# Terms of Reference for Environmental and Social Impact Assessment (ESIA)

# Umkomaas Regional Sewage Treatment Plant

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Annexure D: Terms of Reference for Livelihood Restoration Plan
Annexure E: Terms of Reference for Integrated Water Use Licence Application

| Acronym | Description |
|---|---|
| AEL | Atmospheric Emissions Licence |
| BAP | Biodiversity Action Plan |
| BMP | Biodiversity Management Plan |
| CBA | Critical Biodiversity Area |
| CHP | Combined Heat and Power |
| CLO | Community Liaison Officer |
| COD | Chemical Oxygen Demand |
| CWDP | Coastal Waters Discharge Permit |
| DFFE | Department Forestry, Fisheries and the Environment |
| DWS | Department of Water and Sanitation |
| DWAF | Department of Water Affairs and Forestry (*now DWS*) |
| EA | Environmental Authorisation |
| EAP | Environmental Assessment Practitioner |
| EAPASA | Environmental Assessment Practitioners Association of South Africa |
| EHS | Environmental, Health and Safety |
| EIA | Environmental Impact Assessment |
| EIS | Ecological Importance and Sensitivity |
| EPC | Engineering Procurement and Construction |
| ESIA | Environmental and Social Impact Assessment |
| ESMP | Environmental and Social Management Plan |
| ESSS | Environmental and Social Scoping Study |
| EWS | eThekwini Water and Sanitation |
| GAC | Granular Activated Carbon |
| GRM | Grievance Redress Mechanism |
| GHG | Greenhouse Gas |
| GRP | Glass Reinforced Plastic |
| HMP | Heritage Management Plan |
| IFC | International Finance Corporation |
| iWULA | Integrated Water Use Licence Application |
| IWWMP | Integrated Water and Waste Management Plan |
| KZN EDTEA | KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs |
| LRP | Livelihood Restoration Plan |
| MHI | Major Hazardous Installation |
| MLD | Megalitres Per Day |
| NEMA | National Environmental Management Act (Act No. 107 of 1998) (as amended) |
| NEM:WA | National Environmental Management: Waste Act (Act No. 59 of 2008) (as amended) |

| Acronym | Description |
|---|---|
| NGO | Non-Governmental Organisation |
| NHRA | National Heritage Resources Act (Act No. 25 of 1999) |
| NWA | National Water Act (Act No. 36 of 1998) (as amended) |
| OHSA | Occupational Health and Safety Act (Act No. 85 of 1993) |
| O&M | Operation and Maintenance |
| PAP | Project Affected Person |
| PE | Population Equivalent |
| PES | Present Ecological State |
| PPP | Public Private Partnership |
| PST | Primary Settling Tank |
| PVC | Polyvinyl Chloride |
| PWWF | Peak Wet Weather Flow |
| Pr.Sci.Nat. | Professional Natural Scientist |
| PS | Performance Standard / Pump Station |
| RAP | Resettlement Action Plan |
| REC | Recommended Ecological Category |
| RQO | Resource Quality Objective |
| SACNASP | South African Council of Natural and Scientific Professionals |
| SANS | South African National Standards |
| SAPPI | South African Pulp and Paper Industries |
| SEP | Stakeholder Engagement Plan |
| SOUR | Specific Oxygen Uptake Rate |
| STP | Sewage Treatment Plant |
| TEP | Treated Effluent Pipeline |
| THP | Thermal Hydrolysis Process |
| TKN | Total Kjeldahl Nitrogen |
| TMP | Traffic Management Plan |
| ToR | Terms of Reference |
| TP | Total Phosphate |
| TSS | Total Suspended Solids |
| UNESCO | United Nations Educational, Scientific and Cultural Organisation |
| VFA | Volatile Fatty Acids |
| WAS | Waste Activated Sludge |
| WBG | World Bank Group |
| WHO | World Health Organisation |
| WML | Waste Management License |
| WUL | Water Use License |

# 1 INTRODUCTION

## 1.1 Background

The recent, on-going and anticipated future regional and economic growth developments in the Umkomaas region will inevitably result in a significant shortfall in the capacity of the region's wastewater treatment facilities. The considerable adverse implications this would inevitably have for the environment prompted the eThekwini Water and Sanitation (EWS) to investigate sustainable solutions to the problem.

EWS has a statutory obligation to ensure the provision of water services, which include sanitation services, to communities in a sustainable manner and has the right to administer water and sanitation services limited to potable water supply systems and domestic wastewater and sewage disposal systems. Furthermore, the Municipal Systems Act (Act 32 of 2000) and Water Services Act (Act 108 of 1997) place an obligation on EWS to ensure that water and sanitation services are provided to its community.

At present, the Umkomaas region is serviced by the Craigieburn, Magabeni and Umkomaas Sewage Treatment Plants (STPs). Two of these STPs (Craigieburn and Umkomaas) will be replaced by the new proposed regional Umkomaas STP.

The eThekwini Municipality has requested the International Finance Cooperation's (IFCs) advisory services in the Public Private Partnerships (PPP) unit to act as a lead transaction advisor to assess the potential to design, finance, construct, operate and maintain a new regional STP at Umkomaas as a Public Private Partnership (PPP). The ultimate objective of the project is for the eThekwini Municipality to improve levels of service and to increase the availability and reliability of water resources.

Royal HaskoningDHV accordingly conducted an Environmental and Social Scoping Study (ESSS) in 2021 for the new STP as well as ancillary infrastructure. This ESSS formed the basis to define the minimum expected content of the Environmental and Social Impact Assessment (ESIA) that will have to be developed by the selected concessionaire as part of its contractual obligations and as such, is the object of the present TOR.

## 1.2 Project Context

EWS intends to construct a new regional STP within the uMkhomazi catchment in the southern part of the eThekwini Metropolitan Municipality. A proposed provisional plant capacity of 11 Megalitres per day (MLD) STP is planned to serve the greater catchment in order to accommodate both existing and future flows generated within the catchment area. The proposed STP will cater for the uMkhomazi catchment, which includes the catchment area of the old Umkomaas and Craigieburn STPs as well as adjoining areas. The capacity of the new STP allows for the projected growth of sewage flows to year 2052, beyond which future expansion to the regional STP would be required.

### 1.2.1 Effluent Standards

The treated effluent will be used by the neighbouring Sappi Saiccor pulp plant as non-pulp process water and then disposed through the plant's sea outfall. During periods of planned annual maintenance and shut-down of the Sappi mill, during which the Sappi mill is unable to take effluent (which will normally be for 2 weeks per year), treated effluent will be discharged to the uMkhomazi River.

The quality of the treated effluent shall comply with criteria under two operation conditions:

a) When delivered to Sappi for use in its non-pulp process, quality standards are as prescribed by Sappi ("Reuse at Sappi" in Table 3-1 below).

b) During periods when the Sappi mill is unable to take effluent the "special limit" for effluent disposal in the environment as per the National Water Act (NWA) applies ("Discharge in River" in the Table 3-1 below).

**Table 1-1: Umkomaas STP treated effluent discharge standard**

| Parameter | Units | Reuse at Sappi | Discharge in river (Special limit) |
|---|---|---|---|
| Faecal coliforms | (per 100 ml) | 0 | 0 |
| COD | mg/ℓ | 65 | 30 |
| pH | | 5.5 < pH < 9.5 | 5.5 < pH < 7.5 |
| Ammonia as N | mg/ℓ | 3 | 2 |
| Nitrate as N | mg/ℓ | - | 1.5 |
| Free Chlorine | mg/ℓ | 0.25 | 0 |
| Suspended solids | mg/ℓ | 25 | 10 |
| Electrical Conductivity | mS/m | 70 mS/m | 50 mS/m above background receiving water to a maximum of 100 mS/m |
| Ortho Phosphate as P | mg/ℓ | 1 | 1 (median)<br>2.5 (maximum) |
| Fluoride | mg/ℓ | 1 | 1 |
| Soap, oil and grease | mg/ℓ | 2.5 | 0 |

The discharge standard for heavy metals must be in accordance with the NWA which sets limit values for heavy metal concentrations in effluent to be discharged in water courses. For the Umkomaas STP, the general limit applies (for heavy metals) for effluent to be reused by Sappi and special limits apply when the effluent is discharged to the river[1].

Sappi has been issued a Coastal Water Discharge Permit (CWDP) for the discharge of effluent from the Sappi Saiccor mill via the sea water outfall to the Indian Ocean. The CWDP will need to be amended to provide for the proposed regional STP reuse scheme. The treated effluent reuse scheme will not result in an increase in the volumes discharges via the sea water outfall. The treated effluent supply will displace raw (river) water and will therefore result in an equivalent reduction in volumes of water abstracted from the uMkhomazi River. For the purpose of the ESIA the sea outfall is part of the area of influence of the project and, as such, the ESIA should assess associated risks and impacts to the people and the environment (see Section 3.3, Specialist Studies).

[1] *• The Umkomaas STP and part of the pipeline alignment is located within the Vernon Crooks Corridor Key Biodiversity Area (KBA), designated for threatened and restricted-range plants, amphibians and birds*
*• The wider area is a mix of natural habitats with agricultural and forestry land uses, settlements, and roads. Natural Habitats include Critically Endangered KwaZulu-Natal Coastal Forest and KwaZulu-Natal Coastal Belt Grassland, and Endangered wetlands. As well as being highly threatened ecosystems, they likely support additional Critical Habitat values.*
*• The site and pipelines fall within several potentially important aquatic ecosystem features of national conservation importance, including Endangered and Critically Endangered freshwater vegetation types (Indian Ocean Coastal Belt Seep and Valley Bottom Wetlands – CR, and the uMkhomazi Estuary - EN), Endangered rivers types (uMkhomazi River, Mahlongwana river) and an Endangered Estuary (uMkhomazi).*
*• The uMkhomazi Estuary is of "high importance" from a biodiversity perspective and of high conservation importance as it forms part of a core set of priority estuaries in need of protection to achieve national biodiversity targets. The estuary is also an important nursery area for estuarine fish and is one of only four predominantly open estuaries in the Mvoti to uMzimkulu Water Management Area.*

### 1.2.2. Biodiversity

The ESSS found that the new STP, the treated effluent discharges, and some sections of the connection pipelines are located in areas of high sensitivity for terrestrial and aquatic biodiversity, some of these areas are likely to support natural and critical habitat per IFC PS6 definition. The project also overlaps with nationally protected areas and internationally recognized biodiversity areas.

## 1.3 Scope of Work

EWS proposes to develop the new regional Umkomaas STP that will serve the larger uMkhomazi area by replacing two existing, smaller treatment works. The project comprises of the following components:

- Construction of Raw Sewage Conveyance Systems to collect the sewage at the existing main outfall sewers, located at the old STPs, and convey this to the new STP. The following two (2) Sewage Conveyance Systems are proposed:
  i. Craigieburn STP to new regional Umkomaas STP; and
  ii. Old Umkomaas STP to new regional Umkomaas STP.
- Sludge Handling and Beneficiation plant within the new regional STP to treat sludge generated by wastewater treatment process,
- A Treated Effluent Pipeline (TEP) to the South African Pulp and Paper Industries (SAPPI) as the off taker plus a bypass discharge to the uMkhomazi River,
- Combined Heat and Power (Biogas) facility, and
- The establishment of a construction camp/s (on or off the new proposed STP site).

The new Umkomaas STP will replace the following existing plants that will need to be decommissioned once the new works is fully operational:

- Old Umkomaas STP, and
- Craigieburn STP.

The project will require an Environmental and Social Impact Assessment (ESIA) that is consistent with the requirements of the IFC Performance Standards as well as National Legislation.

### 1.3.1 Project Locality

The site that has been identified by EWS for the Umkomaas STP is located on the south bank of the uMkhomazi River and adjacent and east of the N2 national road. The approximate centre point of the site is roughly 1 500m north-west of the existing Umkomaas STP and 3 100m north-east of the existing Craigieburn STP.

The proposed STP site is situated on Canonbrae Farm No. 16713 Portion 0, Umkomaas and is approximately 3.9 hectares (ha) in size. The proposed project site is currently a green-fields site of which a small portion has in the past been utilized as a garden refuse site. The co-ordinates for the approximate centre of the site are - Latitude 30°11’44” S and Longitude 30°46'53" E.

According to the uMkhomazi Local Area Plan (2010), the site is zoned as a “Conservation Zone”[2]. The site was owned by SAPPI Southern Africa Proprietary Limited and was handed over to EWS under a land donation agreement for the purpose of the proposed project. It must be noted that the site is also the subject of a land claim by the Umnini Community.

The proposed new regional Umkomaas STP location site is shown in Figure 1-1 below. *It must be noted that since the undertaking of the ESSS, the Magabeni STP and associated Sewage Conveyance System which includes infrastructure such as pumpstations has been removed from the Scope of Work as provided for in the Technical Specification which was updated during 2022.*

[2] *According to the Spatial Planning and Land Use Management Act, 2013 (Act No 16 of 2013) conservation means normally or otherwise reasonable association with the use of land for the preservation or protection of the natural or built environment, including the preservation or protection of the physical, ecological, cultural or historical characteristics of land against undesirable change or human activity.*

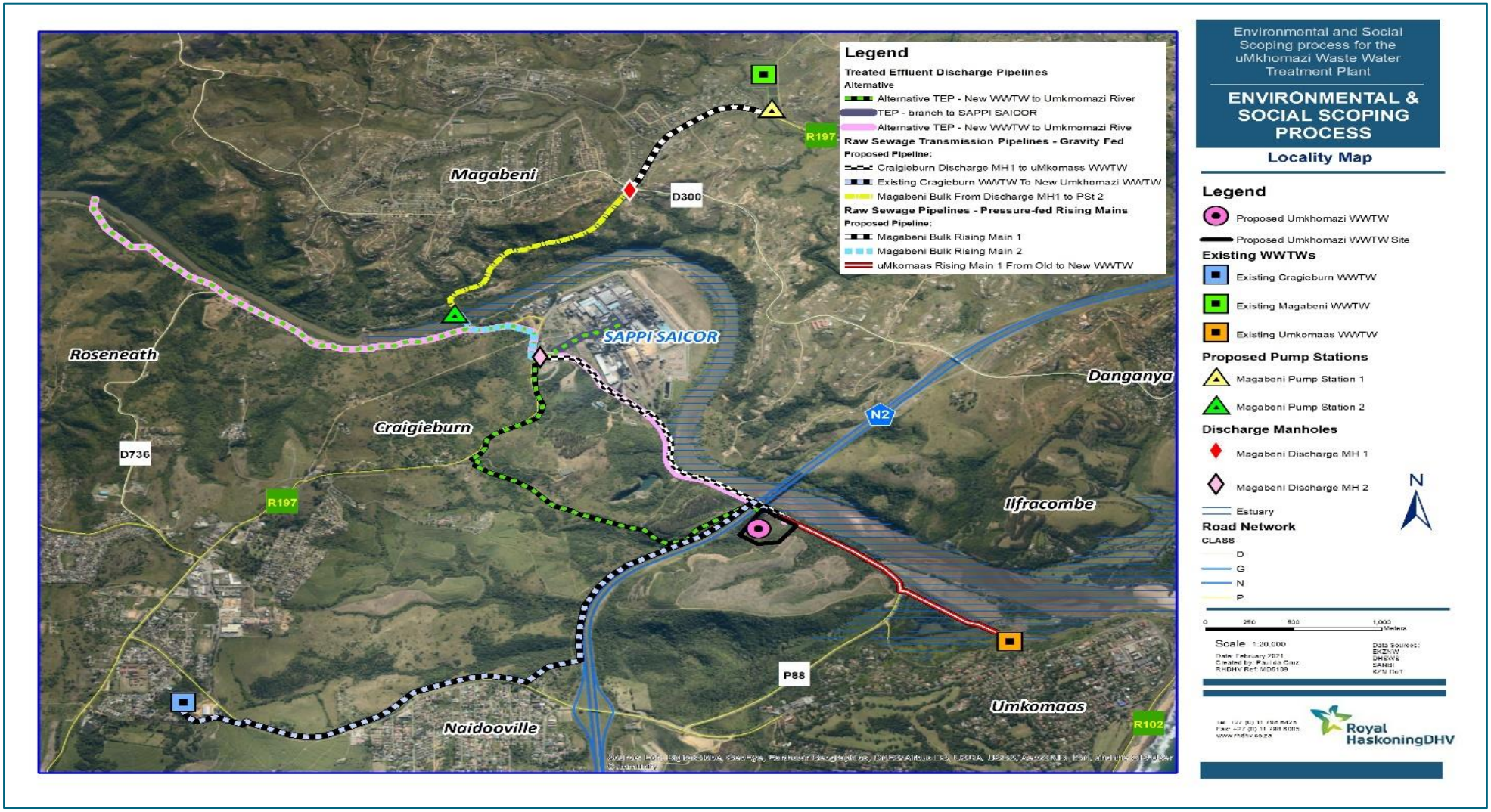



**Figure 1-1: Proposed new Umkomaas STP locality map**

### 1.3.2 Project Description

The proposed project is for the construction and operation of the proposed Umkomaas STP and ancillary infrastructure inclusive of the raw sewage conveyance system (pipelines, pump station and manholes). Further project detail on these components, and additional components such as the TEP to Sappi and bypass to uMkhomazi River, decommissioning of the existing STPs, access routes, additional infrastructure [such as Combined Heat and Power (CHP)] and / or location and layout of temporary construction camp/s, will need to be detailed in the ESIA, as informed by the detailed design.

#### 1.3.2.1 Project Components and Layout

The overall process for the STP to achieve the required effluent and sludge standards is to be determined by the PPP concessionaire in its design. Various configurations are possible. For the purpose of the feasibility study and the ESSS undertaken, one possible configuration has been developed at concept level and is illustrated below Figure 1-2.

The basic process operations for the proposed Umkomaas STP are:

- Preliminary treatment (screening and grit removal)
- Secondary treatment (Primary Settling Tanks, biological nutrient removal reactors and final clarification step)
- Tertiary treatment, polishing and disinfection;
- Sludge handling including:
  - Sludge screening and thickening
  - Thermal Hydrolysis;
  - Digestion and Biogas production;
  - Sludge drying and beneficiation.
  - Combined Heat and Power
    - Gas-to-energy
    - Heat to the digesters

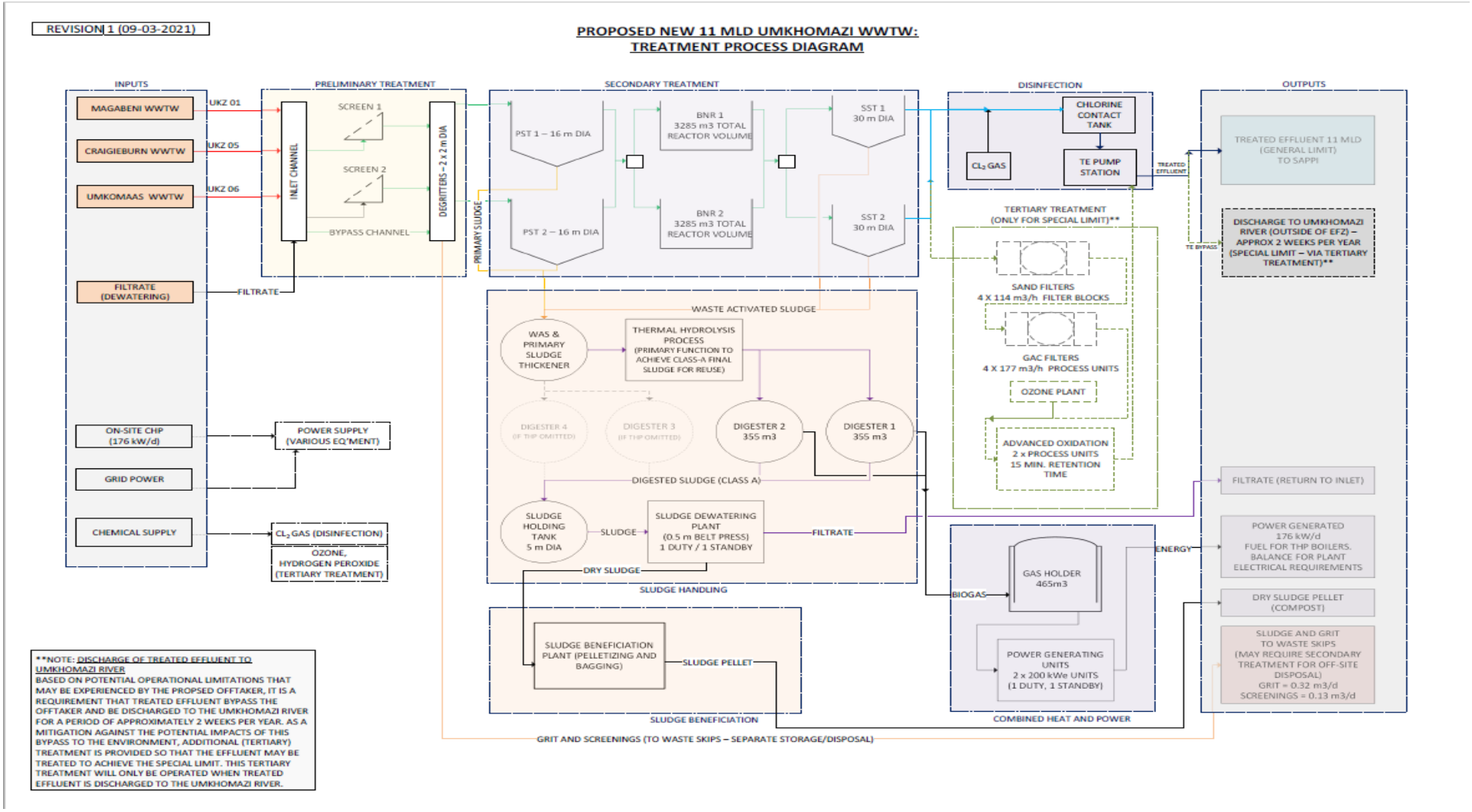



**Figure 1-2: The proposed treatment process diagram for the new Umkomaas STP 11 MLD plant**

### 1.3.3 Treatment Process

Influent from the existing STPs (to be decommissioned) will require treatment at the plant. In this regard the following is proposed:

#### 1.3.3.1 Preliminary Treatment

The preliminary treatment facility will incorporate screening and screenings handling, grit and detritus removal, and flow metering. The preliminary treatment facility will consist of at least two (2) parallel modules capable of handling the combined Peak Wet Weather Flow (PWWF) with emergency bypass. The preliminary treatment process will provide for sufficient capacity and redundancy to allow full-flow operation while any one unit is undergoing maintenance. The components involved in the preliminary treatment is presented in the Royal HaskoningDHV (2020) Concept Design Report.

#### 1.3.3.2 Secondary Treatment

The secondary treatment will allow for the removal of the following constituents:

- COD;
- Total Kjeldahl Nitrogen (TKN); and
- Total Phosphate (TP).

This can be achieved by removing part of the load to the biological reactors though a Primary Settling Tank (primary sludge will enhance biogas production).

The secondary treatment process will involve the following steps:

- ***Primary Settling Tanks*** - Primary Settling Tanks (PST) are used to reduce the load that needs to be treated in the subsequent biological reactors by transferring a portion of the waste load (typically around 30 to 40% for COD and 15 to 20% for TKN and TP) in the raw sewage to the sludge handling system. With anaerobic digestion used to treat the primary sludge, it has the benefit of reducing the energy consumption per unit of sewage treated. However, primary clarification often has the effect that the settled sewage has increased TKN/COD and TP/COD ratios. This can affect the performance of the biological nutrient removal process negatively in terms of treated water quality, as there may not be sufficient COD to remove all the nitrogen and phosphorus remaining in the settled sewage. The option to include a fermentation step for the primary sludge to increase the Volatile Fatty Acids (VFA) and Readily Biodegradable COD (RBCOD) would solve this problem.
- ***Biological Reactors*** - The Biological Nutrient Removal Activated Sludge Reactor concept design is based on the three -stage UCT process configuration, which incorporates: (i) anaerobic cells for the stimulation of enhanced biological phosphorus removal bacteria, (ii) anoxic cells for the denitrification of the nitrate rich recycle from the downstream aerobic cells, (iii) aerobic cells for the oxidation of residual COD and ammonia as well as for the uptake of available phosphorus. The aerobic cells will be aerated though fine bubble aeration in order to increase oxygen transfer. It should be noted that the BNR process may be served by a number of different technologies and their advantages and disadvantages will be weighed by de concessionaire in its STP design. The UCT process is only used as a starting point in the concept development. Addition of metal salts to the biological reactor may be included either as a failsafe to achieve the desired phosphate concentrations or as part of general operations.
- ***Secondary Clarifiers*** - The secondary clarifiers allow for the separation of activated sludge and treated secondary effluent. These may be traditional secondary clarifiers, or their function may be superseded by other technologies by incorporating this function into the reactor. Membrane Bioreactor (MBR) and granular biomass (e.g. Nerada) technologies allow for this.

The components involved in the secondary treatment is presented in the Royal HaskoningDHV (2020) Concept Design Report.

#### 1.3.3.3 Tertiary Treatment

The proposed off taker (Sappi) has specified limits that are more stringent than the general limits for some of the treated effluent parameters (e.g. COD, ammonia, orthophosphate and faecal coliforms). In addition due to operational limitations (downtime) that may be experienced by the proposed off taker, treated effluent will need to be discharged to the environment for a period of approximately 2 weeks per year. Under such conditions the treated effluent will be pumped upstream and discharged to the uMkhomazi River. Additional (tertiary) treatment is proposed to achieve the special limit to mitigate potential negative environmental impacts. The tertiary treatment plant as set out in the Royal HaskoningDHV (2020) Concept Design Report consists of rapid gravity filtration, Granular Activated Carbon (GAC) filtration and advanced oxidation.

The processes will require pumping (for filter and contact tank feed, backwash and scouring) as well as chemical dosing for the advanced oxidation process. Although the ultimate dosing rates and hence chemical use will depend on a number of factors, it is estimated that at the design capacity of the plant, the ozone consumption will be 1,24-ton $O^3$ per day and the hydrogen peroxide consumption will be approximately 1,22 tons $H^2O^2$ per day. Although it would not be necessary to dose gaseous chlorine (as disinfectant) when the advanced oxidation plant is in operation, the energy and chemical cost implications are significant, and so the tertiary treatment will only be operated when treated effluent is discharged to the uMkhomazi River.

### 1.3.4 Treated Effluent Reuse

A TEP and pumping infrastructure must be provided to convey treated effluent from the Umkomaas STP to the Sappi plant. A potential pipeline route has been identified for this treated effluent reuse pipeline with an approximate length of 4 025m. The pipeline must terminate at the entrance to the Sappi plant and a metered connection must be provided at this point, which shall be the supply point. The residual pressure at the supply point shall be not less than 100 kPa.

A treated effluent discharge pipeline to the uMkhomazi River, upstream of the existing weir (U1H003) shall be provided and shall be suitable to provide a means of discharge during periods when the treated effluent cannot be supplied to Sappi.

The Royal HaskoningDHV (2020) Concept Design Report further provide some of the guiding principles that should apply to the planned re-use scheme, which included information on the concept of treated effluent, approximate raw water use by Sappi, uMkhomazi River water quality, treated effluent quality monitoring, frequency of occasional treated effluent discharges to the River and Coastal Water Discharge Permit (CWDP) provisions. The schematic arrangement of the use of treated effluent by Sappi is provided in Figure 1-3 below:

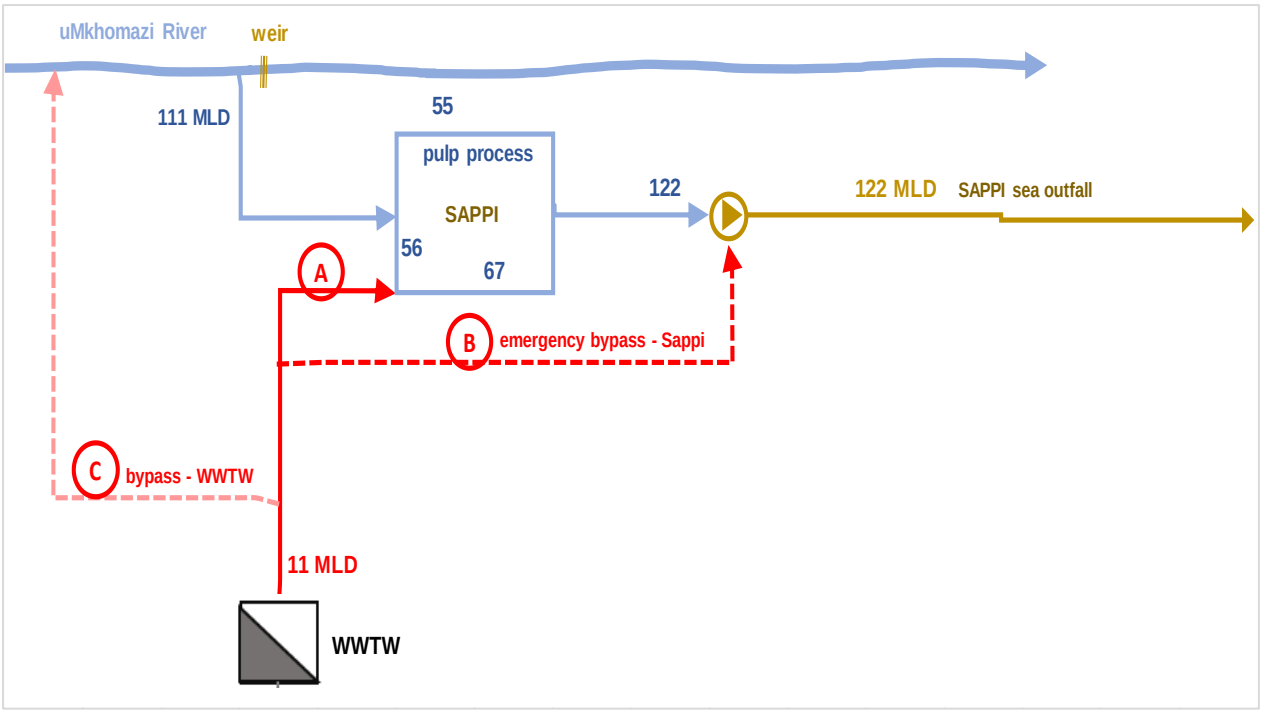



**Figure 1-3: Schematic of use of treated effluent by SAPPI**

### 1.3.5 Sludge Treatment and Handling

Since the Umkomaas STP is in the planning stages, analyses and limited actual measured quantities of the sludges are available. The expected categorisation of the expected sludge masses has been made based upon the expected industrial and domestic wastewater contributions and the concept treatment processes to determine the options available for the disposal or reuse of the sludge.

Sludge production is based upon the pollutant loads entering the treatment works and may be estimated from anticipated populations. Population Equivalent (PE) or unit per capita loading, in wastewater treatment is the number expressing the ratio of the sum of the pollution load produced during 24 hours by industrial facilities and services to the individual pollution load in household sewage produced by one person in the same time frame. Industrial discharges to the wastewater receiving network will be regulated at source under trade waste by-laws, which will limit organic concentrations in terms of COD, Ammonia and Total Suspended Solids (TSS).

Sludges produced by biological sewage treatment processes, prior to further treatment, are high in volatile suspended solids. The untreated sludge produced by a STP requires treatment to address the following:

- Untreated sludges are high in pathogenic disease-causing organisms,
- Putrefy easily,
- Lead to the attraction of vectors, such as flies, and
- Are odorous.

The sludge requires stabilisation (treatment) before it can safely be disposed of off-site. There are three generic processes used to stabilise the sludge to reduce the volatile organic matter present in the sludge before they can be disposed of or beneficially reused. These processes are:

- Biological Stabilisation
- Thermal Stabilisation
- Chemical Stabilisation

Sludge handling for the Umkomaas STP will consist of screening and pre-thickening/dewatering the combined primary and Waste Activated Sludge (WAS), Thermal Hydrolysis treatment (for sludge

stabilization) followed by anaerobic digestion for further stabilization biogas production. While solar drying of sludge is permissible, this may only be implemented as a secondary means of drying, e.g. to achieve lower moisture content, after initial mechanical dewatering.

All sludge shall be treated so that the final sludge achieves a sludge Stability Class of 1 and a Specific Oxygen Uptake Rate (SOUR) not exceeding 2 mgO2/gTSS.h. While EWS has expressed a preference for sludge reuse, the method of sludge disposal is not prescribed. The stabilised sludge could be dewatered and pelletized for use as fertilizer although this option will depend on further engineering design by the concessionaire. On-site incineration of sludge will however not be permitted.

Disposal of grit and screenings on site will not be permitted. All grit, screenings and detritus that is produced at the sites must be properly disposed of at a suitable waste disposal site.

### 1.3.6 Raw Sewage Conveyance System

The existing Craigieburn and Umkomaas STPs will contribute to the new regional Umkomaas STP. In order for raw sewage to reach the new regional STP, it will be necessary to provide conveyance systems to collect the raw sewage at the existing main outfall sewers, located at the old STPs, and convey this to the respective site of the new STP. These raw sewage conveyance systems will include gravity and/or pumped mains.

The Sewage Conveyance Pipelines feeding the new Umkomaas STP are:

- Craigieburn STP to new regional Umkomaas STP, and
- Old Umkomaas STP to new regional Umkomaas STP

As an outcome of the Concept Design in 2020, it was determined that the area of Danganya, northeast of the proposed new STP, is not sewered. At the time of Concept Design, it was considered that, in future, sewage collected in the Danganya area will reach the new regional STP *via* the Magabeni STP and associated Sewage Conveyance System. The Magabeni STP component however no longer forms part of the project scope as per the Technical Specification which was updated during 2022.

#### 1.3.6.1 Pipelines

The pipeline routes between the old STPs and the new regional STP are presented in Figure 1-4 as well as a conceptualization thereof in Figure 1-5 below.

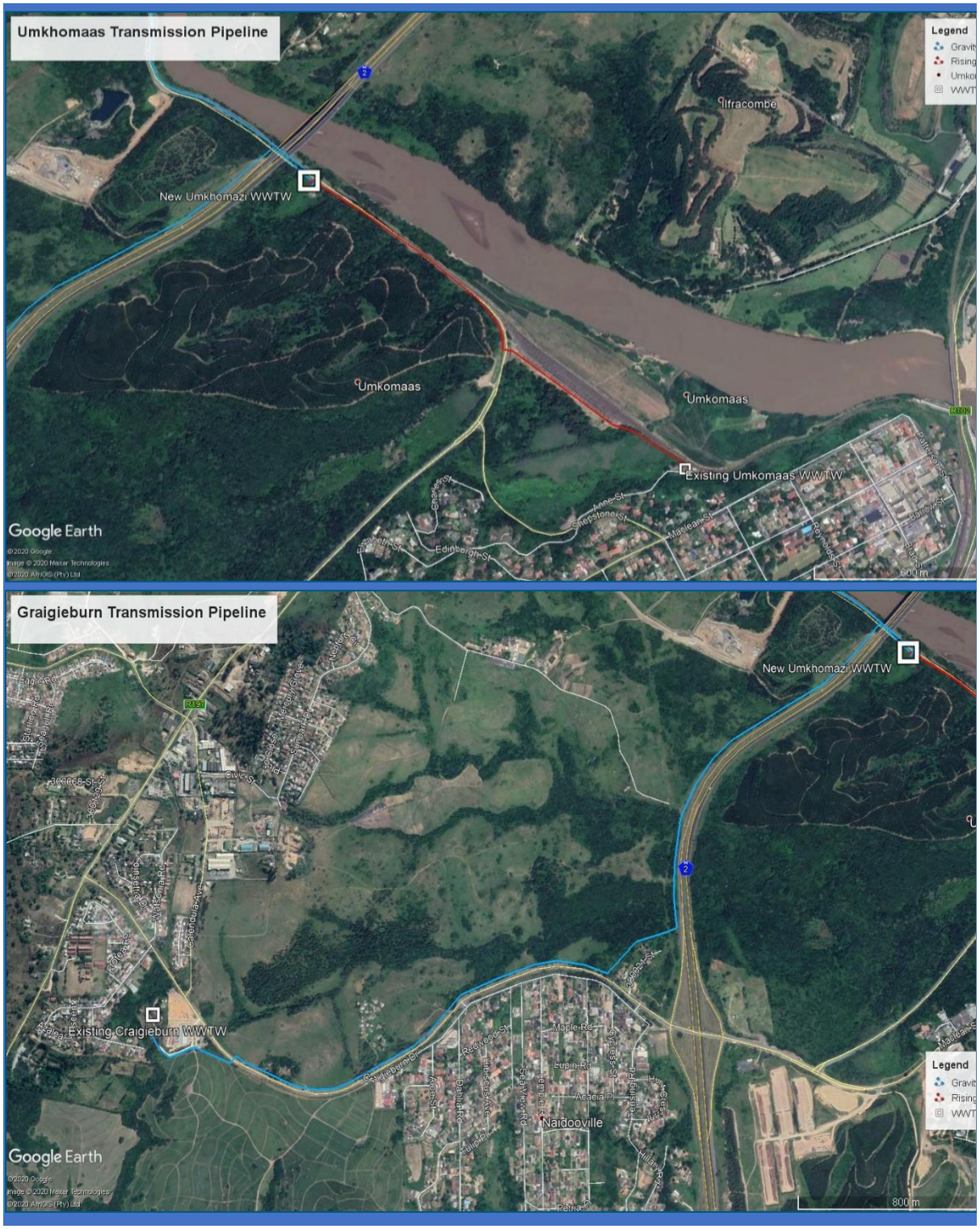



**Figure 1-4: Raw sewage conveyance system**

A schematic of all new proposed pipelines is also presented in Figure 1-5 below:

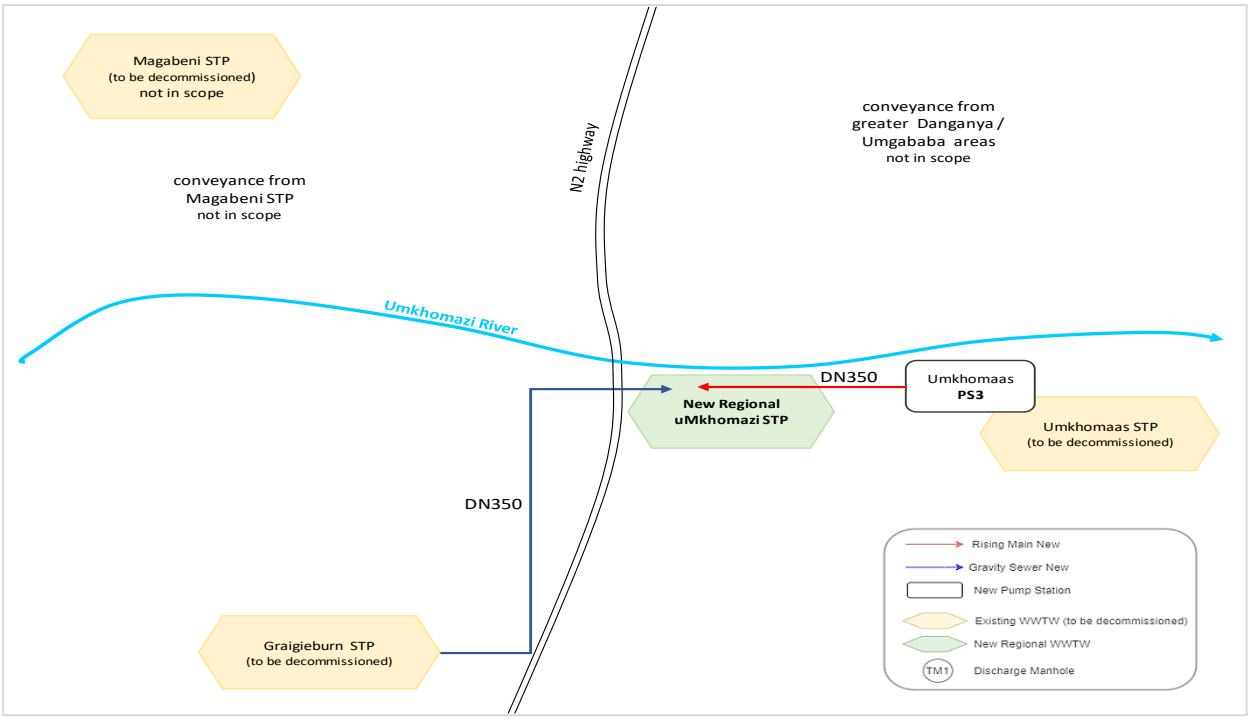



**Figure 1-5: Schematic layout of the new proposed Umkomaas STP raw sewage transmission network**

Further details pertaining for the pipelines are provided in Table 3-2 below:

**Table 1-2: Pipeline details**

| Pipeline | From | To | Length (m) | Diameter (mm) | Rising/gravity |
|---|---|---|---|---|---|
| UZ5 | Craigieburn STP | New Regional Umkomaas STP | 4160 | 350 | Gravity |
| UZ6 | Old Umkomaas STP | New Regional Umkomaas STP | 1520 | 350 | Rising |

The gravity pipeline in the concept design have been planned assuming the use of Polyvinyl Chloride (PVC) or Glass Reinforced Plastic (GRP) pipes. The final material selection as well as optimisation of pipe routes (e.g. by using pipe bridges and / or inverted siphons to reduce overall pipeline length) will be completed during the final design. In general, it is proposed that pipelines cross watercourses underground rather than on pipe bridges. Gravity mains will either have to be placed on pipe bridges or require invert siphons when low areas (e.g. Rivers) are to be crossed.

#### 1.3.6.2 Pump Station

One new pump station (PS) is required which will be located on the Umkhomaas sewage transmission pipeline. This pump station will replace the existing Umkhomaas Pump station which will also be decommissioned.

**Table 1-3: Pump Station details**

| PS no. | PS name | Design inflow ($m^3/h$) | Pump duty point | | Indicative power requirement (kW) | Emergency storage | |
|---|---|---|---|---|---|---|---|
| | | | Flow rate ($m^3/h$) | Total head (m) | | Time (hours) | Volume ($m^3$) |
| UZ9 | Umkomaas PS | 415 | 415 | 26 | 73 | 4 | 1662 |

## 1.4 Decommissioning of Existing Works

Decommissioning of the two existing STPs will take place as soon as the new STP is fully commissioned and tested and have completed a trial operation period. Once it is clear that the new STP is fully operational, the flows can systematically (i.e. one old plant at a time) be diverted into the raw sewage conveyance pipelines to be carried to the new STP.

The old STPs must initially be maintained to provide flexibility in the event of a snag at the new STP. This will be a relatively short period (e.g. 3 to 4 months) during which period some snags at the new STP are inevitable. Once the new STP is fully operational and the initial 3 to 4 months has passed, the old STPs can be completely decommissioned. For full decommissioning, the inlet to the old STP will be blocked (e.g. brick or concrete) and both the water and sludge lines of the STP will be cleaned and drained (wash down, empty all tanks, flush all pipelines, etc.). Some buildings and structures might be demolished (as a safety precaution) and all mechanical and electrical equipment will be removed.

Decommissioning of the existing STPs will entail the requirements set out below:

- Site assessments shall be undertaken (as part of the ESIA) and a remediation plan compiled for each of the existing STPs that are to be decommissioned.
- All superfluous mechanical and electrical equipment must be removed and the Municipality must be notified of all power supply points that become redundant.
- Structures that can be reused for the raw sewage conveyance systems shall be repurposed accordingly and must be modified and / or adapted as required, made safe for the intended purpose and fenced off from the remainder of the site.
- Where existing structures are repurposed, these must be repaired or refurbished to suit their intended purpose and shall be maintained and repaired periodically so that the structure has a remaining useful life of 20 years at the end of the PPP term.
- Redundant structures must be made safe where possible. Given the nature of the sites and structures, this must specifically address requirements to eliminate fall and / or drown hazards and unauthorised entry. Redundant structures that cannot be made safe must be demolished.
- Areas where structures are removed or demolished must be planted with suitable ground coverings. Similarly, all areas that are potentially at risk of erosion must be landscaped and planted with suitable ground coverings in a manner that will mitigate the risk of erosion.
- All redundant STPs shall be fenced and provided with a secured point of access.

## 1.5 Other Considerations

### 1.5.1 Chemical Storage

The anticipated volumes of chemicals to be stored at the Umkomaas STP is presented in Table 3-4 below.

**Table 1-4: Expected chemicals to be stored**

| Chemical storage | Amount stored | Units |
|---|---|---|
| Oxygen (LOX) | 30 000 | kg |
| Hydrogen Peroxide ($H_2O_2$) | 30 000 | kg |

### 1.5.2 Waste Management

Solid waste produced at the STP consists of grit, screenings and dewatered sludge. The expected volumes of grit and screenings would be as follows:

- Expected grit volumes (washed) = 1.3 $m^3$/d; and
- Expected screenings volumes = +/- 500 l/d (washed, dewatered and compacted).

Grit and screenings must be collected, e.g. in a suitably sized skip or bin and would need to be disposed of on a regular basis. The norm is for grit and screenings to be disposed of at a suitably registered landfill site.

Dewatered sludge will need to be disposed of. The South African Guidelines for disposal of wastewater sludges to landfills, are now regulated by the National Environmental Management Waste Act (Act No. 59 of 2008) (NEM:WA). In terms of the regulations, landfills need to have a hazardous rating to accept wastewater sludges. This adds to disposal costs. Furthermore, the solids concentration of sludges to hazardous landfills, (if not stabilised) now needs to be greater than 40%. This recent regulation also has an impact on the disposal of screenings and grit removed in inlet works to landfills.

### 1.5.3 Construction Camp(s)

Temporary construction camp(s) will be required for the construction phase of the new regional Umkomaas STP and associated raw sewage pipeline transmission network. The location and size of the required construction camp(s) is not available at this stage. These will need to be identified and located outside of environmentally sensitive areas. The recommendation is made that existing brownfield sites must be investigated for this purpose.

### 1.5.4 Water Provision

Water will be required during the construction stage. During the detailed design stage, the Engineering Team will investigate the volumes of water required and potential water sources. Should raw water sources be required, this will need to be applied for as part of the iWULA to be undertaken.

### 1.5.5 Energy Generation

The integrated Thermal Hydrolysis Process (THP) and Anaerobic digestors will allow for preheating of sludge/water feed streams, heat to the digestors as well as biogas to boilers and gas engines for power generations. Indicative layout of the CHP system is provided within the 2020 Concept Design Report.

The power generation units will be designed to operate in a full duty configuration with the biogas storage unit allowing for biogas storage and equalisation. It should be noted that all required moisture traps and gas scrubbers required in terms of the required specification set out by the CHP unit manufacturers should be adhered to. This would increase electrical power generation efficiency as well as provide for longer CHP unit lifecycle.

### 1.5.6 Access Roads

The new STP development site can be accessed *via* the N2 and subsequent use of the R197 road. No new access roads will be built / or is required. An access control point shall be set up so as to prevent unauthorised access to the site. Beyond the access control point, the Concessionaire shall provide internal roads that provide access to the various parts and components of the STP for operation, maintenance and inspection.

# 2 OBJECTIVES OF THE ESIA

The general objective is to ensure a thorough identification and analysis of the environmental and social risk and impacts, compliance with national environmental legislation and the IFC Performance Standards (IFC PS) and applicable requirements of WBG EHS Guidelines (General and Sector); and to design the respective measures to avoid, prevent, reduce and/or offset the risk and impacts identified.

The ESIA must comply with the NEMA EIA Regulations 2014 (as amended) to meet local regulatory requirements[3]. The ESIA study will provide the relevant authorities with sufficient information to make an informed decision regarding the proposed project.

The above will be achieved through the preparation of an ESIA and its respective Environmental and Social Management Plans (ESMP) for the construction and operation of the Umkomaas STP and for the closing and decommissioning of the STPs that the new Regional STP will substitute in order to ensure environmental and social sustainability of all project activities and different components.

Specific Objectives include:

- Undertake a thorough analysis, evaluation, and identification of the required measures to prevent, mitigate, restore and/or compensate the potential adverse environmental and social impacts and to enhance the potential positive impacts to achieve compliance with the National Legislation and the IFC Performance Standards. This to include:
  - Detailed quantification of the positive and negative changes due to the project over the current baseline for all affected water bodies (Rivers, estuary, marine protected area, wetlands) under all scenarios and project configurations to assess the risks and impacts on human health and the environment (including ecosystem services and human uses of the water bodies). The results of the assessment are to be used to define the exact quantity and quality of treated wastewater discharges (effluent discharge limits).
  - Detailed analysis of the pipeline alignments to avoid disturbance/modification on sensitive areas.
- Address PS6 requirements for the specific biodiversity context: avoid disturbance/modification on sensitive areas through a detailed analysis of the pipeline alignments, collect robust baseline and conduct Critical Habitat Assessments, develop mitigation measures to achieve no net loss of natural habitat (Biodiversity Management Plant), develop a mitigation strategy to achieve net gains of those biodiversity values for which critical habitat has been designated and implement additional programs to promote and enhance the conservation aims and effective management of relevant protected/internationally recognized areas (Biodiversity Action Plan).
- Develop ESMP and other instruments/documents required to (i) guide the design of the project and its components, including recommendations of potentially changes to the project and its components designs according to the IFC PS and applicable requirements of WBG EHS Guidelines, (ii) manage and monitor, through specific plans, contractors and subcontractors, (iii) manage and monitor, through specific plans, compliance with effluent discharges limits and compliance of industrial discharges into the WWTP, (iv) monitor HSE performance of the project during construction and operation phases, (v) manage Environmental and Social (E&S) risks and impacts associated with decommissioning, dismantling current STPs, (vi) manage others E&S aspects relevant to the nature of the project.
- Plan and organize the stakeholder engagement activities undertaken for the development of the ESIA study, including an analysis of interested and affected parties, detailing documentation requirements, and dissemination of information about the project. Stakeholder engagement shall be undertaken

[3] *At this stage, only an EIA has been provided for in terms of South African Regulatory requirements. Should the next phases of the study confirm a need for a WML and / or AEL, an Integrated Application for WML and EA will need to be considered for the EIA.*

during the preparation of the ESIA in accordance with national regulations and IFC PS 1. The result of the stakeholder identification, analysis, and public consultation activities prior to ESIA finalization should be reflected in a dedicated chapter of the ESIA and in a stand-alone Stakeholder Engagement Plan (SEP) which will summarize related activities conducted to date, issues raised, and will lay out how ongoing engagement will occur in future with selected groups.

## 2.1 Indicative Table of Content to be covered by the ESIA

Please note that the proposed content is for indicative purposes. The content might include more elements according to the findings during the assessment and/or the nature of the project.

1. Non-technical Executive Summary.
2. Legal, Regulatory and Policy Framework.
3. Description of the Project and Project Components.
4. Baseline Environmental Information and Data.
5. Socio-economic Assessment.
6. Environmental and Social Impacts.
7. Analysis of alternatives as identified and agreed in the ESSS and further assessed as part of this ESIA.
8. Environmental and Social Management Plan, including RAPs/LRPs and other specific management and monitoring plans.
9. Public Consultation summary and records and Stakeholder Engagement Plan.

# 3 APPROACH TO UNDERTAKE THE ESIA STUDY

## 3.1 Authority Consultation

On-going consultation with KZN Economic Development, Tourism and Environmental Affairs (EDTEA), National Department of Forestry, Fisheries and the Environment (DFFE), eThekwini Metropolitan Municipality, Department of Water & Sanitation (DWS), Ezemvelo KZN Wildlife, Ward Councillors, mobilised organisations and all other authorities identified during the ESSS (and further ones that may be identified during the ESIA study) must continue throughout the duration of the project. Authority consultation is, therefore, seen as a continuous process that takes place until completion of the environmental investigations.

At the onset of the process, a pre-application meeting with the KZN EDTEA and / or DFFE will be required to confirm the regulatory requirements and approach for the ESIA. Thereafter, regular communication with the assessing officer will be required, so as to ensure their continued understanding of the proposed project and to ensure that all requirements are met by the Environmental Assessment Practitioner (EAP).

## 3.2 Project Area of Influence and Alternatives

The project scope will take place at Umkomaas which is a small coastal town situated just 50km south of Durban and is accessible by rail and by roads including the N2 Freeway and the coastal R102. The proposed new STP is located adjacent to the uMkhomazi River approximately 2km upstream of the River's mouth and the proposed treatment plant site falls within an area designated as conservation in terms of the local town planning. As part of the STP infrastructure various sewage conveyance systems are proposed within / and in close vicinity to the suburbs of Cragieburn, Naidooville and uMkhomaas. The sewage conveyance routes follow corridors that are generally disturbed along the uMkhomazi River, the existing N2 as well as other secondary and gravel roads.

According to IFC's PS1, the project area of influence encompasses:

- The area likely to be affected by (i) the project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project; (ii) impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which affected communities' livelihoods are dependent;
- Associated facilities, which are facilities that are not funded as part of the project, and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable; and
- Cumulative impacts that result from the incremental impact on areas or resources used or directly impacted by the project from which other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

The project area of influence was only informed by feasibility level technical information available during the Scoping phase and the exact area of influence will need to be determined at the ESIA stage once detailed technical information becomes available and in line with IFC's PS1 criteria noted above. The Project Area of Influence will need to be extended to incorporate additional aspects such as the decommissioning of the existing STPs, access roads, construction camps, sea outfall etc.). It is important that the alternatives analysis for sewage conveyance systems, etc be based on the mitigation hierarchy to avoid, where not possible minimize, physical / economic displacement and impacts on any Critical/Natural Habitat[4].

The Analysis of Alternatives section of the ESIA shall reflect in a concise manner the options considered for the project during the ESSS and as part of the ESIA, including STP footprint and location of the raw sewage and treated effluent conveyance systems, location of the discharge points. It shall also reflect the quantification of the positive/negative change due to the project over the current baseline for the water bodies (rivers, estuary, marine protected area, wetlands), for all scenarios and for all project configurations.

## 3.3 Impact Assessment and Specialist Studies

The approach to the impact assessment must follow the principles and steps outlined by the internationally accepted mitigation hierarchy, which seeks to first avoid or prevent impacts, followed by measures to minimise impacts and lastly efforts to rehabilitate or offset any significant residual impacts. As such, a staged iterative approach to impact mitigation is proposed, in which specialists contribute to the planning, design, layout and alignment options prior to assessing final impacts.

Throughout the ESIA study a gender lens will need to be applied to understand if and how the project disproportionately impacts on gender, identify gender specific risks (such as workforce gender-based violence), define mitigation measures for identified risks and impacts, and suggest opportunities to close the gender gap.

The specialist studies described in Table 3-1 will need to be prepared as part of the scope of work and will play a crucial role in the ESIA study. In addition to the studies described in Table 3-1, the following documents shall be developed as part of the ESIA. The TORs setting out the minimum requirements for these documents are provided as part of the ESIA TOR package:

- Terms of Reference for Stakeholder Engagement Plan (Annexure A)
- Terms of Reference for Environmental Monitoring Programme (Annexure B)
- Terms of Reference for Biodiversity Action Plan (Annexure C)

[4] *Natural Habitat (NH) and Critical Habitat (CH) as defined by IFC PS6*

- Terms of Reference for Livelihood Restoration Plan (Annexure D)
- Terms of Reference for Integrated Water Use Licence Application (Annexure E)

In addition to the specialist studies, the typical environmental aspects i.e. site establishment, access, storm- and wastewater management, soil contamination, hazardous materials management, waste generation, protection of watercourses, vegetation clearing, noise, workshop and equipment storage and maintenance associated with construction activities and Operations and Maintenance (O&M) of this type of project must also as a minimum be considered.

**Table 3-1: ToR for Specialist Studies[5]**

| Specialist Study | ToR |
|---|---|
| Terrestrial Biodiversity Assessment | Direct and indirect risks and impacts to priority biodiversity values, including internationally recognized areas (e.g.) Key Biodiversity Areas (KBA), nationally designated conservation areas threatened ecosystems, wetlands, Critical Biodiversity Areas (CBAs), D'MOSS areas, and EFZ's of the uMkhomazi Estuary that have been identified in the ESSS at a preliminary level and will need to be verified and assessed further during the ESIA study. These areas are further protected or classified as CBAs regionally, nationally and internationally. Many of these CBAs are classified as such due to the potential or 'modelled' presence of endangered or critically endangered vegetation types or plant / animal species which may no longer be viable given the transformation or degradation of these habitats. Therefore, detailed assessments are required to verify the KBA and CBA status to afford the suitable protection to these areas. Therefore, a detailed Biodiversity Impact Assessment inclusive of a Critical Habitat Assessment (CHA) and a Biodiversity Action Plan (BAP) will be required[6]. The scope of work will entail the following:<br><br>***a. Baseline Data Collection***<br>▪ Baseline studies should be conducted for the relevant biodiversity attributes and ecosystem services and should be aligned with the Species Environmental Assessment Guidelines by SANBI (2022), as well as IFC PS6.<br>▪ Baseline studies should be informed by a literature review, desktop analysis, fieldwork surveys and stakeholder engagement and consultation and other relevant assessments.<br>▪ The baseline surveys must be conducted in appropriate season/s for each taxa / group assessed. For sites with potentially significant impacts on NH and CH and ecosystem services, the baseline should include field surveys over multiple seasons.<br>▪ Faunal surveys to confirm presence and abundance of threatened, restricted -range and migratory species conducted at the ecologically appropriate season.<br>▪ Baseline studies must be conducted by appropriately qualified biodiversity specialists registered with SACNASP or other internationally relevant natural science professional body. |

*[5] These specialist studies are not exhaustive, and further studies may be required based on the detailed design. The appointed consultant will need to determine all relevant specialist studies*
*[6] To be aligned with PS6 and the associated Guidance Note 6.*

| Specialist Study | ToR |
|---|---|
| | ▪ Identification and compilation of plant species lists comprising species of conservation concern and priority species must be recorded. The location of all floral species of conservation concern and fauna (direct sightings or tracks / signs of faunal activity) where possible, should be undertaken.<br>▪ Assessment of the ecological importance / sensitivity and ecosystem services of terrestrial habitat based on key criteria such as threat status, presence of red data species or suitability to support key species of conservation significance, habitat condition, etc.<br>▪ Mapping of vegetation condition and the site ecological importance of mapped untransformed vegetation communities as well as habitat suitability for key species (avifauna, small mammals, reptiles, amphibians, invertebrates) and confirmation of CHs.<br>▪ Provision of a consolidated terrestrial ecological sensitivity map and shapefiles.<br><br>***b. Preliminary Planning and Design Phase Input***<br>As a means of feeding CH information into the planning phase, initial findings of the baseline assessment need to inform design and alignment considerations prior to assessing the final anticipated ecological impacts. Typically, this would include an iterative process including practical steps to avoid sensitive areas and negative impacts prior to the project design being finalised (in line with the mitigation hierarchy) and may include:<br>▪ Provision of any relevant planning, design and alignment/ layout recommendations based on the outcomes of the field investigation and the baseline assessment findings.<br>▪ Provision of any relevant ecological or biodiversity conservation buffer zones or development setbacks and no-go areas informed by the compilation of a terrestrial ecological sensitivity map for the study area.<br>▪ Provision of site-specific design recommendations in key ecological constraint and sensitive areas.<br><br>***c. Impact Assessment***<br>Only once development plans, layouts, design specifications and pipeline alignments have been finalised, taking into consideration the measures described in the Preliminary Planning and Design Phase Input, the formal impact assessment may commence. The impact assessment should involve the following:<br>▪ Identification and description of the direct and indirect project-related impacts on biodiversity and ecosystem services.<br>▪ Each impact shall be presented taking into account at minimum: characterisation / nature / duration (positive, negative, direct, indirect, cumulative, short-term, long term, permanent, reversible); magnitude, likelihood; and spatial scale.<br>▪ Provisions of recommendations in terms of impact mitigation and management aimed at reducing impacts significance in line with the principles of the mitigation hierarchy. |

| Specialist Study | ToR |
|---|---|
| | ▪ Identify residual impacts (inclusive of magnitude and significance) where avoidance or minimization measures are not available it may be appropriate to design and implement measures that compensate / offset for residual risks and impacts. A residual impact assessment should be undertaken to assess residual impacts.<br>▪ Compilation of the specialist terrestrial biodiversity impact assessment report.<br>▪ Compilation of a BAP and mitigation as well as biodiversity offsets and rehabilitation requirements (refer to annexed ToR) designed to achieve no net loss of NH and net gains in CH.<br>▪ Additionally, the Biodiversity Impact Assessment will identify the need for any permits and / or licences which may be required due to the removal and / or relocation of protected trees / vegetation or species of conservation concern.<br>▪ Compilation of the specialist terrestrial biodiversity impact assessment report which will need to comply with the minimum requirements of:<br>o Appendix 6 of the National Environmental Management Act: EIA Regulations 2014 (as amended);<br>o Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity; and<br>o IFC Performance Standards. |
| **Freshwater Assessment** | Direct and indirect risks and impacts to conservation areas and CHs including wetlands, threatened ecosystems, CBAs, D'MOSS areas, and the EFZ of the uMkhomazi Estuary that have been identified in the ESSS at a preliminary level and will need to be verified and assessed further during the ESIA study. A detailed Freshwater Impact Assessment (rivers and wetlands) inclusive of a CHA and hydropedology study will be required. The scope of work entails the following:<br><br>***a. Baseline Data Collection***<br>▪ Baseline studies should be conducted for the relevant freshwater attributes and ecosystem services and should be aligned with the Species Environmental Assessment Guidelines by SANBI (2022) and IFC PS6.<br>▪ Baseline studies should be informed by a literature review, desktop analysis, fieldwork surveys and stakeholder engagement and consultation and other relevant assessments.<br>▪ The baseline surveys must be conducted in appropriate season/s. For sites with potentially significant impacts on NH and CH and ecosystem services, the baseline should include field surveys over multiple seasons.<br>▪ Quarterly surveys to capture variability in biotic and abiotic features so that data is suitable for inclusion in the monitoring plan for assessment of trends in CH features or in Present Ecological State (PES).<br>▪ Baseline studies must be conducted by appropriately qualified biodiversity specialists registered with SACNASP or other internationally relevant natural science professional body<br>▪ Detailed infield delineation of freshwater habitat to be measurably affected by the proposed development according to the DWAF (2005) - A Practical Field Procedure for Identification and Delineation of Wetlands and Riparian Areas. Delineation of watercourses within 500m of the study area will also need to be undertaken. |

| Specialist Study | ToR |
|---|---|
| | ▪ The WET-Health Ver 2.0 - A Refined Suite of Tool for Assessing the Present Ecological State of Wetland Ecosystems (Macfarlane et al, 2020) should be used to assess the PES of delineated watercourse units.<br>▪ The EcoStatus tools i.e. Hydrological Driver Assessment Index (HAI), Geomorphology Driver Assessment Index (GAI), Fish Response Assessment Index (FRAI), Macro-invertebrate Response Assessment Index (MIRAI), Riparian Vegetation Response Assessment Index (VEGRAI) and Index of Habitat Integrity (IHI) should be used to inform the PES of the uMkhomazi River.<br>▪ The South African Scoring System Version 5 (SASS5) should be used to determine aquatic macro-invertebrate community integrity.<br>▪ Determine the Ecological Importance and Sensitivity (EIS) of the biota and habitat. The following ecological aspects should be considered as the basis for the estimation of EIS for the uMkhomazi River:<br>o The presence of rare and endangered species, unique species (i.e. endemic or isolated populations) and communities, intolerant species and species diversity should be taken into account for both the instream and riparian components of the river.<br>o Diversity of aquatic habitat types or features.<br>o Refuge value of habitat types.<br>o Sensitivity of habitat to flow changes.<br>o Sensitivity to flow-related water quality changes.<br>o Migration route / corridor for instream and riparian biota.<br>o National parks, Wilderness areas, Nature reserves, Natural Heritage sites and Natural areas.<br>▪ Considering the PES and the EIS, a realistic and practically attainable Recommended Ecological Category (REC) should be indicated for the delineated watercourses.<br>▪ Collection of water samples to test *in situ* water quality for the following parameters: COD, pH, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Electrical conductivity (EC), temperature, microbiological indicators (e.g. Enterococci sp. and E. coli) and nutrients (Ammonia, Phosphate, Chlorine, Fluoride), soap, oil and grease.<br>▪ Provision of freshwater delineation map and shapefiles.<br><br>***b. Preliminary Planning and Design Phase Input***<br>As a means of feeding CH information into the planning phase, initial findings of the baseline assessment need to inform design and alignment considerations prior to assessing the final anticipated impacts. Typically, this would include an iterative process including practical steps to avoid sensitive areas and negative impacts prior to the project design being finalised (in line with the mitigation hierarchy) and may include:<br>▪ Provision of any relevant planning, design and alignment / layout recommendations based on the outcomes of the field investigation and the baseline assessment findings. |

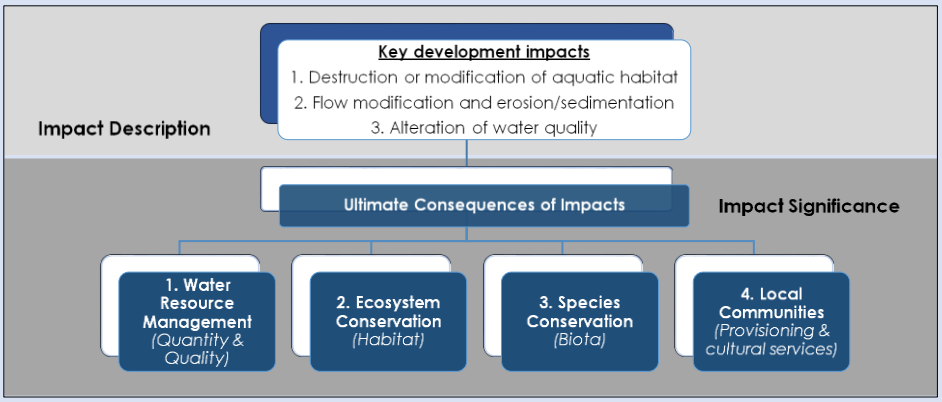
| Specialist Study | ToR |
|---|---|

- Provision of any relevant aquatic (wetland, river and estuarine) buffer zones or development setbacks and no-go areas informed by the compilation of a sensitivity map for the study area.
- Provision of site-specific design recommendations in key ecological constraint and sensitive areas.

***c. Impact Assessment***

Only once development plans, layouts, design specifications and pipeline alignments have been finalised, taking into consideration the measures described in the Preliminary Planning and Design Phase Input, the formal impact assessment may commence. The impact assessment should involve the following:

- Identification and description of the direct and indirect project-related impacts on the delineated watercourses and ecosystem services.
- Each impact shall be presented taking into account at minimum: characterisation / nature / duration (positive, negative, direct, indirect, cumulative, short-term, long term, permanent, reversible); magnitude, likelihood; and spatial scale.
- Assessment of the significance of the potential impacts. Key development impacts should be assessed in terms of the 'ultimate ecological consequences' in terms of water resource quality, quantity, ecosystems, species (biota), and ecosystem services as depicted in the graphic below:




**Impact description and significance methodology**

- Provisions of recommendations in terms of impact mitigation and management aimed at reducing impacts significance in line with the principles of the mitigation hierarchy.
- Identify residual impacts (inclusive of magnitude and significance) where avoidance or minimization measures are not available it may be appropriate to design and implement measures that compensate / offset for residual risks and impacts. A residual impact assessment should be undertaken to assess residual impacts.
- Assess the need for offsets should significant residual impacts be expected and provide preliminary recommendations to address expected losses using best practice offset guidelines.

| Specialist Study | ToR |
|---|---|
| | ▪ Assessment of risk to watercourses using the DWS Risk Matrix (2016).<br>▪ Compilation of a post-construction rehabilitation and management plan for wetland and aquatic habitats disturbed by construction activities, with additional best practice measures for rehabilitation in key offset areas and local priority conservation zones, where identified.<br>▪ Compilation of the specialist wetland and aquatic habitat impact assessment report inclusive of hydropedological impacts and risks which will need to comply with the minimum requirements of:<br>o Appendix 6 of the National Environmental Management Act: EIA Regulations 2014 (as amended);<br>o Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity; and<br>o IFC Performance Standards.<br>▪ Additionally, the Freshwater Impact Assessment will be in support of the iWULA required in terms of the NWA (refer to the WULA ToR).<br><br>***d. Framework for the Development of an Aquatic Monitoring Programme***<br>▪ A Framework for the Development of an Aquatic Monitoring Programme for the operational phase of the STP in accordance with PS6, WUL and EA conditions must be developed.<br>▪ The programme should seek to monitor potential long-term impacts that the STP discharge has on receiving aquatic ecosystems (i.e. the uMkhomazi River and estuary in this case), reported against RQOs (refer to ToR for Environmental Monitoring) set for the receiving environments and agreed discharge quality and quantities (volumes). Importantly the programme must report against flow, water quality, habitat and biota scenarios modelled as part of the impact assessment phase of the project (i.e. those that show potential improvements in PES from decommissioning of existing plants and flow augmentation to the estuary).<br>▪ The programme should contain as a minimum:<br>o Purpose of monitoring programme;<br>o Aim and Objectives of the monitoring programme;<br>o Key risk and development impacts informing the monitoring plan;<br>o Potential water quality threats and pollution pathways to be monitored;<br>o Roles and responsibilities for monitoring;<br>o Confirmation of funding for monitoring;<br>o Monitoring site selection and rationale;<br>o Monitoring variables, methods and techniques (aligned with water quality and biological indictors set out in the RQO's);<br>o Reporting requirements;<br>o Use of monitoring results to inform impact management; and<br>o Review of the monitoring plan and adaptive management cycle.<br><br>The minimum requirements for the Aquatic Monitoring Program are further detailed in the annexed TOR for Environmental Monitoring. |
| **Marine and Estuarine Impact Assessment** | A dispersion modelling study to investigate the effects of changes in constituent profile and effluent volumes on plume behaviour and dispersion potential for the |

| Specialist Study | ToR |
|---|---|
| ***(including a dispersion modelling study and CWDP amendment)*** | SAPPI marine outfall will be required. The objective of the study should be to assess diffuser performance and achievable initial and final dilutions. This work will be an update to the dispersion modelling study conducted by Luger & Botes (1998).<br><br>The study should include both near-field and far-field dispersion models. The near-field model should assess dilution potential, performance, and hydraulics of the diffuser, while the far-field hydrodynamic model should assess plume behaviour in the broader environment.<br><br>The appointed service provider must:<br>▪ Determine and describe the baseline physical coastal processes and dispersion characteristics at the discharge site including but not necessarily limited to water quality characteristics, waves, currents and tides based on available data and information. The service provider will be expected to liaise with the appointed service provider undertaking the SAPPI SAICCOR receiving environment quality monitoring program to determine the availability of existing data. Note that if it is anticipated that additional (primary) data on the physical coastal processes and dispersion characteristics at the discharge site is required for the dispersion modelling (Task 4 below), this must be clearly motivated and should be costed in the tender proposal.<br>▪ Provide a detailed description of the natural environment in the vicinity of the outfall including all key habitats, fauna and flora that are likely to be found in this area, along with ecological processes and features, and any existing beneficial uses of this environment that could potentially be affected by effluent discharged from the SAPPI SAICCOR outfall. All important, sensitive or significant areas should be identified and must be delineated on detailed georeferenced maps of the study area.<br>▪ Outline the typical environmental fate and potential harm of all key constituents in the effluent from the SAPPI SAICCOR outfall, with a view to identifying and prioritising environmentally harmful constituents for inclusion in the model.<br>▪ Undertake near- and far-field numerical modelling to evaluate dispersion of effluent from the SAPPI SAICCOR outfall, including all priority constituents therein, and the associated impacts on the receiving environment. The model should be able to provide information on plume dimensions and behaviour through the water column, constituent fate and sedimentation processes for a range of different discharge scenarios.<br>▪ Provide an interpretation of the outputs/findings of the modelling studies to inform the assessment of impacts on the receiving environment paying particular attention to any important, sensitive or significant features in the study area. This should include an assessment of compliance with the latest version of the South African Water Quality Guidelines for Coastal Marine Waters at the edge of the mixing zone. The maximum extent of the mixing zone should be determined in consultation with DWS and should be informed |

| Specialist Study | ToR |
|---|---|
| | by relevant guideline documents adopted by and/or prepared for the Department.<br>▪ Investigate and describe possible options for optimising the dispersal of the effluent and for minimising the impact on the marine environment.<br>▪ A draft report addressing all of the above tasks must be submitted on the conclusion of the study. The reports should be submitted on a company letterhead and should be signed by the authors. Reports should include the following sections at least:<br>a) Introduction;<br>b) Terms of Reference;<br>c) Baseline physical coastal processes and dispersion characteristics at the discharge site;<br>d) Baseline description of the natural environment and other existing beneficial uses<br>e) Likely fate of and potential impacts associated with by priority constituents and effluent properties<br>f) Residual Impact Assessment<br>g) Methodology for the dispersion modelling<br>h) Findings from the dispersion modelling study studies<br>i) Options for optimising the dispersal of the effluent and for minimising the impact on the marine environment; and<br>j) Conclusions and Recommendations<br><br>The service provider will be expected to address any comments on the draft report to the satisfaction of the client, and to submit a final report in electronic and hard copy format (5 copies) on completion of the study.<br><br>▪ A presentation outlining key findings from the study shall be delivered to the client at their offices on completion of the study.<br>▪ Service provider shall submit four detailed progress reports, and attend progress meetings for these deliverables as follows:<br>a) Inception report<br>b) Baseline results<br>c) Preliminary modelling results<br>d) Final modelling results<br><br>▪ The appointed Service Provider must:<br>a) Be independent;<br>b) Have expertise and knowledge in the various fields required to draft the reports/ assessments as listed above. Alternatively, the service provider must appoint the experts required and take responsibility for the payment of any outsourced work;<br>c) Comply with applicable legal requirements;<br>d) Be registered with SACNASP or other internationally relevant natural science professional body; and |

| Specialist Study | ToR |
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| | e) Must provide a list of names and brief CVs of individuals who will be involved in the study, along with a brief (2 page) motivation explaining why the team/individuals are best suited to undertake the project.<br>▪ The Estuarine Ecological Assessment will be in support of the iWULA required in terms of the NWA (see annexed ToR).<br>▪ A Water Quality and Biomonitoring Programme will need to be provided for the operation phase of the project (see annexed ToR).<br>▪ Notwithstanding the duties listed above, the successful bidder shall perform any other duty reasonably associated with the role of a consultant. |
| Hydrological and Geohydrological Assessment | A Hydrological (surface water) and Geohydrological (groundwater) Assessment will be required in support of the ESIA study and iWULA. The objective of the assessment is to identify potential impacts on surface- and groundwater resources arising from the STP upgrade. Management of these potential impacts on the hydrological environment will be discussed in order to ensure environmental legal compliance and efficient, cost-effective water resource management. In order to meet these objectives, the following scope of work must be undertaken:<br>▪ A desktop review of the baseline receiving environment including existing geohydrological information and borehole data;<br>▪ Hydrological characterisation including water balance;<br>▪ Hydrocensus, surface- and groundwater sampling;<br>▪ Conceptual Stormwater Management Plan;<br>▪ Flood risk assessment including 1:100-year floodline determination and relevant determination taking into account climate change projections;<br>▪ Water quality analysis and surface water monitoring programme; and<br>▪ DWS Risk Assessment including assessment of impacts and mitigation. |
| Air Quality Assessment | A detailed Air Quality Impact Assessment inclusive of an Odour Assessment will be required. The scope of work entails the following, as a minimum:<br>▪ Development of an emissions inventory;<br>▪ Analysis of air pollution potential of treatment technology used and other aspects of the project;<br>▪ Analysis of movement of pathogens;<br>▪ Detailed analysis of the influence of wind on odour and air pollution dispersion;<br>▪ Dispersion simulations of pollutant concentrations for the operational activities using available engineering design parameters;<br>▪ Analysis of dispersion modelling results from operations, and evaluation of potential for human health, and nuisance dust impacts;<br>▪ Identification of suitable air quality management measures;<br>▪ Determine the listed activities and minimum emissions standards as well as the need for an Atmospheric Emission Licence (AEL); and<br>▪ Prescribe any buffers, if necessary. |
| Climate Change Assessment | A Climate Change Assessment, in compliance with the draft National Guideline for Consideration of Climate Change Implications in Applications for Environmental Authorisations, Atmospheric Emission Licences and Waste Management Licences (2021) is required, that will: |

| Specialist Study | ToR |
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| | ▪ Provide an assessment of the extent to which the proposed project will contribute to climate change over its lifetime by quantifying its GHG emissions during construction, operation and decommissioning;<br>▪ Determine the resilience of the project to climate change, taking into account how climate change will impact the project infrastructure and its operation as well as how the project may exacerbate the climate change induced impacts on the affected communities and on the environment in the area of influence, through factors such as rising temperatures, diminishing water supply, and extreme weather patterns; and<br>▪ Assess how these impacts may be avoided, mitigated, or remedied. |
| Heritage and Palaeontological Assessment | A Phase 1 Heritage Impact Assessment will be required to be conducted by a Heritage Consultant to assist in the identification and protection of heritage resources in terms of Section 38 of the National Heritage Resources Act (NHRA) as well as, IFC PS8 requirements, international best practice and guidelines such as the UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage. The Heritage Impact Assessment is not limited to archaeological artefacts, historical buildings and graves. It will also include intangible and invisible resources such as places, oral traditions and rituals. A heritage resource is defined any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The Heritage Impact Assessment will advise on the need for any heritage permits which may be required.<br><br>Similarly, a Phase 1 Desktop Palaeontological Assessment will be required to identify palaeontological sensitivity within the area and to prepare a Chance Find Protocol for inclusion in the ESMP. The need for further assessments and permits will be an outcome of this study. |
| Socio-Economic Assessment | The ESSS provided a baseline description of the study area, specifically focusing on the communities living and working in the project area of influence. The ESIA study will need to elaborate on this, collect baseline data, and further identify and assess the potential impacts of the proposed development (in all its phases) on the social and economic environments. Such impacts include community health and safety, labor influx, noise and visual disturbances, loss of livelihoods, impacts on recreational use of the River/estuary, fishing, and tourism activities, job creation, physical and economic displacement, community perceptions, etc.. Mitigation measures in line with the mitigation hierarchy will be proposed to enhance the positive impacts and reduce the significance of the negative impacts.<br><br>As part of the baseline data collection, it is needed to:<br>▪ Establish the socio-economic attributes of nearby communities using a typical mix of qualitative and quantitative methods. Key attributes to include local population size, demographic characteristics, religion, livelihood and income profiles (in the project area of influence, there are sites for tourism, canoeing, diving, and recreational fishing, and income generating fishing; some of these economic activities are crucial for the local economy), housing characteristics, health and educational conditions/attainment levels, access |

| Specialist Study | ToR |
|---|---|
| | to social services, cultural norms and practices, use of land and other natural resources, types and quantities of assets (e.g. land, housing), energy and water usage. As part of this task, vulnerable persons and groups will need to be identified (as per IFC PS1 paragraph 12)<br>▪ Describe local government and administration arrangements, local Non-Governmental Organisations (NGOs) and community based organizations, community organization and leadership arrangements and any relevant social network structures.<br>▪ Confirm key community needs<br>▪ Describe local security conditions and proximity of police and/or security personnel.<br><br>To note that the project will require:<br>▪ While physical displacement is not expected along the pipelines alignment, it cannot be excluded at this stage given the total length. Some level of economic displacement is expected. Whilst a Resettlement Action Plan (RAP) is not required as per PS5, a Livelihood Restoration Plan (LRP) is required (refer to separate ToR for LRP).<br>▪ A SEP (refer to the ToR for SEP) which will include mechanisms to deal with grievances. |
| MHI Risk Assessment | A specialist consultant will need to be appointed to undertake Major Hazardous Installation (MHI) risk assessment. The MHI risk assessment will be carried out to comply with the requirements of the revised Major Hazard Installation Regulations of July 2001, under the South African Occupational Health and Safety Act (OHSA) and any other applicable legislation and must be fully compliant with the South African National Standards (SANS) 1461:2018 requirements. |
| Sludge Handling and Beneficiation | There are uncertainties regarding exact volumes, nature and classification of the sludge that have an impact on the potential re-use and disposal. The concept design considers several options for the treatment (dewatering), re-use and final disposal of sludge which may change during detail design.<br><br>Despite, a range of Department of Water Affairs and Forestry (DWAF) guidelines that are available for the utilisation and disposal of sludge, without the regulation of and enforcement of the trade effluent policy and sewage disposal by-law at the industries (e.g. in the Verulam area specifically), the final sludge re-use and disposal route will be limited. Further to this, sludge beneficiation initiatives and proposals will rely on secured offtake agreements with local entities which will need to be investigated between the EWS and the PPP Concessionaire.<br><br>In line with the Waste Management Hierarchy, beneficial re-use is preferred over disposal of sludge and other wastes (e.g. screenings) to landfill. Therefore, all options for beneficial re-use should be investigated before considering disposal to landfill and the necessary licensing pursued in the next phases of study. |

| Specialist Study | ToR |
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| | To inform the sludge handling and beneficiation options, sludge will need to be classified in terms of SANS 10234 as prescribed GNR 634, "Waste Classification and Management Regulations, Chapter 2 in terms of the NEM:WA (Act No. 59 of 2008), thereafter a Beneficial Use Assessment will be conducted by using the Guidelines for the utilisation and disposal of wastewater sludge series of documents published by the former Department of Water Affairs and Forestry (DWAF ).<br><br>In addition, the applicable provisions of the WBG EHS Guidelines for Water and Sanitation, General EHS Guidelines on Wastewater and Ambient Water Quality, as well as the WHO Guidelines for the Safe Use of Wastewater, Excreta and Greywater must be considered. |
| Agriculture | An Agricultural Specialist should determine whether an Agricultural Agro-Ecosystem Specialist Assessment or an Agricultural Compliance Statement will be required in terms of the Procedure for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Section 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998 based on the sensitivity rating of the site. If the site is of a Low to Medium sensitivity, then the latter would be required. An Agricultural Agro-Ecosystem Specialist Assessment would be required for a site that is a Very High to High sensitivity. The sensitivity of the site must be determined during the ESIA study to determine the appropriate level of assessment. |
| Contaminated Land / Environmental Site Assessment | Environmental Site Assessments (Phase 1 and 2) shall be undertaken following ASTM E1527-13 and ASTM E1903-11 or equivalent, and a Remediation Plan compiled for each of the existing STPs that are to be decommissioned. This must include:<br>▪ Site reconnaissance to identify present and past potential sources of contamination for soil, subsoil, and groundwater (hot spot areas) and define an investigation plan;<br>▪ Site intrusive assessment (including soil and groundwater samplings) and laboratory analysis to determine levels of soil contamination, groundwater contamination and the general status of each site;<br>▪ Reporting on the findings of the assessments to the applicable regulatory authorities following national regulation or, in its absence, GIIP. The report shall indicate where limits defined in national regulation have been identified or, when GIIP are followed, where screening limits according to GIIP are exceeded. A risk-assessments according to national regulation, or GIIP (ASTM E2081 - 00(2015) or equivalent) shall be undertaken to assess the risks posed to receptors and define remediation objectives accordingly;<br>▪ Compiling a Remediation Plan based on the risk assessment findings and the regulatory authority inputs; and<br>▪ Incorporating the Land Remediation Plan into the ESMP, for implementation of remedial actions. |

## 3.4 Impact Assessment and Mitigation

### 3.4.1 Impact Assessment Methodology

The ESIA Report must include:

- A section with a detailed description of the impact assessment methodology, uncertainties associated with the assessment and key gaps in information.
- Each impact shall be presented taking into account at minimum: characterisation / nature / duration (positive, negative, direct, indirect, cumulative, short-term, long term, permanent, reversible); magnitude, likelihood; and spatial scale.
- For each identified, non-negligible impact, there is the need to define measures to mitigate (adverse) or enhance (positive) impacts and identify the magnitude and significance of residual adverse impact; and
- Impacts that do not require further actions must be clearly depicted.

### 3.4.2 Development of Mitigation and Enhancement Measures

The mitigation hierarchy (Figure 2-1 below) is used to anticipate and avoid, or where avoidance is not possible, minimise, and, where impacts remain, compensate / offset for risks and impacts to workers, communities, and the environment. For positive impacts enhancement measures have been proposed.

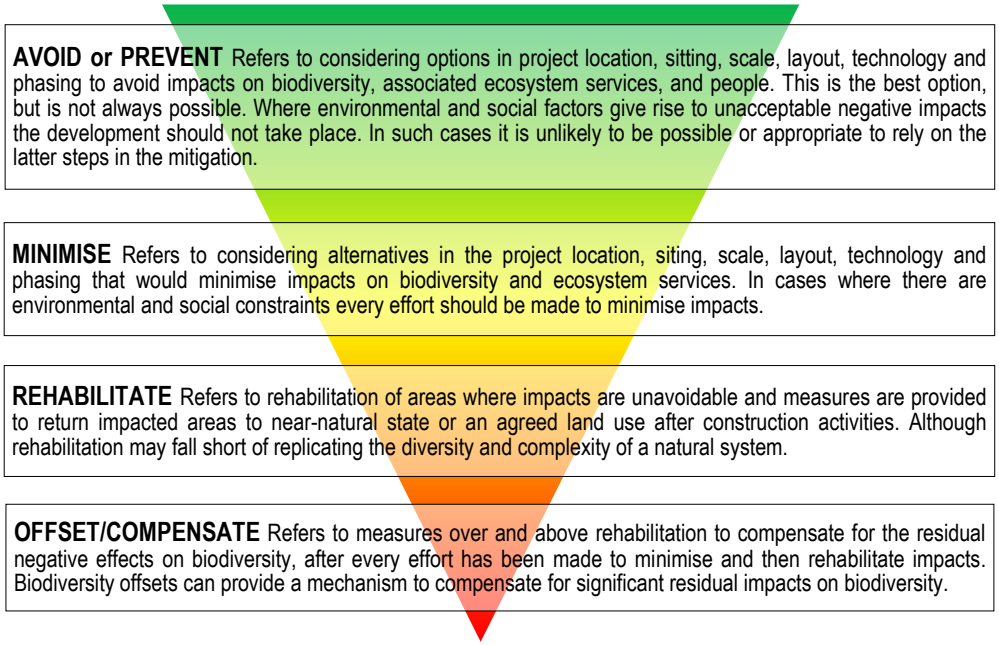


**Figure 3-1: Mitigation hierarchy**

## 3.5 Public Participation & Engagement Process

Informed public consultation and disclosure is an intrinsic aspect of attaining a best practice approach to community engagement and participation. According to IFC PS1, '*the term stakeholder engagement is a means of describing a broader, more inclusive and continuous process between a company and those potentially impacted, that encompasses a range of activities and approaches, and spans the entire life of a project*' (IFC, 2007). To be effective, engagement has to be integrated into the core business of a company.

The IFCs key requirements for stakeholder engagement include:

- Provide affected communities with opportunities to express their views on project risks, impacts and mitigation measures, and allow the client to consider and respond to them;
- Begin early in the process of identification of environmental and social risks and impacts and continue on an on-going basis as risks and impacts arise;
- Be based on the prior disclosure and dissemination of relevant, transparent, objective, meaningful and easily accessible information which is in a culturally appropriate local language(s) and format and is understandable to affected communities;
- Be inclusive of all the relevant groups within the community (including the vulnerable and marginalized);
- Be focused on those directly affected as opposed to those not directly affected; and
- Be free of external manipulation, interference, coercion, or intimidation; and
- Be documented and include opinions and concerns as well as the measures taken to respond to them.

The stakeholder engagement activities will aim at:

- gathering baseline information;
- informing stakeholders about the project and soliciting their concerns (opportunities and concerns, perceptions, attitudes and views of the community on the project design);
- discussing project risks and impacts and proposed mitigation measures;
- managing expectations around local economic benefits such as employment, purchasing, contracting, and additional social services/infrastructures;
- soliciting comments on the draft and final ESIA report; responding to issues as they arise.

In addition to being compliant with the IFC PS1, the public consultation for the ESIA must conform to the requirements of the national environmental assessment laws and regulations, including the relevant disclosure of information and public consultation requirements, and will be developed following principles of good international industry practice. For the Project's consultation and disclosure process to therefore satisfy both South African legislative requirements and the IFC's stakeholder engagement requirements, the following will require implementation as outlined in Table 2-2 below.

To note that the result of the stakeholder identification, analysis, and public consultation activities prior to ESIA finalization should be reflected in a dedicated chapter of the ESIA and in a stand-alone Stakeholder Engagement Plan (SEP), which will summarize related activities conducted to date, issues raised, and will lay out how ongoing engagement will occur in future with selected groups. A specific TOR with the minimum requirements for the SEP is provided in annex. The SEP developed will be implemented and reported on as part of the Project's present and future engagement tool.

The SEP will need to cover, but not be limited to, (i) engagement on issues such as appropriate behaviour in the event of / threat of an hazard to people and the environment, such as an unplanned release beyond the Site due to irregular operation/accident, or during transportation of material to the Site; and (ii) concerns on risks and impacts of the project in relation to issues such as (but not limited to) odour, noise, traffic increases during construction and operation, tourism and recreational activities, fresh and salt water quality and quantity, biodiversity.

**Table 3-2: Project stakeholder engagement requirements – aligned to PS1**

| Aspect | Key Requirements | Medium of Correspondence |
|---|---|---|
| Stakeholder analysis and planning | ▪ Identify Project Affected Persons / Stakeholders (PAPs), including vulnerable groups[7]<br>▪ Develop and implement a Stakeholder Engagement Plan (SEP) | Project SEP |
| Disclosure of information | ▪ Develop a clear action plan on when, who, where and how stakeholders shall be consulted and prepare communication material summarizing the key items described in the ESIA.<br>▪ Provide stakeholders with access to information on:<br>o Purpose, nature and scale of the Project<br>o Duration of proposed Project activities<br>o Any risks, potential impacts and mitigation measures<br>o Proposed stakeholder engagement process | Project SEP and BID |
| Consultation | ▪ In consultation meetings, accompany the project proponent and play an active role during the organization of the meetings and presentations, as well as in the collection of stakeholders' comments and concerns. All the comments and concerns collected during the consultation and disclosure of the draft ESIA shall be then taken into account and reflected by the consultant in the final ESIA.<br>▪ Consultation will be in line with the degree of potential project impacts and will:<br>o Begin early and continue throughout the Project lifecycle<br>o Be based on prior disclosure and dissemination of information<br>o Focus on those directly affected<br>o Be free of outside interference and external manipulation<br>o Enable meaningful participation<br>o Be documented | Consultation during ESIA & Public meetings |
| External communications | Implement and maintain a procedure for external communications that:<br>▪ Registers communication<br>▪ Screens and assesses issues raised<br>▪ Tracks and documents responses | Project Community Liaison Officer (CLO) activities |
| Complaint Form for Project Affected Communities | Establish a grievance redress mechanism to receive and facilitate resolution of Affected Communities' concerns and grievances about the Project. | Grievance Redress Mechanism |

[7] *Vulnerable stakeholders are defined as those who may be differently or disproportionately affected by the Project due to pre-existing disadvantaged status, or whose situation may mean that they are hard to reach, and/or require differentiated measures in consultation and disclosure activities to allow their effective participation.*

| Aspect | Key Requirements | Medium of Correspondence |
|---|---|---|
| Ongoing reporting to affected communities | Report to the community with frequency that is proportionate to the concerns of affected communities but not less than annually | Project CLO activities |

Ongoing consultation with KZN EDTEA, National DFFE, the DWS, the eThekwini Municipality, Ward Councillors, and all other authorities identified during the ESS phase of the project (and further ones that may be identified during the ESIA phase) must continue throughout the duration of the project. Authority consultation is therefore seen as a continuous process that takes place until completion of the environmental investigations.

## 3.6 Environmental and Social Management Plan

The primary objective of an ESMP is to ensure that the health, safety and security of people and communities within and vicinity of the project are protected. The ESMP provides a framework to guide the transparent and effective monitoring, prevention, minimization, mitigation, offset and enhancement measures of E&S impacts identified through the ESIA process for pre-construction, construction, operations, and decommissioning phases.

Key objectives of the ESMP are as follows:

- To ensure continuing compliance with legal requirements and government policies;
- To provide the initial mechanism for ensuring measures identified in this study to mitigate potentially adverse impacts are implemented;
- To provide a framework for mitigating impacts during project execution;
- To provide assurance to regulators and stakeholders that their requirements with respect to Health, Safety and Environmental performance will be met;
- To undertake monitoring to demonstrate that predictions made within the ESMP are valid; and,
- To provide a framework for the compliance with auditing and inspection programs.

The ESMP will, as a minimum, need to comply with the requirements of the IFC PS, and the NEMA EIA Regulations 2014 (as amended) and, therefore, must include , but not limited to the following requirements::

- Compliance with IFC's Performance Standards, National Regulation and other regulatory compliances;
- Assumptions and limitations;
- For each E&S impact identified through the ESIA:
  - A detailed description of the measure to manage the impact / including the relevant standards and the monitoring measures and indicators, targets or acceptance criteria that can be tracked over defined time periods;
  - Reporting requirements for the implementation of the measure;
  - An identification of the persons who will be responsible for the implementation and for the monitoring of the measures and intended users of the ESMP;
  - Timeline for implementation;
  - Implementation procedure or specific plan needed (see below)
  - Indicative budget for the implementation of the measure and associated monitoring activities.
- Proposed overall mechanisms for monitoring compliance with the ESMP and reporting thereon, including a "management of change" capacity to the ESMP reflecting that the ESMP is intended to be a live document subject to regular review and update as the project evolves;

- Proposed overall organizational arrangement to be put in place for the implementation of the ESMP and any related procedures and plans;
- Proposed overall budget for the ESMP implementation;
- An environmental awareness plan; and
- Procedures for managing incidents which have occurred as a result of undertaking the measures.

It is expected that more detailed construction and operations phase E&S procedures will need to be developed by project proponent and/or its Engineering Procurement and Construction (EPC) / O&M contractors prior to the commencement of construction and operations, respectively. A comprehensive Environmental Monitoring program will also need to be prepared, in line with the minimum requirements set out in the Environmental Monitoring TOR in annex.
In support of the ESMP, the following plans will be required as a minimum all to be developed and implemented in line with IFC PS, applicable aspects of the WBG general EHS guidelines and WBG EHS guidelines for Water and Sanitation and national legislation (Table 2-3).

**Table 3-3: Management Plans to support an ESMP**

| Item | Mitigation measure | Management measure |
|---|---|---|
| Biodiversity | ▪ Measures to achieve no net loss of Natural Habitat and associated significant biodiversity values, with appropriate mitigation measures to preserve the integrity of topsoil and existing natural vegetation, protection of wetlands and waterbodies, control of alien invasive species and post-construction restoration.<br>▪ Mitigation strategy and measures designed to achieve net gains of those biodiversity values for which critical habitat has been designated | ▪ Construction-phase Biodiversity Management Plan (BMP)<br>▪ BAP to be prepared and implemented (refer to ToR for BAP). The BAP will also include a biodiversity monitoring plan for the operational phase and implement additional programs to promote and enhance the conservation aims and effective management of relevant Key Biodiversity Areas (KBA). |
| Water Resources (Groundwater and Surface water) | All water resources are to be provided protection during the construction and operation of the proposed Umkomaas STP and associated infrastructure. An Integrated Water and Waste Management Plan (IWWMP) is required which contains provision for a site Stormwater Management Plan, Spill Contingency Plan, Water Balance and Water Quality Monitoring, inclusive of Biomonitoring [treated water quality and quantity monitoring and corrective actions, freshwater, marine water and groundwater quality and quantity monitoring and corrective actions] | IWWMP is required as well as an Environmental Monitoring Programme (refer to ToRs provided) |

| Item | Mitigation measure | Management measure |
|---|---|---|
| Waste, including Sludge / Digested Sludge as well as Solid and Hazardous Waste Management | ▪ Solid waste generated as a result of the decommissioning of the existing STPs and operational phase must be managed in line with the waste management hierarchy.<br>▪ If waste services will be contracted directly, hire only licensed companies with valid permits for waste transportation /treatment and disposal. | ▪ A Waste Management Plan must be implemented. Furthermore, a Rehabilitation Plan for the decommissioning of the existing STPs may be required.<br>▪ Develop strategy and improvement measures and actions to treat and dispose digested sludge, including sludge valorisation opportunities in compliance with Digested Sludge Discharge Standards |
| Heritage and Palaeontology | Chance find procedure to be adopted by the project. | Based on the findings of the Heritage and Palaeontological Assessments, appropriate recommendations from the specialist and / or AMAFA will need to be included in the ESMP.<br><br>A Heritage Management Plan (HMP) only becomes viable if the chance find protocol uncovers any findings. Therefore, the chance find procedure should be implemented. The HMP will be developed as necessary. |
| Community Health, Safety, and Security, including emergency preparedness and response and life and fire safety | ▪ Ensure that innovative, state of the art technology is utilised in the project design in order to decrease human health, safety, and security risk. People before profit.<br>▪ Safety management, including emergency preparedness and response and life and fire safety.<br>▪ Labour influx management. | ▪ Appropriate plans and procedures must be in place prior to construction and must be updated and in place for the operational phase.<br>▪ Emergency preparedness and response plan shall specify responsibilities of the parties and the relevant authorities, detail the procedures to be followed to minimize the harm of any potential accident and ensures appropriate response equipment and materials are in place. The plan will include provisions for update on a continual basis, including drills to test the effectiveness |
| Recreation | Be transparent about the results of specialist studies that determine the impact on the Aliwal Shoal and ultimately marine ecology. Conduct the | Stakeholder Engagement Plan – SEP (including grievance redress issues (GRM) |

| Item | Mitigation measure | Management measure |
|---|---|---|
| | necessary robust consultation with interested and affected persons. | |
| Labour redeployment | No job losses/ retrenchments planned for. Key discussions with personnel suggested that a plan will be in place which will outline the labor needs and/or redeployment. This is expected to be done by EWS and, so that anticipated impacts to be drawn into the ESIA. Labour redeployment plan to be developed and approved. | EWS Labour redeployment plan. |
| Economic (Physical) displacement – site | To manage physical/economic displacement that could not have been avoided for the pipeline servitude right. To ensure that all due legally required land documentation is made available during the course of the land claims process. | Resolution and closure on the current land claim. LRP to be implemented according to the PS5 (refer to annexed TOR for LRP) |
| Occupational Employment, Health and Safety (site and sewage conveyance system routing) | ▪ On site (and pipeline) labour practices (Human resource policies), employment protocols and EHS protocols must be documented and made available for each phase (construction, operations, decommissioning)<br>▪ Labour influx management and construction workers – provide adequate accommodation in line with IFC PSs (if needed). | Plans and procedures |
| Visual | Consider the planting of taller trees around the perimeter fence of the plant. | Procedures |
| Traffic | A Traffic Management Plan (TMP) for the construction phase to be developed and followed to manage nuisances to settlements through which materials for the project is transported and to manage safety risks including when hazardous chemicals are transported to the Site and/or hazardous waste is transported outside the Site | TMP required. All mitigation and measures related to traffic to be included within Community Health Chapter of EHS Management Plan (to be updated during operations phase). |
| Increased Property Sales and Value | No additional mitigation necessary. Individuals will see the direct benefit. | Ensure that communities are always updated *via* regular disclosure |

| Item | Mitigation measure | Management measure |
|---|---|---|
| | | correspondence. The SEP should be updated as necessary. |
| Marine / Estuarine | Implementation of a plan to ensure for Coastal Waster Discharge Permit (CWDP) compliance | Monitoring of effluent disposed to sea (i.e. plume visibility, foam, etc) according to CWDP requirements |
| Air Quality and Odour Management | Development of Air Quality & Odour Management Plan to minimize and control dispersion of odour outside the site and to control air emission, including bio-aerosol, from treatment operations | Plans and procedures |
| Management of Contractors and Subcontractors | It is necessary to monitor the HSE performance of contractors and subcontractors. For that reason, the implementation of a Management of Contractors and Subcontractors Plan according to the IFC Good Practice Note must be developed and implemented. | Management of Contractors and Subcontractors plan required. |
| Stakeholder engagement and Grievances Redress Mechanism | Be transparent about the results of specialist studies that determine the impact on the River ecology and human health. Conduct the necessary robust consultation with stakeholders. | SEP (including grievance redress mechanism) is required – refer to ToR for SEP |
| Pollution Prevention and Spill response / Hazardous Materials Management | Develop a Standard Operating Procedure for in the event of a spill as well as a Management and Mitigation Plan for the handling and storage of hazardous chemicals, construction material and waste, mitigation of excessive dust and noise pollution; | Plan and procedures |
| Energy Conservation and Resource Management | Develop a management plan to ensure that project impacts on resources are minimised and to promote efficient use | Management Plan |
| Contamination of Soil and Water Resources | Environmental Site Assessments (Phase 1) shall be undertaken and a Land Remediation Plan compiled for each of the existing STPs that are to be decommissioned | Plan |

## 3.7 Qualifications and Experience Requirements of the Consultant

The project team will have experience in ESIAs associated with wastewater projects in the South Africa and the minimum experience as specified in Table 3-4 below:

**Table 3-4: Required Expertise**

| Position | Minimum Experience |
|---|---|
| Environmental Specialist | ▪ 15 years of experience in environmental assessment, with at least 3 years of experience in South Africa. Previous experience in ESIAs using IFC Performance Standards and the WBG EHS Guidelines, track record on ESIA of public/municipal wastewater treatment plants; understanding of wastewater treatment process and discharge standards.<br>▪ Registered Environmental Assessment Practitioner (EAP) with the EAP Association of South Africa (EAPASA) and Professional Natural Scientist with the South African Council of Natural Scientific Professions (SACNASP). |
| Social Specialist | ▪ 10 years of experience in social impacts assessment, with at least 2 years of experience in South Africa. Previous experience in ESIA using IFC Performance Standards and the WBG EHS Guidelines, track record of social impact assessment for infrastructure projects including labour issues. |
| Agricultural Specialist | ▪ 7 years of experience in agricultural assessment. Previous experience in ESIA using IFC Performance Standards and the WBG EHS Guidelines, track record in agricultural assessments.<br>▪ Professional Natural Scientist (SACNASP). |
| Biodiversity Specialist | ▪ 15 years of experience in biodiversity assessment. Previous experience in ESIA using IFC Performance and WBG EHS Guidelines, track record in biodiversity assessments.<br>▪ Professional Natural Scientist (SACNASP). |
| Aquatic Specialist | ▪ 10 years of experience in aquatic assessment. Previous experience in ESIA using IFC Performance and WBG EHS Guidelines, track record in aquatic assessments.<br>▪ Professional Natural Scientist (SACNASP). |
| Estuarine Specialist | ▪ 10 years of experience in estuarine assessment. Previous experience in ESIA using IFC Performance and WBG EHS Guidelines, track record in estuarine assessments.<br>▪ Professional Natural Scientist (SACNASP). |
| Hydrological and Geohydrological Specialist | ▪ 10 years of experience in hydrological and geohydrological assessment. Previous experience in |

| Position | Minimum Experience |
|---|---|
| | ESIA using IFC Performance and WBG EHS Guidelines, track record in hydrological and geohydrological assessments.<br>▪ Professional Natural Scientist (SACNASP). |
| Air Quality Specialist | ▪ 7 years of experience in air quality assessment. Previous experience in ESIA using IFC Performance and WBG EHS Guidelines, track record in air quality assessments.<br>▪ Professional Natural Scientist (SACNASP). |
| Heritage and Palaeontological Specialist | ▪ 7 years of experience in heritage and palaeontological assessment. Previous experience in ESIA using IFC Performance and WBG EHS Guidelines, track record in heritage and palaeontological assessments.<br>▪ Professional Member of the Association of Southern African Professional Archaeologists |
| Climate Change Specialist | ▪ 7 years of experience in climate assessment. Previous experience in ESIA using IFC Performance and WBG EHS Guidelines, track record in climate assessments.<br>▪ Professional Natural Scientist (SACNASP). |
| Major Hazard Installation (MHI) Risk Specialist | ▪ 10 years of experience in MHI assessment. Previous experience in ESIA using IFC Performance and WBG EHS Guidelines, track record in MHI assessments. |
| Contaminated Site Consultant | ▪ 10 years of experience in environmental assessments, with relevant experience in contaminated land assessments. Should have previous work experience in decommissioning process and should have previous work experience with Wastewater Treatment works.<br>▪ Should be SACNASP registered. |

# 4 OTHER LICENSES AND / OR PERMITS

According to national legislation, the construction, operation and maintenance of the STP, cannot proceed without additional licences being in place e.g. WUL (for triggered water uses), Waste Management License (WML) for the treatment and handling of sludge, Atmospheric Emissions Licence (AEL) for the biogas facility, amendment of the CWDP and as far as possible an integrated licensing process should be followed. The above licensing processes rely on detailed design information to adequately identify and evaluate the environmental and social risks and impacts of the project.

# 5 ANNEXES TO THE TOR PACKAGE

1. Terms of Reference for Stakeholder Engagement Plan (Annexure A)
2. Terms of Reference for Environmental Monitoring Programme (Annexure B)
3. Terms of Reference for Biodiversity Action Plan (Annexure C)
4. Terms of Reference for Livelihood Restoration Plan (Annexure D)
5. Terms of Reference for Integrated Water Use Licence Application (Annexure E)