Aquatic assessment for proposed multi-use development on RE/1627, Sedgefield

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DECLARATION OF CONSULTANTS INDEPENDANCE

This report was compiled by Jacqueline (Jackie) Dabrowski, the Director of Confluent Environmental (Pty) Ltd. Jackie holds a Ph.D. in Veterinary Science and her post-graduate studies were in the field of freshwater ecology. She has conducted research and published scientific articles on a range of topics including aquatic food webs, fish health, trends in water quality, branchiopod diversity, and land-use impacts on water quality. Her consulting work has focussed on a range of environmental assessments of dams, rivers, estuaries, ephemeral watercourses and wetlands at various locations in Namibia, Liberia and South Africa.

At the time of conducting this study, I declare that:

- I am an independent specialist consulting in the field of Aquatic Science;
- I do not have any financial interest in the undertaking of the activity, apart from remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I do not have any vested interest in the proposed activity proceeding;
- I will not engage in any conflicting interests in the undertakings of the activity;
- I undertake to disclose to the competent authority any relevant information with the potential to influence the decision of the competent authority or the objectivity of the report; and,
- I will provide the competent authority with access to all information at my disposal regarding the application, whether this information is favourable to the applicant or not.

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1. INTRODUCTION

1.1 Background

The property RE/1627 is in the town of Sedgefield south of the N2 highway. It is one of the largest remaining erven in the town at approximately 26.5 ha. The landowner is currently considering a range of possible development combinations including:

- Small-scale strawberry farming with associated tourism and recreational opportunities
- Glamping in tents on raised platforms
- Wedding venue
- Extension of Mosaic Village market
- Small residential development
- Educational facilities (school)
- Cycleway or path on a wooden boardwalk
- Small medical clinic

An early sketch of the proposed development is provided in Appendix 1. The selection of developments will be influenced by local demand as well as site sensitivities in different areas of the property. As a greenfield site with significant estuarine and wetland features the latter will be an important aspect influencing both the layout and development options for the site.

Site sensitivities have been previously assessed by an aquatic ecologist in 2006 (Dr. T.G. Bornmann) for a pre-feasibility study by the Knysna Municipality. This report was thoroughly reviewed and provided a helpful comparison of historic conditions at the site 15 years ago. However, much has changed in terms of legislative requirements and methods of wetland assessment since 2006 leading to the requirement of an updated specialist report.

1.2 Scope of Work

The purpose of this report is to:

- Incorporate existing literature available for the site
- Conduct a desktop study of relevant catchment and watercourse features
- Delineate sensitive aquatic features during a site visit
- Determine the Present Ecological State and Ecological Importance and Sensitivity of aquatic systems on the property
- Recommend protective buffer (setback) areas to protect sensitive habitat
- Make recommendations about the proposed development layout based on site sensitivities
- Provide comment on the water use authorisations that will be required if the development goes ahead

2. CHARACTERISTICS OF THE SITE

The entire property, like most of the low-lying areas in Sedgefield, is located within the Estuarine Functional Zone (EFZ; below the 5m contour) of Swartvlei Estuary. The property is in quaternary catchment K40D which drains the southern slopes of the Outeniqua Mountains to the north and extends to the coastline through the Swartvlei Lake and Estuary system. Mean Annual Precipitation for the catchment is 757 mm per annum (Table 1). Rainfall can occur at any time of the year but follows a predominantly bimodal peak in spring (October)

and autumn (March; Figure 1). However, climate extremes have occurred in recent decades (flooding and drought) which have exposed vulnerabilities of low-lying areas in the town. In November 2007, 260 mm of rain fell within a period of 48 hrs, causing flooding of most areas within the EFZ including RE/1627 (Figure 2). While above average rainfall with associated flooding occurred across the Garden Route in 2006 and 2007, this was followed by 3 years of below average rainfall and drought between 2008 and 2010. Sedgefield ran very low on water leading to the construction of a desalination plant, and water had to be trucked into the town in tankers. It is essential that any proposed development on the site takes these water-related vulnerabilities into account to ensure its sustainability.

The Perdespruit channel flows across the entire eastern portion of the property where it enters beneath the N2 and exits under Dr Malan Street to the estuary.The upper portion of the Perdespruit beyond the N2 extends north and then west into Swartvlei Lake. It can be considered an extended arm of the Swartvlei Estuary, but has additional freshwater inflows from the dune catchment and stormwater from roads and buildings.

Table 1. Summary of relevant catchment features for RE/1627 Sedgefield

Feature	Description
Water Management Area	Gouritz
Quaternary catchment	K40D
Mean Annual Runoff	254 mm
Mean Annual Precipitation	757 mm
Ecoregion Level II	20.02,
Geomorphological Zone	Lowland River
NFEPA area	9165, FEPA (Freshwater Ecosystem Priority Area)
Vegetation Type	Southern Cape Dune Fynbos (Least Concern)

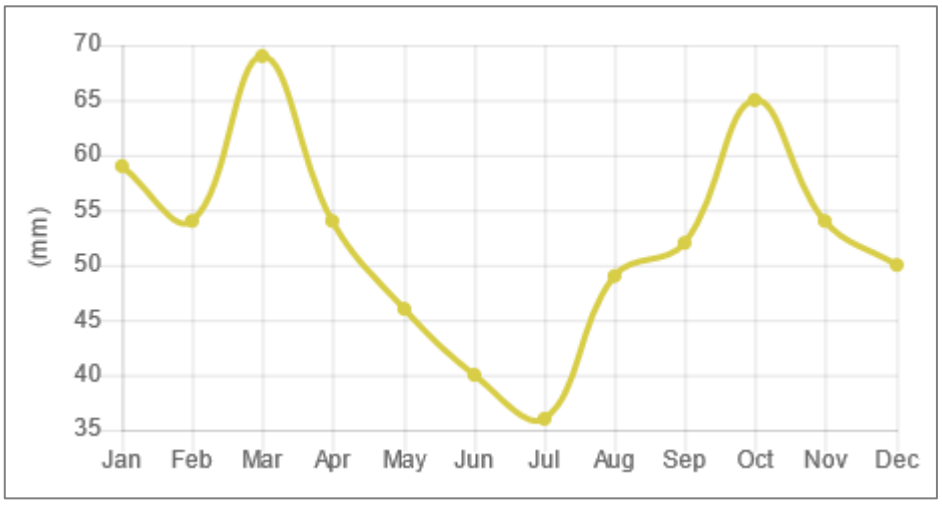

Figure 1. Mean monthly rainfall for Swartvlei.

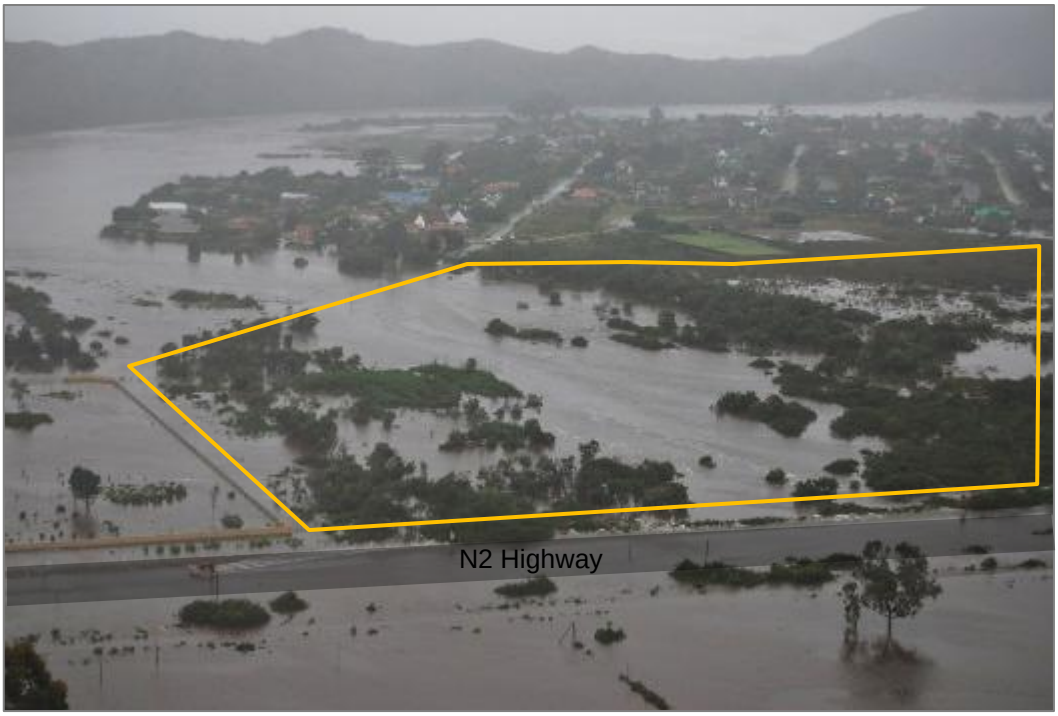

Figure 2. Photo of part of Sedgefield during flooding in 2007. View looking south shows the N2 Highway and the general area of RE/1627 (yellow area).

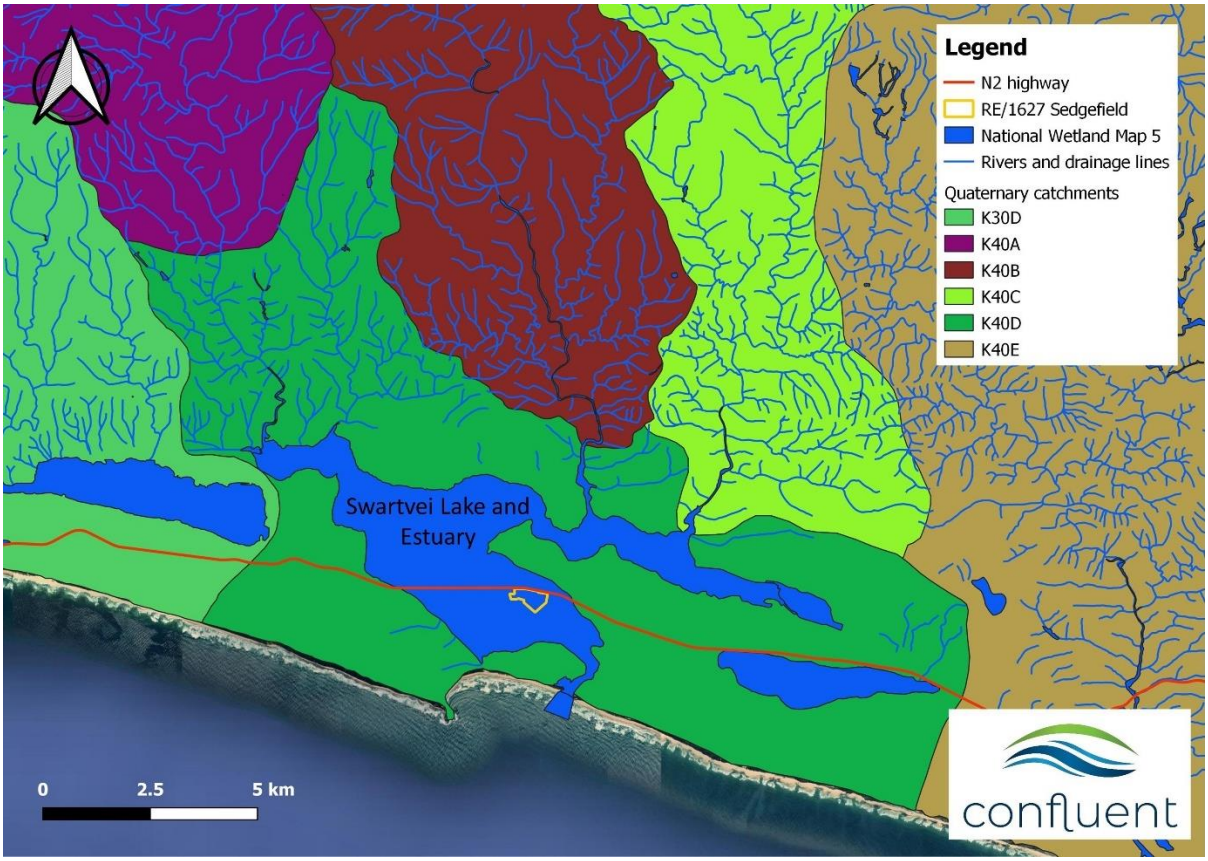

Figure 3. Location of RE/1627 in quaternary catchment K40D.

2.1 Contours at the site

The site was surveyed by G. Savage (2021) as one of the recommendations by Bornmann (2006) was that no development should take place below the 3 m contour. Infilling of areas below 3 m was recommended to bring them up to 3 m to avoid flooding. The estuary mouth is breached when water levels exceed 2 m. a.m.s.l., but as was seen during the 2007 flood event, the area is prone to flooding during extreme rainfall events, even above 3 m, and therefore building below the 3 m contour would not be recommended without accounting for this.

A map depicting relevant contours is shown in Figure 4. A relatively small portion of the property in the central area and north-western corner are above the 3 m contour. A much larger area of the property (11.4 ha) is above the 2.5 m contour (Table 2).

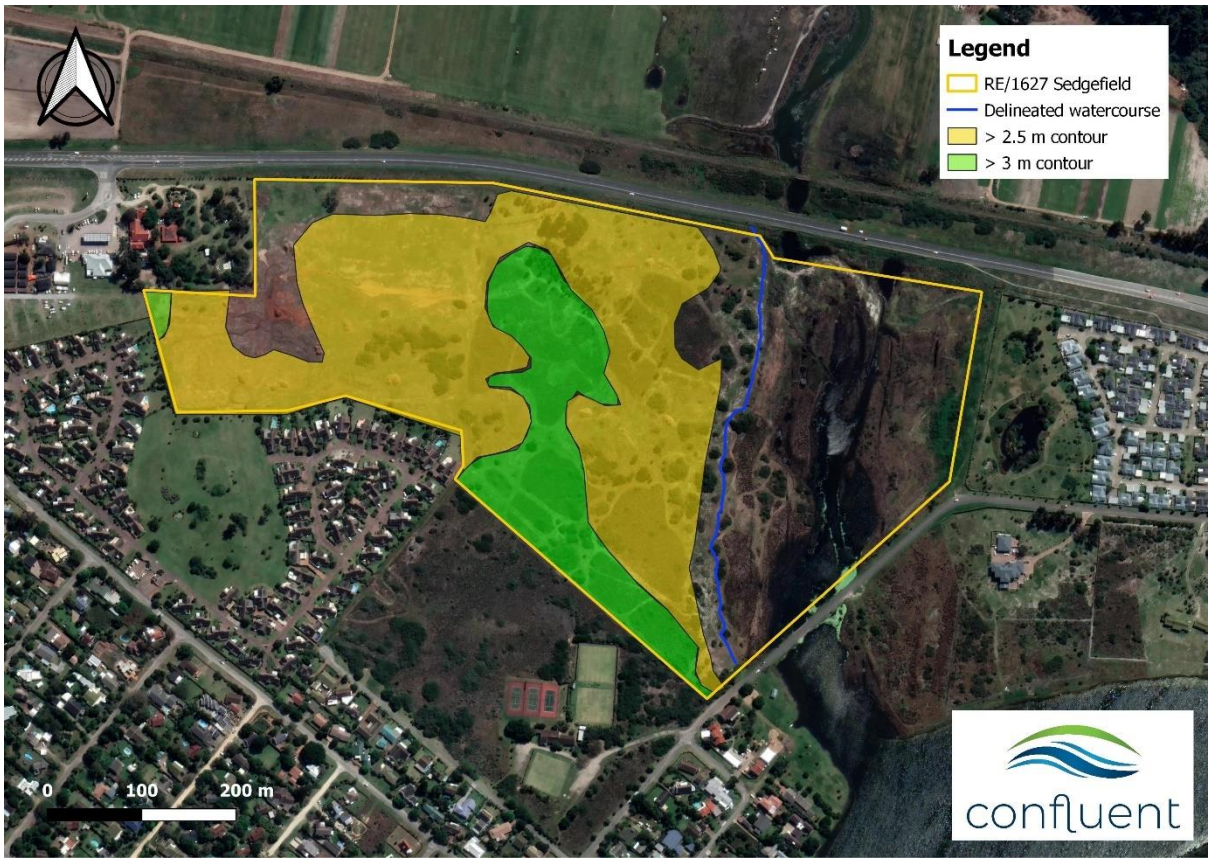

Figure 4. RE/1627 showing the areas > 2.5 m and > 3 m contours as surveyed by G. Savage.

Table 2. Relative area (ha) of land at different contour levels

Contour	Area (ha)
Total property	26.5
Central area > 3 m	3.6
North-west area > 3 m	0.1
Total area > 2.5 m	11.4

2.2 Vegetation

According to VegMap (SANBI, 2018) the mapped vegetation at the site consists of **Southern Cape Dune Fynbos (FFd11)**. In conservation terms the mapped vegetation type is described as Least Concern. Within the context of the town of Sedgefield however, there are very few areas of this vegetation type that have not been completely transformed by urban development or agriculture. Invasion by alien plants has also severely depleted the vegetation type locally.

In reality, vegetation on the site is complex and comprised of multiple distinct types which are influenced by aquatic features, historical agriculture, and alien invasion. The latter was dominated by Port Jackson (*Acacia saligna*) 40%, Myrtle (*Leptospermum laevigatum*) 30%, Rooikrans (*Acacia cyclops*) 20% and Inkberry (*Cestrum laevigatum*) 10% (Approximate proportions provided by landowner). The site has recently been cleared of extensive stands of alien vegetation and very little remains thanks to the efforts of the landowner.

2.2.1 Hydrophytic vegetation

Wetland or hydrophytic vegetation is characterised by plants that are adapted to permanent, seasonal or temporary saturation of soils. Soil saturation with water results in periods of anaerobic (low oxygen) conditions, which are not tolerated by terrestrial plants. Hydrophytic plants have varying tolerance to salinity, leading to further limits on distribution depending on the dominance of fresh or saline water.

Wetland vegetation is dominant on the eastern part of the property where it is associated with the Perdespruit channel and surrounds (Figure 5). It is strongly influenced by the estuary in this section with water levels rising and falling depending on whether open or closed mouth conditions prevail. Areas of freshwater and estuarine vegetation are present, but the latter is dominant. Vegetation units within this section were well-described by Bornmann (2006) as saltmarsh, brackish marsh, and reeds and sedges (Table 3).

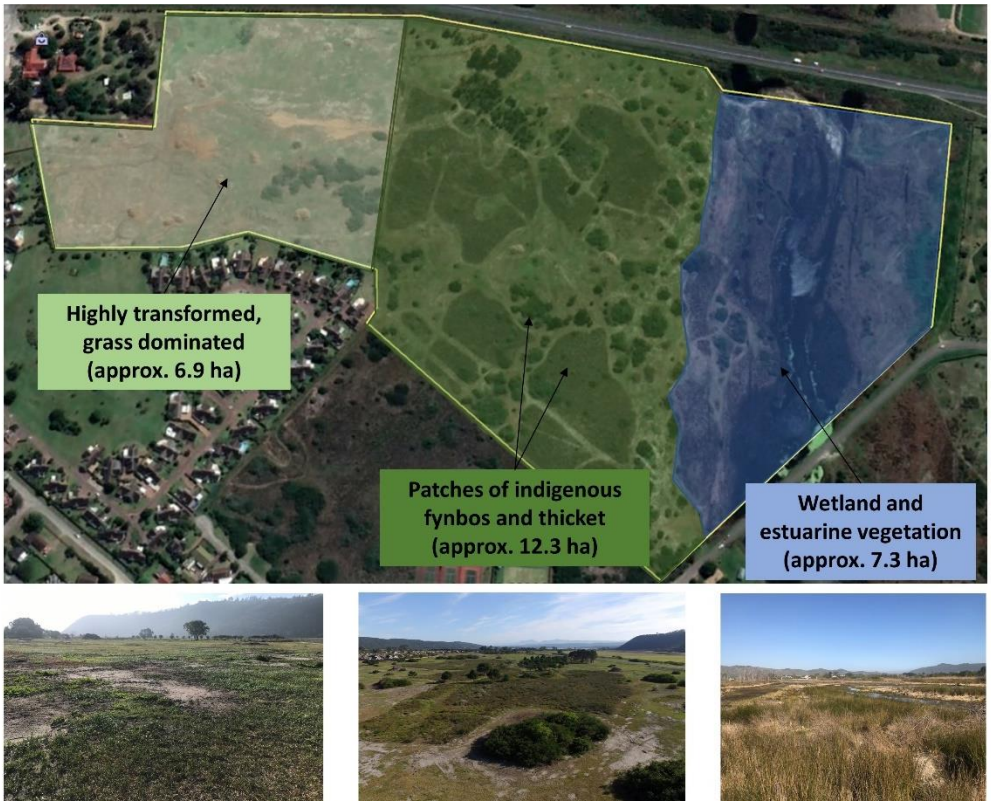

Figure 5. Broad vegetation units on RE/1627 Sedgefield.

2.2.2 Terrestrial vegetation

Three distinct units occur within the terrestrial vegetation. There are numerous patches of indigenous fynbos and thicket which co-occur towards the centre of the property, and totally transformed areas which are covered in grass towards the western extent (Figure 5).

2.3 Conservation status

Most of the property is classified as a **Critical Biodiversity Area: Estuary** according to the Western Cape Biodiversity Spatial Plan (WCBSP, 2017; Figure 6).

The management objective for this category is to "*maintain the habitat in a natural or near-natural state with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity sensitive land uses are appropriate.*"

There is a small area to the north-west and a strip along the south-western boundary that are not classified at any level in the WCBSP.

Swartvlei Estuary is listed as the 7th most important estuarine system in South Africa (Turpie *et al*., 2002).

The property is identified as a **FEPA**, which is a Freshwater Ecosystem Priority Area. FEPAs must remain in a good condition to manage and conserve freshwater ecosystems, and to protect water resources for human use. This does not mean these areas should be fenced off from humans, rather that they be supported by good planning, decision-making and

management to ensure they are not degraded. The recommended condition for all estuary FEPAs is an ecological category of A or B (Nel *et al.,* 2011).

Any work undertaken at the site needs to be carefully implemented to comply with these conservation management objectives.

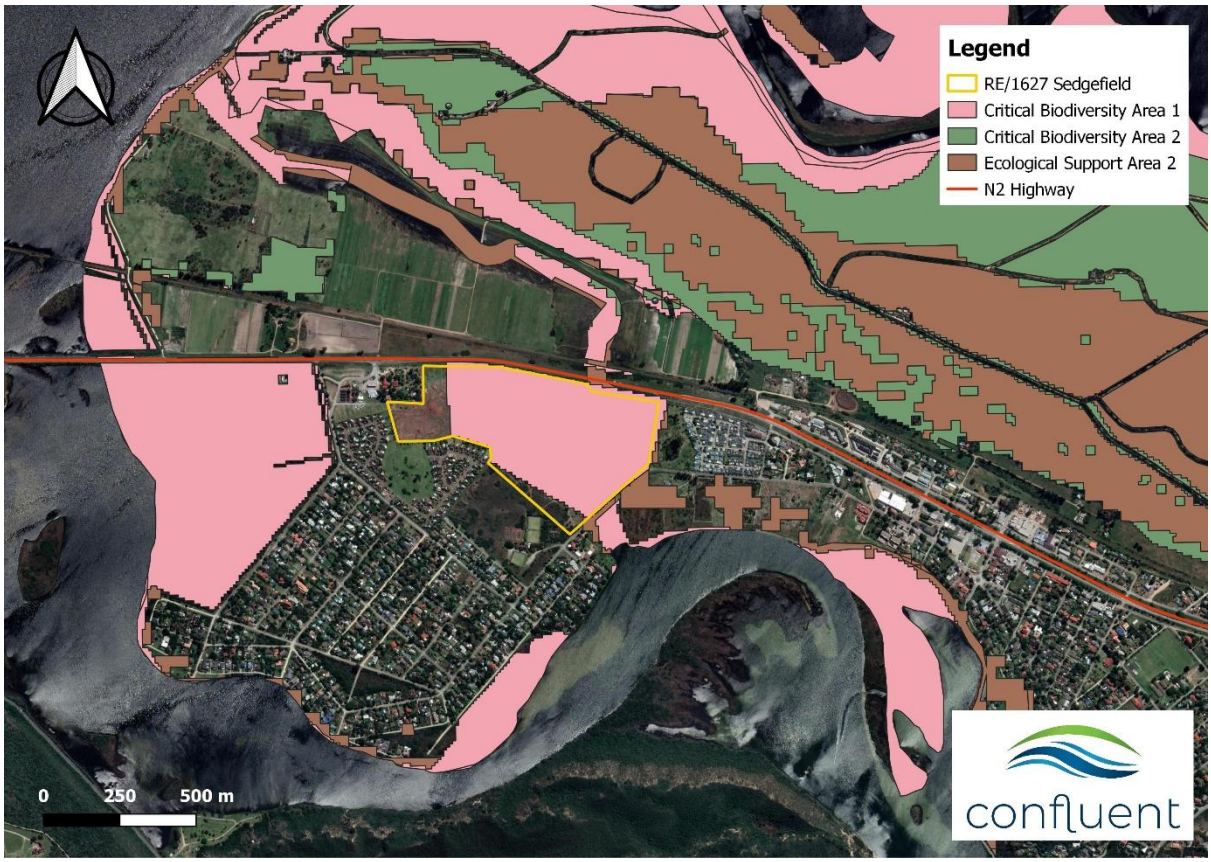

Figure 6. Map of RE/1627 showing Critical Biodiversity Areas on the property as identified in the Western Cape Biodiversity Spatial Plan (2017).

2.4 Historical activities

In 1942 little of present-day Sedgefield was developed (Figure 7). The road can be used as reference in this image as the N2 highway is still in this position. The Perdespruit was a far more distinct arm of the estuary in 1942, and minor agricultural fields were the only observable modification. In the following decades natural vegetation at the site was cleared for agricultural activities on either side of the Perdespruit. This is evident in a historical photo from 1973. The fields appear to have been abandoned over a decade later, as the 1989 image shows encroachment by bushy vegetation throughout the fields and into the Perdespruit. The road crossing the Perdespruit to the south of the property (Dr Malan) appears on the 1989 image for the first time. Bush encroachment is further advanced by 2006 and likely consisted of a large proportion of alien vegetation (Figure 7).


1942


1973

Figure 7. Historical aerial photos of the site in 1973, 1989 and 2006.

3. LITERATURE REVIEW

The Swartvlei Lake and Estuarine system was studied in great detail by Whitfield *et al.* (1983). The Perdespruit is mentioned several times in this report, with reference to the following observations:

- There has been progressive drying of low-lying areas between the upper estuary and the Perdespruit channel. This was attributed to the increased frequency of premature artificial mouth breaches which prevent the inundation of these wetland areas.

- The Perdespruit used to be an eastern meander of the estuary, a meandering channel that crossed the floodplain between the lake and the coast.

This observation is confirmed by the 1942 image in Figure 7.

Vegetation at the site was characterised by Bornmann (2006) as saltmarsh, brackish marsh, and reeds and sedges. The species observed were supported by field observations for this study. A list of species identified in each unit is provided in

Table 3. List of common hydrophytic vegetation observed by Bornmann (2006) and during the present assessment on RE/1627.

Species	Common name	Freshwater / Estuarine	Alien / Indigenous
Saltmarsh			
Cotula coronipifolia	Brass buttons	Estuarine or freshwater	Indigenous
Triglochlin striata	Streaked arrow grass	Estuarine or freshwater	Indigenous
Sarcocornia perennis		Estuarine	Indigenous
Sporobolus virginicus	Salt couch grass	Estuarine	Indigenous
Samolus parosus	Water pimpernel	Estuarine	Indigenous
Salicornia meyeriana	Glasswort	Estuarine	Indigenous
Brackish Marsh			
Juncus krausii	Salt marsh rush	Estuarine	Indigenous
Juncus acutus	Spiny rush	Estuarine	Alien
Paspalum vaginatum	Seashore paspalum	Estuarine	Indigenous
Stenotaphrum secundatum	Saint Augustine Grass	Estuarine or freshwater	Indigenous
Reeds and Sedges			
Phragmites australis	Common reed	Estuarine or freshwater	Indigenous
Schoenoplectus scirpoides	Club rush	Estuarine	Indigenous
Schoenoplectus lacustris	Softstem bulrush	Estuarine or freshwater	Alien
Ficinia nodosa	Dune slack sedge	Estuarine	Indigenous

4. PRESENT ECOLOGICAL STATE

The Present Ecological State (PES) of the Swartvlei Estuary as a whole system is categorised as **B, in a good state which is largely natural, with few modifications**. Recommended mitigation measures to improve this state are to restore base flows from the catchment, and to improve mouth management practices (Van Niekerk *et al.,* 2015). The current PES of Swartvlei was determined as part of a nationwide assessment of the PES of estuaries conducted by Van Niekerk *et al.* (2015). While this finding provides useful baseline information about the estuary which better informs broad-scale management, it does not provide the resolution required for smaller-scale site assessment, development, and management.

4.1 Classification of the watercourse

Swartvlei is classified as a Temporary Open Closed Estuary (TOCE) which is largely regulated by the amount of river inflow received. TOCEs become isolated by a sand berm across the estuary mouth during periods of low river inflow. They remain closed until their basins fill up with sufficient water to breach the berm. However, reduced freshwater inflows (due to

abstraction and damming in the catchment) coupled with extensive development in the EFZ have modified the frequency and water levels at which breaching occurs. Mouth management is now controlled by SANParks and the mouth is artificially breached when water levels exceed 2 m.a.m.s.l.

4.2 Method of assessment

Simplified methods to determine the PES of a section of estuary, or a lake have not been developed in South Africa and are still limited to rivers and wetlands. In this instance however, it is considered possible to apply a method used to assess floodplain wetlands (Figure 8). The main caveats presented by a Temporary Open Closed Estuary (TOCE), are that hydrology is influenced by tidal flows in both directions and open / closed mouth conditions. The conceptual inputs, outputs and throughputs of a floodplain wetland exclude these aspects, but as can be seen in Figure 8, the other hydrological influences are relevant.

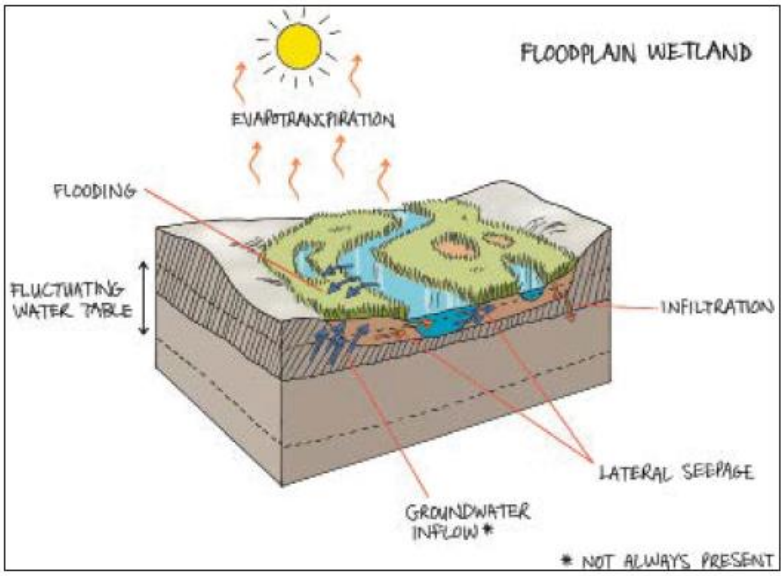

Figure 8. Conceptual diagram of a floodplain wetland (Ollis *et al*. (2016)

The assessment used Level 1 WET-Health which was developed by Macfarlane *et al*. (2008). The tool aims to assess the integrity of a wetland which is defined as a measure of the deviation of wetland structure and function from the wetland's natural reference condition. The method combines an assessment of hydrological, geomorphological and vegetation health in three modules.

Data collection involved a desktop review of the extent and intensity of catchment land use impacts and was undertaken using historical and recent aerial imagery of the site (Chief Directorate: National Geo-spatial Information and satellites). Fieldwork onsite involved the identification and recording of observable impacts to the wetland at the site of relevant activities as well as at reference points upstream and downstream of the activities. The magnitude of observed impacts to the hydrological, geomorphological and vegetation components of the wetland were calculated and combined as per the tool to provide a measure of the overall condition of the wetland area on the property. The condition ranges in scale from 1-10 and resultant scores were then used to assign the wetland into one of six PES categories as shown in Table 4.

Table 4.Wetland Present Ecological State categories and impact descriptions.

Ecological Category	Description	Impact Score
A	Unmodified, natural.	0 – 0.9
B	Largely natural with few modifications / in good health. A small change in natural habitats and biota may have taken place but the ecosystem functions are still predominantly unchanged.	1 – 1.9
C	Moderately modified / fair condition. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.	2 – 3.9
D	Largely modified / poor condition. A large loss of natural habitat, biota and basic ecosystem functions has occurred.	4 – 5.9
E	Seriously modified / very poor condition. The loss of natural habitat, biota and basic ecosystem functions is extensive.	6 – 7.9
F	Critically modified / totally transformed. Modifications have reached a critical level and the lotic system has been modified completely with an almost complete loss of natural habitat and biota.	8 - 10

4.3 Results of the PES

A summary of the major impacts used to determine the Present Ecological State of the Perdespruit is presented in Table 5. Hydrology was the parameter most negatively affected with multiple factors resulting in reduced flows, flushing and the gradual drying out of the system. Geomorphology relates to interaction between the physical structure of the wetland as a result of water and sediment transport. This aspect was considered to be in a fairly natural state, with impacts related to infilling and sediment deposition (due to reduced flushing). Vegetation on the site is moderately modified, having been influenced by historical alien vegetation and agriculture. The extent and composition of wetland vegetation is also likely reduced due to breaching the mouth at 2 m.a.m.s.l. and reduced flushing through this arm of the estuary. This is directly observable as the line of hydrophytic vegetation closely follows the high-water mark at the 2 m contour.

The overall PES was determined to be C. This is a category lower than the PES determined for Swartvlei Estuary as a whole. However, this is consistent with localised impacts at the site.

Table 5. Results of the WET-Health assessment to determine the Present Ecological State (PES) of the Perdespruit on RE/1627 Sedgefield.

Impacts affecting the Present Ecological State
HYDROLOGY: E, Seriously Modified
Reduction in freshwater inflows due to increased abstraction for agriculture in the catchment
Major change in flood peaks due to rigorous mouth management, breaching at 2 m.a.m.s.l.
Modified channel due to road crossings
Road crossings are impeding features
Minor infilling has occurred on the RE/1627, but more has occurred north of the N2
GEOMORPHOLOGY: B, Largely Natural
Altered by infilling north of the N2
Increased deposition due to reduced flushing from high water levels
VEGETATION: C, Moderately Modified
Transformed by historical dense alien vegetation
Transformed by historical agriculture
Reduced wetland vegetation due to drying out of the Perdespruit over time
Wetland vegetation replaced by two road crossings
OVERALL PES: C Moderately Modified

5. WATERCOURSE DELINEATION AND BUFFERS

The wetland area was delineated using methods prescribed by DWAF (2005). The delineation relied heavily on the presence of hydrophytic plants because sandy soil present at the site does not reliably show typical indicators of saturation such as mottling. The buffer area was determined using the detailed site-based model developed by Macfarlane & Bredin (2017) which is the more detailed of the two available models. The buffers are then mapped from the edge of the delineated wetland area (DWAF, 2005).

The recommended buffer is **30 m** from the delineated edge of the wetland / estuarine area which is indicated in Figure 9. This buffer is applicable in both the construction and operational phase of development.

Figure 9. Delineated wetland area and associated 30 m buffer for RE/1627 Sedgefield.

6. RECOMMENDATIONS

The proposed mixed-use development has not been finalised and is to be informed by site-specific ecological sensitivities. Generally, ecological sensitivity at the site follows a west-east gradient with less sensitive, more modified areas to the west, and more sensitive, less modified areas to the east (Figure 10). At a broad-scale level it is therefore recommended that development planning consider more intensive, higher impact developments to the west of the property and reserve lower impact, softer developments towards the east of the development area.

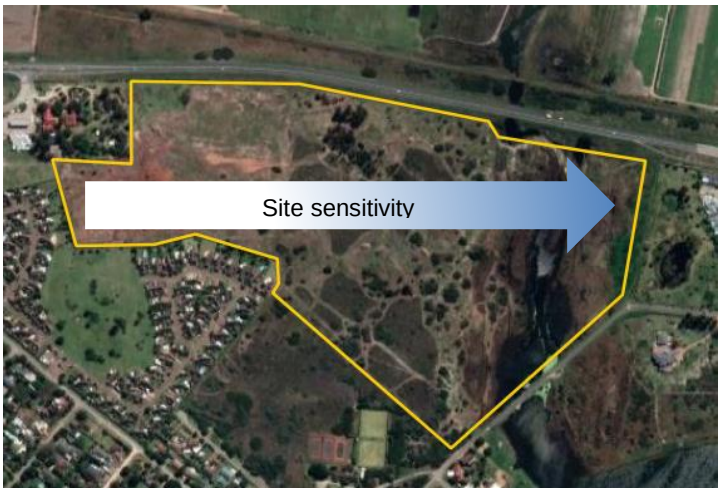

Figure 10. General direction of site sensitivity at RE/1627.

6.1 Site contours and development

This must be considered in conjunction with other factors such as the elevation of the site above sea level (Figure 11) and terrestrial sensitivities (vegetation and animals; Figure 5). While the wetland area on the property has been delineated and buffered to protect the water resource, the remaining area of the property is still entirely located within the EFZ. It is also sensitive to flooding as previously discussed.

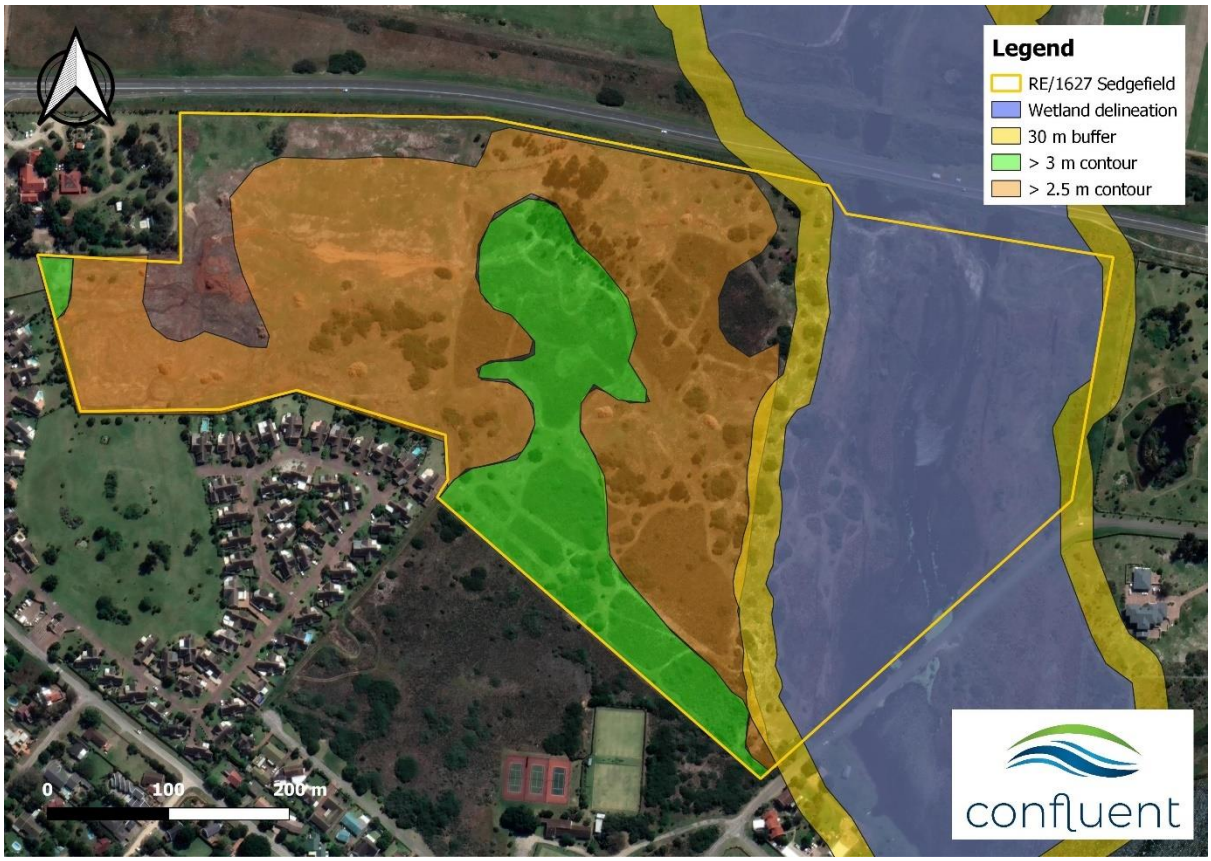

Figure 11. Synthesis of sensitive aquatic habitats and relevant surveyed contours.

It is recommended that infrastructure below the 2.5 m contour (open areas on Figure 11) be reserved to roads, walkways, and structures that can withstand being fully inundated and do not impede floodwaters (are porous).

The largest area of the property outside of the watercourse is between the 2.5 and 3.0 m contour. It is recommended that any infrastructure in this area be constructed on a raised foundation to bring it above the 3 m contour. A suitable approach would be to construct buildings on stilts, platforms, or on elevated strip foundations. Buildings above the 3 m contour can take a more conventional approach but should nonetheless consider that rising sea level and increased frequency of severe climatic events due to climate change can increase the frequency and severity of flooding across the entire property.

In all areas, construction should strive to minimise the extent of impervious surfaces (e.g paving and concrete) as this exacerbates the damage during heavy rainfall. Reducing the amount of runoff from impervious surfaces also protects water resources and aquatic biota (e.g. fish and frogs) from pollutants present in runoff from roads etc. A range of suggested products are provided in as an example of methods to improve water infiltration instead of

runoff. The use of pervious materials such as bark, gravel or grass pavers is recommended on as many parking areas, roads, and pathways (Figure 12).

Figure 12. Example of grass pavers combined with conventional paving in a parking lot.

6.2 Terrestrial biodiversity and sensitivity

While this is an aquatic specialist assessment, it is necessary to highlight the potential sensitivity of terrestrial habitat on RE/1627, especially to fragmentation. As one of the last remaining green spaces within Sedgefield, the property has existing and important habitat for a range of animals and plants and may provide important corridors of connectivity to other areas within Sedgefield. It is important that terrestrial sensitivities are also accounted for by an appropriately qualified specialist.

For instance, there are tortoises on the site (Sedgefield's iconic animal, as a recognised 'slow town'). These animals are sensitive to habitat loss and modification and are especially sensitive to construction. A dead tortoise observed lying sideways along with a pile of cleared alien vegetation on site is testament to the fact that there will be casualties associated with construction work. This applies to other small mammals and reptiles on the site.

The appointment of a general biodiversity specialist is recommended to provide guidance in terms of sensitive areas to be avoided, important corridors for the movement of animals on the property, and methods to mitigate any negative impacts associated with the development. The type of recommendations / guidelines envisaged are as follows:

- Plant a dense, vegetated buffer of indigenous vegetation consisting of small trees and low shrubbery along existing / new walls and fence lines to provide habitat for small mammals and tortoises that are 'channelled' along these linear features.
- Small strategic gaps in walls to facilitate the dispersal of wildlife would be recommended.
- Active search and rescue for tortoises (especially in thickets) prior to, and during construction phase and retention in a temporary fenced area (must be large to reduce competition). They can be released when construction is finished.
- Time construction activities outside of the spring and summer breeding season to reduce the destruction of nests (birds, tortoises, and animals).
- Investigate patterns of movement of animals across the site and consider how modifying the site in terms of fencing and built infrastructure could expose them to greater risk (roads / predation) or exclusion.
- Identify areas of fynbos or thicket that may be of higher value than other areas from a biodiversity perspective to provide guidance on which of these should be retained. A

mixture is envisaged to maintain sufficient diversity of habitat for the wildlife adapted to living on the property.

6.3 Management of wetland and buffer areas

The wetland and wetland buffer area require a mix of active and passive management approaches. For the most part the wetland will continue to function in its somewhat modified way (drier than under natural conditions) without much interference. The main active management recommendations within the wetland are as follows:

- Continue to remove alien vegetation from within the wetland and buffer area. There are several larger alien trees still growing towards the east of the site that should be removed. There is the possibility of ring-barking these trees and leaving them to die where they stand as they will provide perching habitat for birds which is desirable at the site. This would have the added benefit of not disturbing soil and vegetation below. However, they could also be used as material for the constructed heronry that has been proposed by SANParks and the Sedgefield Island Conservancy in this area (See Box 1).
- Remove all woody material that has been dumped in one of the smaller channels along the western edge of the wetland (Figure 13). This practice is damaging to the watercourse as it restricts flow, causes sedimentation (clogging), smothers vegetation, and modifies natural processes. This practice should not occur anywhere within the wetland, and although commonly practiced in agriculture, should cease altogether as it constitutes a type of infilling which is unlawful.

Figure 13. Channel within the wetland that has been filled with woody material which must be removed.

- The only development that would be supported in the wetland or buffer area is the creation of habitat for birds and the construction of a modest wooden boardwalk for walking or cycling which could incorporate a bird hide. A cycleway could potentially connect the Mosaic Village to Dr. Malan Drive. It is strongly encouraged that interpretive information boards about the Perdespruit and estuarine habitat be

included. This has the added opportunity that small groups could be brought to the site to learn about different habitats within estuaries (see Box 1 for more information).

- An often-overlooked impact is the abundance of lights that accompany development. It is important that the entire buffer and wetland area remain free of lighting, and the development in general minimises the use of unnecessary lighting. This is to preserve natural circadian rhythms of wildlife and reduce unnatural interactions and behaviour such as increased predation pressure or insects accumulating pointlessly at lights.

Box 1: Intaka Island Case Study

Intaka Island is a wetland area that was partially developed and partially conserved in Century City, Cape Town. It provides a great example of how sensitive development, and the rehabilitation and maintenance of wetlands can provide opportunities for tourism, recreation, education, and conservation. Key features which could be applicable on Erf 1627 are the bird hide with information and interpretive boards, and a boardwalk along part of the wetland edge. A constructed platform with woody material was built over the water to provide habitat to herons (heronry), and a similar structure has been proposed on the eastern portion of the Perdespruit (supported by SANParks and the Sedgefield Island Conservancy). Intaka Island also has an education centre which can be used for workshops and training, and a lapa which is used for school groups.




To keep the management of the buffer area simple and clear, a preliminary list of Do's and Don'ts is provided for guidance.

DO

- Mark out the wetland buffer as soon as possible using available materials such as painted rocks, wooden stakes, spraypaint etc.
- Remove alien vegetation using hand-held equipment only (saws, tree poppers, clippers, stump herbicides).
- Remove woody material from alien clearing from the buffer zone for disposal by chipping elsewhere on the property.
- Conduct regular inspections every 4-6 months to monitor erosion and alien vegetation.

DO NOT

- Drive or use heavy machinery or heavy vehicles in the wetland buffer zone.
- Discard or burn woody material from cleared aliens into the wetland.
- Remove any indigenous plants.
- Ignore erosion or alien regrowth.

7. WATER USE AUTHORISATION

Legislative acts in South Africa differ in their definition of estuarine systems. According to the National Environmental Management: Coastal Management Act (NEMA: CMA; 2008) and listing notices 1 (GN R. 983) and 2 (GN R. 984) published under the National Environmental Management Act (NEMA), Environmental Impact Assessment (EIA) Regulations (2014), which define an estuary as an open body of surface water-

a) that is part of a watercourse that is permanently or periodically open to the sea;
b) in which as rise or fall of the water level as a result of the tides is measurable at spring tides when the watercourse is open to the sea; or
c) in respect of which the salinity is measurably higher as a result of the influence of the sea.

The National Water Act (NWA; Act No. 36 of 1998) defines an estuary as "a partially or fully enclosed body of water-

a) which is open to the sea permanently or periodically; and,
b) within which the sea water can be diluted, to an extent that is measurable, with fresh water derived from land".

The definition of estuarine habitat is more extensive in terms of listing Notice 3 (GN R 985) published under the NEMA EIA regulations (2014), which define an estuary as the Estuarine Functional Zone (EFZ) as defined in the National Biodiversity Assessment: Estuary Component (van Niekerk & Turpie, 2012). The EFZ is delimited by the 5 m topographical contour surrounding an estuary, which is provided as a spatial layer in the South African National Biodiversity Institute's BGIS website (http://bgis.sanbi.org).

The full extent of RE/1627 is located below the 5 m topographical contour and is therefore defined as part of the estuary because it is located within the EFZ.

Furthermore, the NWA defines a watercourse as:

a) a river or spring;
b) a natural channel in which water flows regularly or intermittently;
c) a wetland, lake or dam into which, or from which, water flows; and
d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

This definition excludes estuaries which means these areas are not subject to authorisation under the NWA. On occasion, if extensive freshwater habitat is shown to be present within the EFZ, this may prompt regulatory requirements under the NWA, but given the obvious estuarine conditions present in the Perdespruit this seems unlikely. Nonetheless, the Breede Gouritz Catchment Management Agency (BCMA) have suggested that this assessment be reviewed by their freshwater specialist to confirm their stance on whether proposed developments would require authorisation or not.

8. CONCLUSIONS

The proposed mixed-use development on RE/1627 will be informed by site sensitivities such as those identified in this assessment. The site follows a general east-west gradient of sensitivity which is generally mirrored by the preliminary development proposal (Appendix 1). The proposed layout and development options must take the results of this assessment and other specialist studies into account. Once the revised layout has been planned, this can be formally assessed through an impact assessment which will include detailed mitigation measures to further ensure that impacts are kept to a minimum.

This report must be submitted to the BGCMA for confirmation that no water use authorisation in terms of the NWA will be required. One caveat to this is if additional water is required for irrigation of strawberries (agricultural use) that could trigger Section 21 a) water use. If a borehole was required to fulfil this need it would need either a General Authorisation or Water Use License depending on the volumes of water required. It is also important to determine how private residences will deal with their sewage as this may influence the requirement for water use authorisation.

9. APPENDIX

9.1 Preliminary proposed layout

10. REFERENCES

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