Proposed Mixed-Use Development on Portion 50 of Farm 202 Hansmoeskraal, George, Western Cape.

Aquatic Biodiversity Compliance Statement

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Date: 8 October 2025
Version: Final

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- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);
- At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this study has reference to, except for financial compensation for work done in a professional capacity;
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being members of the general public;
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse any proposed developments, but aim to present facts, findings and recommendations based on relevant professional experience and scientific data;
- I do not have any influence over decisions made by the governing authorities;
- I undertake to disclose 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 a competent authority to such a relevant authority and the applicant;
- I have the necessary qualifications and guidance from professional experts in conducting specialist reports relevant to this application, including knowledge of the relevant Act, regulations and any guidelines that have relevance to the proposed activity;
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- All the particulars furnished by me in this document are true and correct.

Specialist: Dr. James Dabrowski (Ph.D., Pr.Sci.Nat. Water Resources – Reg. No 114084)

Date: September 2024

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1. INTRODUCTION

Confluent Environmental was appointed by Sharples Environmental Services to undertake a freshwater survey for a proposed for the proposed construction of a mixed-use development on Portion 50 of Farm 202 Hansmoeskraal, in the George Local Municipality, Garden Route District Municipality of the Western Cape.

The scope of work for this report is guided by the legislative requirements of the National Environmental Management Act (NEMA).

1.1 National Environmental Management Act

According to the protocols specified in GN 1540 (Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in Terms of Sections 24(5)(A) and (H) and 44 of the National Environmental Management Act, 1998, when Applying for Environmental Authorisation), assessment and reporting requirements for aquatic biodiversity are associated with a level of environmental sensitivity identified by the national web-based environmental screening tool (screening tool). An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of:

- **Very High** sensitivity for aquatic biodiversity, must submit an Aquatic Biodiversity Specialist Assessment; or
- **Low** sensitivity for aquatic biodiversity, must submit an Aquatic Biodiversity Compliance Statement.

The screening tool classified the site as being of **Very High** aquatic biodiversity as it occurs withing a Strategic Water Source Area (SWSA). According to the protocol, a site sensitivity verification must be undertaken to confirm the sensitivity of the site as indicated by the screening tool:

- Where the information gathered from the site sensitivity verification differs from the screening tool designation of **Low** aquatic biodiversity sensitivity, and it is found to be of a **Very High** sensitivity, an Aquatic Biodiversity Specialist Assessment must be submitted.

1.2 National Water Act (NWA, 1998)

The Department of Water & Sanitation (DWS) is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers.

A watercourse means:

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

For the purposes of this assessment, a wetland area is defined according to the NWA (Act No. 36 of 1998):

"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 typically adapted to life in saturated soil".

Wetlands must therefore have one or more of the following attributes to meet the NWA wetland 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; and
- The presence of, at least occasionally, hydrophilic plants, i.e. hydrophytes (water loving plants).

No activity may take place within a watercourse unless it is authorised by the Department of Water and Sanitation (DWS). According to Section 21 (c) and (i) of the National Water Act, an authorization (Water Use License or General Authorisation) is required for any activities that impede or divert the flow of water in a watercourse or alter the bed, banks, course or characteristics of a watercourse. The regulated area of a watercourse for section 21(c) or (i) of the Act water uses means:

a) The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;

b) In the absence of a determined 1 in 100-year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or

c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.

According to Section 21 (c) and (i) of the NWA, any water use activities that do occur within the regulated area of a watercourse must be assessed using the DWS Risk Assessment Matrix (GN 509) to determine the impact of construction and operational activities on the flow, water quality, habitat and biotic characteristics of the watercourse. Low Risk activities require a General Authorisation (GA), while Medium or High Risk activities require a Water Use License (WUL).

1.3 Scope of Work

The objectives of this assessment included the following:

- To undertake a desktop analysis and site inspection to verify the sensitivity of aquatic biodiversity as **Very High** or **Low**; and
- Compile an Aquatic Biodiversity Compliance Statement or Aquatic Biodiversity Specialist Assessment based on the site verification of the sensitivity of the site.

- Determine whether any activities fall within the regulated area of a watercourse as defined by the NWA.

2. APPROACH

The following rationale was adopted to determine the sensitivity of aquatic biodiversity within the footprint of the site:

- In the event that watercourses are confirmed to fall within the development footprint and that these watercourses will be impacted by the development, then the site sensitivity is confirmed as **Very High** and a full specialist freshwater assessment is required; and
- In the event that no watercourses are identified within the development footprint the site sensitivity is confirmed as **Low** and an Aquatic Compliance statement is required.

The determination of the site sensitivity relied upon the following approaches:

- Interrogation of available desktop resources including:
    - DWS spatial layers;
    - National Freshwater Ecosystem Priority Areas (NFEPA) spatial layers (Nel et al., 2011);
    - National Wetland Map 5 and Confidence Map (CSIR, 2018) – the latest national wetland inventory map for South Africa;
    - Western Cape Biodiversity and Spatial Plan (WCBSP) for George (CapeNature, 2017).
- A site visit was undertaken, during which time the following activities were undertaken:
    - Identification and classification of watercourses within the footprint of the site according to methods detailed in Ollis et al. (2013);
    - Soil augering to confirm the presence of soil indicators (DWAF, 2005) that may indicate the presence of a wetland (if applicable); and
    - Identification of hydrophilic plant species that may indicate the presence of wetland plant species (if applicable).

3. ASSUMPTIONS & LIMITATIONS

- The assessment of the site visit represents a brief temporal snapshot of conditions on the site. Changes in season or short-term changes in climatic conditions may possibly result in the formation of aquatic habitats (e.g. temporary or seasonal wetlands) under significantly wetter conditions. Despite this limitation the sensitivity of aquatic biodiversity on the site was determined with a very high level of confidence.

4. DESKTOP SURVEY

The site falls within Primary Catchment K (Kromme) area and in quaternary catchment K30B (Figure 1). The main river draining this catchment Gwaing River which originates from the Outeniqua Mountains to the north. The project area falls within the Southern Coastal Belt (22) Level 1 ecoregion (22.02 Level 2 Ecoregion), which is characterised by moderately undulating plains with altitude ranging from 0 to 300 m above mean sea level. Mean annual precipitation for the catchment area is approximately 700 mm per year and occurs all year-round, with

peaks in October to November and March to April. Dominant natural vegetation in the vegetation comprises broadly of fynbos, renosterveld, dune thicket, and afro-montane forest. According to geospatial data sources no freshwater features are indicated to occur within the footprint of the property or within close proximity to the property (Figure 2). A small section of an aquatic CBA1 wetland is however mapped to occur in the south-eastern most corner of the property (Figure 3).

The site does not fall within a sub-quaternary catchment (SQC) that has been categorised as a Freshwater Ecosystem Priority Area (FEPA). The site does however fall within the Outeniqua Strategic Water Source Area (SWSA) (Figure 1) which is considered to be of national importance. SWSAs are defined as areas of land that either:

a) Supply a disproportionate (i.e. relatively large) quantity of mean annual surface water runoff in relation to their size and so are considered nationally important; or
b) Have high groundwater recharge and where the groundwater forms a nationally important resource; or
c) Areas that meet both criteria (a) and (b).

SWSAs are vital for water and food security in South Africa and also provide the water used to sustain the economy. Given this context, management and implementation guidelines have been developed with the objective of facilitating and supporting well-informed and proactive land management, land-use and development planning in these nationally important and critical areas (Le Maitre, et al., 2018). The primary principle behind this objective is to protect the quantity and quality of the water they produce by maintaining or improving their condition. The proposed development footprint falls within an urban ‘working landscape’ and in this context the management objectives are to maintain at least the present condition and ecological functioning of these landscapes, to restore where necessary, and to limit or avoid further adverse impacts on the sustained production of high-quality water.

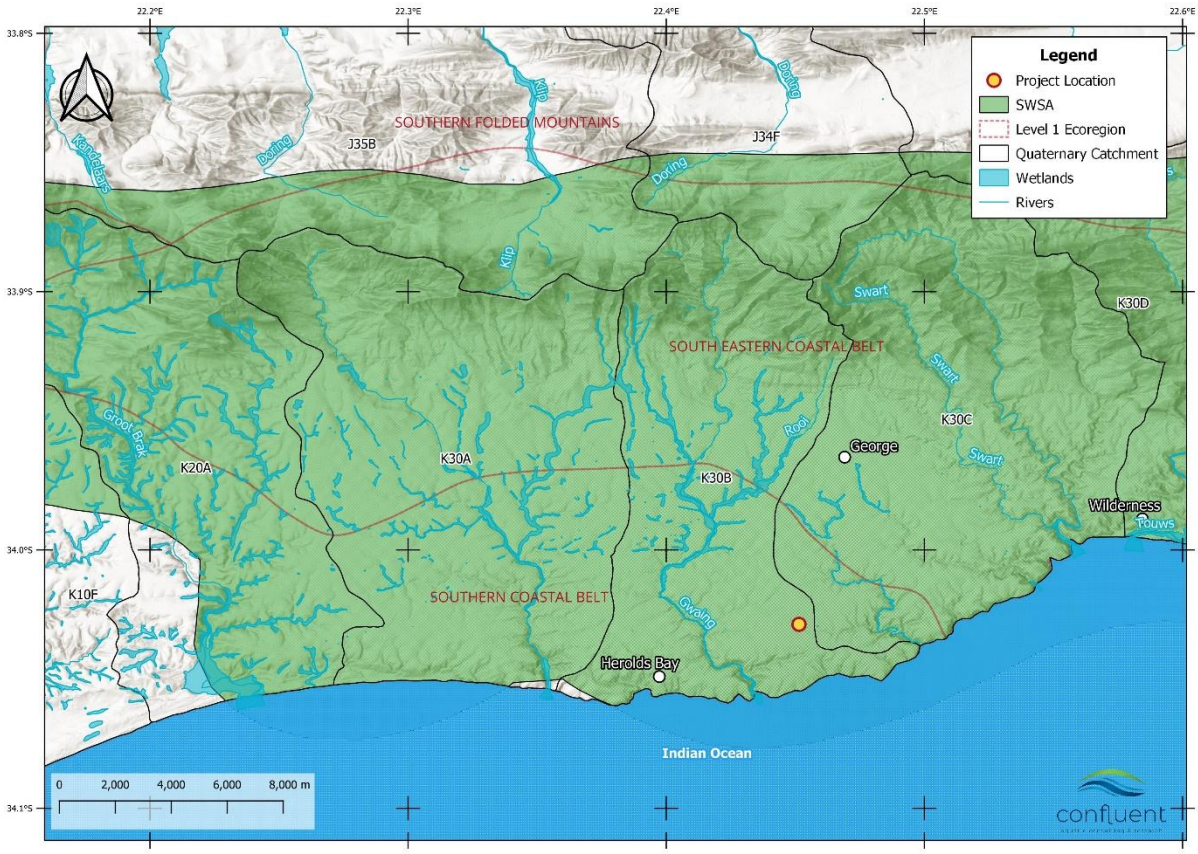

Figure 1: Map indicating the location of the property relative to the quaternary catchment area.

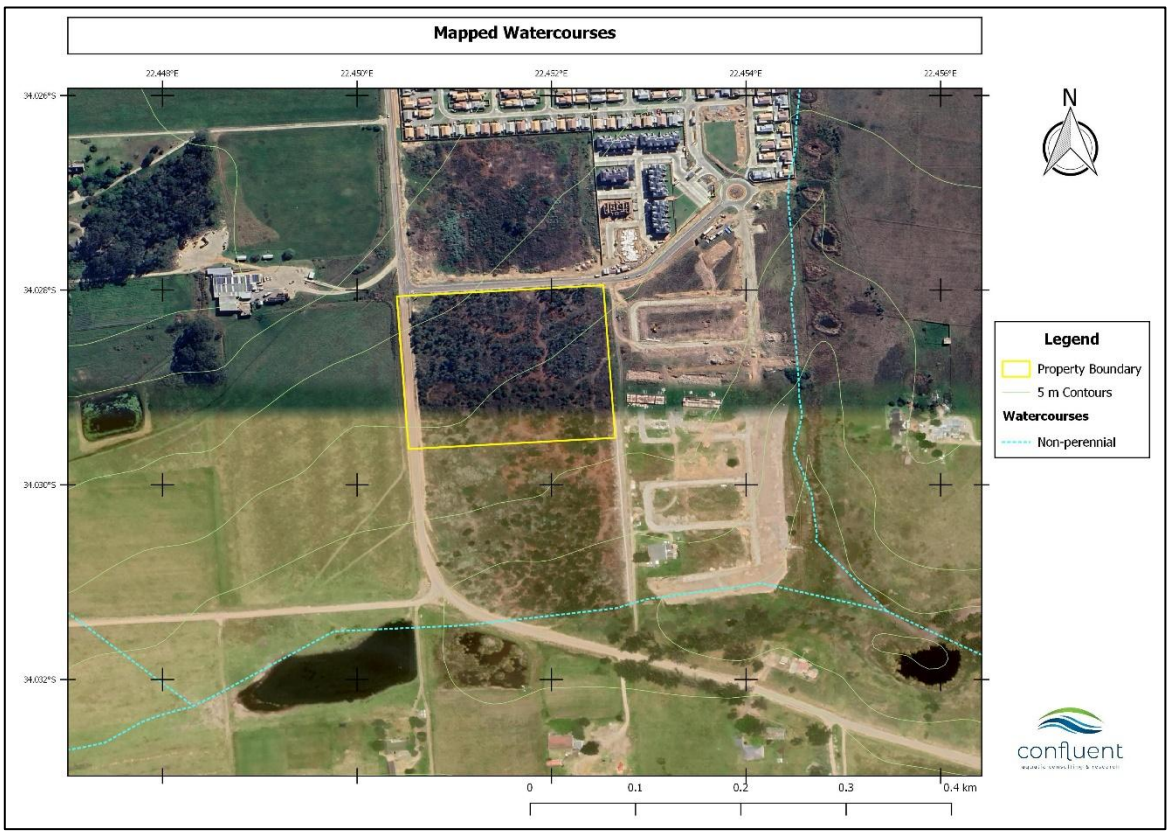

Figure 2: Location of the property in relation to watercourses.

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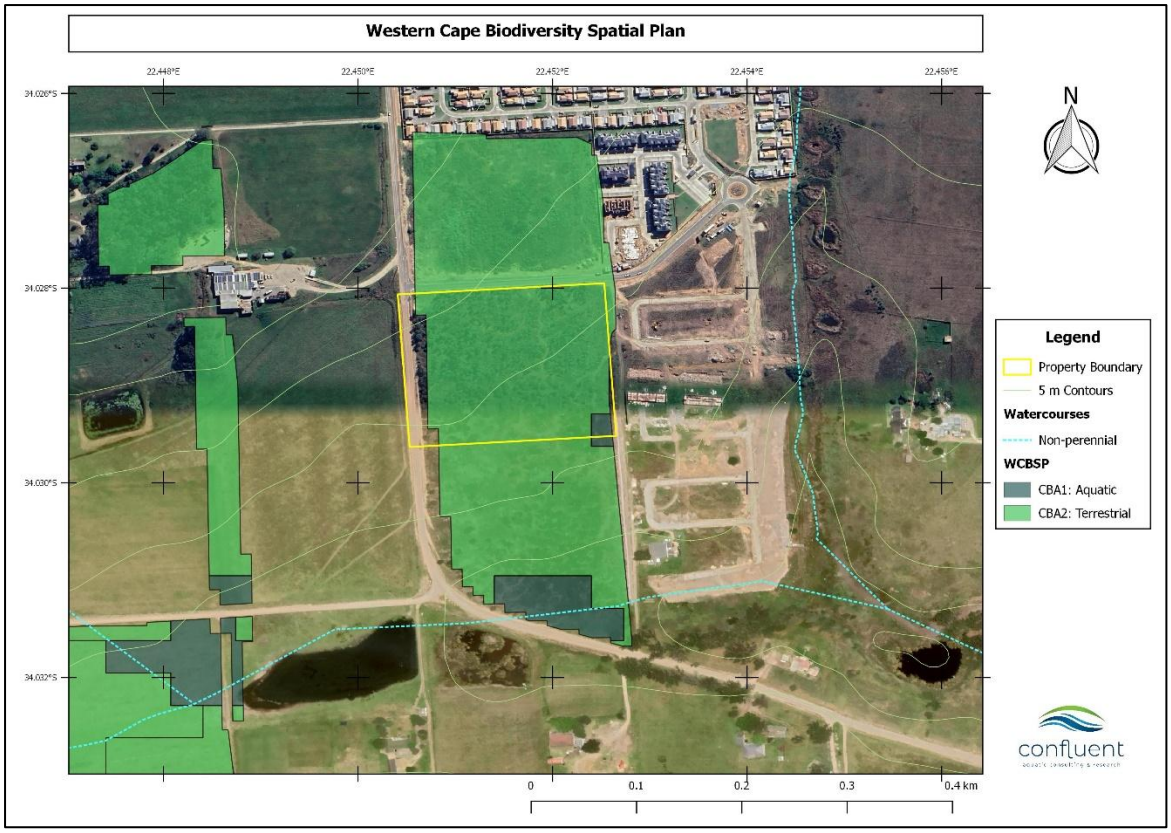

Figure 3: Map of the property relative to the Western Cape Biodiversity Spatial Plan (WCBSP).

5. SITE DEVELOPMENT PLAN

A mixed-use commercial and residential development is planned for the property. Two alternatives have been proposed – Alternative A (Figure 4) and Alternative B (Figure 5).

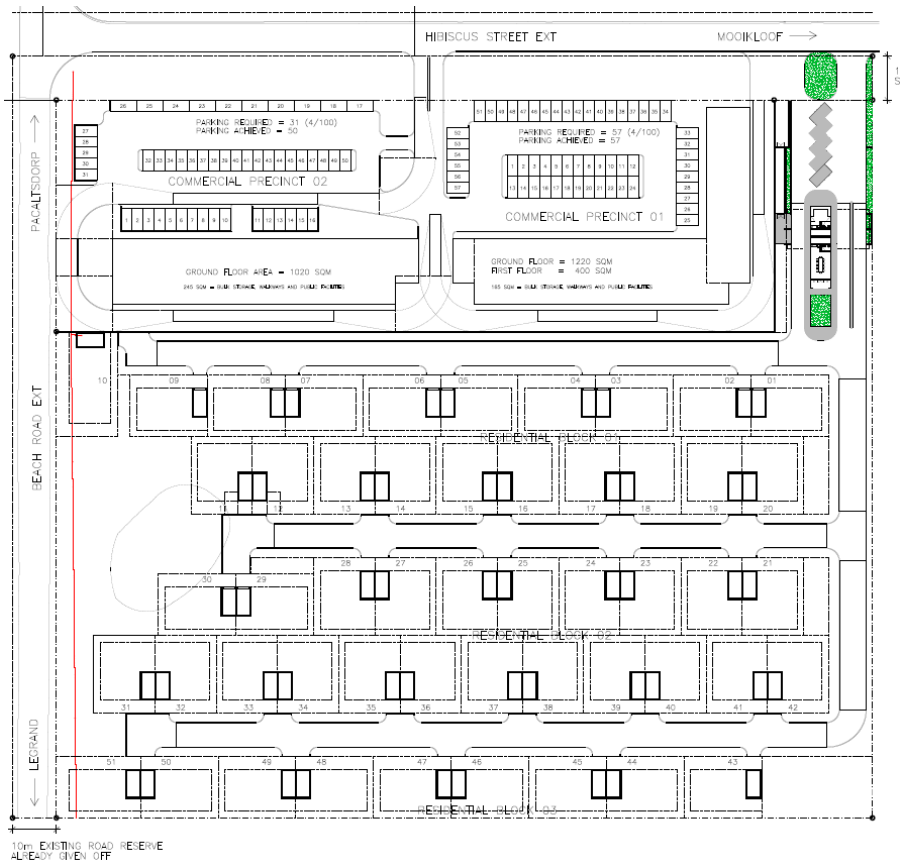

Figure 4: Proposed Site Development Plan – Alternative A.

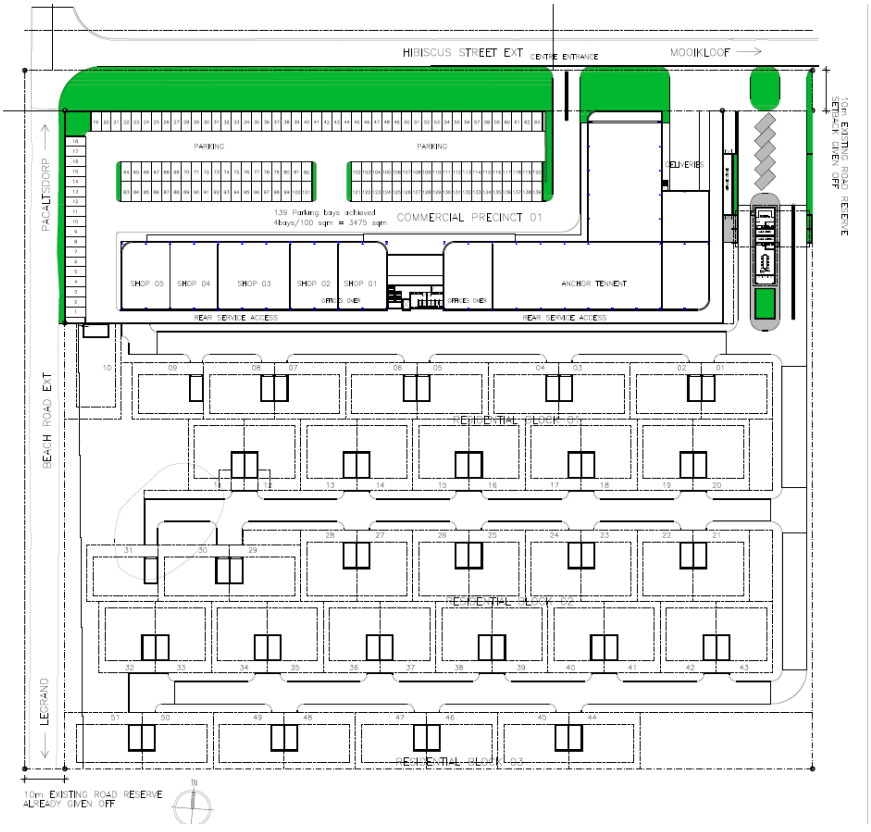

Figure 5: Proposed Site Development Plan – Alternative B.

6. SITE VISIT

The site visit was conducted on 10 September 2024 during which time the entire extent of the property was traversed by foot. The property is relatively flat and there are no clear areas of natural drainage on the property and no natural hydro-geomorphological landscape features (depressions, confined valleys, channels etc.) indicating the presence of a natural watercourse (i.e. stream, river or wetland).

A small man-made dam (approximately 500 m^2) is present mid-way along the western boundary of the of the property (Figure 6). The dam is an excavated depression (with no inflow or outflow) and has a relatively low wall (approximately 1.5 m) around the southern perimeter. The dam is clearly visible in historical imagery from the year 2000 (Figure 7). Since then, the dam has become increasingly vegetated by wetland plants. At the time of the visit the water level was shallow (< 30 cm) and *Typha capensis* and *Juncus effusus* were the most common species present. As there is no visible inflow to the dam, periods of inundation are likely to be temporary following periods of sustained rainfall. Vegetation throughout the remainder of the property consisted of natural fynbos vegetation that has been invaded by several alien invasive plant species, the most common of which included *Pinus sp., Acacia mearnsii* (Black Wattle) *Solanum mauritianum* (Bugweed) and *Rubus sp*. (American Bramble).

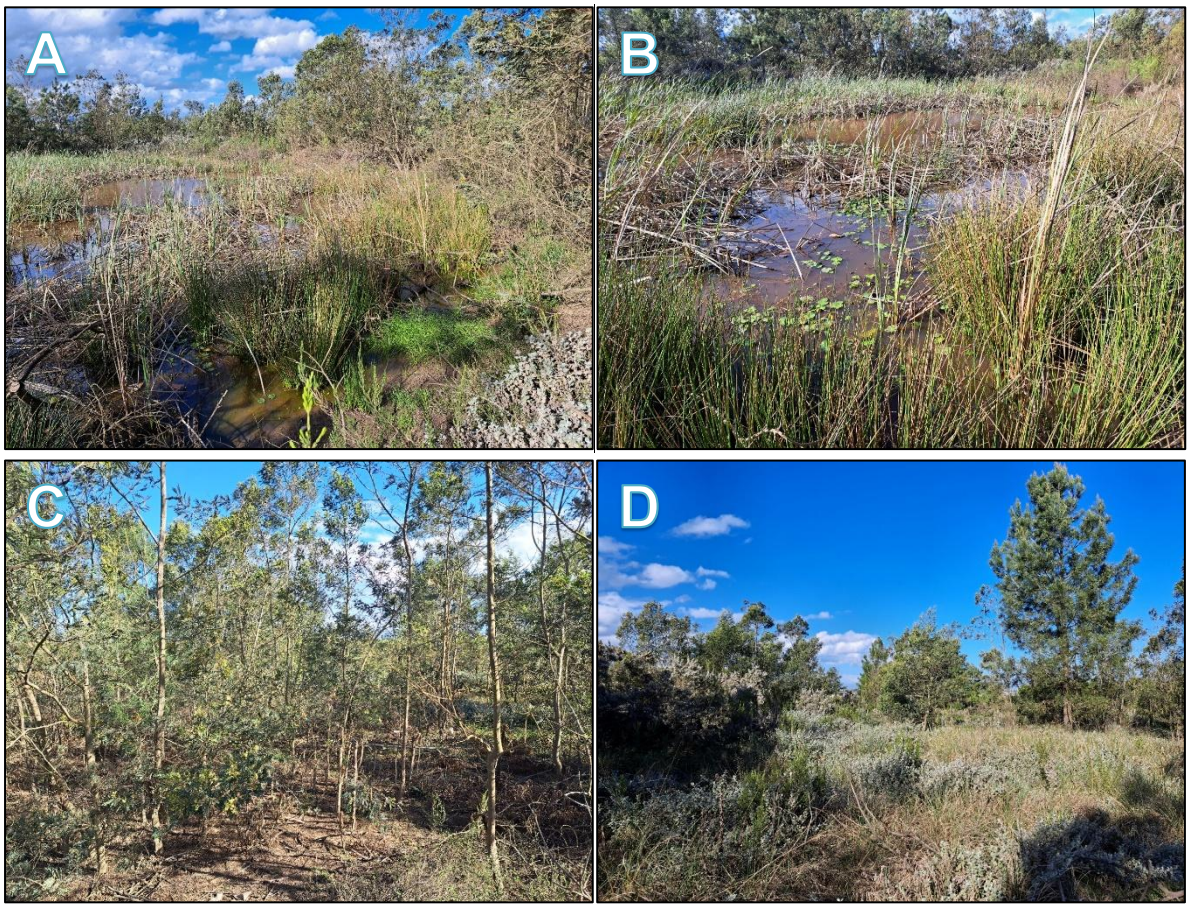

Figure 6: Photographs illustrating the shallow dam with patches of T. capensis, J. effusus and Eleocharis limosa (A & B) and surrounding vegetation invaded by A. mearnsi, Pinus sp. (C &D).

Figure 7: Aerial Google Earth images from 2003 (left) and 2024 (right) indicating the progressive increase in vegetation in the dam (indicated by red arrow).

It can be concluded, with a high degree of confidence, that no natural freshwater features occur within the footprint of the property. In terms of legislation pertaining to the NWA, the property falls outside of the regulated area of any nearby watercourses (i.e. greater than 100 m and 500 m away from a river/stream and natural wetland, respectively).

7. ECOLOGICAL IMPORTANCE

The SDP proposes to close the dam on the property. While the small dam is artificial, it may possibly fulfil an important ecological function, which should be assessed prior to developing the site. The WET-Ecoservices Tool (see Appendix 1) was therefore used to assess the demand and supply of ecosystem services (regulating and supporting, provisioning and cultural services) provided (supply) and required (demand) by the dam Figure 8.

The dam offers some limited biodiversity maintenance services through providing some temporary aquatic habitat. Otherwise, given its small size and isolation from any natural hydrological network it provides very few regulating and supporting services. Apart from serving as a storage unit for water for human use, the dam provides no provisioning or cultural services. The demand for ecosystem services is also negligible as the dam is currently not utilised to support any agricultural or subsistence activities and is not part of a larger hydrological network that is impacted by pollution or flow regulation. Overall, the importance of all ecosystem services provided by the dam (including biodiversity maintenance) is **Very Low** (Table 1). Closure of the dam is therefore unlikely to impact on biodiversity and will have very little effect on the supply of beneficial ecosystem services.

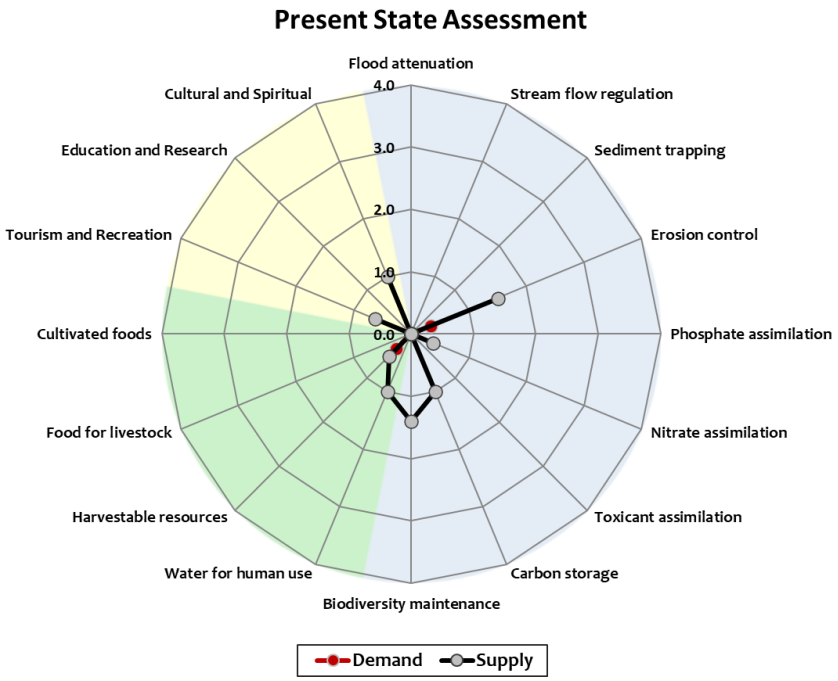

Figure 8: Estimated demand and supply of beneficial ecosystem services

Table 1: Importance scores for ecosystem services provided by the dam

		Present State			
ECOSYSTEM SERVICE		Supply	Demand	Importance Score	Importance
REGULATING AND SUPPORTING SERVICES	Flood attenuation	0.0	0.0	0.0	Very Low
	Stream flow regulation	0.0	0.0	0.0	Very Low
	Sediment trapping	0.8	0.0	0.0	Very Low
	Erosion control	2.3	0.3	0.9	Low
	Phosphate assimilation	0.6	0.0	0.0	Very Low
	Nitrate assimilation	0.5	0.0	0.0	Very Low
	Toxicant assimilation	0.6	0.0	0.0	Very Low
	Carbon storage	1.0	No scores	No scores	No scores
	Biodiversity maintenance	1.4	0.0	0.0	Very Low
PROVISIONING SERVICES	Water for human use	1.0	0.0	0.0	Very Low
	Harvestable resources	0.5	0.3	0.0	Very Low
	Food for livestock	0.0	0.0	0.0	Very Low
	Cultivated foods	1.7	0.0	0.2	Very Low
CULTURAL SERVICES	Tourism and Recreation	0.6	0.0	0.0	Very Low
	Education and Research	0.0	0.0	0.0	Very Low
	Cultural and Spiritual	1.0	0.0	0.0	Very Low

8. MANAGEMENT RECOMMENDATIONS

A key impact related to large residential developments is the generation of large volumes of stormwater associated with an increased area of impermeable surfaces (i.e. roads, roofs and

other infrastructure). Stormwater is typically conveyed into watercourses, where high volumes (and associated high energy) cause degradation of watercourses, mainly due to the erosion of the bed and banks. These watercourses may not necessarily fall within the development footprint but may still ultimately receive stormwater by connecting the development into an existing stormwater network that discharges into the watercourse. In this way, stormwater generated from the site can still affect watercourses located far outside of the development footprint.

It is therefore important that stormwater generated on site should be managed according to Sustainable Drainage System (SuDS) principles. This requires that as much stormwater as possible should be attenuated within the development footprint. For example, the City of Cape Town guideline is that developments must provide for 24-hour extended detention of the 1-year return interval 24-hour storm event. In this respect the following measures, *inter alia*, should be considered:

- Rainwater harvesting tanks be installed at all buildings;
- Use of swales and detention ponds to attenuate stormwater runoff, encourage infiltration and reduce the speed, energy and volumes at which stormwater is discharged from the site;
- Use of permeable paving to encourage infiltration into the soil; and
- Use of retention ponds and artificial wetlands to capture stormwater runoff and prevent its discharge from the site.

9. AQUATIC BIODIVERSITY COMPLIANCE STATEMENT

While the development is located within a SWSA it will not affect the delivery of relatively high volumes of good quality water and has no direct impact on natural water resources. The implementation of an appropriate stormwater management system is recommended to help to attenuate and filter pollutants on site and to regulate stormwater flows to offsite natural watercourses.

Based on the results of the desktop review and the site verification, it can be concluded that the development will not impact on any freshwater biodiversity and that the sensitivity of aquatic biodiversity on the property can be regarded as **Low.** This statement is applicable to both Alternative A and B.

9.1 Recommendations

- According to the SDP almost the entire property will be transformed with very little open space planned. This leaves minimal area for attenuating and managing stormwater on site. Given the challenges associated with managing stormwater runoff, the existing dam can provide a useful stormwater attenuation function and it is recommended that the dam be incorporated into the SDP for this purpose. Alternatively, a detailed stormwater management plan must demonstrate attenuation through other methods (e.g. rainwater harvesting tanks etc.).
- In the event that the dam is to be closed, the following duty of care intervention must be implemented, prior to closure of the dam:
    - An opening in the wall of the dam must be made to allow any accumulated water to slowly exit the dam. This is to allow any biota that may be inhabiting the dam to

migrate from the dam prior to infilling. The dam must ideally be emptied during the winter season (from May to September outside of the breeding season for most biota) at least 3 weeks prior to infilling the dam.

10. REFERENCES

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Nel, J.L., Driver, A., Strydom, W.F., Maherry, A., Peterson, C., Hill, L., Roux, D.J., Nienaber, S., van Deventer, H., Swartz, E. and Smith-Adao, L.B. (2011). Atlas of freshwater ecosystem priority areas in South Africa: Maps to support sustainable development of water resources. Water Research Commission Report No. TT 500/11.

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APPENDIX 1: WET-ECOSERVICES

Ecosystem services in were assessed using WET-EcoServices Version 2 (Kotze, Macfarlane and Edwards, 2021). 16 different ecosystem services were evaluated and included:

- Flood attenuation
- Streamflow regulation
- Sediment trapping
- Phosphate assimilation
- Nitrate assimilation
- Toxicant assimilation
- Erosion control
- Carbon storage
- Biodiversity maintenance
- Provision of water for human use
- Provision of harvestable resources
- Food for livestock
- Provision of cultivated foods
- Cultural and spiritual experience
- Tourism and recreation
- Education and research

WET-EcoServices provides a set of indicators (e.g. slope of the wetland) rated on a five-point scale of 0 to 4 that reflect the supply/capability of a wetland for each of the 16 different ecosystem services listed above. An Excel™ based spreadsheet tool has been developed to conduct the assessment. For each ecosystem service, indicator scores are combined automatically in an algorithm given in the spreadsheet that has been designed to reflect the relative importance and interactions of the attributes represented by the indicators to arrive at an overall supply score. In addition, the demand for the ecosystem service is assessed based on the wetland's catchment context (e.g. toxicant sources upstream), the number of beneficiaries and their level of dependency, which are also all rated on a five-point scale. Again, an algorithm automatically combines the indicator scores relevant to demand to generate a demand score.

A single overall importance score is generated for each ecosystem service by combining the supply and demand scores. This aggregation therefore places somewhat more emphasis on supply than demand, with the supply score acting as the starting score for a “moderate” demand scenario. The importance score is, however, adjusted by up to one class up where demand is “very high” and by up to one class down where demand is “very low”. The overall importance score can then be used to derive an importance category for reporting purposes.

Reference:

Kotze, D.C., Macfarlane, D.M., Edwards, R.J., and Madikizela, B. (2020). WET-EcoServices Version 2: A revised ecosystem services assessment technique, and its application to selected wetland and riparian areas. Water SA, 46(4), 679-688.