APPENDIX D: SPECIALIST REPORTS –

Aquatic and Terrestrial Assessment

RIET RIVER ACCESS ROAD EROSION PROTECTION

AQUATIC AND TERRESTRIAL IMPACT STATEMENT

FOR

JG AFRIKA

Port Elizabeth

6001

BY

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DATE

November 2018

REVISION 1

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SPECIALIST REPORT DETAILS

This report has been prepared as per the requirements of the Environmental Impact Assessment Regulations and the National Environmental Management Act (Act 107 of 1998), any subsequent amendments and any relevant National and / or Provincial Policies related to biodiversity assessments.

This also includes the minimum requirements as stipulated in the National Water Act (Act 36 of 1998), as amended in Water Use Licence Application and Appeals Regulations, 2017 Government Notice R267 in Government Gazette 40713 dated 24 March 2017, which includes the minimum requirements for a Wetland Delineation Report.

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Expertise / Field of Study: BSc (Hons) Zoology, MSc Botany (Rivers), Ph.D Botany Conservation Importance rating (Estuaries) and interior wetland / riverine assessment consultant from 1996 to present.

I, **Dr. Brian Michael Colloty** declare that this report has been prepared independently of any influence or prejudice as may be specified by the National Department of Environmental Affairs and or Department of Water and Sanitation

Signed:… …… Date:…November 2018……

1. Introduction

JG Afrika (Pty) Ltd appointed EnviroSci (Pty) Ltd) on behalf of the Eastern Cape Department of Roads and Public Works (DRPW), to conduct this assessment as part of the Basic Assessment process. This for the proposed routine maintenance of the Riet River Access Road, located within the Ndlambe Local Municipality, Eastern Cape province (Figure 1).

1.1 Aims and objectives

The aim of this report is two part and includes an assessment of the general ecology of the proposed works area (terrestrial and aquatic) as well as provide the applicant with the requisite delineation of any natural waterbodies that would then inform the final selection of the two erosion protection options, while providing the approving authorities with the relevant information to determine legislative requirements particularly with regard any potential Section 21 Water Uses.

Information about the state and function of the observed terrestrial habitats, water bodies, suitable no-go buffers (if required) and assessment of the potential impacts is also provided.

Assumptions and Limitation

To obtain a comprehensive understanding of the dynamics of both the flora and fauna and the aquatic communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. However, due to time constraints these long-term studies are not feasible and are thus mostly based on instantaneous sampling.

Therefore, due to the scope of the work presented in this report, a long-term investigation of the proposed site was not possible and as such not perceived as part of the Terms of Reference. However, a concerted effort was made to assess as much of the potential site, as well as make use of any available literature, species distribution data and aerial photography.

It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.

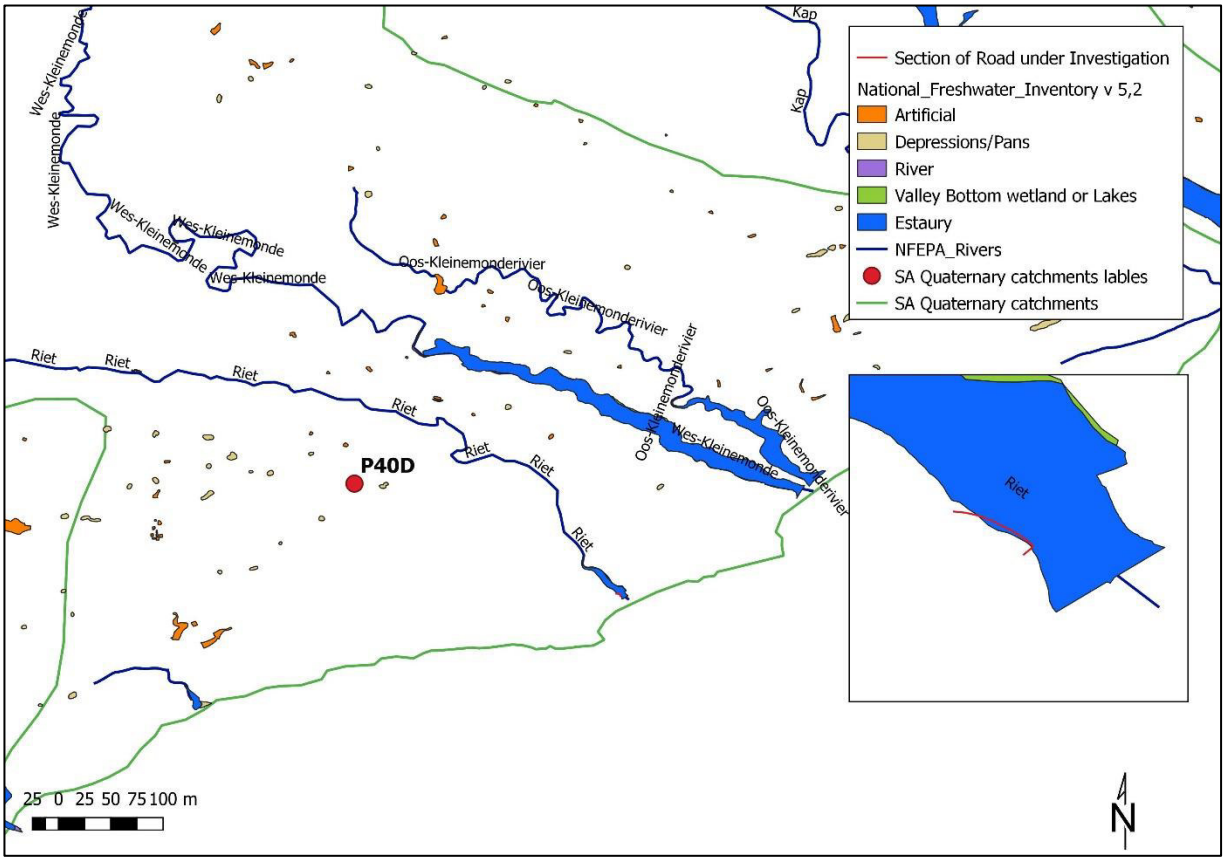

Figure 1: The study area (inset) in relation to the quaternary catchments and known wetland / estuarine systems

2. Terms of Reference

The following scope of work was thus used as the basis of this study to fulfil the above requirements:

2.1 Aquatic Assessment

- An Aquatic Impact assessment of the study area. This covers the site footprint in relation to the wetland and riparian ecosystems functioning within the region.
- A site visit regarding present state assessment of surface water bodies in the area
- Provide a map demarcating the relevant local drainage area of the respective wetland/s, i.e. the dam, its respective catchment and other wetland areas within a 500m radius of the study area. This will demonstrate, from a holistic point of view the connectivity between the site and the surrounding regions, i.e. the zone of influence.
- The maps depicting demarcated wetland areas delineated to a scale of 1:10 000, following the methodology described by the DWAF (2005), together with a classification of delineated wetland areas, according to the methods contained in the Level 1 WET-Health methodology and the latest National Wetland Classification System (Ollis *et al*. 2013).
- The determination of the ecological state of any wetland areas, estimating their biodiversity, conservation and ecosystem function importance with regard ecosystem services and linkages to other systems.
- A separate Risk Assessment Matrix in the required DWS format (Appendix A), for them to determine if a General Authorisation (GA) versus a full Water License for any Section 21 c & i activities, if required.
- Identify and rate potential environmental impacts in terms of accepted impact assessment methodology provided by Public Process Consultants
- Provide mitigations regarding project related impacts that could negatively affect demarcated wetland areas.

- Supply the client with geo-referenced GIS shape files of the wetland / riverine areas.
- Provide recommendations regarding buffers from any water resources identified on site and indicate such on a map.
- Provide one draft report for comment, with a maximum of two rounds of comments addressed.

Terrestrial vegetation assessment

The general scope of the assessment was to determine the extent and conservation importance of any remaining terrestrial habitats (vegetation) that would be affected by the proposed works. This included the assessment of any habitats or species of special concern that would be affected.

Due to the nature and position of the disturbance, a detailed faunal assessment was not considered necessary, but species observed were recorded during the study.

3. Project Description

The section of road under investigation for Environmental Authorisation occurs along the Riet River Access Road, which runs between the R72 road and the mouth of the Riet River. The section of road under consideration measures approximately 120 m in length, is approximately 4 m wide and is in closest proximity to the mouth of the Riet River (Figure 2). Being in such proximity to the Riet River and its mouth, this section of road has, over the last few years, come under significant threat from erosion. This section of road has, therefore been identified as requiring routine maintenance, predominantly in the form of erosion protection.

It is the intention of the DRPW to re-establish the embankment which has been lost to erosion, as well as to widen the existing road, to a total width of 5.5m. The proposed erosion protection measures will prevent future erosion and cutback of the road embankment and surface.

Figure 2: Proposed position (red line) of the erosion protection feature in relation to current inundation levels measured October 2018 (green line)

Two options, namely Option A and Option B, have been developed by the Project Engineers for implementing the required erosion protection measures.

The scope of the erosion protection in terms of **Option A** includes (Figure 3):

- The establishment of erosion protection measures on the eastern bank of the most southern section of the Riet River Access Road (approximately 120m in length);
- Such erosion protection measures will comprise of a combination of dump or crushed rock, to be placed in the river bed, over a length of approximately 100m, to form a base on which to re-establish / widen and protect the road embankment, which has been lost to erosion. This will require the importation of G5 and G4 material, in combination with the placement of Geotextile protection on the side of the river;
- Topsoil will be imported to the site and vegetation will be established on benching that is created on the side slope of the road;
- In addition to this, a gabion protection wall, of approximately 25m in length and 2m wide, is proposed on the southern side of the above-mentioned protection works, as an extension to the protection works, to protect the end of the road from possible erosion in future.
- Road surface drainage is extremely limited and will purely be by means of allowing the run-off stormwater to drain into the river directly by means of a crossfall of 2% to the gravel road.

The scope of the erosion protection in terms of **Option B** includes (Figure 4):

- The establishment of erosion protection measures on the eastern bank of the most southern section of the Riet River Access Road (measuring approximately 120m in length);
- Similar to Option A, such erosion protection measures will require the placement of dump or crushed rock (G4 or G5 material) in the river bed, over a length of approximately 100m, to form a base for the widened and protected road embankment;
- Where Option B differs from Option A is in the creation of geotextile-bags, containing sand, upon which indigenous vegetation will be established;
- As with Option A, a gabion protection wall, of approximately 25m in length and 2m wide, is proposed on the southern side of the above-mentioned protection works, as an extension to the protection works, to protect the end of the road from possible erosion in future.
- Road surface drainage is extremely limited and will purely be by means of allowing the run-off stormwater to drain into the river directly by means of a crossfall of 2% to the gravel road.

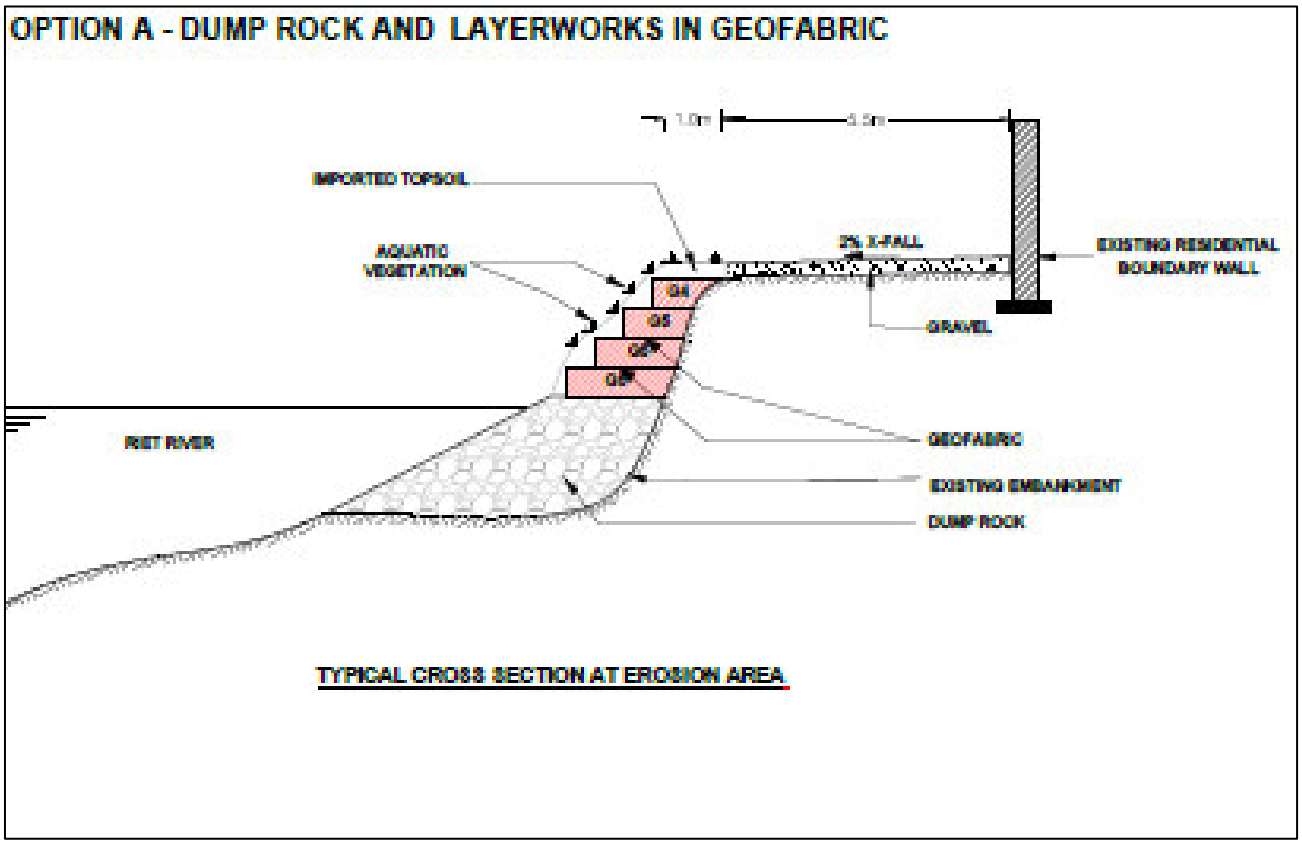

Figure 3: Option A – with revegetation

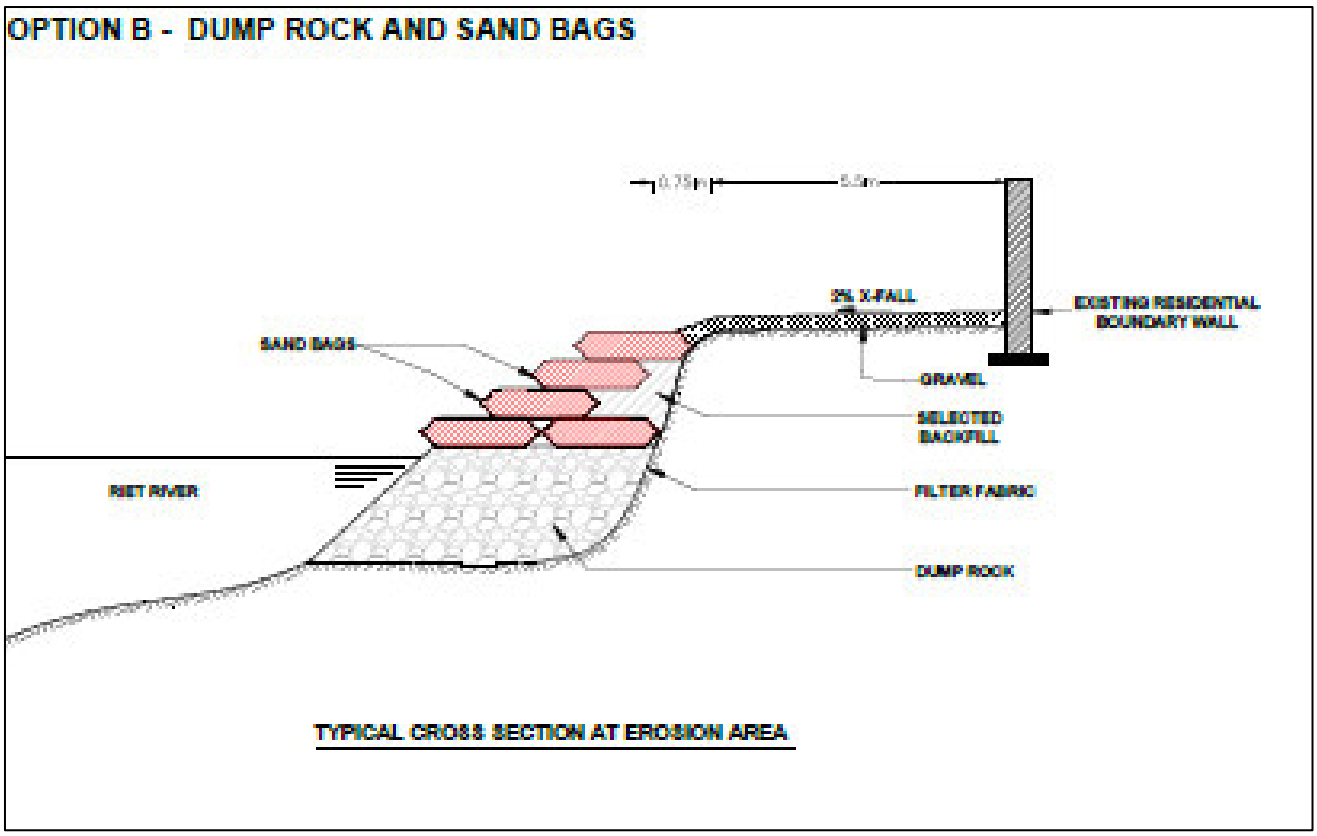

Figure 4: Option B – no revegetation

4. Methodology

4.1 Aquatic assessment

This study will follow the approaches of several national guidelines with regards to wetland assessment. These have been modified by the author, to provide a relevant mechanism of assessing the present state of the study systems, applicable to the specific environment and in a clear and objective means, assess the potential impacts. This was coupled to a site visit conducted late September 2018, after significant rainfall and at the start of the growth season for most plants.

Current water resource classification systems make use of the Hydrogeomorphic (HGM) approach, and for this reason, the National Wetland Classification System approach will be used in this study. It is also important to understand wetland definition, means of assessing wetland conservation and importance as well as understanding the pertinent legislation with regards to protecting wetlands. These aspects will be discussed in greater depth in this section of the report, as they form the basis of the study approach to assessing wetland impacts.

4.1 1 Waterbody classification systems

Since the late 1960's, wetland classification systems have undergone a series of international and national revisions. These revisions allowed for the inclusion of additional wetland types, ecological and conservation rating metrics, together with a need for a system that would allude to the functional requirements of any given wetland (Ewart-Smith *et al*., 2006). Wetland function is a consequence of biotic and abiotic factors, and wetland classification should strive to capture these aspects. **Coupled to this was the inclusion of other criteria within the classification systems to differentiate between river, riparian and estuarine systems, as well as natural versus artificial waterbodies.**

The South African National Biodiversity Institute (SANBI) in collaboration with several specialists and stakeholders developed the newly revised and now accepted National Wetland Classification Systems (Ollis *et al*., 2013). This system comprises a hierarchical classification process of defining a wetland based on the principles of the hydrogeomorphic (HGM) approach at higher levels, with including structural features at the finer or lower levels of classification (Ollis et al., 2013).

Wetlands develop in a response to elevated water tables, linked either to rivers, groundwater flows or seepage from aquifers (Parsons, 2004). These water levels or flows then interact with localised geology and soil forms, which then determines the form and function of the respective wetlands. Water is thus the common driving force, in the formation of wetlands (DWAF, 2005). It is significant that the HGM approach has now been included in the wetland classification as the HGM approach has been adopted throughout the water resources management realm with regards to the determination of the Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) and WET-Health assessments for aquatic environments. All of these systems are then easily integrated using the HGM approach in line with the Eco-classification process of river and wetland reserve determinations used by the Department of Water and Sanitation (DWS). The Ecological Reserve of a wetland or river is used by DWS to assess the water resource allocations when assessing water use license applications (WULA).

The NWCS process is provided in more detail in the methods section of the report, but some of the terms and definitions used in this document are present below:

Definition Box

Present Ecological State is a term for the current ecological condition of the resource. This is assessed relative to the deviation from the Reference State. Reference State/Condition is the natural or pre-impacted condition of the system. The reference state is not a static condition, but refers to the natural dynamics (range and rates of change or flux) prior to development. The PES is determined per component - for rivers and wetlands this would be for the drivers: flow, water quality and geomorphology; and the biotic response indicators: fish, macroinvertebrates, riparian vegetation and diatoms. PES categories for every component would be integrated into an overall PES for the river reach or wetland being investigated. This integrated PES is called the EcoStatus of the reach or wetland.

EcoStatus is the overall PES or current state of the resource. It represents the totality of the features and characteristics of a river and its riparian areas or wetland that bear upon its ability to support an appropriate natural flora and fauna and its capacity to provide a variety of goods and services. The EcoStatus value is an integrated ecological state made up of a combination of various PES findings from component EcoStatus assessments (such as for invertebrates, fish, riparian vegetation, geomorphology, hydrology and water quality).

Reserve: The quantity and quality of water needed to sustain basic *human needs* and *ecosystems* (e.g. estuaries, rivers, lakes, groundwater and wetlands) to ensure ecologically sustainable development and utilisation of a water resource. The *Ecological Reserve* pertains specifically to aquatic ecosystems.

Reserve requirements: The quality, quantity and reliability of water needed to satisfy the requirements of basic human needs and the Ecological Reserve (inclusive of instream requirements).

Ecological Reserve determination study: The study undertaken to determine Ecological Reserve requirements.

Licensing applications: Water users are required (by legislation) to apply for licenses prior to extracting water resources from a water catchment.

Ecological Water Requirements: This is the quality and quantity of water flowing through a natural stream course that is needed to sustain instream functions and ecosystem integrity at an acceptable level as determined during an EWR study. These then form part of the conditions for managing achievable water quantity and quality conditions as stipulated in the **Reserve Template**

Water allocation process (compulsory licensing): This is a process where all existing and new water users are requested to reapply for their licenses, particularly in stressed catchments where there is an over-allocation of water or an inequitable distribution of entitlements.

Ecoregions are geographic regions that have been delineated in a top-down manner on the basis of physical/abiotic factors. • NOTE: For purposes of the classification system, the 'Level I Ecoregions' for South Africa, Lesotho and Swaziland (Kleynhans *et al.* 2005), which have been specifically developed by the Department of Water Affairs & Forestry (DWAF) for rivers but are used for the management of inland aquatic ecosystems more generally, are applied at Level 2A of the classification system. These Ecoregions are based on physiography, climate, geology, soils and potential natural vegetation.

4.1.2 Wetland definition

Although the National Wetland Classification System (Ollis *et al*., 2013) is used to classify wetland types it is still necessary to understand the definition of a wetland. Terminology currently strives to characterise a wetland not only on its structure (visible form), but also to relate this to the function and value of any given wetland.

The Ramsar Convention definition of a wetland is widely accepted as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres" (Davis 1994). South Africa is a signatory to the Ramsar Convention and therefore its extremely broad definition of wetlands has been adopted for the proposed NWCS, with a few modifications.

Whereas the Ramsar Convention included marine water to a depth of six metres, the definition used for the NWCS extends to a depth of ten metres at low tide, as this is recognised as the seaward boundary of the shallow photic zone (Lombard et al., 2005). An additional minor adaptation of the definition is the removal of the term 'fen' as fens are considered a type of peatland. The adapted definition for the NWCS is, therefore, as follows (Ollis *et al*., 2013):

WETLAND: an area of marsh, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed ten metres.

This definition encompasses all ecosystems characterised by the permanent or periodic presence of water other than marine waters deeper than ten metres. The only legislated definition of wetlands in South Africa, however, is contained within the National Water Act (Act No. 36 of 1998) (NWA), where wetlands are defined as "land which is transitional between terrestrial and aquatic systems, where the water table is usually at, or near the surface, or the land is periodically covered with shallow water and which land in normal circumstances supports, or would support, vegetation adapted to life in saturated soil." This definition is consistent with more precise working definitions of wetlands and therefore includes only a subset of ecosystems encapsulated in the Ramsar definition. It should be noted that the NWA definition is not concerned with marine systems and clearly distinguishes wetlands from estuaries, classifying the latter as a water course (Ollis *et al*., 2013). Table 1 provides a comparison of the various wetlands included within the main sources of wetland definitions used in South Africa.

Although a subset of Ramsar-defined wetlands was used as a starting point for the compilation of the first version of the National Wetland Inventory (i.e. "wetlands", as defined by the National Water Act, together with open waterbodies), it is understood that subsequent versions of the Inventory include the full suite of Ramsar-defined wetlands in order to ensure that South Africa meets its wetland inventory obligations as a signatory to the Convention (Ollis *et al.*, 2013).

Wetlands must therefore have one or more of the following attributes to meet the above definition (DWAF, 2005):

- A high water table that results in the saturation at or near the surface, leading to anaerobic conditions developing in the top 50 cm of the soil.
- Wetland or hydromorphic soils that display characteristics resulting from prolonged saturation, i.e. mottling or grey soils
- The presence of, at least occasionally, hydrophilic plants, i.e. hydrophytes (water loving plants).

It should be noted that riparian systems that are not permanently or periodically inundated are not considered true wetlands, i.e. those associated with the drainage lines and rivers.

Table 1: Comparison of ecosystems considered to be 'wetlands' as defined by the proposed NWCS, the National Water Act (Act No. 36 of 1998), and ecosystems included in DWAF's (2005) delineation manual.

Ecosystem	NWCS "wetland"	National Water Act wetland	DWAF (2005) delineation manual
Marine	YES	NO	NO
Estuarine	YES	NO	NO
Waterbodies deeper than 2 m (i.e. limnetic habitats often described as lakes or dams)	YES	NO	NO
Rivers, channels and canals	YES	NO[1]	NO
Inland aquatic ecosystems that are not river channels and are less than 2 m deep	YES	YES	YES
Riparian[2] areas that are permanently / periodically inundated or saturated with water within 50 cm of the surface	YES	YES	YES[3]
Riparian [3] areas that are not permanently / periodically inundated or saturated with water within 50 cm of the surface	NO	NO	YES[3]

[1] Although river channels and canals would generally not be regarded as wetlands in terms of the National Water Act, they are included as a 'watercourse' in terms of the Act

[2] According to the National Water Act and Ramsar, riparian areas are those areas that are saturated or flooded for prolonged periods and would be considered riparian wetlands, as opposed to non –wetland riparian areas that are only periodically inundated and the riparian vegetation persists due to having deep root systems drawing on water many meters below the surface.

[3] The delineation of 'riparian areas' (including both wetland and non-wetland components) is treated separately to the delineation of wetlands in DWAF's (2005) delineation manual.

4.1.3 National Wetland Classification System method

During this study, due to the nature of the wetlands and watercourses observed, it was determined that the newly accepted National Wetlands Classification System (NWCS) be adopted. This classification approach has integrated aspects of the HGM approach used in the WET-Health system as well as the widely accepted eco-classification approach used for rivers.

The NWCS (Ollis *et al*., 2013) as stated previously, uses hydrological and geomorphological traits to distinguish the primary wetland units, i.e. direct factors that influence wetland function. Other wetland assessment techniques, such as the DWAF (2005) delineation method, only infer wetland function based on abiotic and biotic descriptors (size, soils & vegetation) stemming from the Cowardin approach (Ollis *et al.,* 2013).

The classification system used in this study is thus based on Ollis *et al*. (2013) and is summarised below:

The NWCS has a six tiered hierarchical structure, with four spatially nested primary levels of classification (Figure 5). The hierarchical system firstly distinguishes between Marine, Estuarine and Inland ecosystems (**Level 1**), based on the degree of connectivity the particular system has with the open ocean (greater than 10 m in depth). Level 2 then categorises the regional wetland setting using a combination of biophysical attributes at the landscape level, which operate at a broad bioregional scale.

This is opposed to specific attributes such as soils and vegetation. **Level 2** has adopted the following systems:

- Inshore bioregions (marine)
- Biogeographic zones (estuaries)
- Ecoregions (Inland)

Level 3 of the NWCS assess the topographical position of inland wetlands as this factor broadly defines certain hydrological characteristics of the inland systems. Four landscape units based on topographical position are used in distinguishing between Inland systems at this level. No subsystems are recognised for Marine systems, but estuaries are grouped according to their periodicity of connection with the marine environment, as this would affect the biotic characteristics of the estuary.

Level 4 classifies the hydrogeomorphic (HGM) units discussed earlier. The HGM units are defined as follows:

- Landform – shape and localised setting of wetland
- Hydrological characteristics – nature of water movement into, through and out of the wetland
- Hydrodynamics – the direction and strength of flow through the wetland

These factors characterise the geomorphological processes within the wetland, such as erosion and deposition, as well as the biogeochemical processes.

Level 5 of the assessment pertains to the classification of the tidal regime within the marine and estuarine environments, while the hydrological and inundation depth classes are determined for inland wetlands. Classes are based on frequency and depth of inundation, which are used to determine the functional unit of the wetlands and are considered secondary discriminators within the NWCS.

Level 6 uses six descriptors to characterise the wetland types on the basis of biophysical features. As with Level 5, these are non-hierarchal in relation to each other and are applied in any order, dependent on the availability of information. The descriptors include:

- Geology;
- Natural vs. Artificial;
- Vegetation cover type;
- Substratum;
- Salinity; and
- Acidity or Alkalinity.

It should be noted that where sub-categories exist within the above descriptors, hierarchical systems are employed, and these are thus nested in relation to each other.

The HGM unit (Level 4) is the **focal point of the NWCS**, with the upper levels (Figure 6– Inland systems only) providing means to classify the broad bio-geographical context for grouping functional wetland units at the HGM level, while the lower levels provide more descriptive detail on the particular wetland type characteristics of a particular HGM unit. Therefore Level 1 – 5 deals with functional aspects, while Level 6 classifies wetlands on structural aspects.

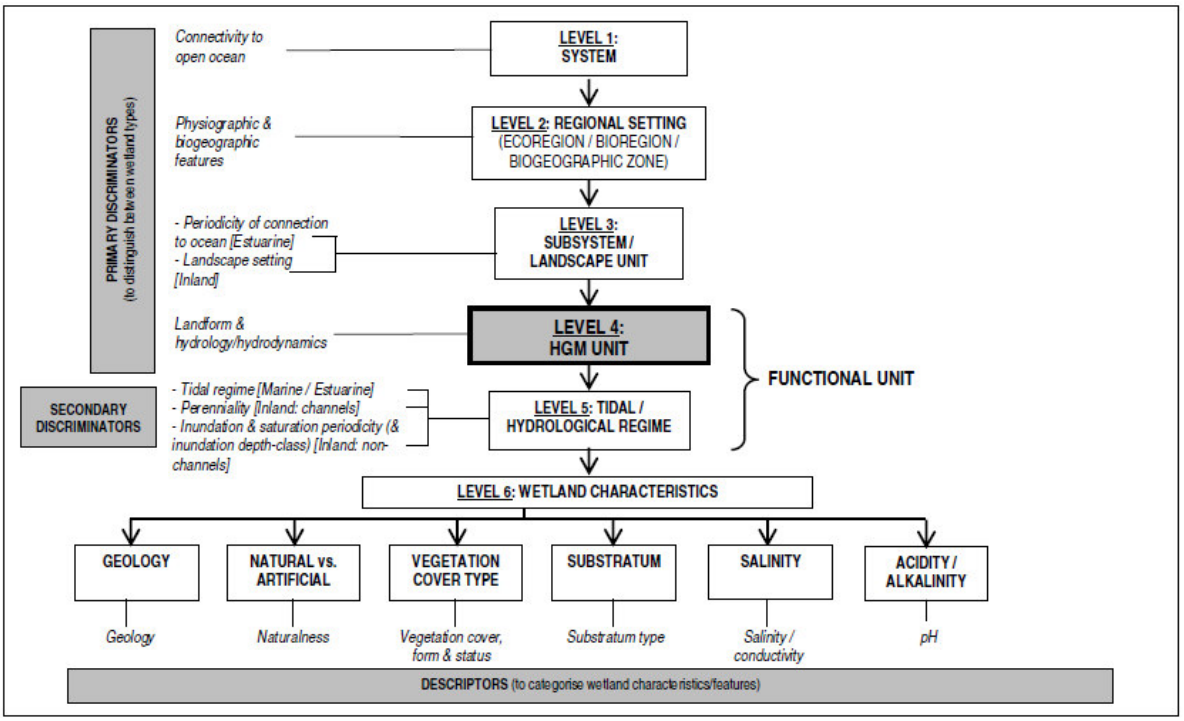

Figure 5: Basic structure of the National Wetland Classification System, showing how 'primary discriminators' are applied up to Level 4 to classify Hydrogeomorphic (HGM) Units, with 'secondary discriminators' applied at Level 5 to classify the tidal/hydrological regime, and 'descriptors' applied at Level 6 to categorise the characteristics of wetlands classified up to Level 5 (From Ollis *et al.*, 2013).

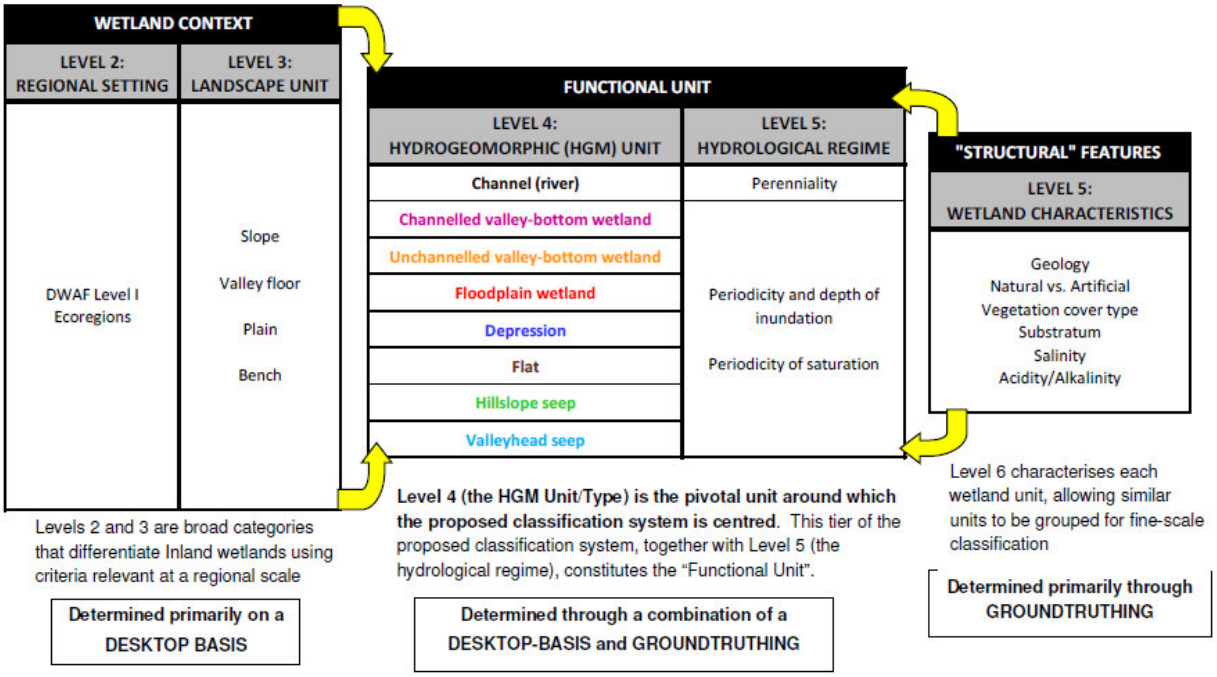

Figure 6: Illustration of the conceptual relationship of HGM Units (at Level 4) with higher and lower levels (relative sizes of the boxes show the increasing spatial resolution and level of detail from the higher to the lower levels) for Inland Systems (from Ollis *et al.*, 2013).

4.1.4 Waterbody condition

To assess the Present Ecological State (PES) or condition of the observed wetlands, a modified Wetland Index of Habitat Integrity (DWAF, 2007) was used. The Wetland Index of Habitat Integrity (WETLAND-IHI) is a tool developed for use in the National Aquatic Ecosystem Health Monitoring Programme (NAEHMP), formerly known as the River Health Programme (RHP). The output scores from the WETLAND-IHI model are presented in the standard DWAF A-F ecological categories (Table 2), and provide a score of the Present Ecological State of the habitat integrity of the wetland system being examined. The author has included additional criteria into the model based system to include additional wetland types. This system is preferred when compared to systems such as WET-Health – wetland management series (WRC 2009), as WET-Health (Level 1) was developed with wetland rehabilitation in mind, and is not always suitable for impact assessments. This coupled with the degraded state of the wetlands in the study area, indicated that a complex study approach was not warranted, i.e. conduct a Wet-Health Level 2 and WET-Ecosystems Services study required for an impact assessment.

Table 2: Description of A – F ecological categories based on Kleynhans *et al*., (2005)

ECOLOGICAL CATEGORY	ECOLOGICAL DESCRIPTION	MANAGEMENT PERSPECTIVE
A	Unmodified, natural.	Protected systems; relatively untouched by human hands; no discharges or impoundments allowed
B	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	Some human-related disturbance, but mostly of low impact potential
C	Moderately modified. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.	**Multiple disturbances associated with need for socio-economic development, e.g. impoundment, habitat modification and water quality degradation**
D	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.	
E	Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive.	**Often characterized by high human densities or extensive resource exploitation. Management intervention is needed to improve health, e.g. to restore flow patterns, river habitats or water quality**
F	Critically / Extremely modified. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.	

The WETLAND-IHI model is composed of four modules. The “Hydrology”, “Geomorphology” and “Water Quality” modules all assess the contemporary driving processes behind wetland formation and maintenance. The last module, “Vegetation Alteration”, provides an indication of the intensity of human landuse activities on the wetland surface itself and how these may have modified the condition of the wetland. The integration of the scores from these 4 modules provides an overall Present Ecological State (PES) score for the wetland system being examined. The WETLAND-IHI model is an MS Excel-based model, and the data required for the assessment are generated during a rapid site visit.

Additional data may be obtained from remotely sensed imagery (aerial photos; maps and/or satellite imagery) to assist with the assessment. The interface of the WETLAND-IHI has been developed in a format which is similar to DWA’s River EcoStatus models which are currently used for the assessment of PES in riverine environments.

4.1.5 Aquatic ecosystem importance and function

South Africa is a Contracting Party to the Ramsar Convention on Wetlands, signed in Ramsar, Iran, in 1971, and has thus committed itself to this intergovernmental treaty, which provides the framework for the national protection of wetlands and the resources they could provide. Wetland conservation is now driven by the South African National Biodiversity Institute, a requirement under the National Environmental Management: Biodiversity Act (No 10 of 2004).

Wetlands are among the most valuable and productive ecosystems on earth, providing important opportunities for sustainable development (Davies and Day, 1998). However, wetlands in South Africa are still rapidly being lost or degraded through direct human induced pressures (Nel *et al.,* 2004).

The most common attributes or goods and services provided by wetlands include:

- Improve water quality;
- Impede flow and reduce the occurrence of floods;
- Reeds and sedges used in construction and traditional crafts;
- Bulbs and tubers, a source of food and natural medicine;
- Store water and maintain base flow of rivers;
- Trap sediments; and
- Reduce the number of water borne diseases.

In terms of this study, the wetlands provide ecological (environmental) value to the area acting as refugia for various wetland associated plants, butterflies and birds.

In the past wetland conservation has focused on biodiversity as a means of substantiating the protection of wetland habitat. However not all wetlands provide such motivation for their protection, thus wetland managers and conservationists began assessing the importance of wetland function within an ecosystem.

Table 3 summarises the importance of wetland function when related to ecosystem services or ecoservices (Kotze *et al*., 2008). One such example is emergent reed bed wetlands that function as transformers converting inorganic nutrients into organic compounds (Mitsch and Gosselink, 2000).

Table 3: Summary of direct and indirect ecoservices provided by wetlands from Kotze *et al*., 2008

Ecosystem services supplied by wetlands	Indirect benefits	Hydro-geochemical benefits		Flood attenuation
				Stream flow regulation
			Water quality enhancement benefits	Sediment trapping
				Phosphate assimilation
				Nitrate assimilation
				Toxicant assimilation
				Erosion control
				Carbon storage
		Biodiversity maintenance		
	Direct benefits	*Provision of water for human use*		
		Provision of harvestable resources[2]		
		Provision of cultivated foods		
		Cultural significance		
		Tourism and recreation		
		Education and research		

Conservation importance of the individual wetlands was based on the following criteria:

- Habitat uniqueness
- Species of conservation concern
- Habitat fragmentation with regards to ecological corridors
- Ecosystem service (social and ecological)

The presence of any or a combination of the above criteria would result in a HIGH conservation rating if the wetland was found in a near natural state (high PES). Should any of the habitats be found modified the conservation importance would rate as MEDIUM, unless a Species of Conservation Concern was observed, in which case it would receive a HIGH rating. Any system that was highly modified (low PES) or had none of the above criteria, received a LOW conservation importance rating. Wetlands with HIGH and MEDIUM ratings should thus be excluded from development with incorporation into a suitable open space system, with the maximum possible buffer being applied. Natural wetlands or Wetlands that resemble some form of the past landscape, but receive a LOW conservation importance rating could be included into stormwater management features, and should not be developed to retain the function of any ecological corridors.

Terrestrial vegetation

The following scope of work and methods was used as the basis of this study to fulfil the above requirements:

A desktop and literature review of the area under investigation was conducted to collate as much information as possible prior to any detailed fieldwork. The purpose of the desktop assessment is to rank relevant areas according to their ecological sensitivity and to identify areas of least ecological risk prior to the site visit.

Other relevant literature for e.g. South African Biodiversity Information Facility (SABIF, which includes the PRECIS / POSA plant distribution database), South African Bird & Herpetological Atlas Projects, relevant Red Data books, ordinances and all systematic bioregional / conservation plans, will also be consulted.

Fieldwork was limited to visual sightings by means of transect walks and plot-based sampling, while particular attention will also be paid to the occurrence Red Data species or Protected species.

Vegetation units was sampled by means of the following techniques as per each site:

- Data collection was plot-based and in the form of vegetation samples within selected reference areas to categorise the various vegetation units.
- Results from the data analysis will provide a description of the dominant and typical species occurring on the site(s), and will include:
    - Threatened, endemic or rare species, with an indication of the relative functionality and conservation importance of the specific community in the area under investigation
    - Invasive or exotic species present in the area
    - The functional and conservation importance of all vegetation communities in investigation

Habitat areas (based on the species compositions of the vegetation analysis, topography and soils) was ranked into high, medium or low classes in terms of their significance based on the Ecological Sensitivity and Conservation Importance. A sensitivity and habitat map (including buffer zones if applicable) was produced based on the above information.

Recommendations and mitigation measures, where required, will also be included in the report with proposed buffers, together with an impact assessment report.

Relevant legislation and policy

Locally the South African Constitution, seven (7) Acts and two (2) international treaties allow for the protection of wetlands and rivers. These systems are protected from destruction or pollution by the following:

- Section 24 of The Constitution of the Republic of South Africa;
- Agenda 21 – Action plan for sustainable development of the Department of Environmental Affairs and Tourism (DEAT) 1998;
- The Ramsar Convention, 1971 including the Wetland Conservation Programme (DEAT) and the National Wetland Rehabilitation Initiative (DEAT, 2000);
- National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) inclusive of all amendments, as well as the NEM: Biodiversity Act;
- National Water Act, 1998 (Act No. 36 of 1998);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983); and
- Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
- Nature and Environmental Conservation Ordinance (No. 19 of 1974)
- National Forest Act (No. 84 of 1998)
- National Heritage Resources Act (No. 25 of 1999)

NEMA and the Conservation of Agricultural Resources Act (CARA), 1983 (Act No. 43 of 1983) would also apply to this project. These Acts have categorised a large number of invasive plants together with associated

obligations on the land owner. Several Category 1 & 2 plants were observed in several areas of the site under investigation.

Alien Invasive Plant Species observed included amongst others:

- *Opuntia spp.*
- *Pennisetum clandestinum*
- *Lantana camara*
- *Araucaria heterophylla*
- *Datura stramonium*

4.4 Provincial legislation and policy

Previously no accepted wetland buffers distances were provided by the provincial authorities and until such a system is developed, it was always recommended that a **50m buffer** be set for all-natural wetlands. More recently a buffer model system described by Macfarlane *et al*., 2017 for rivers, estuaries and wetlands respectively, indicated that any systems within the region should receive a buffer as follows:

- Wetlands: 49m (None identified within 500m of the site)
- Estuary 60m – however the state of the site (existing buildings) and the need for erosion protection within the estuary, it is not possible to implement this buffer.

Other policies that are relevant include:

Provincial Nature Conservation Ordinance (PNCO) – Protected Flora. Provincial Nature Conservation Ordinance (PNCO of 1974) – Protected Flora as listed in Schedule 3 and 4 where relevant. Any such as species must then be removed or relocated with the applicable permits in place, issued by DEDEAT.

None where found within the study area.

PNCO Schedule 2 – applies to the protection of animals and any significant populations or species can also only be removed with the request permits.

Several Milkwoods (*Sideroxylon inerme*) were found in the area, associated with the remaining areas of coastal forest, and are protected under the National Forests Act (Act 84 of 1998). None were found within the study site, but some do occur along the access road closer to the entrance of the village. Should these be disturbed or need to be pruned when heavy machinery is moved onto site, then the requisite permits must be obtained from the Department of Agriculture Fisheries and Forestry (DAFF).

National Freshwater Ecosystems Priority Areas or NFEPAs – (Nel *et al.*, 2011). This mapping product highlights potential rivers and wetlands that should be earmarked for conservation on a national basis. A River NFEPA has been identified within the catchments associated with the study area.

5. Description of the affected environment

A site visit was conducted in October 2018, late spring to assess the aquatic and terrestrial habitats that could be affected by the proposed project activities.

5.1 Aquatic Environment

The proposed works falls in the P40D Quaternary catchment (Figure 7), located within the estuarine portion of the Riet River. Thus, all the wetlands observed are directly associated with the estuary floodplain where inundation levels fluctuate in response to the length or period of mouth closure. Also, while the mouth is closed any runoff from the upper catchment is retained within the open water areas, back flooding the supratidal floodplain areas. Salinities measured during this assessment ranged from 28ppm at the mouth to 15 ppm near the R72 bridge, which is typical of these systems early in the summer rainfall period after good rainfall. As and when summer temperatures increase, and evaporation occurs, salinities can increase beyond that of seawater (35ppm), particularly if little to no rainfall occurs.

This estuary a typical clear water system was described in some detail during an assessment conducted by the CSIR and the various habitat cover associated with this Temporary Open / Closed system was summarised as follows (van Niekerk and Turpie, 2011):

Estuary	Intertidal salt marsh	Supratidal salt marsh	Submerged macrophytes	Reeds and sedges	Mangroves	Sand/mud banks	Channel	Rocks	Swamp	Total (ha)
Riet	0	17.4	2.64	12.3	0	3	36.2	1.52	0	**73.06**

Thus, the Riet River Estuary is dominated by Supratidal salt marsh, reed & sedges and open water. This was confirmed during this assessment as shown in Plate 1, 2 and 3.

The proposed erosion structures will however be placed along the banks and inundated areas of the estuary and open space (maintained parking area) of the site. Plate 3 indicates the observed habitats, with only grasses, open water covering a sand bank being impacted. Several terrestrial trees will be affected by the proposed road and stormwater improvements but are discussed in the next section of this report.

The NFEPA database had indicated a freshwater wetland on the eastern bank of the estuary but this was confirmed to form part of the Supratidal saltmarsh area (estuarine) during the site visit. The only freshwater wetland observed was located upstream of the R72, and is not directly associated with the river/estuary and is also more than 500m from the project footprint (Figure 8).

Plate 1: A view of a large reedbed (*Phragmites australis*) system associated with the upper floodplain areas of the estuary

Plate 2: Supratidal saltmarsh dominated by *Phragmites australis* and *Sarcocornia perennis*

Plate 3: A view of the open water area of the estuary associated with the proposed works area on the left requiring erosion protection

Plants observed along the banks of the estuary included the following, with those shown in BOLD located within the proposed works area:

- ***Stenotaphrum secundatum***
- *Ficinia lateralis*
- *Juncus kraussii*
- *Phragmites australis*
- *Cyperus obtusiflorus var. obtusiflorus*
- *Centella asiatica*
- *Carex clavata*
- *Typha capensis*
- *Sarcocornia perennis*
- ***Cynodon dactylon***
- ***Sporobolus virginicus***

None of these species are listed as protected

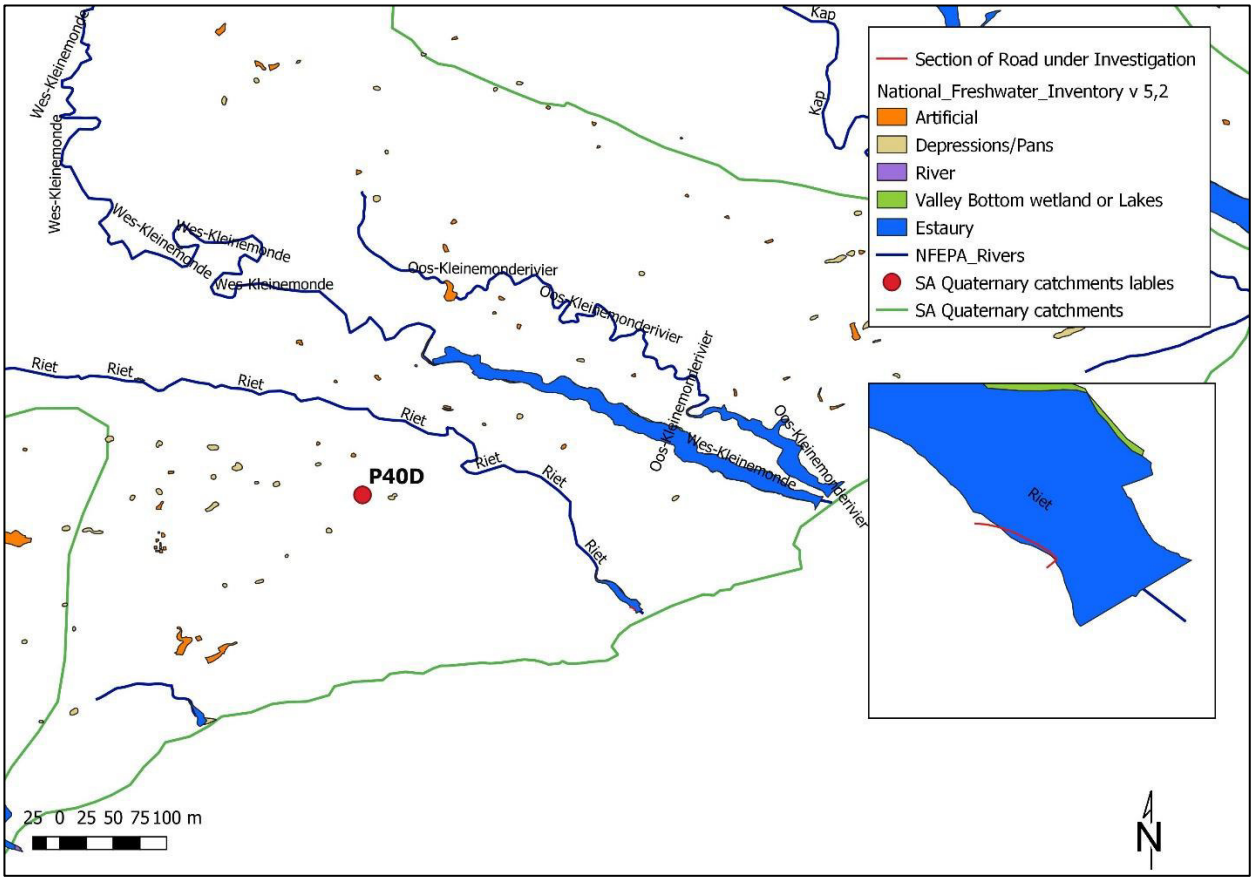

Figure 7: Project locality map indicating the P40D quaternary catchment boundary (green line) (Source DWS and NGI)

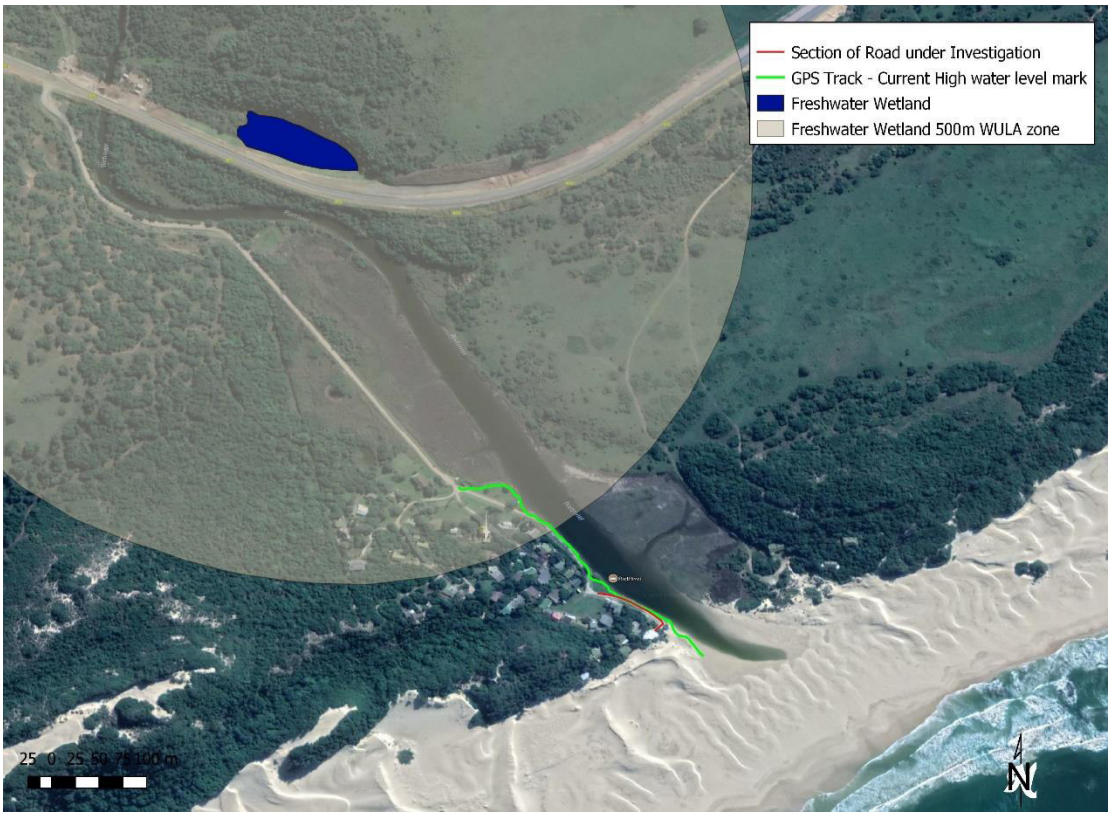

Figure 8: The freshwater wetland created by the R72 and the 500m regulated zone (green line = current inundation level of the estuary)

5.2 Present Ecological State and conservation importance (Aquatic environment)

In this study several other sources of information were also considered, which included the National Freshwater Ecosystems Priority Areas project completed by the CSIR (Nel *et al*., 2011), regional and national biodiversity assessments, and the latest being the National Biodiversity Assessment released by SANBI (Driver *et al*., 2012). Note these are being updated for the 2018 National Biodiversity Assessment due later this year, but spatial information being used for the update was interrogated for this assessment.

A Provisional Present Ecological State of the estuary, including pressures and health condition, was determined as follows (van Niekerk and Turpie, 2011):

Where

- Excellent (dark blue), good (blue), fair (green) to poor (brown).
- Pressure levels are indicated as very high (VH), high (H), medium (M) or low (L). A Blank indicates the absence of a pressure.

	Pressures								Health Condition												
NAME	Change in flow	Polution	Habitat loss	Mining	Artificial Breaching	Fishing Effort(	Fishing Effort(Catches in tones)	Bait collection	Hydrology	Hydrodynamics	Water Quality	Physical habitat	Habitat State	Microalgae	Macrophytes	Invertebrates	Fish Final	Birds	Biological State	Estuary Health State (Mean)	Ecological Category
Riet	L	L	L			L	2.2	Y													B

From a conservation importance standpoint, the estuary was included in both Ecosystem Priority Area (Figure 9), as most of the catchment remains low, with no impacts on the regional hydrology (e.g. dams) and the Ndlambe Biodiversity Sector Plan Critical Biodiversity Areas (part of the Addo Elephant National Park Sector Plan – Vromans *et al*., 2012) (Figure 10)

However, from an aquatic perspective this system was not considered an Aquatic CBA in the provincial wide assessment contained in the Eastern Cape Biodiversity Conservation Assessment (ECBCP) (Berliner & Desmet, 2007) (Figure 11).

Nonetheless, in a national assessment the Riet River Estuary was ranked 91 out of 250 South African estuaries assessed from a Conservation Importance perspective (Turpie *et al.*, 2012)

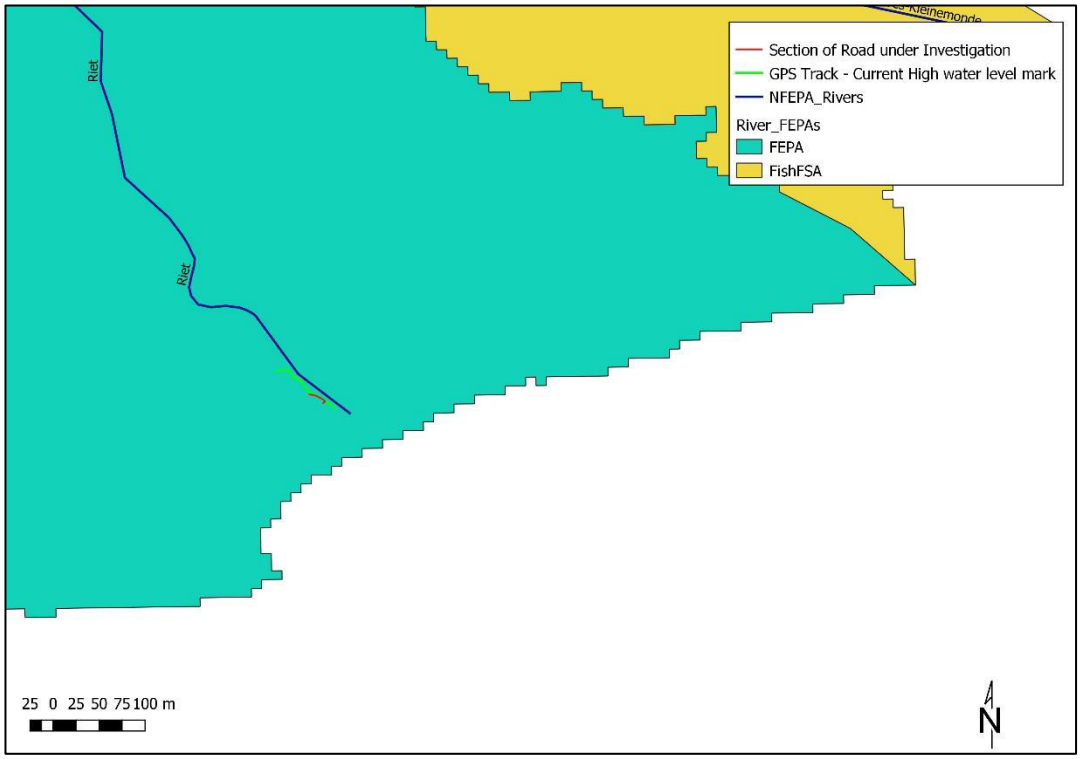

Figure 9: Freshwater Ecosystem Priority Areas (Nel et al, 2012) which include estuarine portions of the catchment

Figure 10: Critical Biodiversity Area spatial data as per Ndlambe Biodiversity Sector Plan (Vromans *et. al*, 2012)

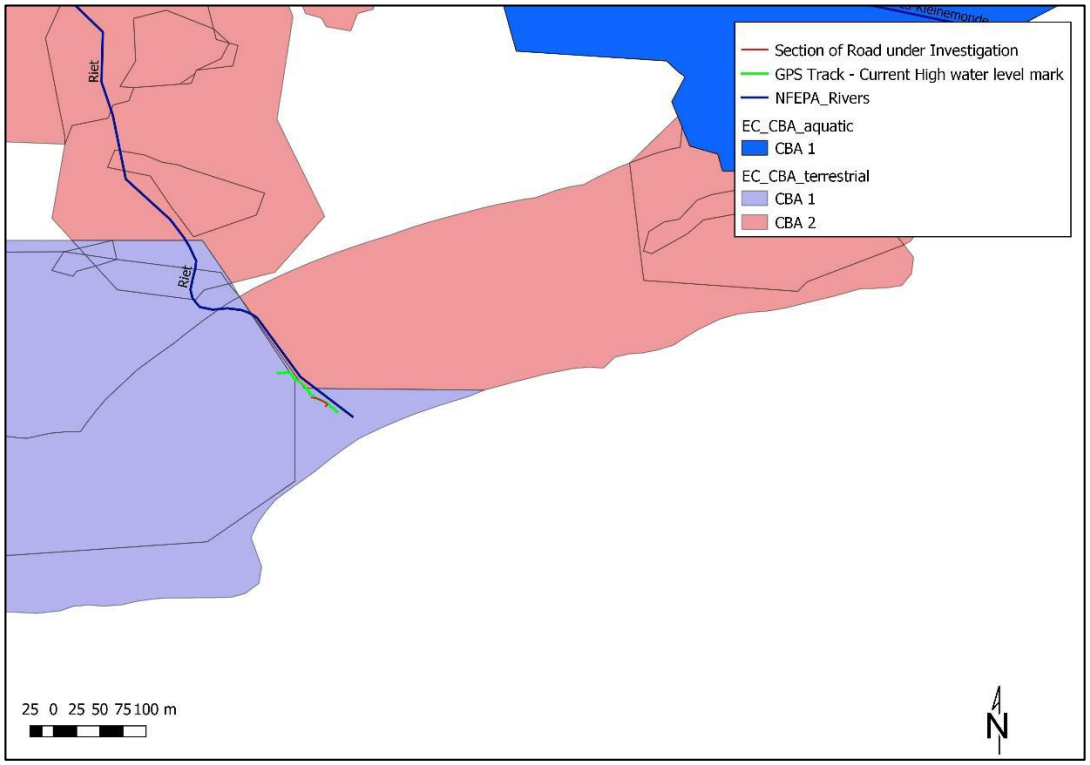

Figure 11: Critical Biodiversity Area spatial data as per Eastern Cape Biodiversity Conservation Plant (Berliner & Desmet, 2007)

5.3 Terrestrial vegetation

The proposed works will occur within the Albany Dune Strandveld (Figure 12) vegetation type as define by Mucina and Rutherford (2007) as amended in the National Vegetation Map 2012 spatial information. This vegetation type is located on the dunes along the coastline. Some of the dominant species of this habitat comprise, for example, the trees and shrubs: *Azima tetracantha, Brachyleana discolor*, *Sideroxylon inerme*, *Zanthoxylum capense, Cassine peragua, Cussonia thyrsiflora;* Climbers: *Asparagus asparagoides, Rhoicissus digitata;* Herbs: *Dietes iridoides, Sansevieria hyacanthoides.* In terms of the **National Biodiversity Thresholds/Targets** (Ecosystem Status), Albany Dune Strandveld is **Least Threatened.** It is well protected.

The observed terrestrial species included the following located mostly in a small patch surrounding the affect homes:

- *Azima tetracantha,*
- *Brachyleana discolor*,
- *Sideroxylon inerme*,
- *Zanthoxylum capense,*
- *Cassine peragua,*
- *Asparagus asparagoides,*
- *Rhoicissus digitate*

Several grass species already mentioned in the aquatic section will be the most affected. However, except for the Milkwood (*Sideroyxlon inerme*) none of these species are protected under the PNCO or National Forestry Act. The Milkwood in question is located behind the affect house in the works area, but would not be affected by the proposed development. Several are located along the narrow access road in the village and could be disturbed if large machines need to access the site. These are located along a 100m section of the road in a small thicket patch (33.5594065S 27.011330E – 33.560102S 27.011979E)

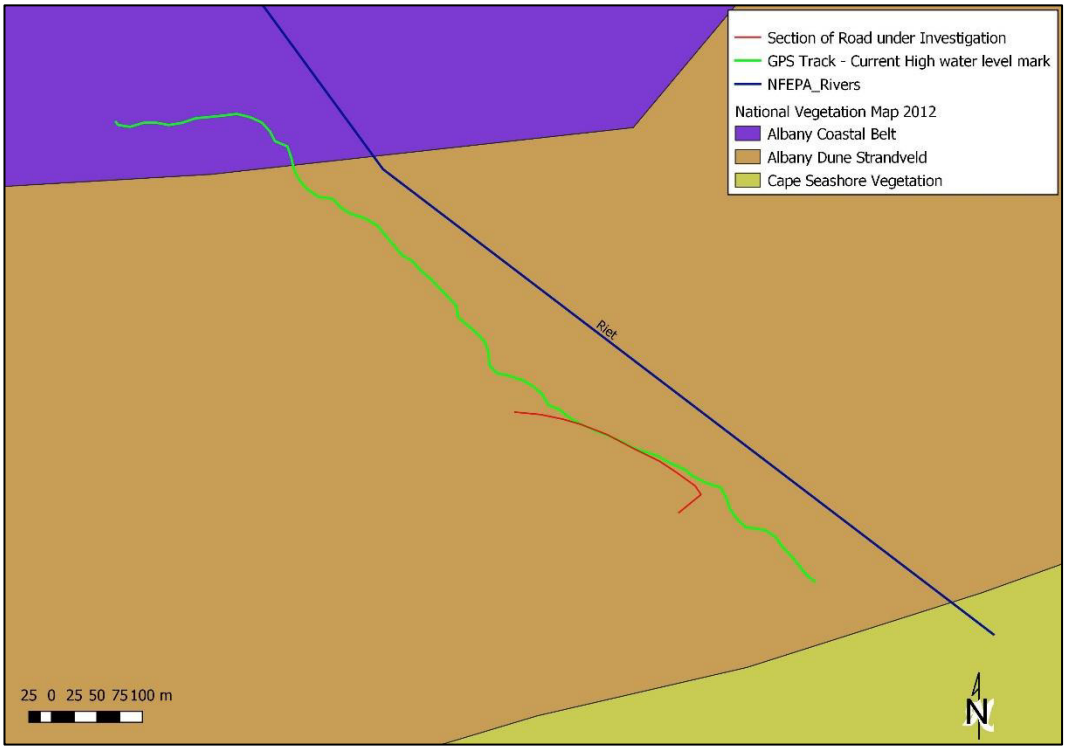

Figure 12: National Vegetation Map (2012) according to descriptions by Mucina & Rutherford

As the site also falls in the Maputoland-Pondoland-Albany Botanical Hotspot (SANParks metadata, 2010) (Figure 13), the following important species could also occur within the region:

- *Brachystelma delicatum* (Vulnerable)
- *Clivia nobilis* (Vulnerable)
- *Crinum lineare* (Vulnerable)
- *Clivia gardenia* (Endangered)
- *Cyrtanthus flavus* (Vulnerable)
- *Disa scullyi* (Endangered)
- *Encephalartos altensteinii* (Vulnerable)
- *Encephalartos latifrons* (Critically Endangered)
- *Encephalartos trispinosus* (Vulnerable)
- *Protea subvestita* (Vulnerable)
- *Riocreuxia alexandrina* (Critically Endangered)
- *Syncarpha recurvate* (Endangered)

None of these species were recorded during the field survey.

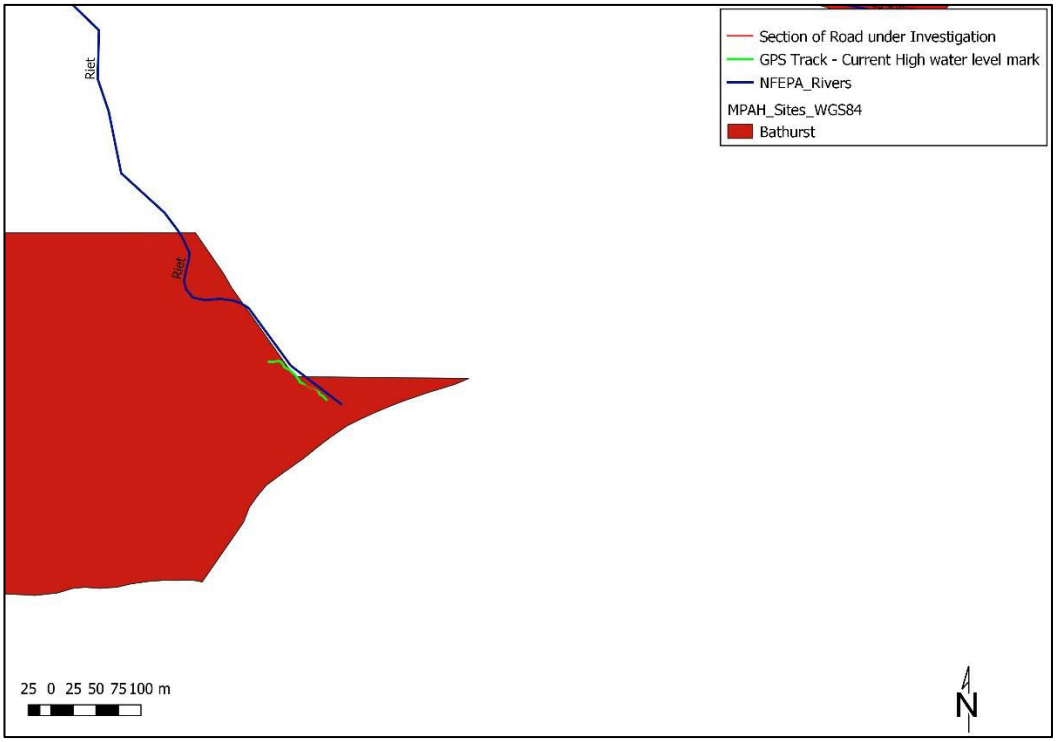

Figure 13: The Bathurst Maputoland-Pondoland-Albany Botanical Hotspot (SANParks metadata, 2010) in relation to the site

In summary the proposed works area is largely disturbed by the existing road, houses or maintenance of the vegetation (mowed grass areas to create parking). However, it is reiterated that the site does still form part of a terrestrial Critical Biodiversity Area (See Figure 10 and 11 above), as shown in the Ndlambe Biodiversity Sector Plan and the ECBCP.

In respect of the ECBCP then the site falls within a Terrestrial CBA Type 1 (T1) category. Each category has an associated biodiversity land management classes (BLMC), which refers to how these categories or areas should be managed to maintain biodiversity (Table 4).

Table 4: Map categories and associated biodiversity land management class (BLMC) and management objective

Category	Biodiversity land management class (BLMC)	Manage as:
Terrestrial CBA 1 (T1)	BLMC 1	Natural landscapes
Terrestrial CBA 1 (degraded) (T1)	BLMC 2	Near-natural landscapes
Terrestrial CBA 2 (with/without degraded)	BLMC 2	Near-natural landscapes
Aquatic CBA 1 (A1)	Aquatic BLMC 1	Natural state
Aquatic CBA 2 (A2a)	Aquatic BLMC 2a	Near natural state

Each biodiversity land management classes (BLMC) has a recommended land use (Refer Table 5), which for BLMC 1 is Conservation, and for BLMC2 is Conservation, Game Farming and Communal Livestock. Although the land use recommendations do not include roads or associated erosion protection, it can be stated that the proposed land use activity must not result in any major degradation or transformation of these areas. Therefore construction management measures will be important to reduce and negate negative impacts during the construction period.

Table 5: Recommended Permissible Land Uses for Terrestrial Biodiversity Land Management Classes (BLMCs) in terms of the Eastern Cape Biodiversity Conservation Plan

(*Abbreviations: No = not recommended; Yes = recommended; Conditional = Approval conditional on environmental authorization)*

Land use	Biodiversity Land Management Class (BLMC)			
	BLMC 1	BLMC 2	BLMC 3	BLMC 4
Conservation	Yes	Yes	Yes	Yes
Game farming	No	Yes	Yes	Yes
Communal livestock	No	Yes	Yes	Yes
Commercial livestock ranching	No	No	Yes	Yes
Dry land cropping	No	No	Conditional	Yes
Irrigated cropping	No	No	Conditional	Yes
Dairy farming	No	No	Conditional	Yes
Timber	No	No	Conditional	Yes
Settlement	No	No	Conditional	Yes

6. Permit requirements

Based on an assessment of the proposed activities and past engagement with DWS, no water use license application will be required as all the works fall within the estuary.

	Water Use Activity	**Applicable to this development proposal**
S21(a)	Taking water from a water resource	Not applicable
S21(b)	Storing water	Not applicable
S21(c)	Impeding or diverting the flow of water in a watercourse	Not applicable
S21(d)	Engaging in a stream flow reduction activity	Not applicable
S21(e)	Engaging in a controlled activity	Not applicable
S21(f)	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit	Not applicable
S21(g)	Disposing of waste in a manner which may detrimentally impact on a water resource	Not applicable
S21(h)	Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process	Not applicable
S21(i)	Altering the bed, banks, course or characteristics of a watercourse	Not applicable
S21(j)	Removing, discharging or disposing of water found underground for the continuation of an activity or for the safety of persons	Not applicable
S21(k)	Using water for recreational purposes	Not applicable

From a terrestrial perspective Milkwood were identified in this assessment (listed above) and will require permits from DAFF.

7. Impact assessment

This impact assessment was based on the impact methodology supplied by JG Afrika, and after careful consideration of the proposed design Options (A or B). Due to the position and scale of the proposed works, only direct impacts during the construction and operational phases are anticipated.

7.1 Aquatic Environment

The only direct impacts on the estuarine environment anticipated include the physical disturbance of the banks (already disturbed) and the inundated sand bank area.

Loss habitat of aquatic habitat containing protected species or Species of Special Concern

Environmental Impact: No aquatic species considered as having conservation concern were observed	***Activity/Aspect & Impact Source:*** N/A	***Proposed Mitigation:*** N/A regardless of design option being selected
Impact Significance		
Without Mitigation:	**N/A**	
With Mitigation:		
Potential to Mitigate: N/A		***Assessment Confidence:*** Complete

The potential spread of alien vegetation into the aquatic environment

Environmental Impact: Several invasive species were recorded during the survey and these could then colonise any structures or areas of disturbance	***Activity/Aspect & Impact Source:*** Due to the nature of the proposed project this would start at the onset of the construction phase, but persist in the medium term in the operational phase impact. However, this is only related to adjacent terrestrial environment			***Proposed Mitigation:*** • Clearing of vegetation should be kept to a minimum, keeping the width and length of the earth works to a minimum. • Alien plant regrowth should also be monitored, and any such species should be removed during the construction phase. • Where soils are slow to revegetate, these areas should be grubbed and planted with species suited to the region. Also refer to the Recommendations section particularly with regard Option A ***Reference to EMP section:*** EMP to be completed after review of draft basic assessment report.		
Impact Significance						
Without Mitigation:	Duration: Long term	Frequency: Occasional	Extent/Scale: Site	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **High**
With Mitigation:	Duration: Medium term	Frequency: Occasional	Extent/Scale: Site Impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **Low**
Potential to Mitigate: Moderate potential / easy to mitigate				***Assessment Confidence:*** Complete		

Loss of Critical Biodiversity Areas (CBA) and habitat fragmentation

Environmental Impact: Based on the information contained within the ECBCP, the site is within Critical Biodiversity Areas.	***Activity/Aspect & Impact Source:*** Due to the nature of the proposed project this would start at the onset of the construction phase, but persist in the medium term in the operational phase impact. However, this would have limited impact on the aquatic environment due to the present day levels of fragmentation and the scale / type of project. If Option A is selected, then the potential to create additional	***Proposed Mitigation:*** • Clearing of vegetation should be kept to a minimum, keeping the width and length of the earth works to a minimum. • Construction activities should not exceed the proposed construction boundaries by more than 2m to avoid the secondary impact of construction and increasing the areas that would require clearing and rehabilitation (e.g. terrestrial habitats) • Option A is recommended as this would provide areas for the colonisation of additional estuarine habitat with revegetation for suitable plants established as plug from plants harvested within the estuary and could included

	estuarine habitat within the system would be seen as a net benefit	▪ Ficinia lateralis ▪ Juncus kraussii ▪ Sarcocornia perennis ▪ Cynodon dactylon ▪ Sporobolus virginicus These species have the ability to rapidly establish themselves while binding the soils. ***Reference to EMP section:*** EMP to be completed after review of draft basic assessment report.

Impact Significance						
Without Mitigation:	Duration: Long term	Frequency: Occasional	Extent/Scale: Site impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **Medium**
With Mitigation:	Duration: Medium term	Frequency: Occasional	Extent/Scale: Site Impact	Probability: Probable	Impact Status: **POSITIVE if Option A is selected**	Significance: **Low**

Potential to Mitigate: Moderate potential / easy to mitigate	***Assessment Confidence:*** Complete

Loss of aquatic habitat

Environmental Impact: The proposed works will require disturbance of soils / sandbanks within the estuarine environment during the construction phase and to a limited degree if Option B is selected for the Operational phase	***Activity/Aspect & Impact Source:*** Due to the nature of the proposed project this would start at the onset of the construction phase, but persist in the medium term in the operational phase impact. However most of the proposed works won't occur within any of the watercourse and the indicated buffers or would occur in already disturbed areas that already have culverts / or are canalised	***Proposed Mitigation:*** • Clearing of vegetation should be kept to a minimum, keeping the width and length of the earth works to a minimum. • Construction activities should not exceed the proposed construction boundaries by more than 2m to avoid the secondary impact of construction and increasing the areas that would require clearing and rehabilitation • Should any water courses be disturbed these should be returned / reinstated to follow the natural ground levels, i.e. no mounds that can alter or disturb flow • Any bare soils exposed to surface water runoff should be managed to prevent erosion / sedimentation. • Option A is recommended as this would provide areas for the colonisation of additional estuarine habitat with revegetation for suitable plants established as plug from plants harvested within the estuary and could included ▪ Ficinia lateralis ▪ Juncus kraussii ▪ Sarcocornia perennis ▪ Cynodon dactylon ▪ Sporobolus virginicus These species have the ability to rapidly establish themselves while binding the soils. ***Reference to EMP section:*** EMP to be completed after review of draft basic assessment report.

Impact Significance						
Without Mitigation:	Duration: Long term	Frequency: Occasional	Extent/Scale: Site impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **Medium**
With Mitigation:	Duration: Medium term	Frequency: Occasional	Extent/Scale: Site Impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **Low**

Potential to Mitigate: Moderate potential / easy to mitigate	***Assessment Confidence:*** Complete

Increase in turbidity and siltation of aquatic habitats

Environmental Impact: Any disturbance of the banks and bed of the estuarine environment (sand) could result in an increase in turbidity (suspended sediments)	***Activity/Aspect & Impact Source:*** Due to the nature of the proposed project this would start at the onset of the construction phase, but persist in the medium term in the operational phase impact until the works areas has been stabilised.	***Proposed Mitigation:*** • Clearing of vegetation should be kept to a minimum, keeping the width and length of the earth works to a minimum. • Construction activities should not exceed the proposed construction boundaries by more than 2m to avoid the

which could then result in siltation (smothering) of nearby habitats used by submerged plants (macrophytes – although none observed near the site) or invertebrates such as sand prawns.				secondary impact of construction and increasing the areas that would require clearing and rehabilitation • Prior to any construction within the estuary, a silt curtain (fence created from geofabric) must be placed at the toe of the proposed works area, and remain until the vegetation (Option A) has stabilised any bare or loose soils. ***Reference to EMP section:*** EMP to be completed after review of draft basic assessment report.		
Impact Significance						
Without Mitigation:	Duration: Long term	Frequency: Occasional	Extent/Scale: Site impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **Medium**
With Mitigation:	Duration: Medium term	Frequency: Occasional	Extent/Scale: Site Impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **Low**
Potential to Mitigate: Moderate potential / easy to mitigate				***Assessment Confidence:*** Complete		

Potential water quality impacts

Environmental Impact: Spills and leaks from any plant or the mixing of cement / concrete near or the estuary	***Activity/Aspect & Impact Source:*** Due to the nature of the proposed project this would remain a construction phase impact only			***Proposed Mitigation:*** • Chemicals used for construction must be stored safely on site and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early. • Littering and contamination of water sources during construction must be prevented by effective construction camp and on-site management. • Emergency plans must be in place in case of spillages onto road surfaces and water courses. • No stockpiling should take place within a water course. • All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds. • Stockpiles must be located away from river channels. • The construction camp and necessary ablution facilities meant for construction workers must not be located in any of the delineated watercourses ***Reference to EMP section***: EMP to be completed after review of draft basic assessment report.		
Impact Significance						
Without Mitigation:	Duration: Long term	Frequency: Occasional	Extent/Scale: Site impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **Medium**
With Mitigation:	Duration: Short term	Frequency: Occasional	Extent/Scale: Site Impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **Low**
Potential to Mitigate: Moderate potential / easy to mitigate				***Assessment Confidence:*** Complete		

7.2 Terrestrial environment

The only direct impacts on the terrestrial environment anticipated include the physical disturbance of the banks (already disturbed) and grassed areas. Habitat fragmentation has already occurred within the proposed works area, similarly loss of terrestrial habitat due to the nature of the site would be limited to small areas of maintained lawns, with most of the impact occurring within the aquatic and both impacts are dealt with in the aquatic section above.

Loss habitat of terrestrial habitat containing protected species or Species of Special Concern

Environmental Impact: Several such e species are known to occur in the region, however none are located within the proposed works area		***Activity/Aspect & Impact Source:*** Due to the nature of the proposed project this would start at the onset of the construction phase, and be limited to the approach road that contain several Milkwood's (*Sideroyxlon inerme*) trees protected under the National Forestry Act		***Proposed Mitigation:*** • Should any of these be disturbed, these must be marked in order to minimise any damage to these specimens, and if any pruning/cutting is required then the requisite permits must be obtained from DAFF ***Reference to EMP section:*** EMP to be completed after review of draft basic assessment report.		
Impact Significance						
Without Mitigation:	Duration: Long term	Frequency: Occasional	Extent/Scale: Site	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **High**
With Mitigation:	Duration: Short term	Frequency: Occasional	Extent/Scale: Site Impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **Low**
Potential to Mitigate: Moderate potential / easy to mitigate				***Assessment Confidence:*** Complete		

The potential spread of alien vegetation into the aquatic environment

Environmental Impact: Several invasive species were recorded during the survey and these could then colonise any structures or areas of disturbance		***Activity/Aspect & Impact Source:*** Due to the nature of the proposed project this would start at the onset of the construction phase, but persist in the medium term in the operational phase impact.		***Proposed Mitigation:*** • Clearing of vegetation should be kept to a minimum, keeping the width and length of the earth works to a minimum. • Alien plant regrowth should also be monitored, and any such species should be removed during the construction phase. • Where soils are slow to revegetate, these areas should be grubbed and planted with species suited to the region. Also refer to the Recommendations section particularly with regard Option A ***Reference to EMP section:*** EMP to be completed after review of draft basic assessment report.		
Impact Significance						
Without Mitigation:	Duration: Long term	Frequency: Occasional	Extent/Scale: Site	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **High**
With Mitigation:	Duration: Medium term	Frequency: Occasional	Extent/Scale: Site Impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **Low**
Potential to Mitigate: Moderate potential / easy to mitigate				***Assessment Confidence:*** Complete		

7.3 Decommissioning phase

No decommissioning phase is envisaged for the foreseeable future. Should certain of the project components be decommissioned in future, the environmental and other relevant legislation applicable to those activities at that time will need to be complied with.

8. Conclusion and Recommendations

Based on the findings of this assessment, most of the impacts would occur within a small portion of the estuarine environment and to limited degree in the terrestrial habitat. However, no direct loss of important or critical habitat will occur as the disturbance will mostly affect a sand bank near the mouth of the system.

In considering the two build options, Option A was identified as the preferred option in this instance as it has the potential to provide a net benefit through the creation of additional estuarine habitat. This will not only increase the structure resilience to future erosion, but also reduce the potential for any habitat loss, while providing an aesthetic advantage over the bare sand bags.

Based then on this selection the overall impacts would be LOW, assuming the following takes place:

- Revegetation takes place using plants listed in the mitigation section and is monitored by suitable specialist. The species selected arel able to colonise rapidly colonise areas (2 – 6 months) while binding the soils with proper care.
- The silt curtain described in the impact section is installed prior to construction to minimise impacts on turbidity as this is a clear water system.
- Alien vegetation is cleared and monitored

Lastly as all the proposed works are located within the estuarine portion of the Riet River, no Water Use Licenses would be required for this works area.

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Province of the
EASTERN CAPE
ECONOMIC DEVELOPMENT,
ENVIRONMENTAL AFFAIRS & TOURISM

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	
NEAS Reference Number:	
Date Received:	

Application for environmental authorization in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amendments to Environmental Impact Assessment Regulations, 2017

PROJECT TITLE

PROPOSED ROUTINE MAINTENANCE OF THE MOST SOUTHERN SECTION OF THE DR02091 ALONG THE RIET RIVER ESTUARY, NDLAMBE LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE

Specialist:	Dr Brian Colloty on behalf of EnviroSci (Pty) Ltd		
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4.2 The specialist appointed in terms of the Regulations_

I, Brian Michael Colloty , declare that

General declaration:

- I act as the independent specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence and is punishable in terms of section 24F of the Act.

Signature of the specialist:

EnviroSci (Pty) Ltd

Name of company (if applicable):

21/9/2020

Date:

Signature of the Commissioner of Oaths:

2020/09/21

Date:

Constable.

Designation:

Official stamp (below)

SUID-AFRIKAANSE POLISIEDIENS
DIST. 14
CKET STORE
2020 -09- 21
WALMER
SOUTH AFRICAN POLICE SERVICE