500 pipeline will fall within the existing cleared servitude that has been previously cut and is already highly transformed and degraded from its original state. Cutting a new alignment between the shooting range and Nsezi WTW would result in the complete transformation of previously undisturbed areas as a new servitude would need to be created. Two design alternatives have been considered; the preferred Design Alternative is to bury the pipeline below natural ground level with a minimum cover of 1.3m. This alternative will include the encasement of the pipeline with a 300mm concrete layer below the two major watercourses. This Design Alternative will have a larger construction impact on the watercourses compared to Design Alternative 2 (construct pipe bridges) in terms of construction work in the bed and banks, but will have less impact in the long term, post construction. Please note this design alternative is the current methodology employed by the applicant with the existing DN1200 pipeline which runs along the cleared servitude.

Taking into consideration the above impacts and mitigation measures, it is the EAP's opinion that there are no significant environmental impacts associated with the proposal which cannot be mitigated. Therefore, it is recommended that the preferred site and Design Alternative 1 be authorised for the construction of the DN1500 pipeline.

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Section 1: Scope of Work and Location of Activity

1.1 Project Title

Upgrade of the Nsezi Water Treatment Plant and the construction of a new DN1500 raw water rising main.

1.2 A Description of the Activities to Be Undertaken Including Associated Structures and Infrastructure As per Section 3(d) (ii)

Mhlathuze Water proposes to upgrade the Nsezi Water Treatment Works (WTW) within Ward 26 in the uMhlathuze Local Municipality, King Cetshwayo District Municipality, KwaZulu-Natal (Figure 1 - 6). The primary purpose of the Nsezi Water Treatment Plant is to provide high quality water to MONDI for the manufacture of paper and to supply various local authorities with potable water for domestic and industrial use. The plant also supplies clarified water to Mhlathuze Municipality for industrial use by Foskor for the manufacturing of phosphoric acid and fertilizer.

A new 3.98km DN1500 pipe line is also being proposed to improve potable water supply in the region. The pipeline will run from the Shooting Range Pump Station to Nsezi WTW and will follow the existing cleared servitude adjacent to the existing DN1200 pipeline on land owned by uMhlathuze Local Municipality.

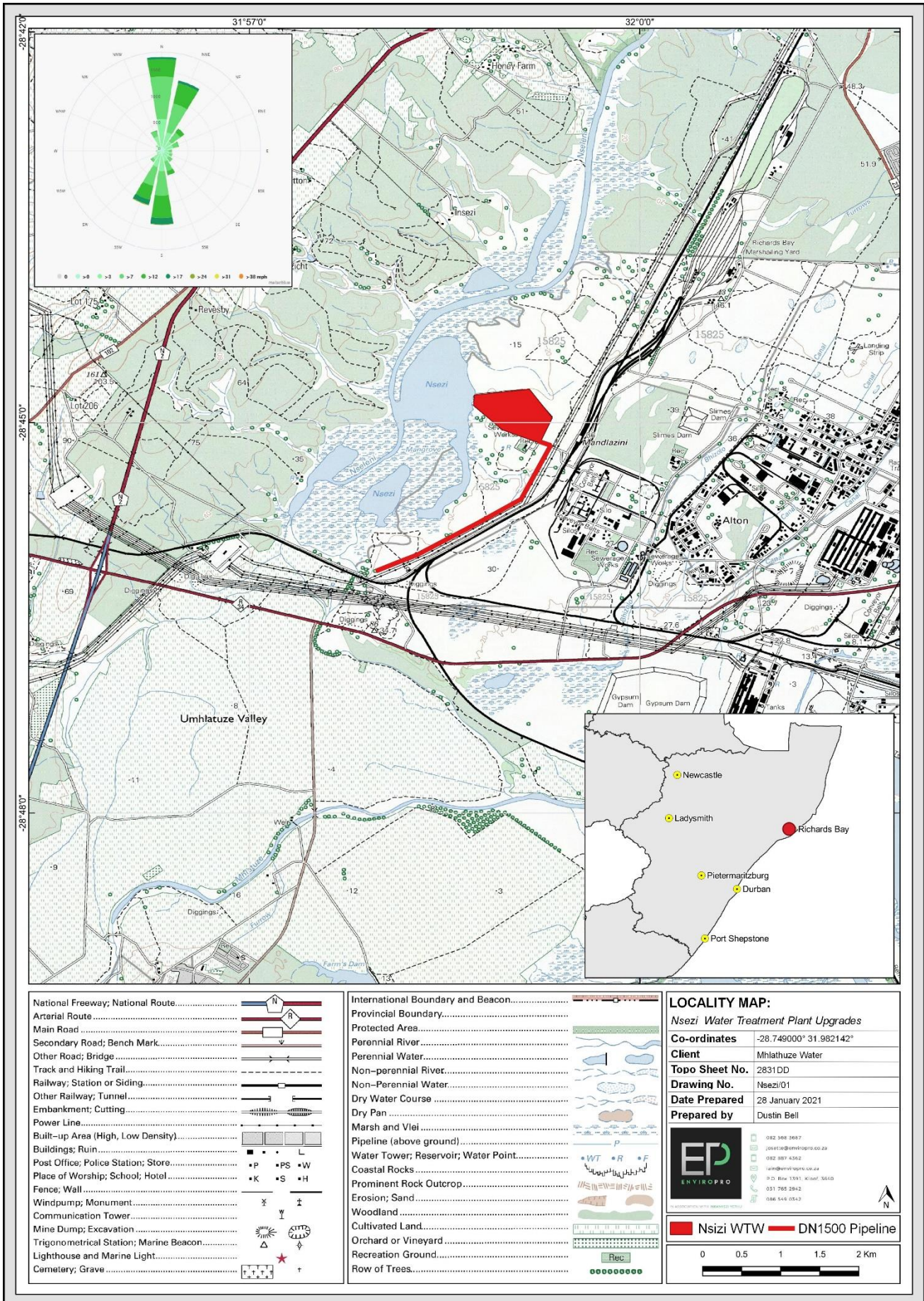
1.2.1 Water Treatment Works

The plant itself will be upgraded to 260 Ml/d potable water capacity, of which 25Ml/d will be supplied to FOSKOR; the balance will be further treated by dissolved air flotation, rapid gravity filtration and disinfection to achieve an excellent water quality to satisfy the stringent requirements of MONDI for paper making and for potable water distribution.

The Nsezi Water Treatment Works (WTW; 28°44'56.40"S 31°58'55.71"E) currently receives raw water from the existing Mhlathuze Weir Pump Station, situated on the Mhlathuze River via the Shooting Range Pump Station (28°46'7.21"S 31°57'55.59"E). This Mhlathuze Weir Pump Station also has the potential to deliver raw water to Lake Nsezi, which acts as a buffer storage for the Nsezi WTW by means of the lake pump station Nsezi WTW boundary. The existing Nsezi WTW boundary encompasses an area of 76 982.22m² (76.98ha). The remaining area is characterised by open space.

The Nsezi WTW will be upgraded in order to increase its potable water capacity from 205 megalitres per day to 260 megalitres per day; of which 25Ml/d will be supplied to FOSKOR. The balance will be further treated by dissolved air flotation, rapid gravity filtration and disinfection to achieve an excellent water quality to satisfy the stringent requirements of MONDI for paper making and for potable water distribution. Please refer to Figure 3 and Appendix A for the site layout.

Figure 1: 1:50 000 Map Indicating the Location of the Site



The upgrade of the WTW has been separated into 2 phases: Part A - Essential Works and Part B – Ancillary Works. Works associated with Part A are urgent and will commence upon receipt of the relevant approvals while works associated with Part B will only take place at a later stage. Table 1 provides details as to the relevant works associated with each phase.

Table 1: Proposed Works Associated with the Nsezi WTW Upgrade

Scope of Works	Area
Part A - Essential Works	
Upgraded to the Inlet Tower	12.90 m ²
Two new 48m Diameter Clariflocculators	4013.48 m ²
Four new Rapid Gravity Filters	962.20 m ²
New Dissolved Air Flotation	1431.50 m ²
A new two megalitre Backwash Recovery Tank	533.74 m ²
A new Sand Trap	233.31m ²
A new Loading Bay	285.90 m ²
Part B – Ancillary Works	
A new Chlorine Building and Scrubber	503.84 m ²
A new Chemical Building	1651.54 m ²
A new 3 megalitre Chlorine Contact Tank	856.67 m ²
Improvements to the Existing Works	N/A
Upgrade to the Lake Pump Station	N/A
Roads and Pipework to Service both Part A and Part B	
Interconnecting Pipework connecting new facility	2774.47 m ²
Internal Roads providing access to facilities	5057.90 m ²
Total Area of New Facilities	
	18317.44 m ²

The upgrade of the WTW will require the construction of 18 317.44 m² of new facilities within the WTW but as this entire area has been classified as transformed by the biodiversity specialist, there will be no clearance of indigenous vegetation; please refer to Section 2 for more detail as to the site's biodiversity characteristics.

Figure 3 provides a graphical representation of the process flow associated with the existing and upgraded WTW. All residue produced from the clarifiers and DAFs will continue to be handled as per the status quo. Currently all residue is pumped to the permitted Alkanstrand Outfall via the existing residue collection chamber. The Alkanstrand Outfall has been approved by the then Department of Environmental Affairs (DEA) with reference number 2012/002/KZN/MHLATHUZE WATER in 2017. Please refer to Appendix B for the full permit.

A number of dangerous goods are used in the treatment process at the WTW. As part of Part A - Essential Works - there will not be any changes to the volumes of the existing chemical storage on site. However, Part B – Ancillary Works - will result in an increase in the storage of dangerous goods. The following changes to the storage of dangerous goods include:

- Converting from 1 ton chlorine cylinders to 12-ton ISO-tankers
- Removal of the sodium hypochlorite dosage system
- Minor modifications to the existing chemical systems
- Addition of a Potassium Permanganate dosage system and
- Addition of a powdered activate Carbon system.

Table 2 below provides details as to the nature and volumes of dangerous goods proposed; please note that dangerous goods storage will only be increased by 70m³ i.e., less than 80m³, and will therefore not require EA.

Table 2: Proposed Works Associated With The Nsezi WTW Upgrade

Chemical Storage			
Description	Hazardous	Existing Storage Volumes	Additional New Storage Volumes
Coagulant 1	Yes	45 m ³	15 m ³
Coagulant 2	Yes	380 m ³	-
Coagulant 3	Yes	45 m ³	-
Disinfectant	Yes	20 m ³	-
pH Correction	Yes	210 m ³	-
Booster Disinfectant	Yes	60 m ³	-
Oxidant	Yes	-	20 m ³
Absorbent	Yes	-	35 m ³
	Grand Total	760 m³	70 m³

Figure 2: Aerial Photograph Showing An Overview Of Nsezi WTW Upgrades Inside and Outside of the Existing WTW Boundary.

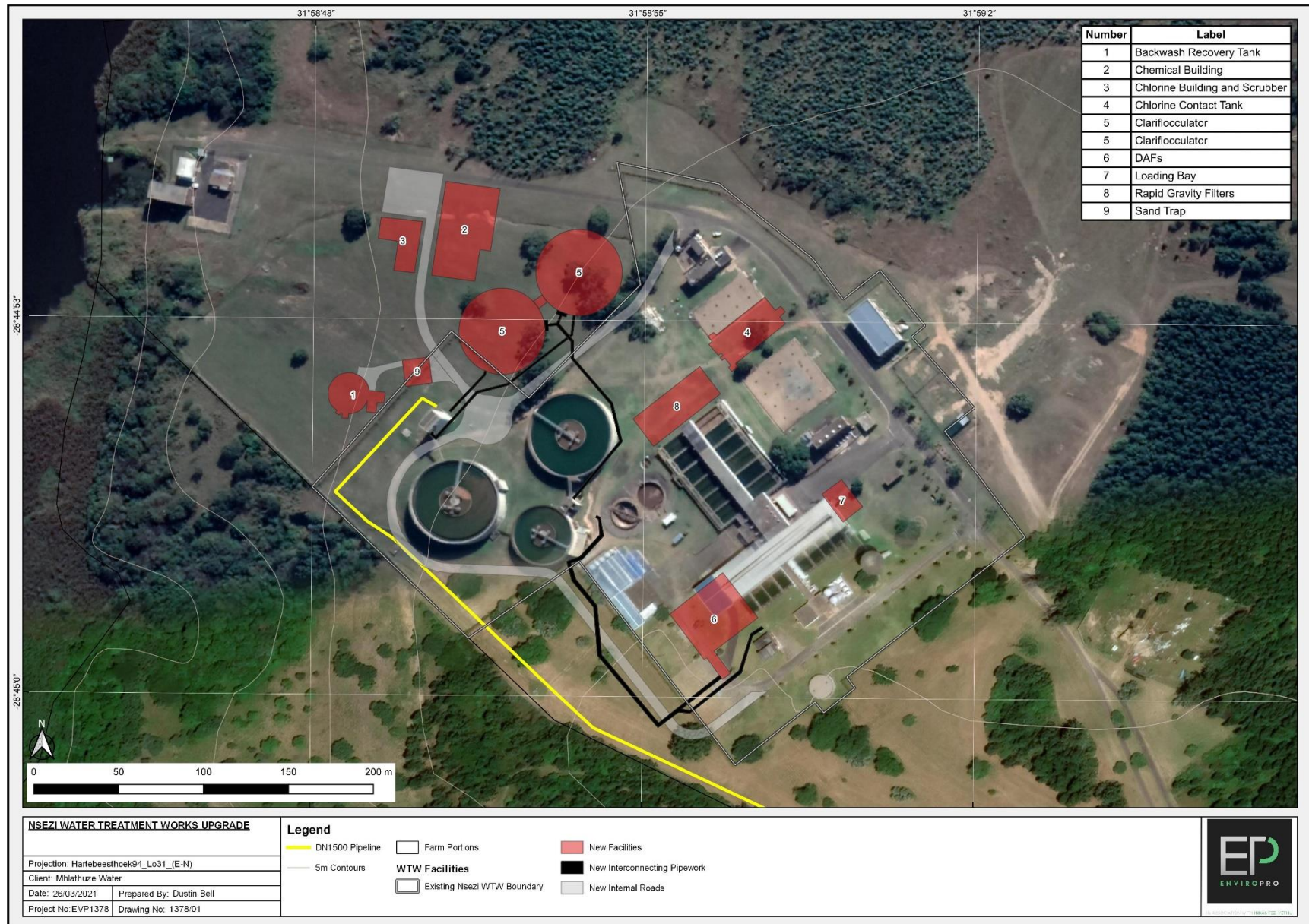
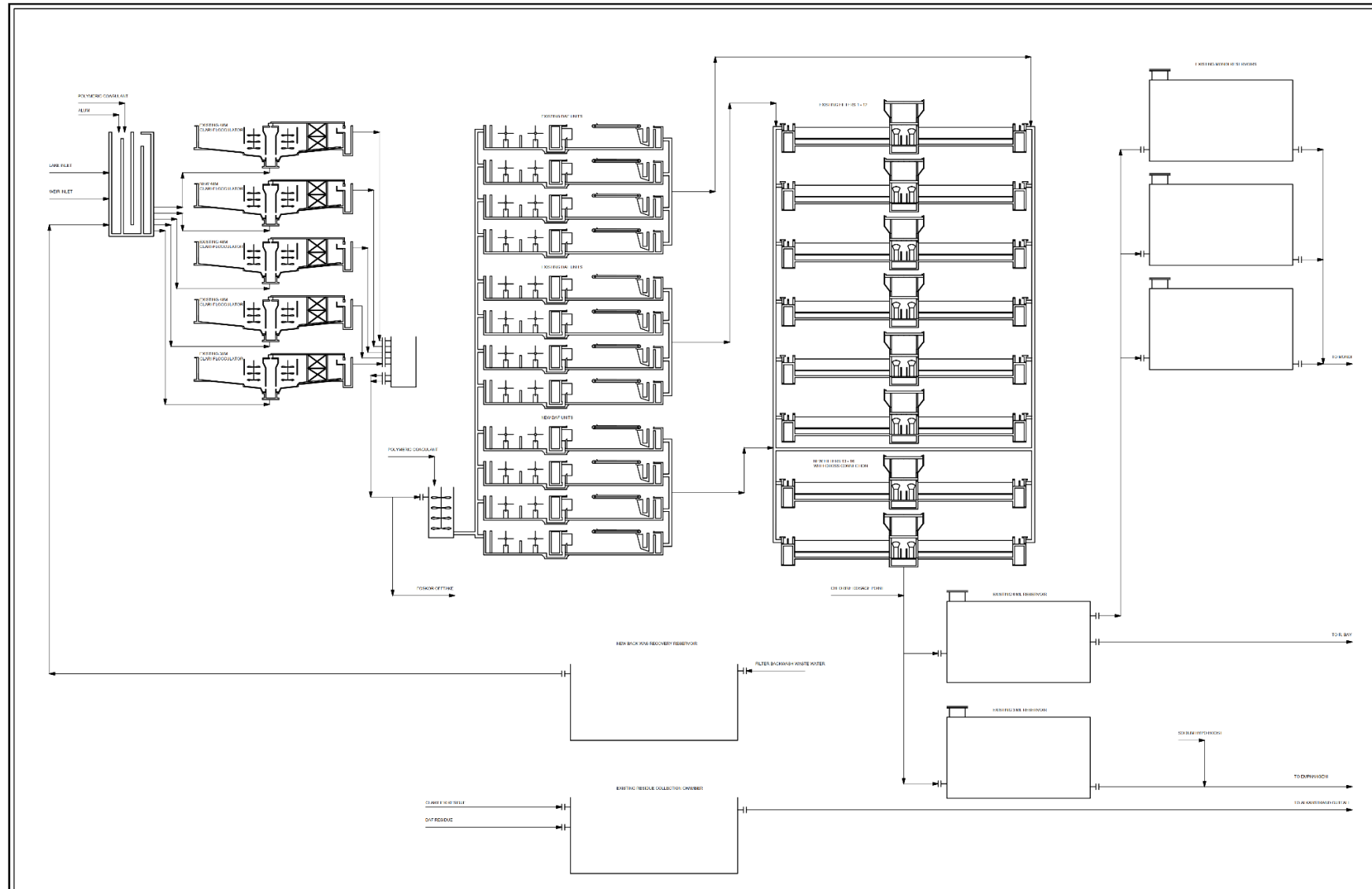


Figure 3: Process Flow Associated with the Nsezi WTW



		MHLATHUZE WATER CNR (SOUTH) CENTRAL ASTERIAL AND BATTERY BEACH ALTON RICHARDS BAY 3901	MHLATHUZE WATER P.O. BOX 1564 RICHARDS BAY 3900	PROJECT: NSEZI WATER TREATMENT WORKS UPGRADE DRAWING NO: PROCESS FLOW DIAGRAM	PROJECT NO: 15011 DATE: 2024-08-01 DRAWN BY: J. HODGSON CHECKED BY: D. HODGSON SCALE: AS SHOWN		MSW CONSULTING SPECIALISING IN WATER SERVICES 101 DE WETTER STREET RICHARDS BAY 3901 TEL: 031 202 2000 FAX: 031 202 2001 WWW.MSWCONSULTING.CO.ZA		NAIDU CONSULTING Durban Head Office 801 1/2 THE COMMONS (DURBAN ONLY) DURBAN, 31 MAIN STREET, DURBAN, 3601 TEL: 031 202 2000 FAX: 031 202 2001 WWW.NAIDUCONSULTING.CO.ZA	SCALE: AS SHOWN SHEET: 1 OF 1 PROJECT NO: 15011 DRAWING NO: 622-02-400-P01
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1.2.2 DN1500 Pipeline Route

The proposed DN1500 pipeline route between the existing Shooting Range pump station and existing inlet tower is located within Nsezi WTW. The new pipeline will follow the existing DN1200 rising main and will be laid within existing cleared servitude. The new DN1500 pipeline has been designed to have a 3m minimum offset from the centreline of the existing DN1200 rising main and will also be 3.98 km long. It will be buried with a minimum cover of 1.3m along the entire length of the new route. As part of this cover the original soil structure will be maintained - i.e., subsoil and topsoil will be stockpiled separately and infilled sequentially. Please note this was the same methodology employed for the existing DN1200 pipeline. The route of the DN1500 pipeline has been indicated in Figures 6-9.

As part of the DN1500 pipeline route there is a requirement to cross a number of watercourses which includes two major crossing points one smaller crossing point, indicated as WC1, WC3 and WC2 respectively on Figure 6-9. Please refer to Section 2 for more detail as to the site's water resources. The proposed construction methodology associated with the DN1500 pipeline will not include the construction of any elevated crossing structures; rather, at the points where the pipeline crosses the two major watercourses the pipeline will be encased with a 300mm thick concrete layer. This concrete layer will add a level of protection around the pipeline to prevent any potential failures. Therefore, as a result of this construction methodology there will be 1567m³ of material infilled into the identified watercourses as part of the DN1500 installation.

In order to install the pipeline a 24m wide working corridor is required based on a 15m allowance north west of the existing DN1200; this working corridor has been graphically represented the Figure 6-9.

The proposed DN1500 pipeline route falls within vegetation that has been classified as the critically endangered Kwambonambi Hygrophilous Grassland ecosystem type and land zoned for conservation as per the City of uMhlathuze town-planning scheme as indicated in Figure 5. The total area of permanent infrastructure associated with the DN1500 is 5 968m² with most of this infrastructure being located within the cleared servitude. Due to alignment issues with the existing DN1200 pipeline, portions of the DN1500 do need to be aligned just outside the servitude, as indicated in Figures 6-9. As explained above, a 24m wide working corridor is required for the proposed DN1500 pipeline. Portions of the existing cleared servitude have been classified as transformed however most of the working corridor overlaps indigenous vegetation as identified by the biodiversity specialist, please refer to Section 2 for more detail as to the site's biodiversity characteristics. Therefore, as indicated in Table 3, 56 687m² of indigenous vegetation will be cleared due to the need to establish the 24m working corridor. Please note this vegetation clearance is required for a 3.98km linear activity directly adjacent to an already transformed portion of land.

Access to the existing servitude already exists and, as such, no new access routes will need to be created. These access routes have been indicated in Figure 6-9. The main construction route will be along the working corridor.

Table 3: Proposed Works Associated With The Nsezi WTW Upgrade

Description	Area
Area of Working Corridor (A)	87 982 m ²
Area of Existing Cleared Servitude (B)	31 295 m ²
Total Indigenous Vegetation to Be Cleared (A-B)	56 687 m ²

Figure 4: Working Corridor

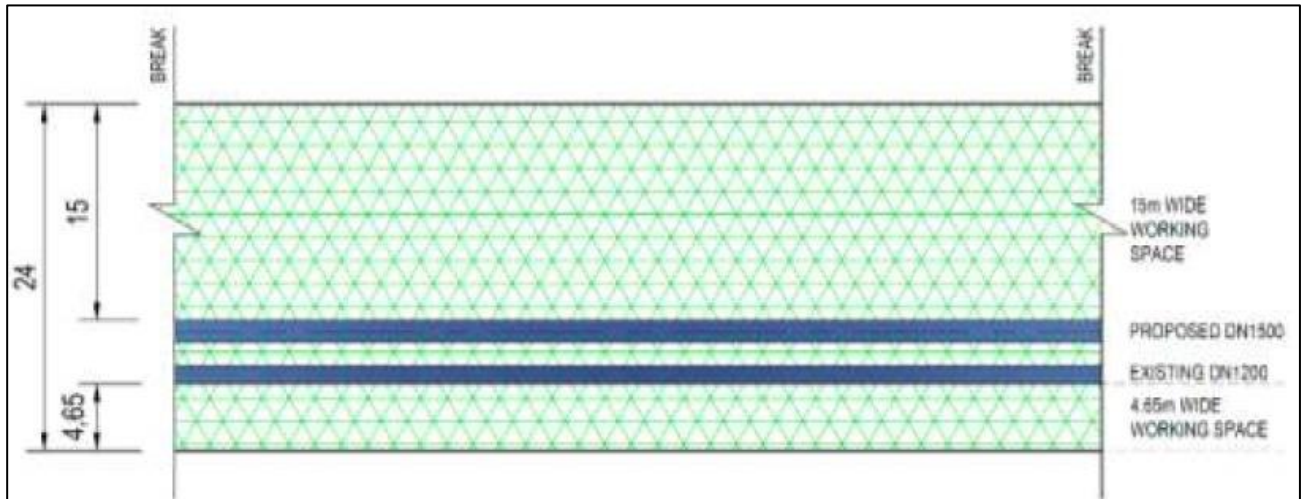


Figure 5: Town-Planning Scheme For The City Of Umhlatuze (Source: City of uMhlatuze, 2021)

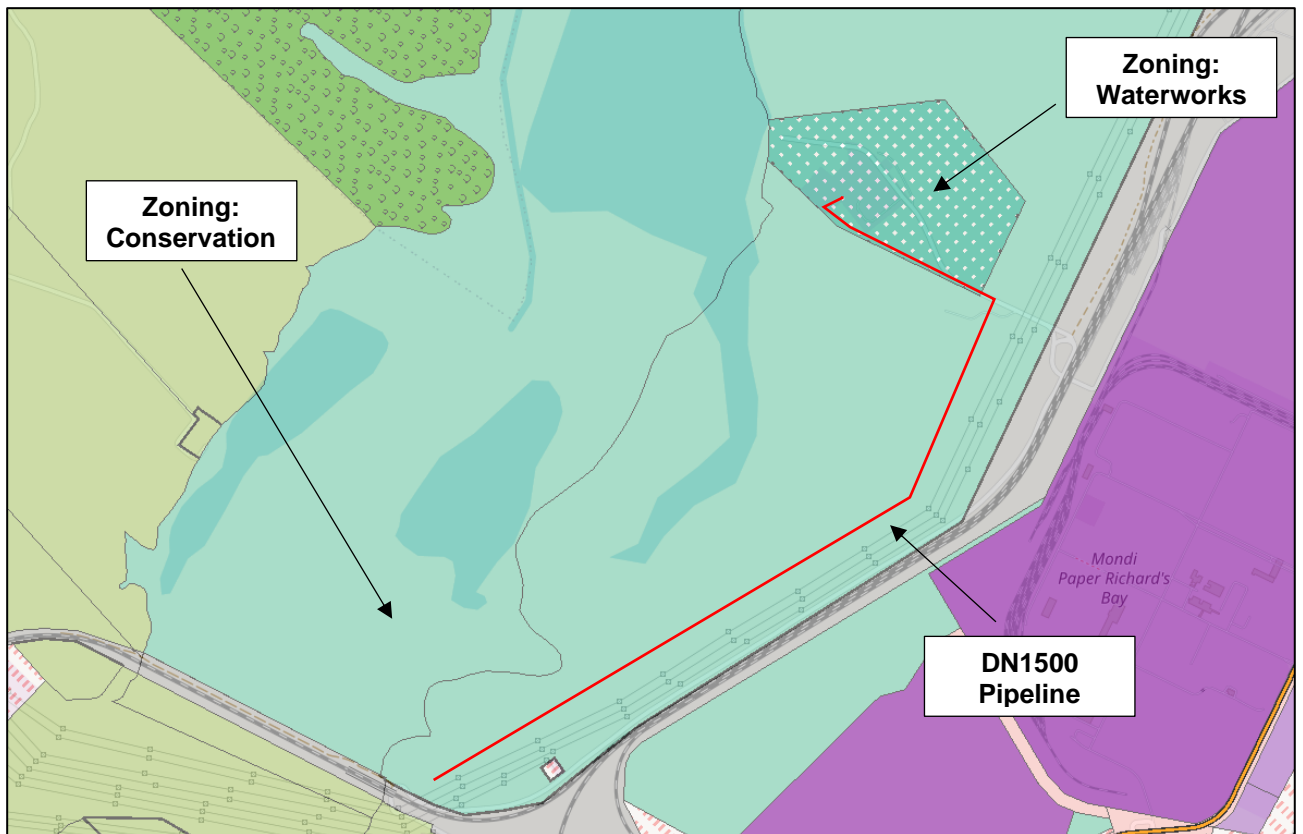


Figure 6: Aerial Photograph Showing The DN1500 Pipeline Which Also Indicates The Working Corridor.



Figure 7: Aerial Photograph Showing Section 1 Of The DN1500 Pipeline Which Also Indicates The Working Corridor.



Figure 8: Aerial Photograph Showing Section 2 Of The DN1500 Pipeline Which Also Indicates The Working Corridor.



Figure 9: Aerial Photograph Showing Section 3 Of The DN1500 Pipeline Which Also Indicates The Working Corridor.



Taking the above project description into consideration and the proposed works only, the DN1500 pipeline will require Environmental Authorisation through a Basic Assessment for the following reasons:

- The construction of a 3.98 km long bulk raw water pipeline with a diameter of 1.5m (Listing Notice 1, Activity 9)
- The clearance of 56 687m² indigenous vegetation for the DN1500 pipeline construction within Kwambonambi Hygrophilous Grassland ecosystem type and on land zoned as conservation according to the City of uMhlathuze town-planning scheme; please refer to Section 2 for more detail as to the site's biodiversity characteristics (Listing Notice 3, Activity 12)
- Infilling and removal of 1 567m³ of material within the identified watercourses on site (WC1, WC2 and WC3); please refer to Section 2 for more detail as to the site's water resources (Listing Notice 1, Activity 9)
- Construction of 1 891m² infrastructure within 32m of the identified watercourses on site which also includes land zoned for conservation; please refer to Section 2 for more detail as to the site's water resources and to Figure 3 (Listing Notice 1, Activity 9).

1.3 Description of Feasible Alternatives as Per Section 3(h)(i)

"Alternatives" are defined as "different means of meeting the general purpose and requirements of the activity"¹. Alternatives considered must be feasible and reasonable². The motivation for the proposed amendment is to develop the site to best suit the current economic climate and housing demand; this has also been taken into account when identifying and investigating different alternatives. Alternatives considered must aim to address key significant impacts of the proposed activity by "maximising benefits and avoiding or minimising the negative impacts"³. Two design alternatives have therefore been assessed in this report and are attached under Appendix A.

1.3.1 Site Alternatives

1.3.1.1 Site Alternative 1 (Preferred Site Alternative)

The project entails the construction of the new DN1500 and the upgrade of the Nsezi WTW. The preferred site for the DN1500 follows the existing cleared servitude, which has been previously cut and is already highly transformed and degraded from its original state. The clearance of vegetation outside of this servitude will be required however this will be directly adjacent to the cleared servitude. Cutting a new alignment between the shooting range and Nsezi WTW would result in the complete transformation of previously undisturbed areas as a new servitude would need to be created. Therefore, in order to avoid significant environmental damage only one site alternative was considered for the proposed DN1500 pipeline in this application.

1.3.2 Design Alternatives

Two design alternatives have been considered for the proposed DN1500 pipeline.

1.3.2.1 Design Alternative 1 (Preferred Design Alternative)

The preferred design alternative is to construct the DN1500 pipeline. The pipeline will be made out of grade X42 steel to API 5L with a yield strength of 289 MPa. The entire length of the pipeline will be buried below natural ground level with a minimum cover of 1.3m. This alternative will however include the encasement of the pipeline with a 300mm concrete layer below the two major watercourses. Please see Appendix A for design drawings indicating this concrete encasement.

1.3.2.2 Design Alternative 2

Alternative 2 is to construct the DN1500 pipeline out of grade X42 steel to API 5L with a yield strength of 289 MPa. The entire length of the pipeline will be buried below natural ground level with a minimum cover of 1.3m apart from the two major watercourses crossing points. However, rather than encasing the pipeline below ground with concrete, elevated pier structures will be constructed to cross the two major watercourses. These structures would be in the form of pier pipe bridges.

¹ Environmental Impact Assessment Regulations, 2014 as amended published under Government Notice No. 326 in Gazette No. 40772 of 07 April 2017.

² DEA & DP (2010) Guideline on Alternatives, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning (DEA & DP).

³ DEA & DP (2010) Guideline on Alternatives, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning (DEA & DP).

1.3.3 The No Go Alternative

The proposed DN1500 pipeline will not be constructed and therefore the upgrades to the Nsezi WTW will not take place. Therefore, the primary purpose to upgrade the plant to 260 Ml/d potable water capacity will not be able to take place. This would negatively impact the industries such as Mondi and FOSKOR who are reliant on this water supply to maintain production. Effectively the negative economic impact as a result the no-go alternative would be significant.

1.4 All Listed and Specific Activities to Be Triggered and Being Applied For As Per Section 3(d) (i)

Table 4: Listed Activities Being Applied for

GNR	Activity Number	Activity as per the legislation	Activity as it applies to the proposal
Listing Notice 1; 4 th December 2017 as amended	9	<p>The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—</p> <p>(i) with an internal diameter of 0,36 metres or more; or</p> <p>(ii) with a peak throughput of 120 litres per second or more;</p> <p>excluding where—</p> <p>(a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or</p> <p>(b) where such development will occur within an urban area.</p>	The DN1500 pipeline (1.5m diameter) will be 3.98km in length and, as such, will trigger this activity.
Listing Notice 1; 4 th December 2017 as amended	12	<p>The development of—</p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</p> <p>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —</p> <p>excluding—</p> <p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such development occurs within an urban area;</p> <p>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</p> <p>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will</p>	The construction of the DN1500 pipeline will result in 1 891m ² of infrastructure within 32m of the watercourses on site and, as such, will trigger this activity.

		be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	
Listing Notice 1; 4 th December 2017 as amended	19	<p><i>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</i></p> <p><i>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</i></p> <p><i>(a) will occur behind a development setback;</i></p> <p><i>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</i></p> <p><i>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</i></p> <p><i>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</i></p> <p><i>(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</i></p>	The construction of the D1500 pipeline will necessitate the crossing of watercourses and hence trenching will be required to be undertaken. Therefore, there will be the infilling of 1 567m ³ within these watercourses and, as such, will trigger this activity.
Listing Notice 3; 4 th December 2017 as amended	12	<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>d. KwaZulu-Natal</p> <p><i>i. Trans-frontier protected areas managed under international conventions;</i></p> <p><i>ii. Community Conservation Areas;</i></p> <p><i>iii. Biodiversity Stewardship Programme Biodiversity Agreement areas;</i></p> <p><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></p> <p><i>v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</i></p> <p><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.</i></p> <p><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></p> <p><i>viii. A protected area identified in terms of NEMPAA, excluding conservancies;</i></p> <p><i>ix. World Heritage Sites;</i></p> <p><i>x. Sites or areas identified in terms of an international</i></p>	The construction of the D1500 pipeline will necessitate the clearance of 56 687m ² of indigenous vegetation within Kwambonambi Hygrophilous Grassland ecosystem type and on land zoned as conservation according to the City of uMhlathuze town-planning scheme and such will trigger this activity.

		<p>convention;</p> <p><i>xi. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;</i></p> <p><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></p> <p><i>xiii. In an estuarine functional zone.</i></p>	
<p>Listing Notice 3; 4th December 2017 as amended</p>	14	<p><i>The development of—</i></p> <p><i>(i) dams or weirs, where the dam or weir, including Infrastructure and water surface area exceeds 10 square metres; or</i></p> <p><i>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</i></p> <p><i>where such development occurs—</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(b) in front of a development setback; or</i></p> <p><i>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</i></p> <p>d. KwaZulu-Natal</p> <p><i>i. In an estuarine functional zone;</i></p> <p><i>ii. Community Conservation Areas;</i></p> <p><i>iii. Biodiversity Stewardship Programme Biodiversity Agreement areas;</i></p> <p><i>iv. A protected area identified in terms of NEMPAA, excluding conservancies;</i></p> <p><i>v. World Heritage Sites;</i></p> <p><i>vi. Sites or areas identified in terms of an international convention;</i></p> <p><i>vii. Critical biodiversity areas or ecological support areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</i></p> <p><i>viii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</i></p> <p><i>ix. Core areas in biosphere reserves;</i></p> <p><i>x. Outside urban areas:</i></p> <p><i>(aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; or</i></p> <p><i>(bb) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</i></p> <p><i>xi. Inside urban areas:</i></p> <p><i>(aa) Areas zoned for use as public open space;</i></p> <p><i>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, zoned for a conservation purpose; or</i></p> <p><i>(cc) Areas seawards of the development setback line or within 100 metres from the high-water mark of the sea if no such development setback line is determined.</i></p>	<p>The construction of the DN1500 pipeline will result in 1 891m² of infrastructure within 32m of the watercourses on site on land zoned as conservation according to the City of uMhlatuze town-planning scheme and, as such, will trigger this activity.</p>

1.5 Location of Activity as per Section 3 (b)(i)-(iii)

Table 5: Location Information

District Municipality	King Cetshwayo District Municipality																				
Local Municipality	City of uMhlathuze																				
Wards	Ward 26																				
Area / Town / Village	Richards Bay																				
Co-ordinates:	Latitude								Longitude												
DN1500 Start-point:	28°46'6.91"S								31°57'55.54"E												
DN1500 End-point:	28°44'54.96"S								31°58'50.54"E												
DN1500 RC1	28°45'53.26"S								31°58'30.88"E												
DN1500 RC2	28°45'37.02"S								31°59'0.83"E												
DN1500 RC3	28°45'22.36"S								31°59'11.73"E												
Nsezi WTW Mid-point:	28°44'56.07"S								31°58'55.85"E												
Property Description:	Portion 41 of Reserve No. 6 15825 Remainder of Reserve No. 6 15825																				
21 Digit Surveyor General no.	N	0	G	V	0	0	0	0	0	0	0	1	5	8	2	5	0	0	0	4	1
	N	0	G	V	0	0	0	0	0	0	0	1	5	8	2	5	0	0	0	0	0

Section 2: Surrounding Land Use as per section 3(h)(iv) and (k)

2.1 DEFF Screening Report

A Screening Report was generated via the DEFF Screening Tool (please refer to Appendix B for the full DEFF report). This details potential specialist reports that may be required based on a desktop level assessment conducted by the screening tool. Table 6 below summarises the screening tool recommendations. It indicates whether they are applicable to the specifics of the project and site and shows the sections of the BAR where these have been addressed. As per the Screening Tool Guidelines, it is the responsibility of the EAP to confirm this list and to motivate in the BAR the reason for not including any of the identified specialist studies by providing photographic evidence of the site situation.

Table 6: National Screening Tool Specialist Requirements and Comments

Specialist Assessment	Conducted	Reason
Agricultural Assessment	No	No agricultural areas will be negatively impacted by the road upgrades.
Archaeological and Cultural Assessment	Yes	Please refer to <i>Heritage and Cultural Aspects</i> under Section 2.6.
Palaeontology Impact Assessment	No	According to the SAHRIS PalaeoSensitivity Map, the proposed project falls within an area of "Low" Paleontological Sensitivity. Therefore, no paleontological studies are required; however a protocol for finds is required and this protocol has been included in the EMPr.
Terrestrial Biodiversity Assessment	Yes	Please refer to <i>Terrestrial Biodiversity</i> under Section 2.4.
Aquatic Biodiversity Assessment	Yes	Please refer to <i>Surface Water and Ground Water</i> under Section 2.3.
Geotechnical Assessment	Yes	Please refer to Appendix B for the Preliminary Geotechnical Report.
Socio-Economic Assessment	No	The construction of the pipeline and the WTW upgrade will have minimal impact on the Socio-Economics within the area. Rather, the outcome of the project provided positive socio-economic impacts as there will be increased potable water supply in the region. Therefore, no Socio-Economic Assessment was conducted on site. Please refer to Section 4.1 for a full needs and desirability description for the project.
Plant Species Assessment	Yes	Please refer to <i>Terrestrial Biodiversity</i> under Section 2.4.
Animal Species Assessment	Yes	Please refer to <i>Terrestrial Biodiversity</i> under Section 2.4.

2.2 Topography and Physical Characteristics of Site

The following applies to the area surrounding the sites as per Figure 1 above.

The gradient of the site is as follows:

Table 7: Gradient of The Site

Gradient	Description
Flat	Portions of the site are flat
1:50 – 1:20	N/A
1:20 – 1:15	N/A
1:15 – 1:10	Portions of the site near the two major crossing have a moderate gradient.
1:10 – 1:7,5	N/A
1:7,5 – 1:5	N/A
Steeper than 1:5	N/A

The topographical features and landforms of the site and surrounding area are as follows:

Table 8: Topographical Features and Landforms of The Site

Topographical Feature	Description
Ridgeline	N/A
Plateau	N/A
Side slope of hill/mountain	N/A
Closed valley	N/A

Open valley	N/A
Plain	N/A
Undulating plain/low hills	The site is located on undulating plains.
Dune	N/A
Sea-front	N/A

Figure 10: Elevation Profile Along The DN1500 Pipeline (Source: Google Earth Pro, 2021).



2.3 Surface Water

The following information has been obtained from the Wetland Baseline and Impact Assessment for the Nsezi Water Treatment Works Project (2021)⁴. The project is situated within the Pongola - Mtamvuna Water Management Areas (WMA 4). The watercourses located around the site are tributaries of the W12H-03459 Sub Quaternary Reach (SQR). The system at a desktop level is regarded as having a PES that is largely modified (Class D) by DWS (2021)⁵. The mean ecological importance and sensitivity has been determined to be “High” and “Very High” respectively.

Ten Hydrogeomorphic (HGM) units were identified within the study area, including various flats, hillslope seeps as well as unchanneled valley bottom (UVB) wetlands. Additionally, various stormwater drainage features as well as an artificial wetland were also identified; please refer to Figure 11.

⁴ The Biodiversity Company (2021) Wetland Baseline and Impact Assessment for the Nsezi Water Treatment Works Project – Appendix B.

⁵ DWA (Department of Water Affairs) 2020. A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Draft. Compiled by RQS-RDM.

Figure 11: Aerial Photograph Delineated Wetlands Associated With The Project Area.



2.3.1 Ecological Functional Assessment

The ecosystem services provided by the wetland units identified on site were assessed and rated using the WET-EcoServices method (Kotze *et al.*, 2008). The average ecosystem service scores for the delineated systems are illustrated in Table 9.

Table 9: Summary Of The PES Scores For The Delineated Wetlands

High	Moderately High	Intermediate
HGM 1	HGM 4	HGM 10
HGM 2	HGM 6	
HGM 3	HGM 7	
HGM 5	HGM 8	
	HGM 9	

2.3.2 The Ecological Health Assessment

The PES for the assessed HGM units is presented in Table 10. Most wetland systems were however determined to have “Moderately Modified” and “Largely Modified” overall PES scores, depending on the level of modification.

Table 10: Summary Of The PES Scores For The Delineated Wetlands

Moderately Modified (C)	Largely Modified (D)	Seriously Modified (E)
HGM 3	HGM 1	HGM 10
HGM 6	HGM 2	
HGM 7	HGM 4	
	HGM 5	
	HGM 8	
	HGM 9	

2.3.3 Ecological Importance & Sensitivity (EIS) Assessment

The wetland EIS assessment was applied to the HGM units to assess the levels of sensitivity and ecological importance of the wetlands. The results of the assessment are shown in Table 11.

Table 11: The EIS results for the delineated HGM types

High (B)	Moderate (C)
HGM 1	HGM 6
HGM 2	HGM 10
HGM 3	
HGM 4	
HGM 5	
HGM 7	
HGM 8	
HGM 9	

2.3.4 Buffer

A conservative wetland management buffer zone of 15m has been recommended for the construction and operation phases. The buffer zone will not be applicable for areas of the project that traverse wetland areas; however, for all secondary activities such as lay down yards, storage areas and camp sites, the buffer zone must be implemented.

2.3.5 Specialist Impact Statement⁶

The proposed project may proceed as has been planned, considering the fact that only “Low” post-mitigation significance ratings have been calculated for the construction and operation phases

2.4 Terrestrial Biodiversity

2.4.1 Ecosystem Type

Kwambonambi Hygrophilous Grasslands (KZN9)

- **Geographical location**

Richards Bay (2832CC), KwaMbonambi (2832CA), Cape St Lucia (2832CB), St Lucia Estuary (2832AD), Empangeni (2831DB), Felixton (2831DD). Ecosystem lies inland but adjacent to Kwambonambi Dune Forest threatened ecosystem (KZN 8). It incorporates the hygrophilous grasslands behind the primary dune system as well as swamp forest. It includes the Richards Bay surrounds up to the lower Umfolosi Flats.

- **Description**

Key biodiversity features include: one amphibian species, *Hyperolius pickersgilli*; four millipede species including *Centrobolus fulgidus*, *Centrobolus richardi*, *Centrobolus rugulosus* and *Doratogonus zuluensis*; one plant species, *Kniphofia leucocephala*; and six vegetation types including KwaZulu-Natal Coastal Forest, KwaZulu-Natal Dune Forest, Mangrove Forest, Maputaland Wooded Grassland, Maputaland Coastal Belt and Swamp Forest.

2.4.2 Flora Assessment⁶

A full list of flora species recorded within the assessment area provided in the Biodiversity Impact Assessment can be found within Appendix B.

A total of 88 species, representing 44 families of indigenous flora species, was recorded within the assessment area, with six of these species' endemic to South Africa. As indicated in Table 12 seven of the recorded flora species are protected by legislation. Permits must be obtained from Ezemvelo KZN Wildlife and The Department of Environment, Forestry and Fisheries if these species are to be relocated and/or removed.

Invasive Alien Plants (IAP) were also present within the area due to the disturbance from anthropogenic influences. Ten IAP species were recorded within the assessment area and all are listed as Category 1b. These IAP species include: *Catharanthus roseus*, *Chromolaena odorata*, *Eucalyptus grandis*, *Lantana camara*, *Schinus terebinthifolius*, *Litsea glutinosa*, *Solanum mauritianum*, *Tagetes minuta*, *Tithonia diversifolia*, *Verbena bonariensis*, *Psidium cattleianum*

Table 12: Summary Of Flora Species Recorded Which Are Protected By Legislation

Family	Species Name	Growth Form	Conservation Status	Endemism
Anacardiaceae	<i>Sclerocarya birrea</i> subsp. <i>caffra</i>	Large tree	LC	
Hyacinthaceae	<i>Albuca setosa</i>	Geophytic herb	LC	
Hyacinthaceae	<i>Ledebouria</i> sp.	Geophytic herb	-	
Hypoxidaceae	<i>Hypoxis hemerocallidea</i>	Geophytic herb	LC	
Iridaceae	<i>Aristea abyssinica</i>	Geophytic herb	LC	
Moraceae	<i>Ficus trichopoda</i>	Large tree	LC	
Polypodiaceae	<i>Microsorium scolopendria</i>	Fern	LC	

2.4.3 Faunal Assessment⁶

A full list of faunal species recorded within the assessment area provided in the Biodiversity Impact Assessment can be found within Appendix B.

⁶ The Biodiversity Company (2021) Nsezi Water Treatment Plant Upgrade - Biodiversity Impact Assessment – Appendix B.

2.4.3.1 Amphibians

A single amphibian species (*Hyperolius marmoratus*, Painted Reed Frog) was recorded during the survey period. Considering the presence of swamp habitats and the extent of grassland habitats, it is possible that the area supports a high diversity of species.

2.4.3.2 Reptiles

No reptile species were recorded during the survey period. The lack of species richness was likely due to the combination of the inherent secretive nature of reptile species and limited time available for fieldwork. Nevertheless, the presence of suitable habitat suggests that the area supports a diverse reptile community.

2.4.3.3 Avifauna

Twenty-three species of avifauna were recorded within the assessment area during the survey period, with one of the species regarded as being of conservation concern (*Coracias garrulus*, European Roller).

2.4.3.4 Mammals

No mammal species were observed during the survey based on either direct observation or the presence of visual tracks and signs. However, due to the presence and extent of natural habitat, it is likely that there is a diverse assemblage of small mammal species.

2.4.4 Present Impacts to Biodiversity⁶

Considering the anthropogenic activities and influences within the landscape, several negative impacts to biodiversity were observed within the assessment area. These include:

- Invasive Alien Plants
- Roads and associated vehicle traffic
- Powerlines
- Solid waste dumping
- Vegetation clearing and unsustainable harvesting
- Livestock grazing

2.4.5 Habitats and Site of Ecological Importance (SEI)⁶

Seven different habitat types were delineated within the assessment area, as per Figure 12. These habitats include:

- Swamp Forest
- Subtropical Alluvial Vegetation
- Maputaland Wooded Grassland
- Maputaland Coastal Belt
- Northern Coastal Forest
- Transformed
- Wasteland

Clearance of vegetation would be required in all of the identified habit types apart from Maputaland Coastal Belt which falls outside of the construction footprint.

All habitats within the assessment area of the proposed development were allocated a sensitivity category. The sensitivities of the habitat types delineated are illustrated in Figure 13.

2.4.6 Specialist Impact Statement⁶

As per the specialist report, the proposed project may result in the destruction or degradation of intact and functional habitats. However, this can be minimised if the recommended mitigation measures are implemented. It is the opinion of the specialist that the proposed development can proceed provided that all mitigation measures be implemented.

Figure 12: Aerial Photograph Showing the Identified Habitats

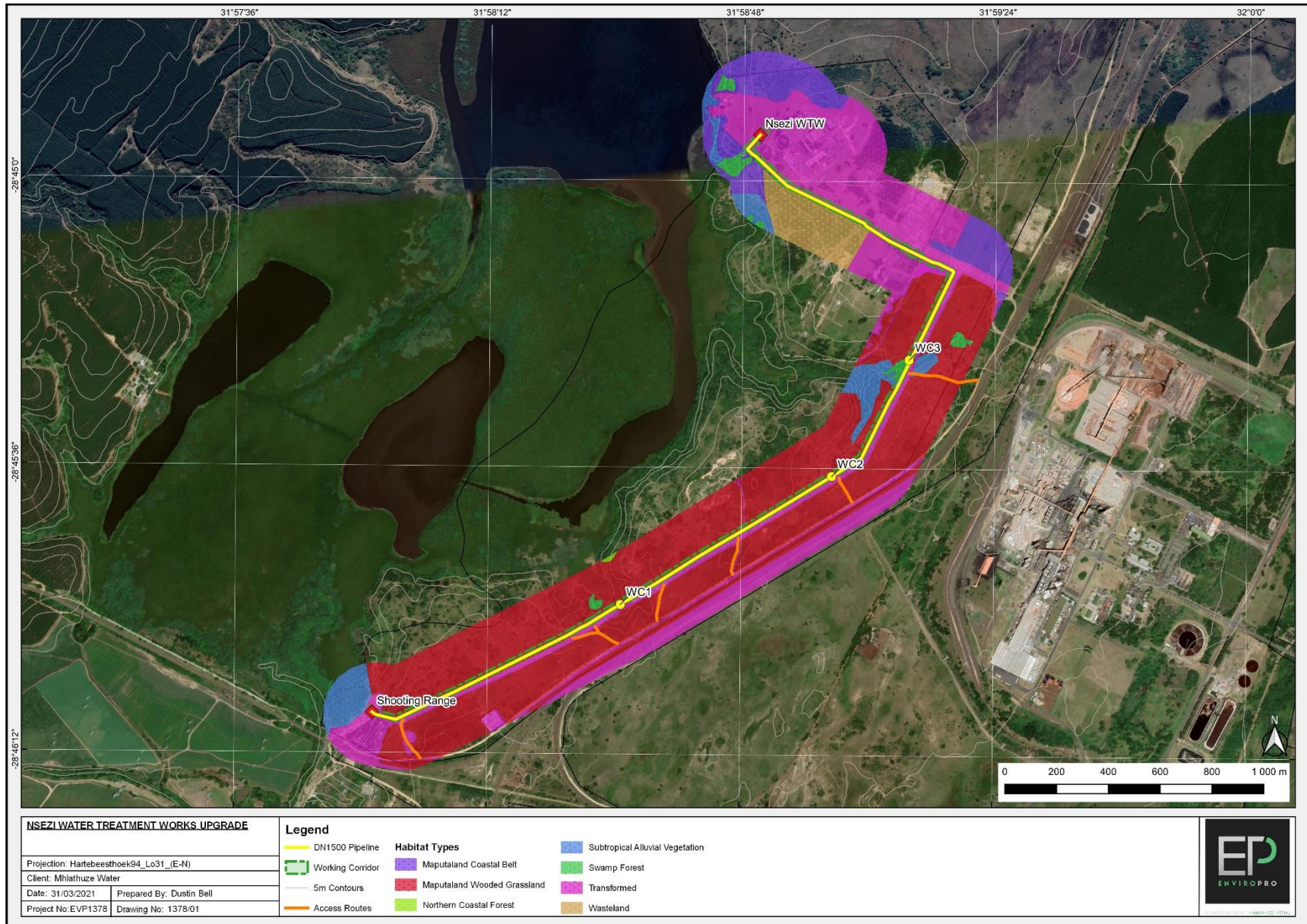
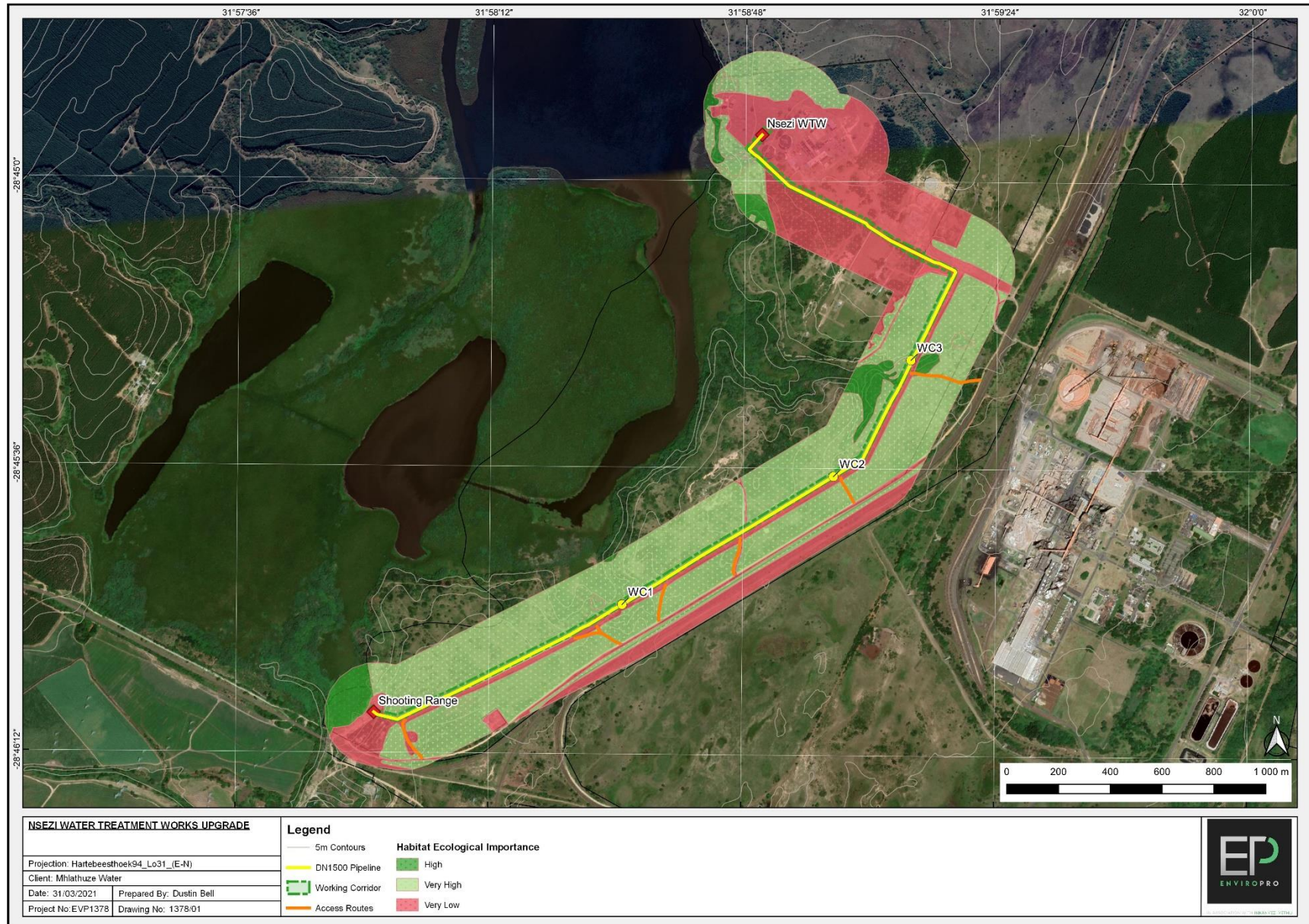


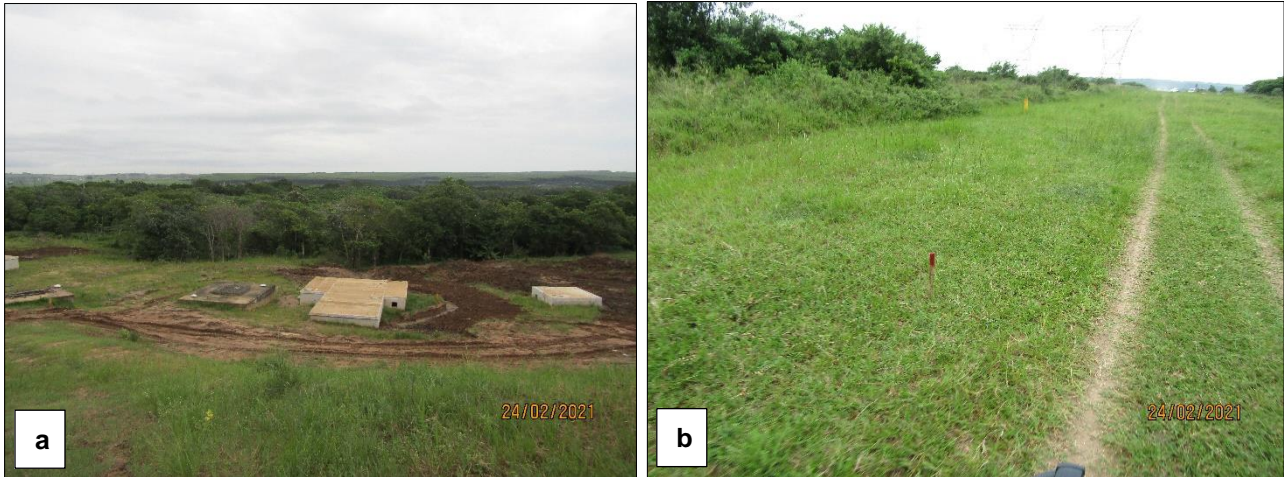
Figure 13: Aerial Photograph Showing the Identified Habitat Sensitivities.



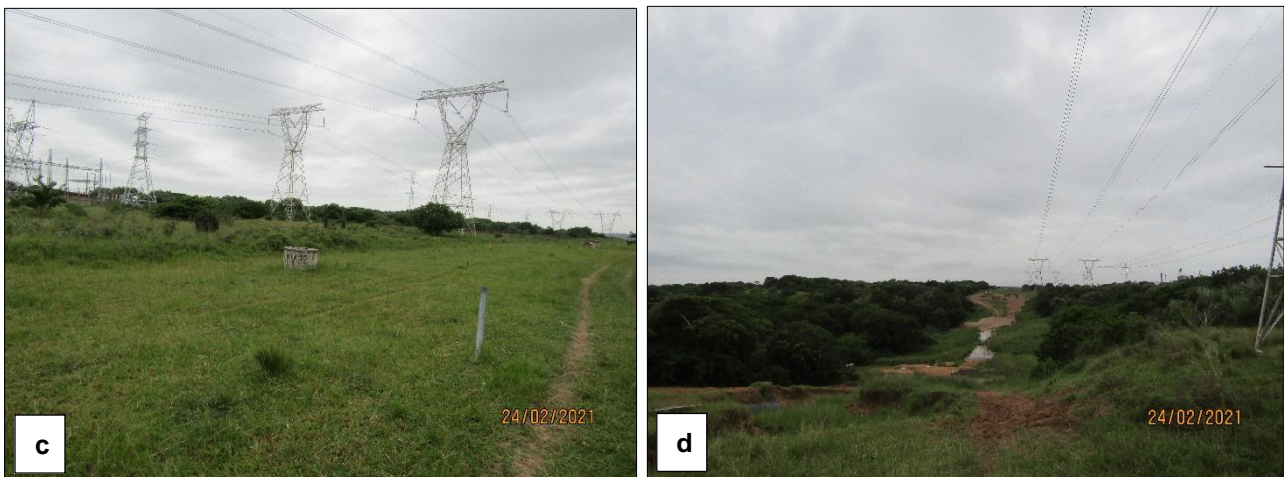
2.5 Heritage and Cultural Aspects⁷

During the site inspection, no heritage sites were noted. This is most probably due to the pipeline being situated in an existing servitude which has been disturbed by an existing pipeline and other infrastructure including weirs and several power lines. A topographical map from the late 1950s indicates that there were several homesteads in the project area. No signs of these homesteads were found during the inspection. The area immediately outside the servitude boundary was also inspected to ensure that there were no heritage sites in close proximity to the servitude and proposed pipeline. No such sites were found but it should be noted that there was a dense vegetation cover outside the servitude which made visibility difficult. Construction workers will be cautioned to operate with care on the site and should any unidentified archaeologically, or culturally, sensitive aspects be discovered on-site, construction activities are to stop immediately and the issue assessed and the authorities (AMAFSA) notified if need be.

Figure 14: Photographs of the Site Taken on The 24th February 2021.



(a) View of the existing Shooting Range Pump Station; **(b)** View of the existing cleared servitude looking towards the Nsezi WTW near the Shooting Range Pump Station.



(c) View of the existing cleared servitude also showing electrical infrastructure which runs along the servitude; **(d)** View looking down towards WC1.

⁷ JLB Consulting (2021) NSEZI NEW DN1500 RAW WATER PIPELINE, RICHARDS BAY, KWAZULU-NATAL, Phase 1 Heritage Impact Assessment – Appendix B



e



f

(e) Close-up view of WC1 indicating the wetland vegetation associated with the site; **(f)** View of the existing cleared servitude between WC1 and WC2.



g



h

(g) View of WC2 along the existing servitude; **(h)** View looking down towards WC3.



i



j

(i) Vegetation adjacent to the cleared servitude near WC3; **(j)** View of the cleared servitude near the Nsezi WTW.



(e) A further view of the transformed areas associated with the Nsezi WTW upgrades.; **(f)** View of the active Nsezi WTW grounds

Section 3: Policy and Legislative Context

3.1 Identification of All Legislation, Policies, Plans, Guidelines, Spatial Tools, Municipal Development Planning Frameworks And Instruments As Per Section 3(e) (i) And Compliance Of Proposed Activity With Legislation And Policy 3(e) (ii)

Table 13: Legislation Table

Legislation	Compliance of Activity
The Constitution of South Africa (No. 108 of 1996)	The Constitution cannot manage environmental resources as a standalone piece of legislation; hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations is designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld on an ongoing basis throughout the country. In terms of Section 24, the constitution gives every person the right to an environment that is not harmful to their health and wellbeing.
National Environmental Management Act (Act 107 of 1998)	<p>The National Environmental Management Act (Act 107 of 1998) (NEMA) is South Africa’s overarching environmental legislation. It includes a set of principles that govern environmental management and against which all Environmental Management Programmes (EMPr) and actions are measured. These principles include and relate to sustainable development, protection of the natural environment, waste minimisation, public consultation, the right to an environment that is not harmful to one’s health or wellbeing, and a general duty of care.</p> <p>The Environmental Impact Assessment (EIA) Regulations, 2014: GNR.982, R.983, and R.985 under Section 24 of the NEMA define the activities that require Environmental Authorisation and the processes to be followed to assess environmental impacts and obtain Environmental Authorisation.</p> <p>The proposed development requires EA in the form of a BA process. The associated EMPr includes mitigation measures, recommended by specialists, that are required to be implemented to ensure that environmental resources are protected.</p>
National Water Act (Act 36 of 1998)	<p>NWA states that a person may only use water if the water use is authorised by a license under NWA or if the responsible authority has dispensed with a license requirement if it is satisfied that the purpose of the NWA will be met by the granting of a license, permit or other authorisation under any other law.</p> <p>The site is located within 500m of wetlands and there will be the alterations to the bed and banks of a watercourse. Therefore, a water use authorisation will be required as per Section 21 (c) and (i) of the National Water Act.</p>

National Environmental Management: Waste Act (Act 59 of 2008)	<p>To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement, and to provide for matters connected therewith. Section 15 allows the Minister to publish a list of activities, which require a Waste Management License. The most recent list is published in Government Gazette 37083 Notice No. 921 dated 29 November 2013.</p> <p>It is unlikely that any activities carried out by the development will trigger a Waste Management Activity.</p>
National Environmental Management: Air Quality Act (Act 39 of 2004)	<p>To reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.</p> <p>It is unlikely that any activities carried out by the development will have an impact on the local and regional air quality.</p>
National Environmental Management: Protected Areas Act (Act 57 of 2003)	<p>The National Environmental Management: Protected Areas intends to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes, for the establishment of a national register of all national, provincial and local protected areas, for the management of those areas in accordance with national norms and standards, for intergovernmental co-operation and public consultation in matters concerning protected areas, and for matters in connection therewith.</p> <p>The proposed development will not have an impact on any protected areas.</p>
National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008)	<p>The National Environmental Management: Integrated Coastal Management Act aims to establish a system of integrated coastal and estuarine management in the Republic, including norms, standards and policies, in order to promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes, and to ensure that development and the use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable, to define rights and duties in relation to coastal areas, to determine the responsibilities of organs of state in relation to coastal areas, to prohibit incineration at sea, to control dumping at sea, pollution in the coastal zone, inappropriate development of the coastal environment and other adverse effects on the coastal environment, to give effect to South Africa's international obligations in relation to coastal matters and to provide for matters connected therewith.</p> <p>All residue produced from the clarifiers and DAFs will continue to be handled as per the status quo. Currently all residue is pumped to the permitted Alkanstrand Outfall via the existing residue collection chamber. The Alkanstrand Outfall has been approved by the then Department of Environmental Affairs (DEA) with reference number 2012/002/KZN/MHLATHUZE WATER in 2017.</p>
National Forest Act (Act 84 of 1998)	<p>To reform the law on forests as the government recognises that everyone has the constitutional right to have the environment protected for the benefit of present and future generations. Natural forests and woodlands form an important part of that environment and need to be conserved and developed according to the principles of sustainable management. Plantation forests play an important role in the economy, have an impact on the environment and need to be managed appropriately. The State's role in forestry needs to change; and the economic, social and environmental benefits of forests have been distributed unfairly in the past.</p> <p>The proposed development will potentially have an impact on natural forests and, such, a permit will need to be applied through the Department of Environment, Forestry and Fisheries.</p>

Environmental Conservation Act (Act 43 of 1596)	This Act makes provisions for the application of general environmental principles for the protection of ecological processes, promotion of sustainable development and the protection of the environment. This Act has mostly been repealed by NEMA.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	The National Environmental Management: Biodiversity Act intends, to provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1598, the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources, the establishment and functions of a South African National Biodiversity Institute and for matters connected therewith. The site is located within an endangered ecosystem type and, as such, an EA is being applied for through a BA process.
National Heritage Resources Act (Act 25 of 1599) KwaZulu-Natal Heritage Act (Act 4 of 2008)	The National Heritage Act (No. 25 of 1599) aims to promote good management of the national estate in order to preserve the country's unique heritage for current and future generations. The KwaZulu-Natal Heritage Act (Act No. 4 of 2008) provides for the conservation and preservation of the physical and intangible heritage resources of the KwaZulu-Natal province. No archaeologically significant artefacts will be disturbed during this project; therefore no permits will be required from the provincial heritage authority, AMAFA
Mineral & Petroleum Resources Development (Act 28 of 2002)	To provide for the sustainable development of the nation's mineral and petroleum resources which includes activities carried out for the winning of any mineral on, in or under the earth (i.e. the use of borrow pits). The material used to install the pipeline must be obtained from a licensed source.
Occupational Health and Safety Act (Act 181 of 1593)	These regulations provide for the health and safety of persons at work, including aspects which are hazardous to health and safety. In terms of major hazardous installation, the regulations shall apply to employers, self-employed persons and users, who have on their premises, either permanently or temporarily, a major hazard installation or a quantity of a substance which may pose a risk that could affect the health and safety of employees and the public. During both the construction phase of this development all the requirements of Occupational Health and Safety Act 1593 will need to be adhered to.
Hazardous Substances Act (Act No. 15 of 1573)	This Act aims to provide for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances, and for the control of certain electronic products, to provide for the division of such substances or products into groups in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products and to provide for matters connected therewith. A Spill Contingency Plan will be compiled for managing spills during the construction of the proposed development.
National Building Regulations and Building Standards Act (Act 103 of 1577)	This Act aims to provide for the promotion of uniformity in the law relating to the erection of buildings in the areas of jurisdiction of local authorities and for the prescribing of building standards.
Guideline on Need and Desirability (2017)	Guideline considered determining the need and desirability of proposed development.
Municipal Planning Framework	
City of uMhlathuze: Integrated Development Plan Review 2020/2021	This project falls in line with the City of uMhlathuze 's goals to improve water infrastructure and service provision in the municipality

Section 4: Motivation, Need and Desirability

4.1 Need and Desirability as Per Section 3(F)

The following table has been prepared as per the 2017 Integrated Environmental Management Guideline: Guideline on Need and Desirability compiled by the Department of Environmental Affairs.

Table 14: Need and Desirability as Per the 2017 Guideline on Need and Desirability

“Securing ecological sustainable development and use of natural resources”	
<p><i>How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?</i></p>	<p>The construction of the pipeline will result in the infill of material into the site's watercourses and clearance of indigenous vegetation associated with the working corridor. The impact on the ecological integrity of the area has been rated as low during both the construction and operational phases due to the nature of the development and measures implemented to reduce impact by choosing the route with the least impact.</p>
<p><i>How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity?</i></p> <p><i>What measures were explored to firstly avoid these negative impacts and, where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts?</i></p> <p><i>What measures were explored to enhance positive impacts?</i></p>	<p>The construction of the pipeline will result in the infill of material into the site's watercourses and clearance of indigenous vegetation associated with the working corridor. The construction phase of the project will see numerous alien invasive species being removed from the project footprint.</p> <p>No alternative routes were assessed as the existing route is already transformed.</p> <p>The pipeline does not offer much opportunity to enhance biological diversity but the proposed route does seek to avoid areas where construction would have the highest impact. The construction phase of the project will see numerous alien invasive species removed from the project footprint.</p>
<p><i>How will this development pollute and/or degrade the biophysical environment?</i></p> <p><i>What measures were explored to firstly avoid these impacts and, where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts?</i></p> <p><i>What measures were explored to enhance positive impacts?</i></p>	<p>Apart from risk of spills etc. during construction which can be managed and mitigated, the development of the pipeline will not pollute and/or degrade the biophysical environment during operation.</p> <p>The EMPr details measures to manage hazardous materials and fuels used on site during construction and details the measures to put in place to ensure that pollution is prevented.</p> <p>Due to the nature of the project - i.e. provision of a large raw water pipeline - there is not much opportunity to enhance positive impacts. The only measure implemented is following the already cleared servitude.</p>
<p><i>What waste will be generated by this development?</i></p> <p><i>What measures were explored to firstly avoid waste and, where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste?</i></p> <p><i>What measures have been explored to safely treat and/or dispose of unavoidable waste?</i></p>	<p>Small volumes of general waste and a small amount of hazardous waste, such as oil spills, will be generated during construction. Cement bags and primer drums will be generated during the construction of the road surface. This will be temporary.</p> <p>No waste will be generated during operation.</p> <p>An EMPr has been provided to ensure waste is properly stored and managed on site and the appropriate disposal of waste is also addressed. Measures for the separation and recycling of waste are addressed in the EMPr.</p>
<p><i>How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage?</i></p> <p><i>What measures were explored to firstly avoid these impacts and, where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts?</i></p> <p><i>What measures were explored to enhance positive impacts?</i></p>	<p>There are no negative or positive impacts on any cultural heritage sites.</p> <p>A heritage impact study was commissioned to assess if there is to be any impact on cultural heritage.</p> <p>The pipeline does not offer much opportunity to enhance cultural diversity but does not negatively impact it any way.</p>

<p><i>How will this development use and/or impact non-renewable natural resources?</i></p> <p><i>What measures were explored to ensure responsible and equitable use of the resources?</i></p> <p><i>How have the consequences of the depletion of the non-renewable natural resources been considered?</i></p> <p><i>What measures were explored to firstly avoid these impacts and, where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts?</i></p> <p><i>What measures were explored to enhance positive impacts?</i></p>	<p>The construction process will make use of quarried materials as bedding material and fuels to operate the vehicles.</p> <p>The EMPr addresses the responsible sourcing of materials and use of permitted sites only.</p> <p>The project will not significantly deplete non-renewable natural resources.</p> <p>These impacts cannot be completely avoided but the EMPr addresses appropriate measures to ensure sustainable sourcing.</p> <p>The pipeline does not offer much opportunity to enhance positive impacts related to non-renewable resources.</p>
<p><i>How will this development use and/or impact renewable natural resources and the ecosystem of which they are part?</i></p> <p><i>Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds?</i></p> <p><i>What measures were explored to firstly avoid the use of resources or, if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?</i></p> <ul style="list-style-type: none"> • <i>Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. dematerialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)</i> • <i>Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative)?</i> • <i>Do the proposed location, type and scale of development promote a reduced dependency on resources?</i> 	<p>The development is not expected to impact any renewable natural resources on site.</p> <p>The natural resources that will be used for the road upgrade may include:</p> <ul style="list-style-type: none"> • Sub base rock and sand material. This must be sourced from a licenced source - i.e. no unpermitted borrow pits may be used unless the site has been authorised through DMR. Should the material be sourced from a licenced facility and be excavated in a responsible manner (according to the authorised site EMPr) then the integrity of the rock and subbase material in this area will not be jeopardised. • Water abstraction for dust suppression. Should abstraction take place from a licenced source and location according to the authorised quantities, this should have little to no impact on the natural water resources in this area.
<p><i>How was a risk-averse and cautious approach applied in terms of ecological impacts?</i></p> <ul style="list-style-type: none"> • <i>What are the limits of current knowledge? (note: the gaps, uncertainties and assumptions must be clearly stated)</i> • <i>What is the level of risk associated with the limits of current knowledge?</i> • <i>Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</i> 	<p>The existing route which has the least impact on the environment was selected. Therefore, unnecessary impacts on vegetated areas have been avoided.</p> <p>There are very few if any gaps in knowledge.</p> <p>A risk averse and cautious approach has been followed by avoiding previously disturbed areas where possible. The impact on the ecological integrity of the area has therefore been rated as low during the construction phase. During operation, there will be very little impact as the area will be rehabilitated.</p>
<p><i>How will the ecological impacts resulting from this development impact on people's environmental right in terms following</i></p>	<p>The proposed development will have very little negative impact on the community's environmental rights. There may be some nuisance and disturbance and access constraints during construction as well as associated noise and dust.</p>

<ul style="list-style-type: none"> Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but, if avoidance is not possible, to minimise, manage and remedy negative impacts? Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts? 	<p>The long-term impacts will be positive as the pipeline will increase the supply of potable water in the region.</p>
<p>Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)</p>	<p>The pipeline will improve potable water supply in the region. There would be some loss of vegetation adjacent to the existing cleared servitude; however the economic and social benefits of having a pipeline far outweigh any negative socio-economic factors.</p> <p>The proposed development will have a low ecological impact and will have a positive impact on the region as a whole. This construction of the pipeline will also improve the provision of potable water in the region. The development will have limited to no impact on the other ecological services during construction and no impact during operation.</p>
<p>Based on all of the above, how will this development positively or negatively impact ecological integrity objectives/targets/considerations of the area?</p>	<p>The development should have no significant negative impacts on ecological integrity based on the understanding that Mhlathuze Water will construct and maintain the pipeline as per the conditions of the EMPr.</p>
<p>Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations.</p>	<p>Due to the nature of the development, no other feasible site alternatives could be considered; please refer to Sections 1.3 and 4.2. In terms of technology alternatives, the preferred alternative will have a smaller construction impact on the watercourse in terms of construction work in the bed and banks. The preferred alternative will also have less impact in the long term, post-construction. Due to post-construction impacts being permanent this technology is seen as much more favourable when considering ecological impacts.</p>
<p>Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area.</p>	<p>The construction of the pipeline will increase sedimentation within the catchment during construction and will result in a minor loss of biodiversity. In terms of positive cumulative ecological impacts, none have been identified.</p>
"Promoting justifiable economic and social development"	
<p>What is the socio-economic context of the area based on, amongst other considerations, the following considerations:</p> <ul style="list-style-type: none"> The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area? Spatial priorities and desired spatial patterns (e.g. need for integrated or segregated communities, need to upgrade informal settlements, need for densification, etc.)? Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.)? and Municipal Economic Development Strategy ("LED Strategy")? 	<p>The project is located in a rural area adjacent to an industrial hub of Richards Bay. The pipeline is, however, located within an existing cleared servitude. The area is therefore targeted for pipeline construction.</p>
<p>Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?</p>	<p>The identified positive socio-economic impacts are as follows:</p> <ul style="list-style-type: none"> Improved provision of high-quality water to support local industrial activities. Increased provision of potable water for domestic use. Provision of employment for local labour.

	<ul style="list-style-type: none"> Skills development through intensive programmes directly involved in the planning, construction and commissioning of the pipeline.
<i>How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?</i>	The pipeline will be significant for the regional community as there will be an increased supply of potable water.
<i>Will the development result in inequitable (intra- and inter-generational) impact distribution, in the short- and long-term?</i>	No, as the proposed development is an SOP project; it will benefit the public in general and will not result in inequitable (intra- and inter-generational) impact distribution.
<i>Will the impact be socially and economically sustainable in the short- and long-term?</i>	Yes, the development will be socially and economically sustainable as there have not been any significant negative socio-economic impacts identified. The pipeline will have a positive long-term social impact.
<p><i>In terms of location, describe how the placement of the proposed development will:</i></p> <ul style="list-style-type: none"> result in the creation of residential and employment opportunities in close proximity to or integrated with each other reduce the need for transport of people and goods result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport?) compliment other uses in the area be in line with the planning for the area for urban related development, make use of underutilised land available within the urban edge optimise the use of existing resources and infrastructure opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement) discourage "urban sprawl" and contribute to compaction/densification <ul style="list-style-type: none"> contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs encourage environmentally sustainable land development practices and processes take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.) the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential) impact the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement 	Construction of the pipeline will result in a small number of employment activities during the construction phase. No further employment opportunities will be created during operation.
<i>How were a risk-averse and cautious approach applied in terms of socio-economic impacts?</i>	There have been no long-lasting significant negative socio-economic impacts identified with the proposed development.

<ul style="list-style-type: none"> • <i>What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</i> • <i>What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?</i> • <i>Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</i> 	Therefore, a risk-averse and cautious approach was not required.
<p><i>How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:</i></p> <ul style="list-style-type: none"> • <i>Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts but, if avoidance is not possible, to minimise, manage and remedy negative impacts?</i> • <i>Positive impacts. What measures were taken to enhance positive impacts?</i> 	The proposed development will not negatively impact people's environmental rights. In fact, the development will have a positive impact by the improved provision of potable water.
<p><i>Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)</i></p>	The pipeline will improve potable water supply in the region. There would be some loss of vegetation adjacent to the existing cleared servitude; however the economic and social benefits of having a pipeline far outweigh any negative socio-economic factors.
<p><i>What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?</i></p>	As the development is for the increased supply of water to the Nsezi WTW, no other alternatives were considered from a socio-economic point of view. The proposal of constructing the pipeline is the "best practicable environmental option"
<p><i>What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries) and is the development located appropriately?</i></p>	There have been no identified impacts which will adversely affect vulnerable and/or disadvantaged persons. The project will in fact have a positive impact by addressing the lack of basic services and access into the community.
<p><i>Considering the need for social equity and justice, do the alternatives identified allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?</i></p>	Yes, the best practicable environmental option is selected.
<p><i>What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?</i></p>	The development will not impact anyone's access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing.
<p><i>What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?</i></p>	The EMPr includes conditions which have been developed to manage operational impacts. Upon receipt of the EA, the EMPr will become legally binding. Therefore, the Mhlathuze Water will be bound to the conditions of the EMPr throughout the life cycle of the pipeline.
<p><i>What measures were taken to:</i></p> <ul style="list-style-type: none"> • <i>ensure the participation of all interested and affected parties?</i> • <i>provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation?</i> • <i>ensure participation by vulnerable and disadvantaged persons?</i> • <i>promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means?</i> 	<p>The following steps were followed during the public participation process.</p> <ul style="list-style-type: none"> • Noticeboards detailing the proposed development were erected on the site on the 2nd March 2021. • An English/IsiZulu advert was placed in the Zululand Observer on the 4th March 2021. • The Ward Councillor was notified of the application via email on the 10th March 2021. • All relevant authorities and stakeholders were notified of the application via email between the 3rd March 2021 and 29th March 2021. • Land Owner consent was signed by uMhlathuze Local Municipality on the 17th March 2021. • All relevant authorities and registered I&APs will be given the opportunity to review complete copies of

<ul style="list-style-type: none"> • ensure openness and transparency, and access to information in terms of the process? • ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition was given to all forms of knowledge, including traditional and ordinary knowledge? • ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein would be promoted? 	<p>the Draft BAR. The Draft BAR will be circulated for a legislated 30-day comment period.</p>
<p><i>Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle- and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area).</i></p>	<p>As the proposed development is an SOP project, it will benefit the public in general and will not result in inequitable impact distribution.</p>
<p><i>What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?</i></p>	<p>During construction and operation, a full health, safety and environmental induction will be conducted with all employees. This induction brings to the attention of the employees all potential human health hazards and environmental dangers associated with the workings of the site. Inductions also indicate that all employees have a right to work in a clean and safe environment.</p>
<p><i>Describe how the development will impact job creation in terms of, amongst other aspects:</i></p> <ul style="list-style-type: none"> • the number of temporary versus permanent jobs that will be created • whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area?) • the distance from where labourers will have to travel • the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits) and • the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.). 	<p>There will be the provision of temporary jobs during construction. However, there will be no new employment opportunities created during the operational phase. This is due to the nature of the development being a pipeline with only general maintenance required over its life cycle.</p>
<p><i>What measures were taken to ensure:</i></p> <ul style="list-style-type: none"> • that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment? • that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures? 	<p>The proposed project falls under the jurisdiction of the Mhlathuze Water and as such there was no inter-governmental coordination required.</p>
<p><i>What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?</i></p>	<p>The proposed development is to take place on a public owned land; however, it will not negatively impact people's common heritage with respect to the environment.</p>
<p><i>Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?</i></p>	<p>All of the mitigations proposed by the EAP and specialists are realistic and practical.</p>
<p><i>What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?</i></p>	<p>The EMPr will designate responsibility for all conditions. This document will be legally binding and as such any non-compliances with the conditions of the EMPr will effectively be breaking the law; therefore, the Mhlathuze Water will prioritise these items.</p>
<p><i>Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the</i></p>	<p>Due to the nature of the development, no other feasible site alternatives could be considered; please refer to Sections 1.3 and 4.2. In terms of technology alternatives, the preferred alternative will have a smaller construction impact on the watercourse in terms of construction work in the bed and banks. The preferred alternative will also have less impact in</p>

<i>best practicable environmental option in terms of socio-economic considerations.</i>	the long term, post-construction. Due to post-construction impacts being permanent, this technology is seen as much more favourable when considering ecological impacts.
<i>Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area.</i>	The proposed project will have a positive cumulative socio-economic impact. Increased potable water supply to the region.

4.2 Motivation for Preferred Site, Activity and Technology Alternative

4.2.1 Site Alternatives

4.2.1.1 Site Alternative 1 (Preferred Site Alternative)

The project entails the construction of the new DN1500 and the upgrade of the Nsezi WTW. The preferred site for the DN1500 follows the existing cleared servitude, which has been previously cut and is already highly transformed and degraded from its original state. The clearance of vegetation outside of this servitude will be required however this will be directly adjacent to the cleared servitude. Cutting a new alignment between the shooting range and Nsezi WTW would result in the complete transformation of previously undisturbed areas as a new servitude would need to be created. Therefore, in order to avoid significant environmental damage only one site alternative was considered for the proposed DN1500 pipeline in this application.

4.2.2 Design Alternatives

4.2.2.1 Design Alternative 1

Where the pipeline route is required to cross a watercourse, the pipeline will be placed in a concrete casing in the bed of the watercourse. The pipeline will therefore be below the ground, attached to the bedrock, below the water surface. The pipe will not block or impede the flow of water in the watercourses. This crossing technique will have a larger construction impact on the watercourses, in terms of construction work in the bed and banks, but will have less impact in the long term, post construction. Please note this design alternative is the current methodology employed by the applicant with the existing DN1200 which runs along the cleared servitude.

4.2.2.2 Design Alternative 2

The alternative water crossing technology would be to construct pipeline bridges at each watercourse. This would entail building pier structures into the watercourse beds to support the pipes above ground as they cross the watercourse. This approach will have a larger environmental and visual impact at the watercourse crossing. Constructing pier bridges across the watercourses would potentially create long term water flow impedance as a result of the piers located in the watercourse beds and banks. The above-ground pipes will be very visible at each watercourse crossing. This technique would make the pipe susceptible to damage during flood events when the water levels rise, which would demand more infrastructural maintenance and repair for the Mhlathuze Water and will threaten the consistent supply of potable water for all users in this area.

Section 5: Public Participation

5.1 Notification of Interested and Affected Parties

- 1) *Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of:*
 - i. *the site where the activity to which the application or proposed application relates is or is to be undertaken and*
 - ii. *any alternative site*

Three noticeboards (isiZulu and English) were placed along the proposed DN1500 route on the 2nd March 2021. The noticeboard detailed the Mhlathuze Water's proposed plan to construct the D1500 pipeline and upgrade the Nsezi WTW, subject to a basic assessment. See Appendix C – Proof of Placement of Notice Board.

- 2) *Giving written notice, in any of the manners provided for in section 47D of the Act, to:*
 - i. *the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken*
 - ii. *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*
 - iii. *the municipality which has jurisdiction in the area*
 - iv. *any organ of state having jurisdiction in respect of any aspect of the activity, and*
 - v. *any other party as required by the competent authority*

The following steps were taken during the public participation process:

- Noticeboards detailing the proposed development was erected on the site on the 2nd March 2021.
- An English/isiZulu advert was placed in the Zululand Observer on the 4th March 2021.
- The Ward Councillor was notified of the application via email on the 10th March 2021.
- All relevant authorities and stakeholders were notified of the application via email between the 3rd March 2021 and 29th March 2021.
- Land Owner consent was signed by uMhlathuze Local Municipality on the 17th March 2021.
- All relevant authorities and registered I&APs will be given the opportunity to review complete copies of the Draft BAR. The Draft BAR will be circulated for a legislated 30-day comment period.

See Appendix D – Proof of Notification.

- i. *owners, persons in control of, 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;*

Email notifications were sent out to all I&APs between the 3rd March 2021 and 29th March 2021. See Appendix D – Proof of Notification.

- 3) *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;*
- 4) *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 paragraph (c)(ii)*

An An English/isiZulu advert was placed in the Zululand Observer on the 4th March 2021 detailing the proposed project, Basic Assessment requirements and to provide contact details of EnviroPro should anyone wish to register as an I&AP. See Appendix E – Proof of Advert Placement.

5.2 Registered Interested and Affected Parties

42. *A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of:*

- (a) *all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP*
- (b) *all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register and*
- (c) *all organs of state which have jurisdiction in respect of the activity to which the application relates.*

The contact details of all I&APs who have registered have been provided in the Registered I&AP list in Appendix F.

5.3 Comments

Comments of interested and affected parties to be recorded in reports and plans.

- 5) *The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.*
- 6) *Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to-*
 - i. *a lack of skills to read or write*
 - ii. *disability or*
 - iii. *any other disadvantage*
 - iv. *reasonable alternative methods of recording comments must be provided for.*

All comments received from I&APs have been recorded in the comments and response table. The original comments provided have been included together with the C&R table. See Appendix G – Comments and Response table and Comments Received.

Section 6: Impact Assessment

6.1 Methodology to Determine and Rank Significance and Consequences of Impacts Associated With All Alternatives as Per Section 3(h) (vi)

Impacts are assessed qualitatively and quantitatively, looking at the duration / frequency of the activity and likely impacts associated with that activity during both construction and operation. If the activity happens frequently, the risk of the associated impact occurring is much higher than if the activity happens less frequently. The geographical extent of the impact is assessed - i.e. will the impact be restricted to the point of occurrence or will it have a local or regional effect? Impacts are also reviewed looking at severity levels and consequences should the impact occur - i.e. will the severity be low, medium or high? - and then probability of the impact occurring is taken into account.

Whether or not the impact can be mitigated and the extent to which it can be avoided, managed, mitigated, or reversed is assessed - i.e. the probability of occurrence after mitigation has been applied. This also takes into account likelihood of human error based on construction and operational auditing experience - i.e. even though spills can be completely mitigated and prevented, there is always a small chance that spills will still occur (residual risk). Based on all of these factors, the impact is then rated to determine its significance - for example, an impact can have a regional effect with severe environmental implications; however the probability of it occurring is very low, and the implementation of the proposed mitigation measures means that the ultimate rating is medium or low.

Please see below a description of the scoring. The full impact scoring tables detailing how the significance rating was calculated can be found in Appendix H.

Table 15: Scoring of Impacts

Scoring of Impacts	
Duration / Frequency of activity likely to cause impact	0 = No impact 1 = short term / once off 2 = medium term / during operation 3 = long term / permanent
Geographical Extent	0 = No impact 1 = point of impact / restricted to site 2 = local / surrounding area 3 = regional
Severity (level of damage caused) if impact were to occur	0 = No impact 1 = minor 3 = medium 5 = major
Probability of impact without mitigation	1 - 5 = low. 6 -10 = medium. 11 -14 = high.
Significance before application of Mitigation Measures	A score of between 1and 5 is rated as low. A score of between 6 and 10 is rated as medium. A score of between 11 and 14 is rated as high.
Will activity cause irreplaceable loss of resources?	10 = Yes 0 = No
Mitigation measures	0 = No impact - 5 = can be fully mitigated - 3 = can be partially mitigated -1 = unable to be mitigated
Probability of impact after mitigation	0 = No impact 1 = Low 2 = Medium 3 = High
Significance after application of Mitigation Measures	A score of between 1and 5 is rated as low. A score of between 6 and 10 is rated as medium. A score of between 11 and 14 is rated as high.

6.2 Impact Assessment of the Site and Design Alternatives

Table 16: Specific Impacts Associated with Design Alternative 1 (Preferred Design Alternative)

See Appendix H for the full impacts scoring matrix, which assesses the impacts on the below identified sensitive environmental aspects. The specific activities and associated impacts identified in Table 11 below are site-specific and relate to the Preferred Site and Design Alternatives.

Aspect	Nature and Consequences of impact	Sig. rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
Construction				
A) Clearing and earthworks for construction of the pipeline in the RC1, RC2 and RC3.	1) Direct impact: Erosion and loss of soil from the watercourse leading to sedimentation of the downstream wetlands and drainage lines.	8 (Medium)	<p>During construction there will be the loss of wetland areas due to excavations required for the installation of the pipeline. However, this will only be a temporary loss as the pipeline will be placed below the wetland and such upon acceptable rehabilitation wetland areas will return, and such there should be no net loss of wetland. The following measures must be carried out to mitigate against erosion and siltation within the watercourse during construction:</p> <ul style="list-style-type: none"> All areas upstream and downstream of the construction footprint must be demarcated as a 'no-go' zone with snow netting for the duration of the construction process. No site staff are permitted to enter these areas. The recommended buffer of 15m must be implemented. Earth berms or sand bag barrier must be used as storm water and soil barriers to prevent eroded material from entering the surrounding wetland and watercourse areas. When erosion and siltation is observed within the watercourse areas, effort must be made to prevent further erosion in that area. Sand bags and pack rock may be used within these areas to limit the duration period that areas are exposed. No excavated material or fill material may be stored within 15m of any watercourse. Sandbags or pack rock must be placed below the soil stockpiles as berms should erosion start to occur from these areas. Bedding material that will be used must not be stored within 15m of the watercourse before it is used. The recommended buffer of 15m must be implemented. An approved storm water plan (by the ECO) must be adhered to during construction. Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seed bank. Once a rehabilitation method statement has been established and undertaken, monitoring activities must be put in place to verify the progress made on the rehabilitation objectives and targets. An Invasive Alien Plant Control included in the EMPr must be implemented. 	4 (Low)
	2) Cumulative Impacts: Erosion and loss of material leading to deposition of material downstream of the wetland affecting other wetland systems.	9 (Medium)		5 (Low)
	3) Direct Impact: The construction and excavation activity of the wetlands area within the pipeline footprint will result in temporary loss of wetland area (555m ²) during construction.	9 (Medium)		5 (Low)
	4) Cumulative Impact: Potential for reduced wetland area functionality for the wider wetland system.	8 (Medium)		4 (Low)
B) Operation of vehicles and use of construction	5) Direct Impact: Direct and cumulative damage to the wider wetland	8 (Medium)	The following measures must be carried out to mitigate potential damage to the wetland area during construction of the road:	4 (Low)

⁸ See Appendix H for more details.

Aspect	Nature and Consequences of impact	Sig. rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
<p>equipment within the wetland areas associated with WC1, WC2 and WC3 during the construction of the pipeline.</p>	<p>areas outside of the construction area.</p>		<ul style="list-style-type: none"> • There will be work within the wetland area as per the layout; however areas of the wetland not within the construction footprint must be demarcated as no-go areas. The recommended buffer of 15m must be implemented; • Heavy vehicles must avoid working near the wetland areas as far as possible. Where heavy vehicles are required to work in the wetland during the construction of the pipeline, these vehicles must remain in the authorised working corridor footprint. There must be no haphazard entry into/exit from the wetland - i.e. construction plant and vehicles may only travel along existing access routes and may only use a single point of entry into and out of the wetlands. • The contractor must limit in-stream work to minimize streambank and bed disturbance. • Construct the pipeline in the dry season where possible when water levels will be lowest and the risk of erosion and downstream siltation is lowest. • Any disturbed areas within the construction footprint must be rehabilitated within a month of occurrence to the satisfaction of the ECO and or DEFF Compliance Authorities. • All activity within the wetland must be strictly according to the prescribed engineering designs and approved drawings. • No soil stockpiling may take place within 15m of any watercourse. • Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seed bank. • Once a rehabilitation plan has been established and undertaken, monitoring activities must be put in place to verify the progress made on the rehabilitation objectives and targets. • An extensive Invasive Alien Plant Programme must be developed and implemented. No herbicides are to be used within or adjacent to aquatic ecosystems. No herbicide is to be applied on windy days to prevent drift. • Areas that have been cleared of invasive vegetation must be re-vegetated with indigenous pioneer species local to the area. This will aid in impeding the growth of IAPs. These areas must be monitored to ensure suitable vegetation growth. 	
<p>C) Draining excavated areas during construction.</p>	<p>6) Direct Impact: Draining the excavated areas can cause major siltation of downstream wetland and drainage lines.</p>	<p>8 (Medium)</p>	<p>The draining of the excavated areas during construction is essential in order for construction activity to take place for laying of the pipeline within watercourses (such as pouring concrete). The following mitigation measures must be carried out:</p> <ul style="list-style-type: none"> • Where possible, all excavated areas must be drained into a temporary settling pond before releasing the water into the downstream wetland area • Where this is not possible or practical, the pumped water must be released onto renomattresses or pack rock to prevent the scouring and resultant downstream erosion from the pumped pipe outflow • Drip trays must be used under all fuel operated machinery at all times. 	<p>4 (Low)</p>
	<p>7) Direct Impact: Hydrocarbon spills can occur through careless management of fuel operated machinery</p>	<p>7 (Medium)</p>		<p>3 (Low)</p>

Aspect	Nature and Consequences of impact	Sig. rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
	such as pumps and generators.			
D) Clearing of vegetation for the establishment of the working corridor	8) Direct Impact: Degradation, destruction and fragmentation of 56687m ² of high-very high sensitive habitats.	8 (Medium)	This impact cannot be completely mitigated as there will be vegetation loss, however, the following measures must be carried out to mitigate unnecessary and preventable vegetation clearing and limit the damage: <ul style="list-style-type: none"> • Sensitive areas must be specifically demarcated to prevent movement of workers into sensitive surrounding environments. All areas outside the working corridor must be demarcated as a 'no-go' zone with snow netting for the duration of the construction process. No site staff are permitted to enter these areas. • Areas that are denuded during construction must be re-vegetated with indigenous vegetation; this will also reduce the likelihood of encroachment by Invasive Alien Plant species. • No staff may bring or plant any plant species into any portion of the project area, unless undertaken in line with the required/approved rehabilitation. No plant species whether indigenous or exotic must be brought into the project area, to prevent the spread of exotic or invasive species. • Areas regarded as sensitive must under no circumstances be fragmented or disturbed further or used as an area for dumping of waste, laydown or infringement. • The Contractor must inform all site staff as to the use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities. The recommended number of ablution facilities according to the Environmental Health and Safety Act should be implemented. Ablution facilities must be regularly serviced in order to prevent spillage and pose a health hazard. • The Contractor must supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. • Where a registered disposal facility is not available close to the site, the Contractor must provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site. Temporary storage of domestic waste shall be in covered waste skips. • Stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised and be surrounded by bunds. • Permits must be obtained from Ezemvelo KZN Wildlife and The Department of Environment, Forestry and Fisheries if any protected species are to be relocated and/or removed. 	6 (Medium)
	9) Direct Impact: Disruption/alteration of species activities (breeding, migration, feeding) due to noise, vibration and dust	8 (Medium)	The following measures must be carried out to mitigate against excessive and preventable impact on fauna: <ul style="list-style-type: none"> • Sensitive areas must be specifically demarcated to prevent movement of workers into sensitive surrounding environments. All areas outside the working corridor must 	5 (Low)

Aspect	Nature and Consequences of impact	Sig. rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
	<p>10) Direct Impact: Direct mortality of fauna</p>	8 (Medium)	<p>be demarcated as a 'no-go' zone with snow netting for the duration of the construction process. No site staff are permitted to enter these areas.</p> <ul style="list-style-type: none"> • If any indigenous faunal species are recorded during construction, activities must temporarily cease to allow fauna to move off. In the event that fauna does not voluntarily move away, an appropriate specialist must be consulted to identify the correct course of action. • Fauna species such as frogs and reptiles that have not moved away must be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified ECO, trained in the handling and relocation of animals. • The duration of the construction must be minimised to as short-term as possible, in order to reduce the period of disturbance on fauna. • Any open trenches that are left open for more than two hours, must have at least one end that is sloped/tapered, in order to allow animals that fall in to escape. If this is not possible, then branches must be placed inside the trenches allowing small animals to climb out. • Prior and during vegetation clearance, any larger fauna species noted must be given the opportunity to move away from the construction machinery. • No trapping, killing or poisoning of any wildlife is to be allowed on-site, including snakes, birds, lizards, frogs, insects or mammals. • During the construction phase, noise and vibrations must be kept to a minimum to reduce the impact on the fauna. • During the construction phase, no construction is to occur at night to minimise all possible disturbances to amphibian species possibly inhabiting the wetland. • Staff must be educated about the sensitivity of faunal species and measures must be put in place to deal with any species that are encountered during the construction process. • Appropriate measures must be implemented to prevent excessive noise and vibration. No construction is to occur at night to avoid disturbance to amphibians. 	4 (Low)
	<p>11) Direct Impact: Removal of alien invasive vegetation found along the pipeline route.</p>	0 (Positive)	<ul style="list-style-type: none"> • This is a positive impact. 	4 (Low)
	<p>12) Indirect Impact: Encroachment of alien vegetation into cleared areas.</p>	9 (Medium)	<p>There is currently a significant amount of alien vegetation located on the site and within the surrounding area.</p> <ul style="list-style-type: none"> • An extensive Invasive Alien Plant Programme must be developed and implemented. No herbicides are to be used within and adjacent to aquatic ecosystems. No herbicide is to be applied on windy days to prevent drift. • Areas that have been cleared of invasive vegetation must be re-vegetated with indigenous pioneer species local to the area. This will aid in impeding the growth of IAPs. These areas must be monitored to ensure suitable vegetation growth. 	5 (Low)

Aspect	Nature and Consequences of impact	Sig. rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
E) Construction activity in areas with no vegetated cover.	13) Direct Impact: Erosion on exposed banks and areas resulting in scouring, blocked storm water systems and the siltation of watercourses and wetlands.	7 (Medium)	This impact is partially unavoidable as the construction activity will need to take place over cleared exposed areas. The following mitigation measures must, however, be applied: <ul style="list-style-type: none"> • Exposed banks that are susceptible to erosion within 15m of the edge of watercourse must not be left exposed for more than 2 months at any time. • Erosion/ storm water protection measures must be implemented above and below the slope in the form of sand bag berms, pack rock berms or even vegetation berms to slow runoff down the slope. • Any accumulated siltation that enters a watercourse must be removed by spade and shovel (by hand). • Exposed cut and fill slopes near the riparian areas must be top soiled, hydro seeded or have grass sods planted within 4 weeks of being cut. 	3 (Low)
F) Handling of hazardous chemicals on site	14) Direct Impact: Spilling of hazardous chemicals into the receiving environment and penetrating into sensitive habitats	7 (Medium)	The following measures must be carried out to mitigate the contamination of the environment with hazardous chemicals: <ul style="list-style-type: none"> • Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be routinely maintained, and all re-fuelling and servicing of equipment is to take place in low-sensitivity demarcated areas. • The contractor must have action plans on site and training for sub-contractors and employees in the event spills, leaks and hazardous chemical spills to the surrounding environment. A specialist Contractor must be used for the bioremediation of contaminated soil where the required remediation material and expertise is not available on site. A Hazardous Chemical Spill Contingency Plan must be compiled. 	3 (Low)
G) Sourcing of layer work material	15) Indirect Impact: Sourcing material from unlicensed borrow pits and sand mines in an illegal and unplanned manner can be dangerous to the surrounding community and detrimental to the local environment.	6 (Medium)	Bedding material is often sourced from local quarries or sand mines. The following criteria must be adhered to: <ul style="list-style-type: none"> • Any local quarry or sand mine used must be a permitted source through DMR. • The contractor excavating the material must do so within the parameters of the mining permit, adhering to the EMP conditions for that particular site. 	1 (Low)
H) Clearing and excavation for creation of the pipeline.	16) Direct Impact: Impact on existing services i.e., powerlines, water pipes etc.	9 (Medium)	The following measures must be implemented prior to and during excavation along the entire route of the pipeline: <ul style="list-style-type: none"> • All existing services must be identified and be relocated prior to construction • During excavations the first 300 mm of soil (i.e. topsoil) must be stockpiled separately from the soil excavated deeper than 300 mm • The pipeline system must be divided up into 100 m intervals. Each interval's soil must be stockpiled and filled back up (in the correct order) to avoid long periods of stockpiling. 	4 (Low)

Aspect	Nature and Consequences of impact	Sig. rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
I) The construction period of DN1500 pipeline.	17) Indirect impact: This is a positive impact for the community through the potential creation of local employment.	0 (Positive)	This is a positive impact.	0 (Positive)
Operation				
J) Placement of the DN1500 pipeline.	18) Direct impact: Incomplete trenching and rehabilitation of the site resulting in long-term erosion around watercourses and damage to watercourse banks where pipe crossings have been placed.	8 (Medium)	The following measures must be carried out to mitigate long term erosion: <ul style="list-style-type: none"> • Trench rehabilitation must be effectively carried out before contractors leave the site. • Soil in the trenches must be compacted effectively to the same level or slightly higher than the surrounding land to prevent settling which could create depressions for water to travel along, creating erosion funnels and exposing the pipeline. • Indigenous vegetation must be planted after the soil has been compacted. The vegetation must have taken successfully before contractors leave the site. 	4 (Low)
	19) Direct impact: Improper placement of pipes in the beds of watercourses resulting in permanent impact on the flow regime of the watercourses.	8 (Medium)	Please note, due to the placement of the pipeline underneath the bed of the watercourses, the pipelines will not impact the flow regime of the rivers during operation. However, the following must be implemented: <ul style="list-style-type: none"> • The pipeline must be built as per the approved engineering designs. 	4 (Low)
	20) Direct impact: Loss of high-very high sensitive habitats	12 (High)	There will be the long-term loss of indigenous vegetation in order to maintain a wider pipeline servitude at some points along the route, however this impact can be reduced through the implementation of acceptable rehabilitation throughout the entire working corridor. The following measures must be carried out to ensure the impact as a result of the loss of indigenous vegetation is reduced: <ul style="list-style-type: none"> • Progressive rehabilitation that has taken place during construction must be monitored annually by an independent auditor. • Where required, additional indigenous species must be planted to the satisfactory of the independent auditor • Once a rehabilitation method statement has been established and undertaken, monitoring activities must be put in place to verify the progress made on the rehabilitation objectives and targets. • An extensive Invasive Alien Plant Programme must be developed and implemented post construction and must form part of the annual independent audit. 	10 (High)
	21) Indirect impact: Emigration of fauna due to altered habitat conditions	10 (Medium)		6 (Medium)
	22) Indirect impact: Construction of the DN1500 pipeline resulting in increased	0 (Positive)	This is a positive impact.	0 (Positive)

Aspect	Nature and Consequences of impact	Sig. rating of impacts ⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
	potable water supply into the region.			
	23) Indirect impact: Failure of the pipeline resulting in localised flooding and erosion.	7 (Medium)	Various measures to ensure pipe integrity must be implemented including: <ul style="list-style-type: none"> • The pipeline test pressure according to SANS 2001: DP2 must be 1.5 times the working pressure of the pipeline, up to a maximum of 10 bar • Testing of welds to Mhlathuze Water specifications must be strictly controlled and test results verified periodically by an independent party. Hydraulic pressure testing must be carried out with open fox holes at joints. 	3 (Low)
K) Maintenance of the DN1500 pipeline	24) Direct impact: Poor maintenance of the pipeline servitude resulting in IAP encroachment into disturbed areas arising from construction activity	9 (Positive)	The following measures must be carried out to ensure there is no IAP encroachment: <ul style="list-style-type: none"> • An extensive Invasive Alien Plant Programme must be developed and implemented post construction and must from part of the annual independent audit. 	5 (Low)

Table 17: Site Specific Impacts Associated with Design Alternative 2

See Appendix H for the full impacts scoring matrix, which assesses the impacts on the above system. The impacts relating to the Design Alternative 1 (Preferred Design Alternative) and Design Alternative 2 are very similar, therefore the impacts below include the impacts which differentiate the most between the two Design Alternatives.

Aspect	Nature and Consequences of impact	Sig. rating of impacts ⁹ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
Construction				
L) Construction of the pier bridges	25) Indirect impact: Increased construction costs due to the pier bridge construction methodology resulting in increased economic strain on Mhlathuze Water	13 (High)	This impact cannot be mitigated.	16 (High)
Operation				
M) Placement of piers	26) Direct impact: Improper placement of piers to support the pipes across the watercourses resulting in permanent impact on the flow regime of the watercourses.	8 (Medium)	The following must be implemented to mitigate any permanent impact on the flow regime: <ul style="list-style-type: none"> • The number of concrete piers located in the watercourse must be limited. • Piers must be placed outside of preferential flow paths with the least number of pier structures used as possible • Where possible the pipeline should span the entire width of the watercourse, therefore negating the need for any piers in the watercourse. 	4 (Low)
	27) Direct impact: Operation of a pier pipeline structure which can increase the exposure to flood damage and consequential ongoing maintenance and service disruption.	8 (Medium)	The following must be implemented to mitigate any damage from flood events: <ul style="list-style-type: none"> • The pipeline must be raised above the 1:100-year flood line level to avoid flood damage. • The raised pipe must include additional reinforcement for protection from weathering. 	4 (Low)

⁹ See Appendix H for more details.

Table 18: Standard Construction Impacts Associated with Site Alternative 1 (Preferred) and Design Alternative 1 (Preferred) and Design Alternative 2

See Appendix H for the full impacts scoring matrix, which assesses the generic impacts associated with project and to all site and design alternatives.

Aspect	Nature and Consequences of impact	Sig. rating of impacts ¹⁰ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
N) Cleared exposed surfaces from the construction activity.	28) Direct impact: On site erosion due to improper management of storm water by the contractor during construction.	7 (Medium)	<p>Areas exposed to erosion must be protected. The following apply to erosion control on site:</p> <ul style="list-style-type: none"> • Sand bags, berms, stone pitching must be used to control erosion from forming during construction. • No excavated material or fill material may be stored within the watercourses or within 15m of the watercourses. • Bedding material that will be re-worked may not be stored within 15m of the watercourses before it is used. • Temporary stormwater measures should be implemented to ensure that material does not wash off the surface into any watercourse during construction. 	3 (Low)
O) Construction vehicles driving along gravel roads and moving across areas of exposed soil, dusty conditions generated during construction and by construction vehicles.	29) Direct impact: Dusty conditions impacting on air quality affecting community members and fauna along the construction route.	8 (Medium)	<p>There will be increased dust generated during the construction phase; however, this will be on a temporary basis - i.e. the site will be worked continuously for a few months until construction is completed. Further to this:</p> <ul style="list-style-type: none"> • Vehicle speed limits within the construction areas must be reduced to 40km/hr to reduce the amount of dust raised along the gravel roads to and from the site. • The material being transported to the site in the back of the trucks must be covered. • Water carts must be used on site should dust levels elevate to a nuisance level. • Shade cloth must be utilised for stockpiled materials where required. • The applicant must comply with the National Dust Regulations (Government Notice R827, 2013) with regards to dust levels produced on site. 	5 (Low)
P) Construction vehicles and personnel working in the area during construction.	30) Direct impact: Creating a nuisance to the surrounding area and residents.	7 (Medium)	<ul style="list-style-type: none"> • The work area must be designated to prevent trespassing onto adjacent properties. • Speed limits will be obeyed and enforced by the contractor. • A complaints register will be kept on site in the environmental file. 	3 (Low)
Q) Increase daily presence of heavy vehicle and plant traffic on	31) Indirect impact: Impacting existing traffic conditions and pedestrians.	7 (Medium)	<p>The construction activity will pose an increased risk to pedestrians and traffic. This cannot be avoided as traffic will increase during the construction phase temporarily (for a few months) until construction is completed.</p> <ul style="list-style-type: none"> • Appropriate construction safety signage must be erected to notify of construction activities and potential hazards on site 	5 (Low)

¹⁰ See Appendix H for more details.

Aspect	Nature and Consequences of impact	Sig. rating of impacts ¹⁰ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
adjacent roads.			<ul style="list-style-type: none"> Flagmen must be in attendance to direct traffic where required. 	
R) An increase in heavy vehicles and plant.	32) Indirect impact: Emissions from construction vehicles associated with the construction activities.	6 (Medium)	<p>The construction phase of the project will see the increase in vehicles moving through the area which will result in the increase of emissions into the atmosphere.</p> <ul style="list-style-type: none"> All construction vehicles operating on the site must be fitted with the appropriate silencers and exhausts in order to reduce the emissions and noise into the atmosphere. 	4 (Low)
S) Excavations taking place on site.	33) Direct impact: Unidentified existing services being impacted on site.	8 (Medium)	<p>Services have been identified on the site; however, any unidentified services that will be impacted must follow:</p> <ul style="list-style-type: none"> As standard construction practice, the engineer and contractor must identify any potential existing services that may be affected before construction. Any infrastructure that is removed must be replaced, and any damage caused by construction must be repaired. 	4 (Low)
T) Generation and storage of waste during construction.	34) Direct impact: Improper storage of waste on site resulting in littering and impact on environment on site affecting surrounding community. Incorrect disposal of waste leading to pollution at the dump site or at sites where waste may be illegally disposed of.	8 (Medium)	<p>The construction phase of the project will see an increase in workers on site and therefore an increase in waste in the area.</p> <ul style="list-style-type: none"> Littering will not be permitted in the study area Designated waste storage areas with appropriate waste receptacles must be set up within the construction site camp Waste will be removed from site and disposed of at a registered waste disposal site Safe disposal slips for the disposal of all waste must be obtained and kept on site as proof of safe disposal Waste management will be controlled through the implementation of the EMP. This impact can be managed and mitigated. 	4 (Low)
U) Insufficient number of toilet facilities on site	35) Direct impact: Construction staff having to use the surrounding areas as ablutions, resulting in contamination of the environment.	9 (Medium)	<p>The increase in construction personnel during the construction phase will require an appropriate number of toilet facilities for the site.</p> <ul style="list-style-type: none"> Appropriate and sufficient toilet facilities (1 toilet per 15 employees) must be provided by the contractor; All toilet facilities must be checked on a daily basis All toilet facilities must be emptied and cleaned on a weekly basis. 	5 (Low)
V) Inappropriate disposal of toilet waste.	36) Indirect impact: Resulting in the contamination of the environment.	7 (Medium)	<p>The following mitigation measures must be adhered to:</p> <ul style="list-style-type: none"> All toilet facilities on site utilised by the construction personnel must be checked on a daily basis and emptied on a weekly basis by the contractor A registered waste removal contractor must remove sewage waste from site or sewage waste must be disposed of at a permitted Waste Water Treatment Site Safe disposal slips for the disposal of effluent waste must be obtained and kept on site as proof of safe disposal. 	2 (Low)
W) Generation of noise associated	37) Direct impact: Excessive noise pollution on site.	8 (Medium)	<p>The construction phase of the project will see the increase in vehicles moving through the area which will result in the increase of noise.</p>	5 (Low)

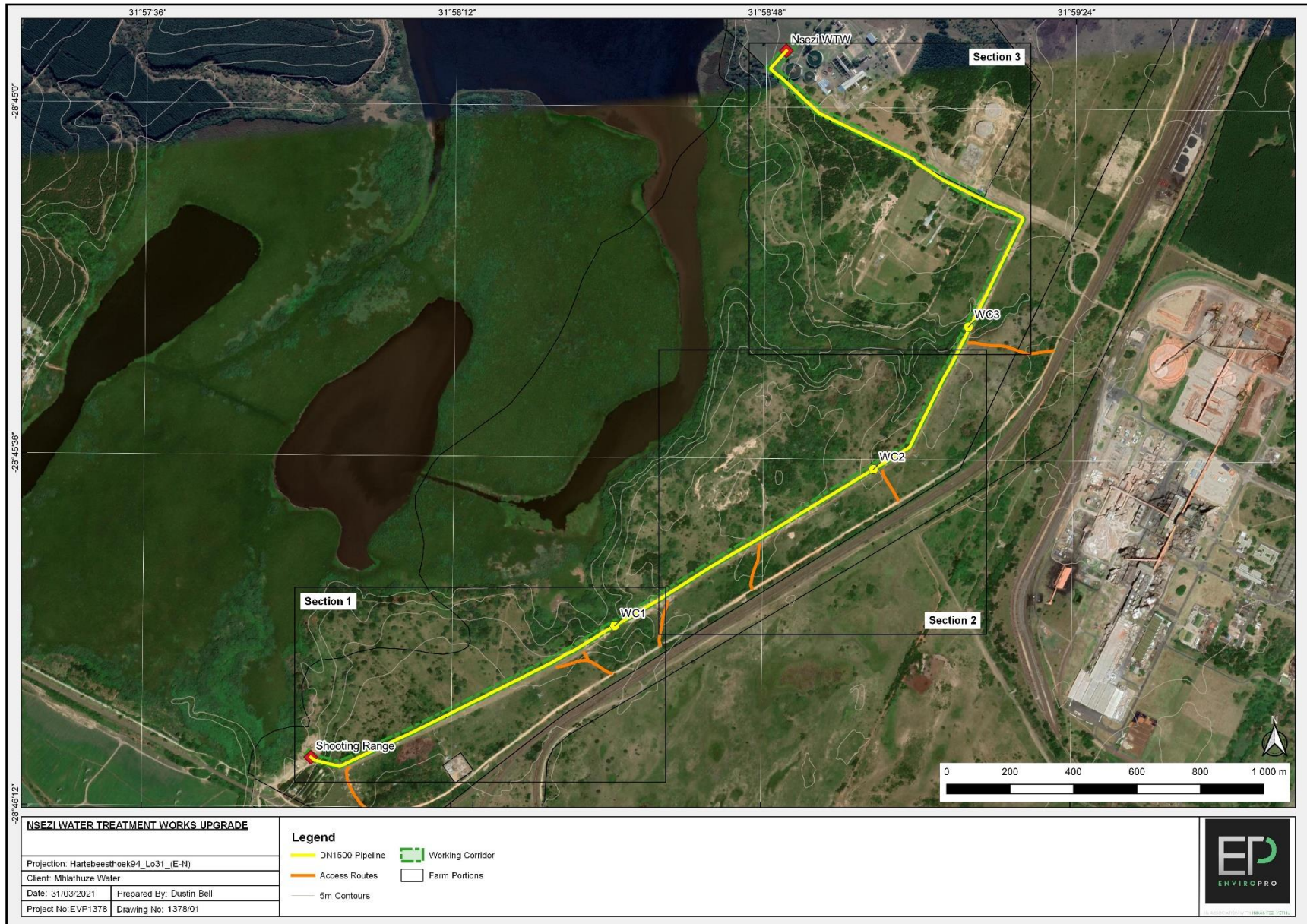
Aspect	Nature and Consequences of impact	Sig. rating of impacts ¹⁰ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
with the construction plant and activity.			<ul style="list-style-type: none"> All construction vehicles operating on site must be fitted with standard silencers to reduce the noise levels produced. 	
X) Construction work taking place outside of the construction footprint.	38) Direct impact: Damage to adjacent properties during construction.	7 (Medium)	<p>The following mitigation measures must be adhered to:</p> <ul style="list-style-type: none"> All services must be identified prior to construction through notifying surrounding stakeholders prior to any potential traffic congestion The contractor must create alternative access routes to the properties where required The contractor must be aware of the stakeholders' movements and where possible, disruptive activities must be scheduled outside of peak traffic hours Surrounding land owners and stakeholders must be notified prior to disruptive activities during construction Any infrastructure that gets removed must be replaced and any damage caused from construction must be repaired. 	3 (Low)

6.3 Environmental Impact Statement as per section (I)

The critical impacts associated with the construction of the DN1500 pipeline relate to those during the construction period, specifically the construction of the pipeline across the identified watercourses on site and the clearance of vegetation associated within the working corridor. These construction-related impacts will be temporary and, as such, the impact areas can be rehabilitated once construction has been completed. If a successful progressive rehabilitation plan is implemented on site, impacts relating to the clearance of vegetation can be significantly reduced. In addition, an extensive Invasive Alien Plant Programme must be implemented to ensure this low rating. The crossing of the watercourses is unavoidable; however, if all identified mitigation measures are implemented - which includes adhering to the recommended 15m buffer - all impacts have been rated as low. Operational impacts relate to the incorrect construction techniques and poor rehabilitation of the site leading to long standing impacts. Therefore, if all identified operations impacts are implemented all operational impacts can be avoided. A number of positive impacts may result from the construction of the DN1500 pipeline; these relate to increasing the supply of potable water in the region. The primary mitigation measure is that all construction activities must be confined to the proposed working corridor. Once construction is complete there should be no significant impacts related to the operation of DN1500 pipeline, as depicted in Figure 15 below.

Taking into consideration the above impacts and mitigation measures, it is the EAP's opinion that the construction of the DN1500 pipeline is authorised.

Figure 15: Aerial Photograph Showing The DN1500 Pipeline Which Also Indicates The Working Corridor.



6.4 Impact Management Objectives and Outcomes for the Development for Inclusion in the EMPr as Per Section 3(m)

The following objectives and outcomes must be considered for this project:

- Objectives:
 - For there to be no lasting negative impacts on the environment once construction is complete, specifically within the identified indigenous vegetation and wetland areas.
 - To practice responsible construction, 'best practice', with regards to housekeeping on-site during construction (outlined within the EMPr) and enforce the polluter pays principle. The applicant/contractor must be responsible for their actions on-site during construction and the rehabilitation of the site post-construction.
- Outcomes:
 - To promote sustainable development. Create infrastructure and an environment that is healthy and sustainable for future generations.

6.5 Assumptions, Uncertainties and Gaps in Knowledge Relating To the Assessment and Mitigation Measures Proposed As Per Section 3(o)

The information in this report is based on findings of the appointed specialists. The design drawings have been provided to the EAP by the engineer. A site visit has been conducted by the EAP.

6.6 Period for Which Authorization Is Required, Proposed Monitoring and Auditing and Post Construction Requirements

Environmental authorisation is required for the construction of the DN1500 pipeline within 2021; therefore, the authorization would need to be valid for a period of five years, within which time construction would need to commence.

Given the nature of this project, it is recommended that **monthly** ECO audits be carried out for the duration of the construction phase of this project. One post construction audit should be conducted once construction is complete.

The EMPr details the post construction, rehabilitation, and closure objectives which will be monitored by the ECO and compliance authorities.

6.7 Financial Provisions as Per Section 3(s)

The contractor is responsible for and must ensure that the site has been rehabilitated in full before leaving the site. No upfront financial provision is required for this project.

6.8 EAP Opinion on Whether Or Not to Authorise Activity and Recommendations and Conditions for Authorisation as Per Section 3(n) and (p)

With respect to the design alternatives, it is recommended that preferred Design Alternative 1 be authorised. The significance of the impacts associated with the project are considered to be 'low'.

6.9 Summary of Additional Recommendations To Be included As Part of the Environmental Authorisation:

Stakeholders, Properties & Services

- As standard construction practices, the engineer and contractor must identify all existing services that may be affected before construction.

Traffic & Construction Pedestrians

- Appropriate signage and barriers must be used to cordon off construction areas.
- All construction vehicles must be fitted with the appropriate silencers and exhausts.

Housekeeping, waste management, storage, and materials handling

- Littering must not be permitted on site.
- All hazardous materials and substances must be stored within a secured area in the construction camp. The storage area should be a hard-surfaced, bunded, and covered area.
- Cement mixing must be done on a hard surface that is protected from stormwater runoff.
- Contractors must be required to dispose of construction rubble at an appropriate landfill site. Delivery notes and safe disposal certificates to prove appropriate disposal should be available.
- Appropriate and sufficient toilet facilities must be provided by the contractor.
- Toilet facilities must be provided by a registered company and all sewage must be disposed of at an appropriate facility. Safe disposal certificates must be kept on record.

- Toilet facilities must not be located within 32m of any watercourse.

Dust and erosion control

- A water cart must be used to dampen dusty surfaces and suppress dust.
- Exposed areas must be rehabilitated and revegetated as soon as possible during construction.
- Areas exposed to erosion must be protected through the use of sandbags, berms and efficient construction processes - i.e.: limiting the extent (footprint) and duration period that areas are exposed. The contractor must ensure that any blockages created during construction are resolved.

Protection of the watercourses

- All watercourses must be demarcated to prevent movement of workers into these areas. All areas outside the working area must be demarcated as a 'no-go' zone with snow netting for the duration of the construction process. No site staff are permitted to enter these areas.
- The engineer/contractor must ensure that only clean stormwater runoff enters the environment. Any contaminated runoff must be collected and disposed of at an appropriate waste facility.
- No excavated material or fill material may be stored within the drainage line or 15m of any watercourse.
- Only the area directly in the path of construction may be cleared and excavated. The remainder of the watercourse must be demarcated as a 'no-go' area.
- Heavy vehicles must avoid working near the watercourse as much as possible.
- Stormwater must not be channelled directly into any water body without the flow velocity being slowed. Channelled flows must be diffused.

Protection of the indigenous vegetation

- Sensitive areas must be specifically demarcated to prevent movement of workers into sensitive surrounding environments. All areas outside the working corridor must be demarcated as a 'no-go' zone with snow netting for the duration of the construction process. No site staff are permitted to enter these areas.
- A progressive rehabilitation must be developed and implemented.
- An extensive Invasive Alien Plant Programme must be developed and implemented.
- Areas that are denuded during construction must be re-vegetated with indigenous vegetation. This will also reduce the likelihood of encroachment by Invasive Alien Plant species.
- Permits must be obtained from Ezemvelo KZN Wildlife and The Department of Environment, Forestry and Fisheries if any protected species are to be relocated and/or removed.

Protection of Heritage Resources

- Attention is drawn to the South African Heritage Resources Act, 1999 (Act No. 25 of 1999) and the KwaZulu-Natal Heritage Act (Act no 4 of 2008) which require that operations that expose archaeological or historical remains should cease immediately, pending evaluation by the provincial heritage agency.

Appendix A: Drawings and Maps

Appendix B: Specialist Reports

No.	Prepared By	Authors	Professional Registrations	Title of Report	Date of Report
1	The Biodiversity Company	Rian Pienaar	Cand. Sci. Nat.	Wetland Baseline and Impact Assessment for the Nsezi Water Treatment Works Project	March 2021
2	The Biodiversity Company	Dr. Mahomed Desai	Pr. Sci. Nat.	Nsezi Water Treatment Plant Upgrade - Biodiversity Impact Assessment	March 2021
3	JLB Consulting	Jean Beater	ASAPA - Amafa	Nsezi New DN1500 Raw Water Pipeline, Richards Bay, Kwazulu-Natal Phase 1 Heritage Impact Assessment	March 2021
4	Geosure	Francis Smith	Pr. Sci. Nat.	Preliminary Geotechnical Investigation	March 2021

Appendix C: Noticeboard

Appendix D: Notification

Notification Register
Adjacent Landowner Map
Notification Email
Ward Councillor Notification Email
Advert
Land Owner Consent
SAHRIS Upload

Appendix E: Registered I&APs

Appendix F: Comments and Responses

Appendix G: Impacts Scoring Matrix

Appendix H: EAP Declaration

Appendix I: Environmental Management Programme