Appendix V: Aquatic Environment Specialist Report



FEN CONSULTING

Aquatic Biodiversity

Site Sensitivity Report

FOR ERF 28005 GEORGE, WESTERN CAPE PROVINCE.

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EXECUTIVE SUMMARY

FEN Consulting (Pty) Ltd (FEN) was appointed to undertake a freshwater site sensitivity verification (SSV) of Erf 28005 George ('subject property'), Western Cape Province as part of a due-diligence and pre-feasibility assessment in response to comment received from the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) in October 2026. FEN undertook a freshwater ecosystem verification assessment following a high-level screening assessment in order to identify freshwater ecological sensitivities and potential opportunities and constraints, particularly from an enviro-legal perspective.

Prior to the site verification, an extensive background assessment and review of prior previous studies was undertaken. The outcome of the desk-based assessments indicated that no aquatic or freshwater ecosystems have been identified by relevant databases within the subject property, and that the only 'wetland' feature identified by the various databases within a 500 m radius of the site is deemed artificial in origin. This feature is an impoundment that functions, at least partially, to attenuate stormwater runoff from the surrounding developments (including the Garden Route Mall and N2 highway) situated approximately 211 m south of the subject property and is not visible on historical aerial photographs prior to 2006. More pertinently, no wet response is visible within the subject property on any of the historical aerial photographs (dated between 1957 and 2006) nor on digital satellite imagery. The absence of a wet response is supported by previous specialist studies which assert that the primary driver of the observed wet response is poorly managed stormwater ingress (especially from Blue Mountain Village which borders the subject property to the north), in tandem with a perched water table at approximately 1 m to 1.5 m below surface as well as various disturbances which have altered the natural drainage patterns of the site. During the site investigation, it was observed that the subject property has undergone various disturbances in the past. Most notably, various earthworks (likely relating to the excavation of test pits as part of previous geotechnical studies and the channels created to drain stormwater from the site) have resulted in artificial ponding of surface water.

Based on the observations during the field assessment which was undertaken on 9 November 2026, visual assessment of historical aerial photographs, digital satellite imagery, and a background database study, it was concluded that due to historical land use changes and alteration of the natural drainage patterns and hydrological regime in conjunction with the discharge of stormwater to the subject property, the observed wet response therein would cease to persist under "normal" circumstances. In the event that a pre-development landscape were to be reinstated, and stormwater from the adjacent built environment directed away from the subject property, the ecosystem observed within the subject property would likely revert to a terrestrial state. Accordingly, the wet response is not considered meet the definition of riparian and/or wetland features, as contained in the National Water Act, 1998 (Act No. 36 of 1998) (as amended) (NWA). Accordingly, the wet response is not subject to the regulations associated with the NWA or the National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended) (NEMA) insofar as these Acts govern watercourses.

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GLOSSARY OF TERMS

Alluvial soil:	A deposit of sand, mud, etc. formed by flowing water, or the sedimentary matter deposited thus within recent times, especially in the valleys of large rivers.
Biodiversity:	The number and variety of living organisms on earth, the millions of plants, animals and micro-organisms, the genes they contain, the evolutionary history and potential they encompass and the ecosystems, ecological processes and landscape of which they are integral parts.
Buffer:	A strip of land surrounding a wetland or riparian area in which activities are controlled or restricted, in order to reduce the impact of adjacent land uses on the wetland or riparian area.
Catchment:	The area where water is collected by the natural landscape, where all rain and run-off water ultimately flows into a river, wetland, lake, and ocean or contributes to the groundwater system.
Delineation (of a wetland):	To determine the boundary of a wetland based on soil, vegetation and/or hydrological indicators.
Ecoregion:	An ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region".
Groundwater:	Subsurface water in the saturated zone below the water table.
Hydromorphic soil:	A soil that in its undrained condition is saturated or flooded long enough to develop anaerobic conditions favouring the growth and regeneration of hydrophytic vegetation (vegetation adapted to living in anaerobic soils).
Hydrology:	The study of the occurrence, distribution and movement of water over, on and under the land surface.
Temporary zone of wetness:	The outer zone of a wetland characterised by saturation within 50 cm of the surface for less than three months of the year
Watercourse:	In terms of the definition contained within the National Water Act, a watercourse means: • A river or spring; • A natural channel which water flows regularly or intermittently; • A wetland, dam or lake into which, or from which, water flows; and • 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
Wetland Vegetation (WetVeg) type:	Broad groupings of wetland vegetation, reflecting differences in regional context, such as geology, climate, and soils, which may in turn have an influence on the ecological characteristics and functioning of wetlands.

ACRONYMS

CBA	Critical Biodiversity Area
CVB	Channelled Valley Bottom
CR	Critically Endangered
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EPL	Ecosystem Protection Level
ES	Ecological Sensitivity
ESA	Ecological Support Area
ETS	Ecosystem Threat Status
EWR	Ecological Water Requirements
FEPA	Freshwater Ecosystem Priority Areas
FRAI	Fish Response Assessment Index
GIS	Geographic Information System
GN	Government Notice
GPS	Global Positioning System
ha	hectares
HGM	Hydrogeomorphic
IHAS	Invertebrate Habitat Assessment System
IHI	Integrated Habitat Integrity
LC	Least Concern
mm	Millimeter
m.a.m.s. l	Meters above mean sea level
MAP	Mean Annual Precipitation
MBSP	Mpumalanga Biodiversity Sector Plan
MHW	Mpumalanga Highveld Wetlands
MIRAI	Macroinvertebrates Response Assessment Index
MTS	Main Transmission Substation
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act
PES	Present Ecological State
REDZ	Renewable Energy Development Zone
RQS	Research Quality Services
RQIS	Research Quality Information Services
SACNASP	South African Council for Natural Scientific Professions
FEN	FEN Consulting
FEN 5	South African Scoring System
SA RHP	South African River Health Programme
SSV	Site Sensitivity Verification
SWSA	Strategic Water Source Area
SQR	Sub quaternary catchment reach
subWMA	Sub-Water Management Area
WEF	Wind Energy Facility
WetVeg Groups	Wetland Vegetation Groups
WMA	Water Management Areas
WMS	Water Management System
ZoR	Zone of Regulation

1 INTRODUCTION

1.1 Background

Century Property Developments (Pty) Ltd ('Century') is considering purchasing Erf 28005 (the 'subject property'), in George, Western Cape, for residential development.

The subject property forms part of the greater Garden Route East and Eden Meander multi-phased development, which was approved by the Department of Environmental Affairs and Development Planning (DEA&DP) on 22 August 2011 (Environmental Authorisation REF: EG12/2/3/2-D2/11-1192/08). Prior to that, it formed part of the Blue Mountain Residential Development, for which environmental authorization was issued in 2005 (EG12/2/1-37Kraaibosch192/2&71 (4855) GEORGE dd 06/12/2005). Subsequently, comment received from the DEA&DP in October 2026 in response to a draft Environmental Impact Report submitted in support of an amendment application to the existing Environmental Authorisation (EA), noted that queries regarding the presence of a wetland on the property had been raised with the Breede-Olifants Catchment Management Agency ('BOCMA'). In response to this, and as part of the due diligence and feasibility investigation prior to completion of the purchase, FEN Consulting (Pty) Ltd ('FEN') was appointed by Century to undertake a freshwater site sensitivity verification (SSV) of the subject property (depicted in Figure 1 and Figure 2).

This SSV is prepared in accordance with Government Notice (GN 320) (20 March 2020) of the National Environmental Management Act (NEMA) Environmental Impact assessment (EIA) Regulations of 2014 as amended, prior to proceeding with the final purchase of the property and, if necessary, with any specialist studies, to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool). Further to this, FEN was requested to identify, using a combination of desktop-based techniques and field verification, all potential freshwater ecosystems associated with the subject property, and where applicable, to consider relevant Zones of Regulation (ZoR) associated with such freshwater ecosystems in accordance with relevant legislation, specifically GN 4167 as published in the Government Gazette 49833 of 08 December 2023 as it relates to activities as stipulated in Section 21(c) and (i) of the National Water Act, 1998 (Act No. 36 of 1998) (as amended) (NWA). In this regard, a 500 m radius around the subject property was generated and forms the greater investigation area within which potential freshwater ecosystems, and possible impacts exerted on the receiving environment within the subject property, were considered.

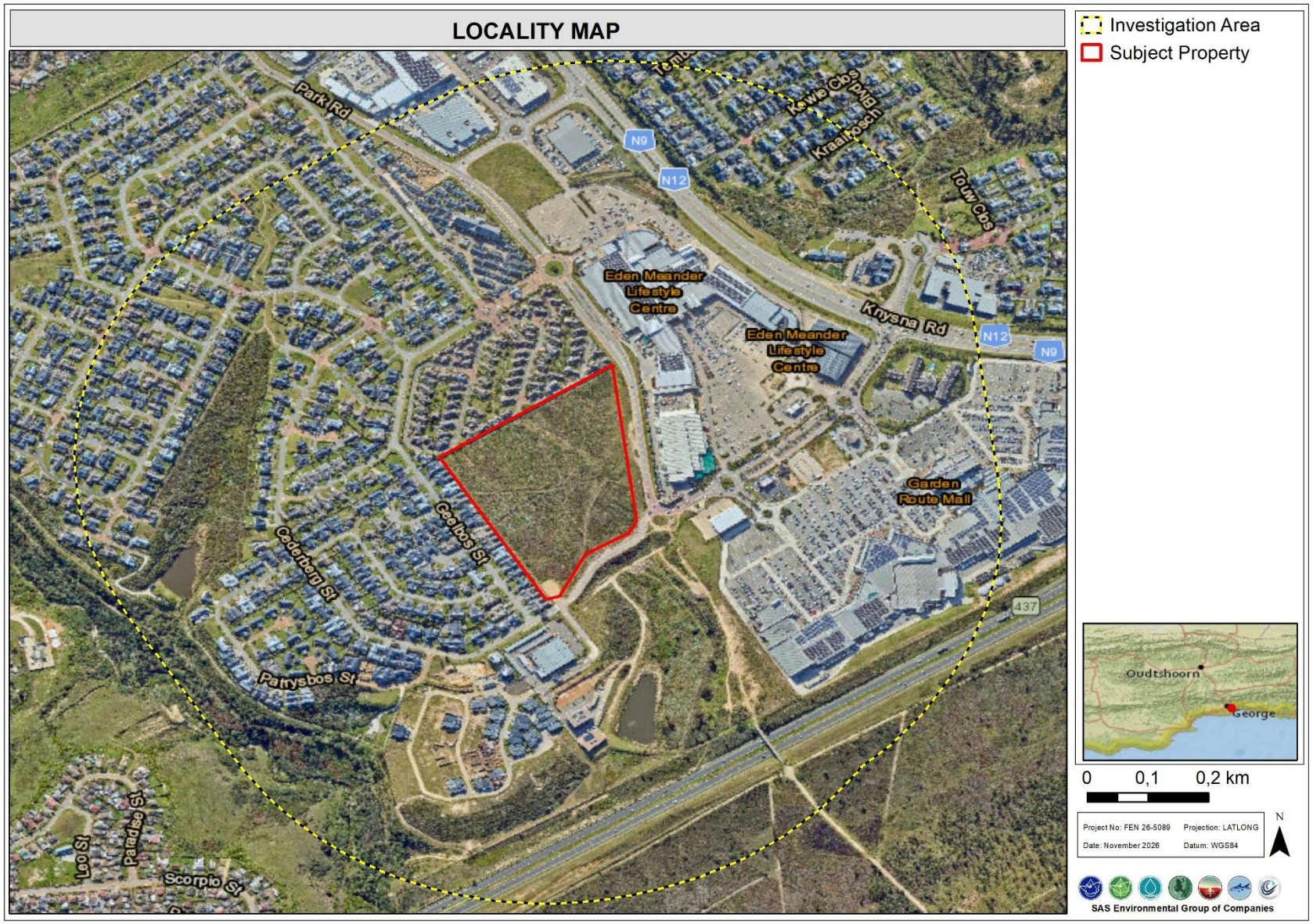

Figure 1: The subject property depicted on digital satellite imagery.

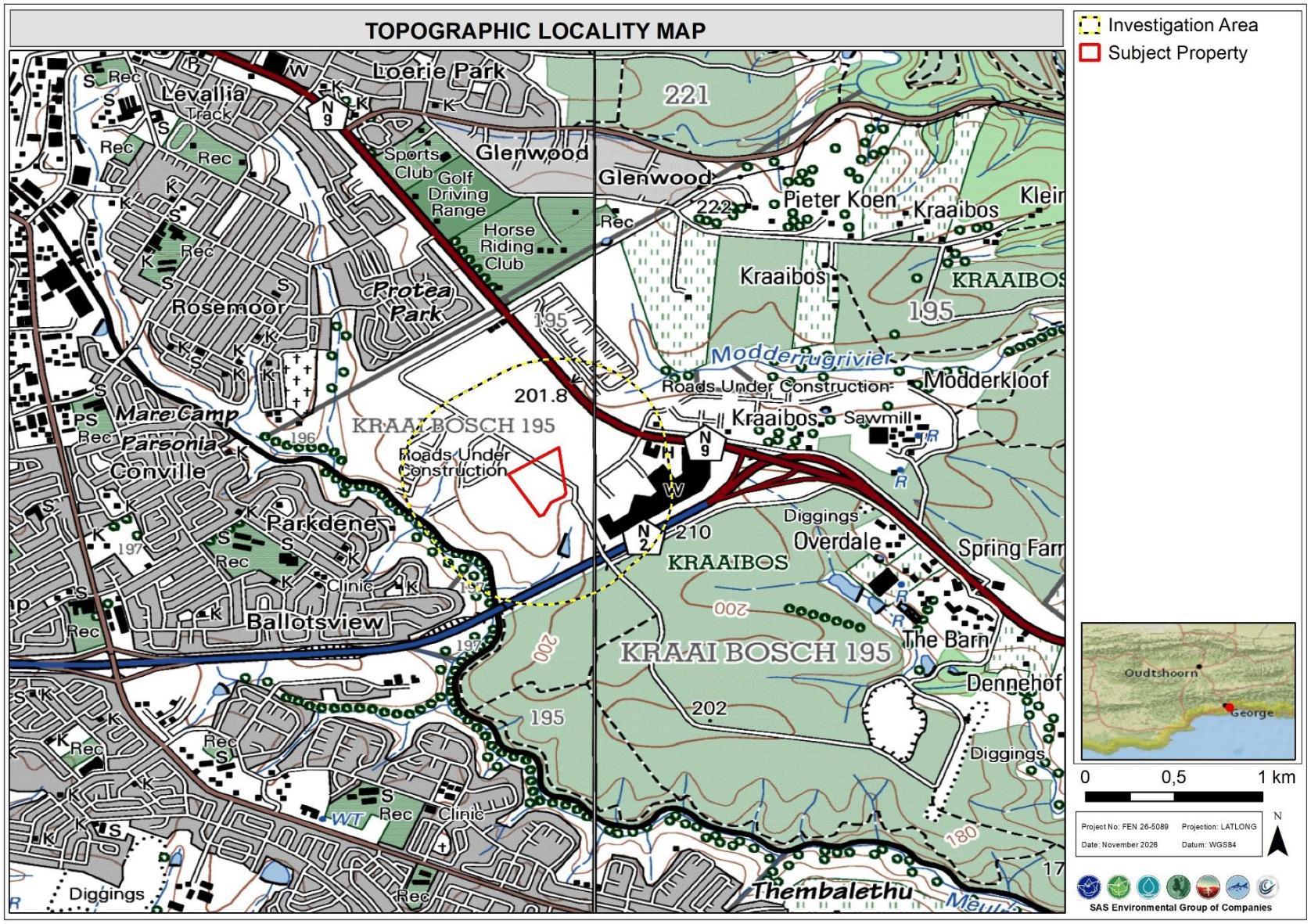

Figure 2: The subject property depicted on topo-cadastral data.

1.2 Scope of Work

Specific outcomes in terms of this report are outlined below:

- A background study of relevant national, provincial and municipal datasets (such as the National Freshwater Ecosystem Priority Areas (NFEPA), 2011 database, the National Biodiversity Assessment (NBA), 2018 database and the Western Cape Biodiversity Sector Plan (WCBSP), 2023) was undertaken to aid in the identification of freshwater ecosystems associated with the subject property;
- Potential freshwater ecosystems and/or wet signatures associated with the subject property were verified according to the "Department of Water Affairs and Forestry (DWAF)[1], 2008[2]: A practical field procedure for identification of wetlands and riparian areas". Aspects such as topography, soil morphological characteristics, floral community characteristics, and indicators of periodic inundation (e.g., sediment deposition, dried remains of algae) were used to verify the freshwater ecosystems/wet signatures; and
- The Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland systems (Ollis *et al*., 2013) was consulted as part of the determination of whether the wet signatures identified within the subject property potentially constitute a watercourse as defined by the NWA.

1.3 Assumptions and Limitations

The following assumptions and limitations are applicable to this report:

- The freshwater ecosystem verification is confined to the subject property as illustrated in Figures 1 and 2 and does not include the neighbouring and surrounding properties outside thereof, although the general areas surrounding the subject property were considered in the desktop assessment, and were briefly verified during the site assessment;
- Global Positioning System (GPS) technology is inherently somewhat inaccurate and some inaccuracies due to the use of handheld GPS instrumentation may occur. Notwithstanding this, and the points above, the delineations are considered adequate for the purposes of the EA process but should be refined in the event that micro-siting of specific infrastructure is necessary;

[1] The Department of Water Affairs and Forestry (DWAF) was formerly known as the Department of Water Affairs (DWA) and subsequently as the Department of Water and Sanitation (DWS). For the purposes of referencing in this report, the name under which the Department was known during the time of publication of reference material, will be used.
[2] Even though an updated manual is available since 2008 (Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas), this is still considered a draft document currently under review.

- Watercourses and terrestrial zones create transitional areas where an ecotone is formed as vegetation species change from terrestrial to obligate/facultative species. Within this transition zone, some variation of opinion on the watercourse boundaries may occur. However, if the DWAF (2008) method is followed, all assessors should get largely similar results;
- With ecology being dynamic and complex, certain aspects (some of which may be important) may have been overlooked. However, it is expected that the watercourses have been accurately assessed and considered, based on the field observations and the consideration of existing studies and monitoring data in terms of riparian and wetland ecology.

2 ASSESSMENT APPROACH

2.1 Freshwater Ecosystem Verification

For the purposes of this investigation, the definition of wetland and riparian systems was taken as per that in the NWA. The definitions are as follows:

A **watercourse** means:

(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.

Wetland habitat is “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.”

Riparian habitat includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent areas.

For the purposes of this investigation, the term 'freshwater ecosystem' is considered synonymous with 'watercourse' as defined in the NWA.

Due to the degree of historical disturbances to the subject property (including *inter alia* forestry, earthworks and urban development within neighbouring properties), use was made of historical aerial photographs (1957-1989; refer to Section 4.1), historical and current digital satellite imagery, topographic maps and available provincial and national wetland databases to aid in the identification of potential freshwater ecosystems. The following was taken into consideration when utilizing the above:

- linear features: since water flows/moves through the landscape, freshwater ecosystems often have a distinct linear element to their signature which makes them discernible on aerial photography or satellite imagery;
- vegetation associated with freshwater ecosystems: a distinct increase in density as well as shrub size near flow paths;
- hue: with water flow paths often showing as white/grey or black and outcrops or bare soils displaying varying chroma created by varying vegetation cover, geology, and soil conditions, changes in the hue of vegetation with freshwater ecosystem vegetation is often indicated on black and white images as areas of darker hue (dark grey and black). In colour imagery these areas mostly show up as darker green and olive colours or brighter green colours in relation to adjacent areas where there is less soil moisture or surface water present; and
- texture: with areas displaying various textures, created by varying vegetation cover and soil conditions.

During the field assessment undertaken on 9 November 2026, the presence of any freshwater ecosystem characteristics as defined by DWAF (2008) and by the NWA, were noted (please refer to Section 4 of this report).

3 RESULTS OF THE DESKTOP ASSESSMENT

3.1 Consideration of the DFFE Screening Tool

The protocol for the assessment of freshwater and aquatic biodiversity prepared in support of the Department of Forestry, Fisheries and Environment (DFFE) (previously the Department of Environmental Affairs (DEA)) National Web-based Environmental Screening Tool (2020), provides the criteria for the assessment and reporting of impacts on aquatic/freshwater

biodiversity for activities requiring Environmental Authorisation (EA). For the aquatic/freshwater biodiversity theme, the requirements are for sites which support various levels of biodiversity. The relevant aquatic/freshwater biodiversity theme in the National Web-based Environmental Screening Tool (2020) has been provided by the South African National Biodiversity Institute (SANBI). Based on the sensitivity rating, a suitably qualified specialist must prepare the relevant report or opinion memorandum which is to be submitted as part of the EA application.

As part of the process of the background information gathering, the screening tool was applied to the study and investigation areas. According to the guidelines, an applicant intending to undertake an activity on a site identified as being of “very high sensitivity” for an aquatic biodiversity theme must submit an Aquatic Biodiversity Impact Assessment, or if the area is identified as being of “low sensitivity” then an Aquatic Biodiversity Compliance Statement must be compiled and submitted to the competent authority. It is noted, however, that during a site survey undertaken by a suitably qualified freshwater ecologist should the sensitivity be determined different from that assigned by the screening tool (i.e. that a high risk to the regional aquatic biodiversity or freshwater ecosystems in the area is likely even though it is assigned as a “low” sensitivity, or if it is assigned a high sensitivity, however, the proposed development risks are deemed low) then the relevant assessment approach must be followed based on the site survey results and not the screening tool allocation.

According to the Screening Tool, the subject property (and neighbouring properties) are located within an area indicated to be of **very high** aquatic biodiversity sensitivity (Figure 3). The sole trigger for this rating it’s the site’s location within the Outeniqua Strategic Surface Water Area (SWSA; refer to Table 1 for additional detail). No wetlands, rivers, or aquatic Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) are indicated by the various datasets. Refer to Section 4.4 for further detail regarding the field verification of the indicated status.

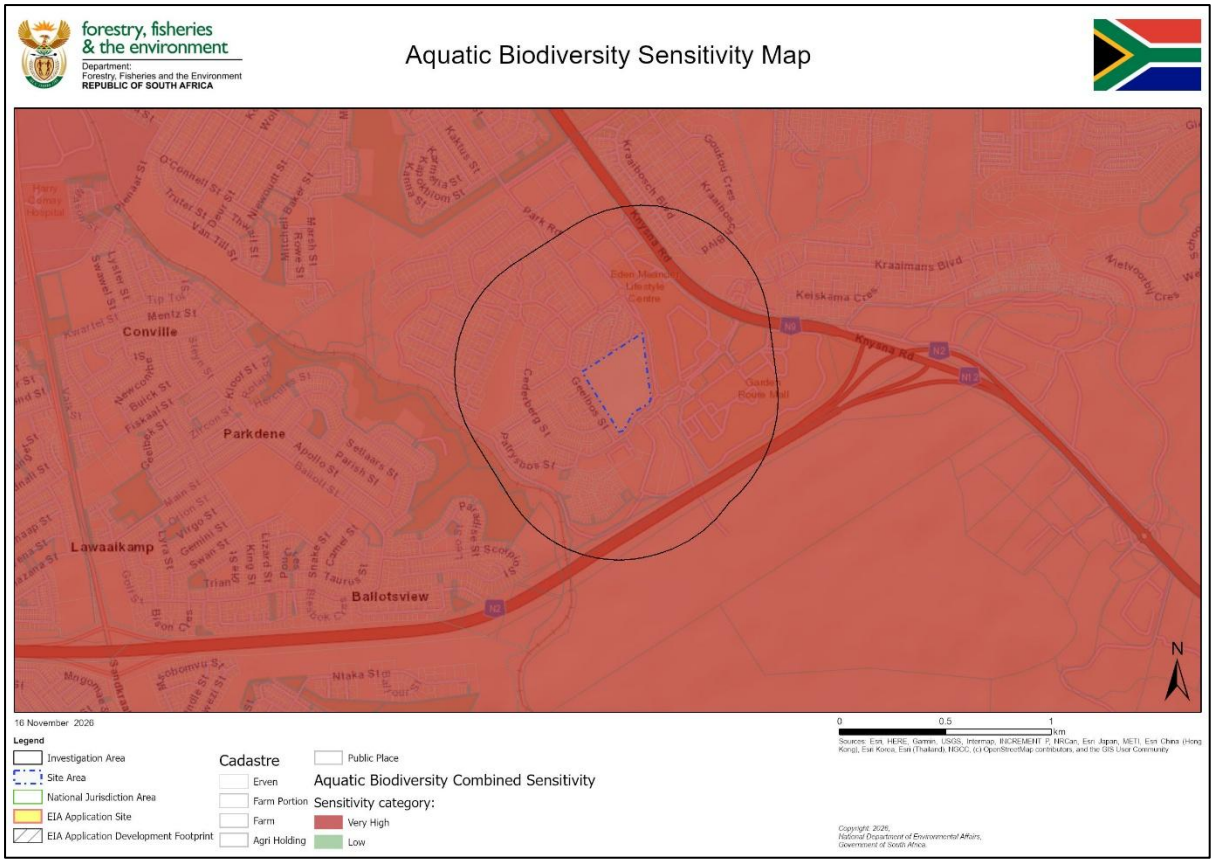

Figure 3: Aquatic Biodiversity Theme Sensitivity associated with the subject property according to the National Web-based Screening Tool (2020; Accessed 2026).

3.2 Ecological Importance and Sensitivity of the Subject Property Based on National and Provincial Datasets

The following section contains data accessed as part of the desktop assessment which is presented as a "dashboard-style" report below (Table 1). The dashboard report aims to present concise summaries of the data on as few pages as possible, to allow the reader to understand how this information has been integrated into the findings of this report.

It is important to note that although all data sources used to provide useful and verifiable, high-quality data, the various databases used do not always provide an entirely accurate indication of the actual field characteristics associated with the proposed study area at the scale required to inform the EA and/or water use authorisation processes. Given these limitations, this information is considered useful as background information to the study, is important in legislative contextualisation of the risks and impacts and was thus used as a guideline to inform the assessment and to focus on areas and aspects of increased conservation importance during the field verification. It must, however, be noted that field verification of key areas may potentially contradict the information contained in the relevant databases, in which case the field-verified information must carry more weight in the decision-making process.

Table 1: Desktop data relating to the characteristics of the subject property.

Aquatic ecoregion and sub-regions in which the subject property is located	
Ecoregion	South Eastern Coastal Belt
Catchment	Keurbooms
Quaternary Catchment	K30C
WMA	Gourits
subWMA	Coastal Gourits
Dominant characteristics of the Ecoregion Level II (Kleynhans *et al.* 2007)	
Code	20.02
Dominant primary terrain morphology	High Mountains, Undulating Hills, Moderately Undulating Plains, Low Mountains.
Dominant primary vegetation types	Mountain Fynbos, Afromontane Forest, Dune Thicket, Grassy Fynbos, South and South-West Coast Renosterveld.
Altitude (m a.m.s.l)	0 – 1300
MAP (mm)	500 – 800
Coefficient of Variation (% of MAP)	<20 – 30
Rainfall concentration index	<15
Rainfall seasonality	All year
Mean annual temp. (°C)	14 – 18
Winter temperature (July)	2 – 20
Summer temperature (Feb)	10 – 28
Median annual simulated runoff (mm)	80 – >250
Strategic Water Source Areas for Surface Water (SWSA) (2021)	
Surface water SWSAs are defined as areas of land that supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size. The SWSA for groundwater reflect areas that have high groundwater recharge and where the groundwater forms a nationally important resource. The database developed jointly by the Mpumalanga Tourism and Parks Agency (MTPA) and the Council for Scientific and Industrial Research (CSIR) (Lötter, M.C. and Le Maitre, D., 2021) was consulted for surface water, while the Water Research Commission (WRC) developed database (Le Maitre, D.C. *et al*., 2017) was consulted for the groundwater SWSAs.	

Detail in terms of the National Freshwater Ecosystem Priority Area (NFEPA) (2011) database	
FEPACODE	The subject property and associated investigation area are not located in a sub-quaternary catchment of freshwater importance.
Wetland Vegetation Type	The subject property and associated investigation area are located within the Eastern Fynbos-Renosterveld Granite Fynbos Wetland Vegetation (WetVeg) type, considered to be critically endangered (CR) according to Mbona *et al.* (2015).
NFEPA Wetlands (Figure 4)	According to the NFEPA database (2011), no wetlands are indicated within the subject property. An artificial wetland flat is indicated in the southern portion of the investigation area. The wetland is indicated to be in a Heavily to Critically Modified ecological condition (Class Z) by the database.
NFEPA Rivers	As per the NFEPA database (2011), no rivers are indicated within the subject property nor within the associated investigation area.
National Biodiversity Assessment (2018): South African Inventory of Inland Aquatic Ecosystems (SAIIAE) Rivers, Artificial Wetlands, and Draft National Wetland Map 6 (2024) (Figure 5)	
According to the NBA Rivers database, no rivers are indicated within the subject property and associated investigation area. According to the National Wetland Map 6 Database, no wetlands are indicated to occur in the subject property. The Artificial Wetlands database indicates a small dam in the southern portion of the investigation area. This dam correlates with the artificial wetland indicated by the NFEPA wetlands database.	
Importance according to the Western Cape Biodiversity Spatial Plan (WCBSP) (2024) (Figure 6)	
According to the WCBSP Dataset (2024), the majority of the subject property falls within Critical Biodiversity Areas (CBA) 2 of terrestrial importance. The investigation area falls within CBA 1 and 2s of terrestrial importance. **CBAs** are High ranking "natural or semi-natural" wetlands within each type (top quarter of total scores = CBA1 [rank 1]; second quarter = CBA2 [rank 2]). CBA2s are restorable irreplaceable sites, which are needed for biodiversity targets but not for management consolidation, connectivity or viability of priority Biodiversity Network sites.	
Detail of the area in terms of the Land Type Data (Job *et al.*, 2019)	
The potential presence of wetlands in the vicinity of the subject property and investigation area can be examined in the context of the land type for the area. The subject property and associated investigation	

<table>
<tr><td colspan="2">According to the SWSA databases, the subject property and investigation area are located within the Outeniqua SWSA for surface water. They do not fall within a groundwater SWSA.</td><td>area fall within the Db33 land type grouping. Db Land Types accommodate duplex soils and gleycutanic soils, including Estcourt, Sterkspruit, Swartland, Valsrivier and Kroonstad soil forms. After subtracting exposed rock land, these Land Types consist of land with more than 50% duplex soils. Db refers to land where brown duplex soils are dominant.</td></tr>
<tr><td colspan="3">National web based environmental screening tool (2020) (Accessed 2026) (Section 3.1, Figure 3)</td></tr>
<tr><td colspan="3">The screening tool is intended for pre-screening of sensitivities in the landscape for assessment within the EIA process and assists with implementing the migration hierarchy, allowing developers to adjust their proposed development footprint to avoid sensitive areas.</td></tr>
<tr><td colspan="3">The subject property and the associated investigation area are considered to be of very high aquatic biodiversity sensitivity by the screening tool, due to being within the Outeniqua SWSA.</td></tr>
<tr><td colspan="3">Ecological Status of the most proximal sub-quaternary reach (DWS, 2014)</td></tr>
<tr><td>Sub-quaternary reach</td><td>K30C – 09093 (Swart River)</td><td rowspan="8">Considering the subject property is more than 3 km southeast and in a different local catchment, it is highly unlikely that similar fish and aquatic macro invertebrate species will be found within the subject property, considering the lack of hydrological connectivity. As a result, the ecological status and related background information pertaining to the Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) for the K30C – 09093 (Swart River) are not provided in this report.</td></tr>
<tr><td>Point Proximity to the subject property</td><td>±3.6 km northeast of the subject property</td></tr>
<tr><td>Assessed by an expert?</td><td>Yes</td></tr>
<tr><td>PES Category Median</td><td>Largely Modified (Class D)</td></tr>
<tr><td>Mean EI Class</td><td>Moderate</td></tr>
<tr><td>Mean ES Class</td><td>High</td></tr>
<tr><td>Stream Order</td><td>2</td></tr>
<tr><td>Default Ecological Class</td><td>High (B)</td></tr>
</table>

CBA = Critical Biodiversity Area; DWS = Department of Water and Sanitation; EI = Ecological Importance; ES = Ecological Sensitivity; ESA = Ecological Support Area; m.a.m.s.l = Metres Above Mean Sea Level; MAP = Mean Annual Precipitation; NBA = National Biodiversity Assessment; NFEPA = National Freshwater Ecosystem Priority Areas; PES = Present Ecological State; SAIIAE = South African Inventory of Inland Aquatic Ecosystems; CVB = Channelled Valley Bottom; UCVB = Unchannelled Valley Bottom; WMA = Water Management Area; WETCON = Wetland Condition; RIVERCON = River Condition.

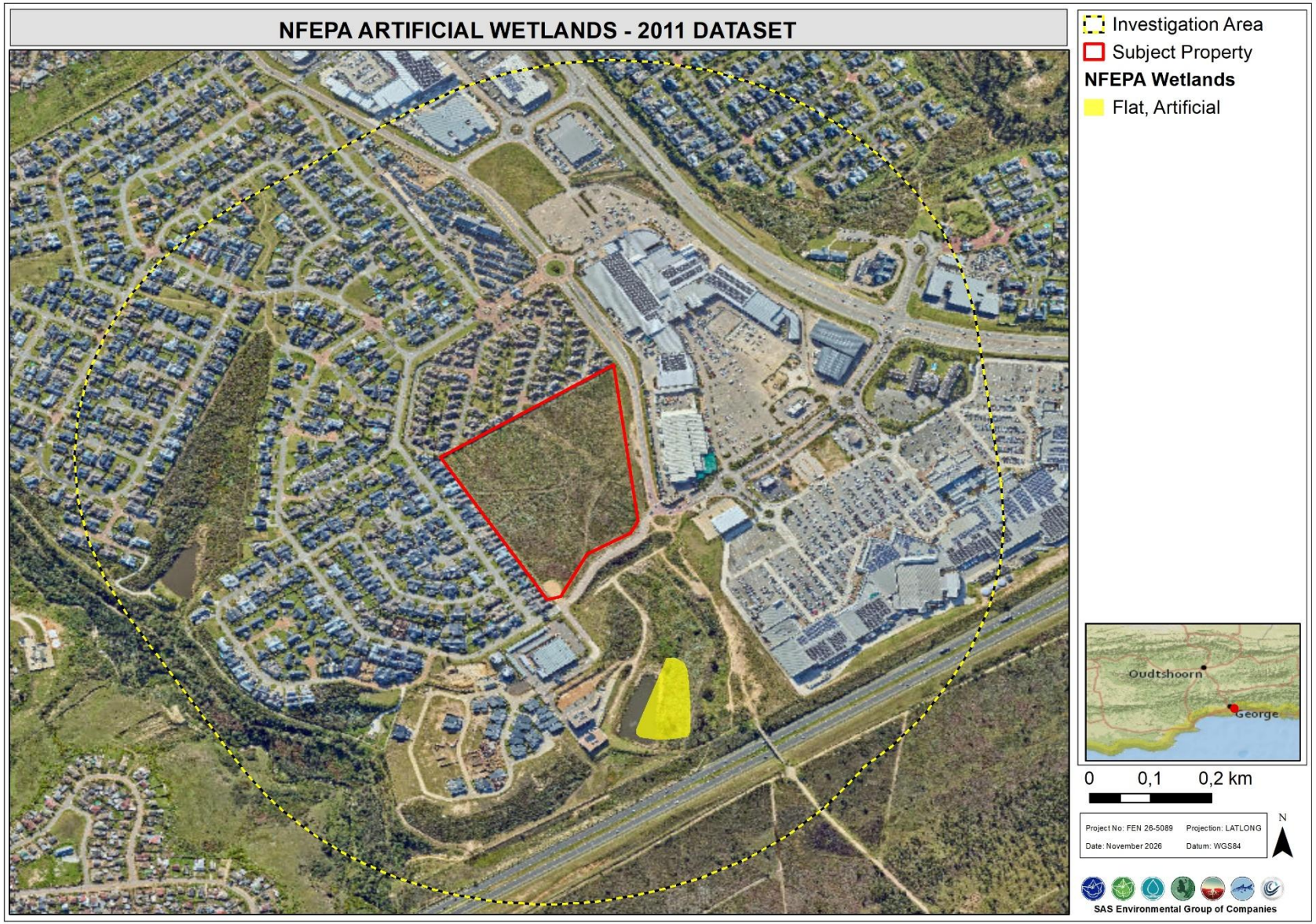

Figure 4: Wetlands associated with the subject property according to the NFEPA (2011) database.

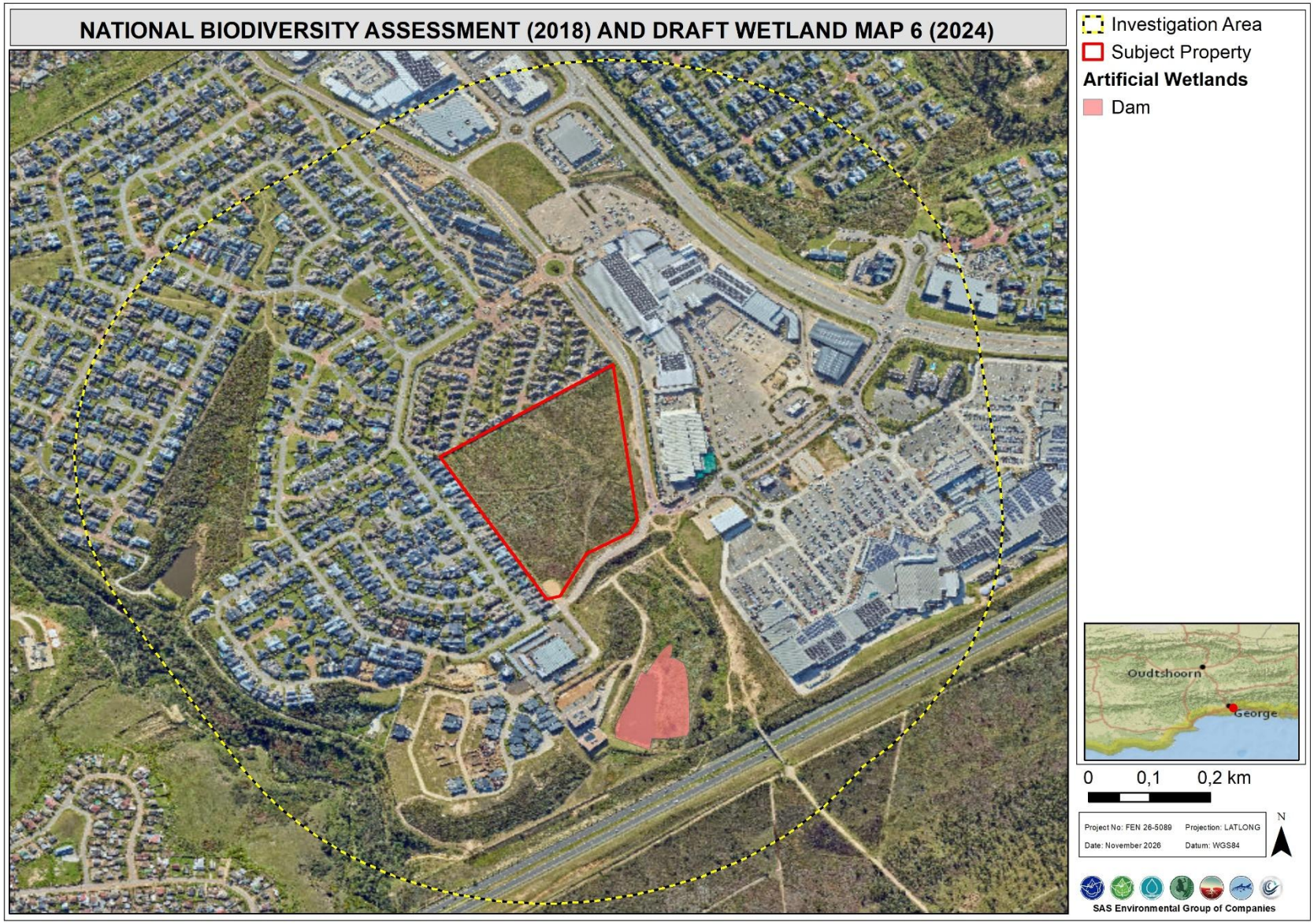

Figure 5: Wetlands associated with the subject property according to the NBA (2018) database.

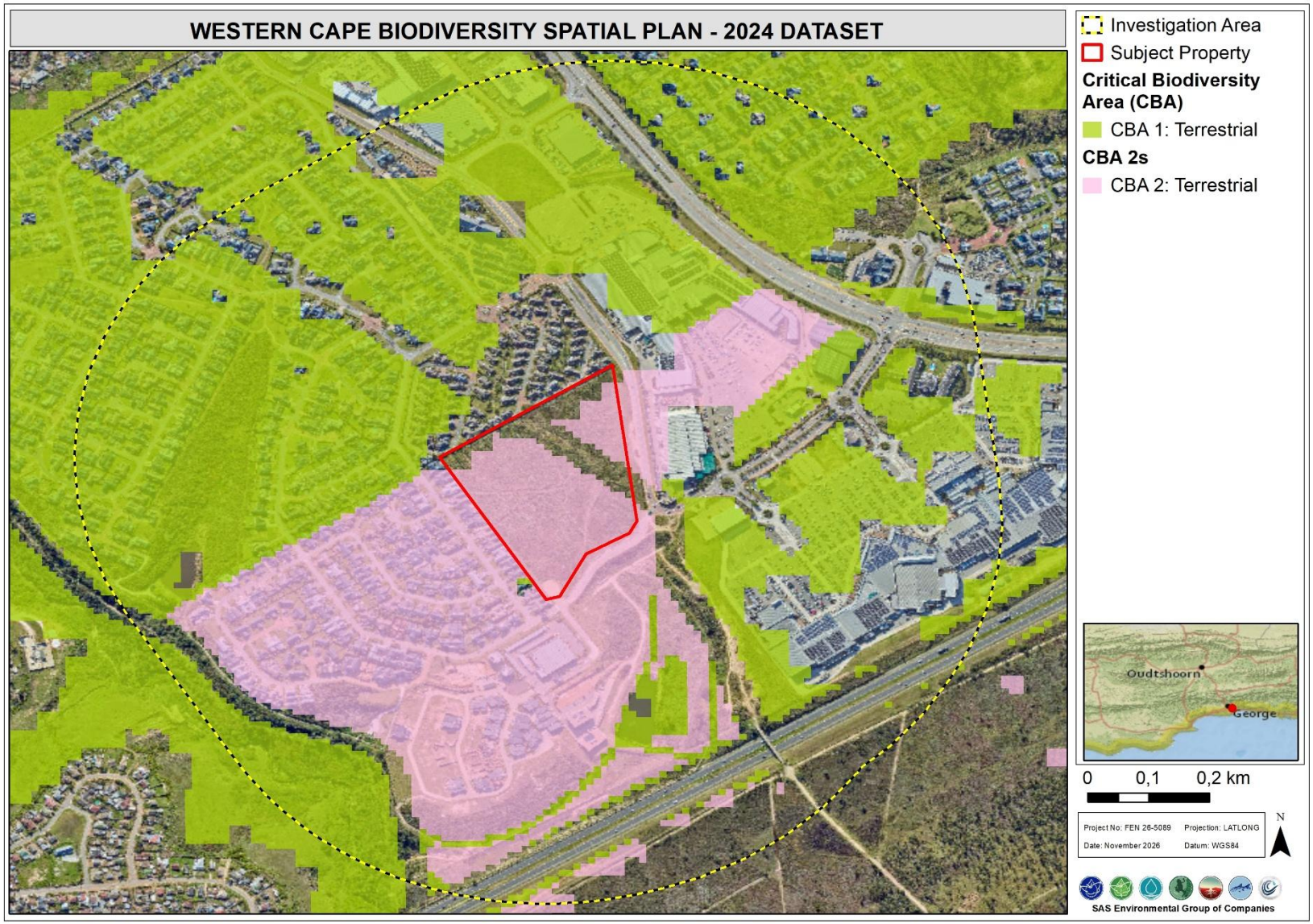

Figure 6: Terrestrial CBAs applicable to the subject property, according to the Western Cape Biodiversity Spatial Plan (2024).

4 RESULTS: FRESHWATER ECOSYSTEM VERIFICATION

4.1 Consideration of Historical Aerial Imagery

Prior to the site assessment, historical aerial photographs dated between 1957 and 2016 were obtained from the Department of Land Reform and Rural Development (DLRRD) geospatial portal (https://ngigeoportal.dlrrd.gov.za/cdngiportal/). The historical imagery aids in determining the presence (or absence) of wet signatures, as well as ascertaining historical land uses which may have influenced the natural hydrological and geomorphological regimes of the subject property. These photographs illustrate that historically the subject property was utilised for forestry until at least 1989 (no imagery between 1989 and 2006 was available to confirm when final clearing occurred, although TerraSoil Science, 2023, provides imagery up to 1991 which indicates the property was still under plantation). The commercial plantation (likely to have been *Pinus spp.*) would have altered the hydrological and geomorphological characteristics of the site through changes to soil structural properties (as a result of vehicular activity, planting and harvesting of trees) as well as evapotranspiration. Subsequent to the clearing of the plantation, the site has been subjected to regular, extensive disturbances mostly relating to rapid urbanisation, which can be seen in digital satellite imagery and aerial photographs from 2006 onwards.

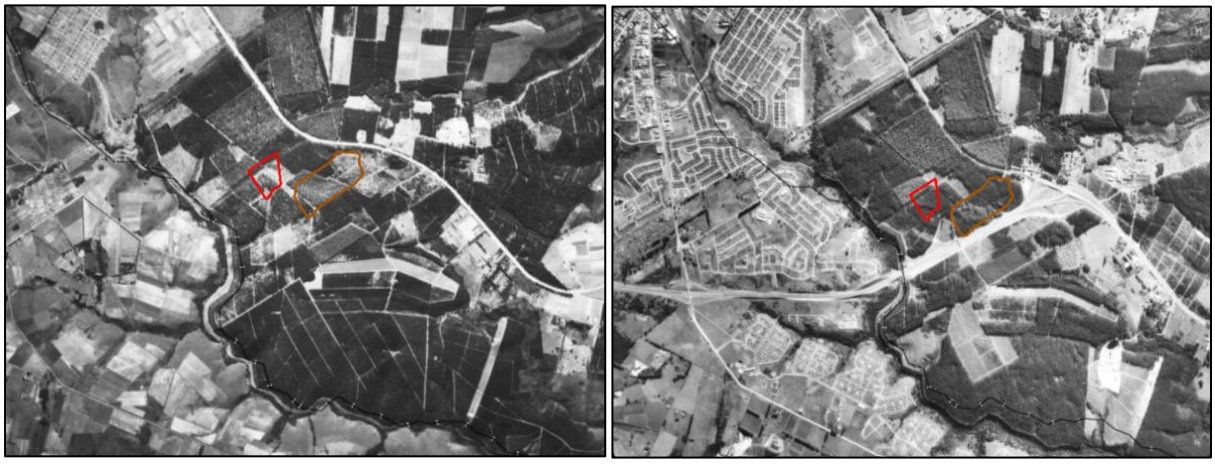

Figure 7: Historical aerial photographs from 1957 (left) and 1989 (right) depicting the approximate location of the subject property (red polygon) and the present-day location of the Garden Route Mall (brown polygon) and illustrating the dominant land uses at the time.

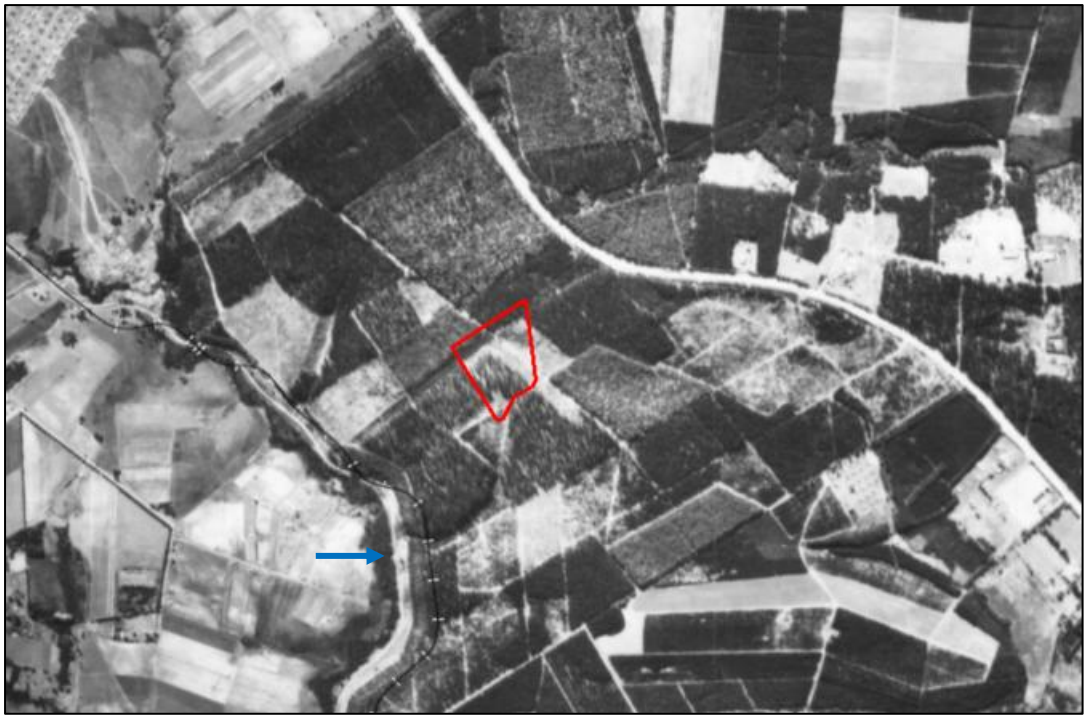

Figure 8: Cropped image of the photograph dated 1957, illustrating the forestry land use of the subject property (red polygon). The Meul River is indicated by the blue arrow.



Figure 9: Aerial photograph dated 2006, depicting the approximate location of the study area in relation to the surrounds. The plantations have been cleared to make way for urban and commercial developments.



Figure 10: Digital satellite imagery dated February 2014, illustrating changing land uses around the subject property (red polygon) as well as disturbances therein, most notably, gravel roads traversing the property (source: Esri World Imagery Wayback accessed via https://gis.george.gov.za/portal/home/index.html).

4.2 Consideration of Previous Specialist Studies

Various specialist studies have been commissioned in support of prior Environmental Authorisation (EA) applications for the development of Erf 28005 over the course of the last ten to 15 years. Relevant to this investigation, the following specialist studies were consulted to obtain an understanding of the characteristics of the subject property:

- Outeniqua Geotechnical Services cc. (2009). Geotechnical report for the proposed filling stations on Portions 8 and 11 of the consolidation of Erf 23333 George and portion of the remainder of Portion 22 of the Farm Kraaibosch 195;
- Parsons and Associates Specialist Groundwater Consultants cc. (2009). Specialist groundwater study: Assessment of potential impacts from proposed filling stations on Portion 22 of Farm Kraaibosch 195 and Erf 23333 George;
- Terra Geotechnical. (2023). Engineering geological report in support of the proposed new Makro and associated infrastructure George – Western Cape;
- TerraSoil Science. (2023). Hydropedology (Level 2) and wetland soil context report: Erf 28005 George, Western Cape Province;
- Virdus Works (Pty) Ltd. (2023). [Technical Memorandum]. Description of the current situation regarding the proposed development of Erf 28005, George; and

- Greenfire Enviro. (2023). Site sensitivity verification report: Erf 28005, George (as appended to Virdus Works (Pty) Ltd, 2023).

The geotechnical and groundwater specialist studies (Outeniqua Geotechnical Services cc, 2009; Parsons and Associates, 2009; Terra Geotechnical, 2023) indicate that although ponding of surface water occurs within the site, this is in part due to a perched water table at approximately 1 m to 1.5 m (Outeniqua Geotechnical Services, 2009) within the pedogenic horizon and the upper alluvial soils (Terra Geotechnical, 2023). This is attributed to an underlying impermeable layer restricting infiltration of surface water to underlying aquifers, resulting in seasonal lateral groundwater movement. Terra Geotechnical (2023) identified groundwater seepage within three test pits at depths between 1.0 m to 2.0 m but does not confirm the daylighting of groundwater at surface. Furthermore, although mottling was identified, this was at depths greater than 800 mm (i.e., deeper than the defining depth of 500 mm stipulated by the DWAF, 2008).

Terra Geotechnical (2023) and TerraSoil Science (2023) both note that stormwater discharge from the Blue Mountain Village to the north is inadequately managed in terms of flow reduction and attenuation. TerraSoil Science (2023) concluded that due to the duplex nature of the soils within the site, stormwater ingress is exhibited rapidly as ponding and associated anthropogenically-induced vegetation indicators.

According to Virdus Works (2023), during the EA application process conducted Calidris Development Management Services, (presumably in the mid-2000s, based on the date of issue of the applicable EAs) no natural or artificial wetlands were identified within the subject property. This aligns with the outcome of the desktop assessment (Section 3) in which no watercourses (either rivers or wetlands) are indicated by any of the relevant databases. While GreenFire Enviro (2023) noted the presence of hydrophytic vegetation (*Typha capensis, Juncus sp*)., the distribution of such vegetation was isolated to two small artificial ‘wetlands’ which GreenFire Enviro (2023) observed had formed due to stormwater discharged from Blue Mountain Village and alteration to the natural drainage of the site caused by the slightly raised construction of a road along the southern boundary (i.e., Platinum Drive).

In summary, the previous specialist studies made available to the specialist as background to this investigation all indicate that the wet response observed within the subject property is largely due to the discharge of stormwater from the surrounds, particularly Blue Mountain Village in the north, as well as disturbances to the natural topography and soil profiles of the site.

4.3 Results of the Field Verification

4.3.1 Sampling Effort

A single field assessment was undertaken on 9 November 2026 (mid-summer season). A walk-through of the property was undertaken by the specialist (Figure 11), during which all possible measures were undertaken to ensure that the study area was thoroughly assessed for any wet response indicators which could be indicative of the presence of freshwater ecosystems as defined by the NWA. Visual assessment methods in conjunction with soil sampling to verify soil characteristics that may indicate the presence, or lack thereof of any potential wet response features within the subject property, were used. A drive-through of the immediate surrounds was also undertaken to gain an understanding of the character of the surrounds.

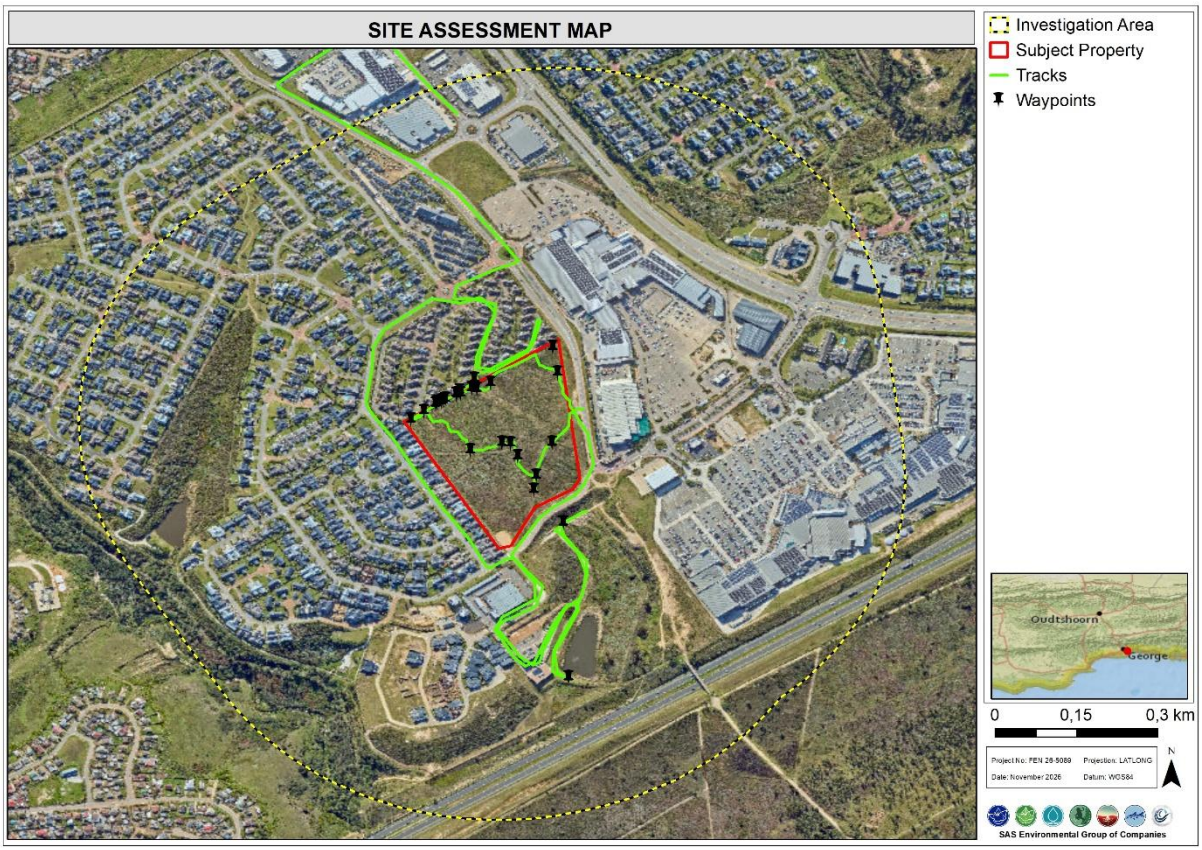

Figure 11: Map depicting the specialist's GPS data (tracks and verification waypoints) overlaid on digital satellite imagery.

4.3.2 General Site Observations

Rainfall in George is not strongly seasonally based, with precipitation being more-or-less evenly distributed throughout the year. Rainfall had been received in the days preceding the

site assessment; accordingly, surface water was present and soil was generally moist throughout the subject property. Commensurate with observations recorded during the desktop and literature review, disturbances to the topography, soil profile and vegetation were apparent throughout the site.

The subject property slopes gently towards the south and is bordered by urban development to the north, east and west. Most pertinently, stormwater generated within the Blue Mountain Village along the northern boundary of the subject property is discharged directly to the subject property, with multiple stormwater outlets noted within the boundary wall of the residential complex, particularly in the north-west (Figure 13). The released stormwater is directed via informal channels developed by the current property owner circa 2020 towards the southern boundary of the property (Figure 14), through a culvert under Platinum Drive which forms the southern boundary of the site (Figure 15) and into an earth impoundment located on the northern side of the N2 highway (Figure 12). Note that this impoundment is not visible in the historical aerial photographs (Section 4.1) and is indicated as an artificial feature by both the NFEPA (2011) and NB (2018) datasets.



Figure 12: Conceptual depiction of the approximate direction of flow (dashed blue arrows) of the stormwater discharge from Blue Mountain Village through the subject property, into the earth impoundment orange polygon).



Figure 13: Multiple stormwater outlets are located within the Blue Mountain Village, releasing stormwater into the subject property.



Figure 14: The channels excavated by the property owner to direct stormwater through the subject property into a stormwater drain under Platinum Drive and ultimately into the earth impoundment upgradient of the N2 highway.



Figure 15: The stormwater channels in the north of the property are ultimately directed into a single channel (blue dashed arrow), which drains south into a stormwater outlet (red arrow) under Platinum Drive.

4.4 Topography, Soil and Floral Indicators

The subject property was investigated for key indicators of wet signatures, focusing on the following indicators:

- Terrain units were used to determine in which parts of the landscape freshwater ecosystems would most likely occur. Elevation profiles were utilised to identify these low-lying areas;
- Vegetation indicators (Figure 16), particularly distinct differences in floral community structure and species composition, proved valuable in discerning the ecotones between terrestrial ecosystems and wet response areas;
- Soil morphological characteristics (Figure 17) such as mottling, gleying and increased soil moisture;
- During the field verification, these indicators (terrain, vegetation and soil morphology) were ground-truthed at various points and utilised in conjunction with historical aerial photographs and digital satellite imagery to confirm whether the wet response observed conforms to the definition of a wetland as per the NWA.



Figure 16: Floral indicators such as *Typha capensis* (left) and *Kniphofia sp.* (right) indicated areas of increased moisture retention.



Figure 17: Soil samples containing indicators of hydromorphy can be helpful in confirming areas of a wet response.

Although ponding of surface water was observed in two small, isolated patches within the northern portions of the subject property, the ponding only occurred in areas where it is clear that earthworks have altered the natural surface topography, and within the stormwater channels created by the property owner. The locations of this ponding were slightly upgradient of two of the test pits excavated by Terra Geotechnical (2023), which infers that surface water cannot drain towards the stormwater channels nor to the south of the site, as it would have done prior to disturbances. Throughout the site, it was apparent that the various earthworks which have taken place over the last ten to 15 years, as well as a degree of disposal of building rubble, have caused considerable alterations to the surface hydrology and geomorphological processes of the subject property, particularly in terms of impeding natural flow patterns. Together with the discharge of stormwater from the surrounding developments particularly Blue Mountain Village, these modifiers are deemed to be the primary cause of the wet response observed within the subject property. Consequently, in the event that the primary driver of the wet response, i.e., stormwater discharge, be more effectively managed (as

recommended by TerraSoil Science, 2023), it is probable that the observed wet response would cease, and that the ecosystem and functioning of the subject property would revert to the historical dryland state with an associated vegetation response.

In consideration of the above, the wet response observed within the subject property is not deemed to meet the definition of a wetland, or watercourse, since it would not persist under normal circumstances, as contemplated in the NWA (refer to Section **Error! Reference s ource not found.**) and is therefore not subject to regulation in terms of the NWA, nor the NEMA insofar as both Acts govern development within and adjacent to watercourses.

4.5 Outcome of the Investigation as it Relates to the DFFE Screening Tool

Based on the outcome of the field investigation, in conjunction with the literature review and background assessment insofar as the latter provides additional context to the site observations, the designation of 'very high' aquatic biodiversity is **partially disputed.** The subject property forming part of a SWSA is not disputed, however, insofar as no freshwater ecosystems occur directly within the subject property, the sensitivity of the site is disputed.

Although a wet response was evident therein, the available evidence points to the observed response being anthropogenically generated and largely a function of the ingress of stormwater. Improved and adequate management of the stormwater generated within the adjacent developments (particularly Blue Mountain Village) would likely lead to the cessation of the primary driver of the observed wet response. Consequently, it is the specialist's considered opinion that the aquatic biodiversity directly associated with the subject property is **'low'** in terms of the presence of aquatic/freshwater ecosystems.

5 LEGISLATIVE REQUIREMENTS, NATIONAL AND PROVINCIAL GUIDELINES PERTAINING TO THE APPLICATION OF BUFFER ZONES

The following legislative requirements were considered during the assessment. A detailed description of these legislative requirements is presented in Appendix B of this report:

- The Constitution of the Republic of South Africa, 1996[3];
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended (NEMA) and associated EIA Regulations (2014; Listing Notice 1 – GN 327 of the EIA Regulations; Listing Notice 3 – GN 324 of the EIA Regulations; Listing Notice 2 – GN 325 of the EIA Regulations), as applicable;
- The National Water Act, 1998 (Act No. 36 of 1998) as amended)) (NWA); and
- Government Notice 4167 as published in the Government Gazette 49833 of 2023 as it relates to the NWA.

Certain articles of legislation related to the above Acts and legislation impose potential zones of regulation on freshwater ecosystems in both a national and provincial context. The Zones of Regulation (ZoR) are not necessarily development exclusion zones, rather areas in which EIA and Water Use Authorisation legislative tools have been introduced for the protection and sustainable use of freshwater resources by requiring that certain types of activities within a freshwater ecosystem, or within a certain distance of a freshwater ecosystem require authorisation. The definition and motivation for a regulated zone of activity for the protection of freshwater ecosystems can be summarised as follows:

Table 2: Articles of Legislation and the relevant zones of regulation applicable to each article.

Regulatory authorisation required	Zone of applicability
Water Use Authorisation Application in terms of the National Water Act, 1998 (Act No. 36 of 1998) as amended)). **Department of Water and Sanitation (DWS)**	**Government Notice 4167 as published in the Government Gazette 49833 of 2023 as it relates to the National Water Act, 1998 (Act No. 36 of 1998) as amended))** In accordance with GN4167 of 2023 as it relates to the NWA, a regulated area of a watercourse in terms of water uses as listed in Section 21c and 21i is defined as: • 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; • in the absence of a determined 1 in 100-year flood line or Riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or • a 500 m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation.
Listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA Regulations (2014), as amended. **Department of Environmental Affairs**	**Activities of Listing Notice 1 (GN 983) and Listing Notice 3 (GN985) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA regulations, 2014 (as amended):** **Activity 12** of Listing Notice 1 (GN 983) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA regulations (2014), as amended states that: *The development of:* *(xii) Infrastructure or structures with a physical footprint of 100 square meters or more;* *Where such development occurs—* *a) Within a watercourse;* *b) In front of a development setback; or*

[3] Since 1996, the Constitution has been amended by seventeen amendments acts. The Constitution is formally entitled the 'Constitution of the Republic of South Africa, 19996". It was previously also numbered as if it were an Act of Parliament – Act No. 108 of 1996 – but since the passage of the Citation of Constitutional Laws Act, neither it nor the acts amending it are allocated act numbers.

Regulatory authorisation required	Zone of applicability
and Development Planning (DEA&DP).[4]	c) *If no development setback has been adopted, within **32 meters of a watercourse**, measured from the edge of a watercourse.* Excluding – (dd) where such development occurs within an urban area…

Based on the outcome of the investigation, the above Zones of Regulation (ZoR) are not considered applicable to potential development within the subject property; however, this must be confirmed by the EAP in conjunction with the applicable Competent Authorities and in consideration of the various investigations undertaken on the subject property by various specialist studies which concur on the matter.

6 CONCLUSION

FEN was appointed to undertake a freshwater site sensitivity verification (SSV) of Erf 28005 George, Western Cape in response to comment received from the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) in October 2026, in which uncertainty regarding the wet response within the subject property was raised.

Prior to the site verification, an extensive background assessment and review of prior previous studies was undertaken. The outcome of the desk-based assessments indicated that no aquatic or freshwater ecosystems have been identified by relevant databases within the subject property, and that the only 'wetland' feature identified by the databases within a 500 m radius of the site is deemed artificial in origin. This feature is impoundment that functions, at least partially, to attenuate stormwater runoff from the surrounding developments (including the Garden Route Mall and the N2 highway) situated approximately 211 m south of the subject property and is not visible on historical aerial photographs prior to 2006. More pertinently, no wet response is visible within the subject property on any of the historical aerial photographs (dated between 1957 and 2006) nor on digital satellite imagery. The absence of a wet response is supported by previous specialist studies which assert that the primary driver of the observed wet response is poorly managed stormwater ingress (especially from Blue Mountain Village which borders the subject property to the north), in tandem with a perched water table at approximately 1 m to 1.5 m below surface as well as various disturbances which have altered the natural drainage patterns of the site. During the site investigation, it was

[4] Note – only listing notice activities that are associated with a zone of regulation are detailed in this table. This does not exclude the applicability of other potentially applicable activities that relate to the freshwater environment (e.g., Listing Notice 1 Activity 19) or any other applicable listing notice activity to the proposed development. The EAP is responsible for confirming the applicability of the activities listed in this table, as well as ensuring that all necessary authorisations are obtained.

observed that the subject property has undergone various disturbances in the past. Most notably, various earthworks (likely relating to the excavation of test pits as part of previous geotechnical studies and the channels created to drain stormwater from the site) have resulted in artificial ponding of surface water.

In consideration of the available information, it is the specialist's considered opinion that largely due to historical land use changes and alteration of the natural drainage patterns and hydrological regime in conjunction with the discharge of stormwater to the site, the observed wet response would cease to persist under "normal" circumstances. In the event that a pre-development landscape were to be reinstated, and stormwater from the adjacent built environment directed away from the subject property, the ecosystem therein would likely revert to a terrestrial state. Accordingly, the wet response is not considered to meet the definition of a wetland nor watercourse as defined by the NWA and is therefore not subject to the regulations of the NWA nor the NEMA insofar as these Acts apply to watercourses.

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Virdus Works (Pty) Ltd. 2023. [Technical Memorandum]. Description of the current situation regarding the proposed development of Erf 28005, George.

APPENDIX A – Indemnity and Terms of Use

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and FEN Consulting (Pty) Ltd and its staff reserve the right to, at their sole discretion, modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

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This report must not be altered or added to or used for any other purpose other than that for which it was produced without the prior written consent of the author(s). This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

APPENDIX B – Legislative Requirements

The Constitution of the Republic of South Africa, 1996	The environment and the health and well-being of people are safeguarded under the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) by way of section 24. Section 24(a) guarantees a right to an environment that is not harmful to human health or well-being and to environmental protection for the benefit of present and future generations. Section 24(b) directs the state to take reasonable legislative and other measures to prevent pollution, promote conservation, and secure the ecologically sustainable development and use of natural resources (including water and mineral resources) while promoting justifiable economic and social development. Section 27 guarantees every person the right of access to sufficient water, and the state is obliged to take reasonable legislative and other measures within its available resources to achieve the progressive realisation of this right. Section 27 is defined as a socio-economic right and not an environmental right. However, read with section 24 it requires of the state to ensure that water is conserved and protected and that sufficient access to the resource is provided. Water regulation in South Africa places a great emphasis on protecting the resource and on providing access to water for everyone.
National Environmental Management Act (NEMA) (Act No. 107 of 1998)	The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in 2017, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact. Provincial regulations must also be considered.
The National Water Act (NWA) (Act No. 36 of 1998)	The National Water Act (NWA) (Act 36 of 1998) recognises that the entire ecosystem and not just the water itself in any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the Department of Water and Sanitation (DWS). Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) & (i).
Government Notice 4167 as published in the Government Gazette 49833 of 2023 as it relates to the NWA	GN 4167 outlines the parameters and process of a General Authorisation (GA), which replaces the need to apply for a licence in terms of Section 40 of the NWA, provided that the water use is within the limits and conditions of the GA. The notice **replaces GN 509 of 2016.** The GA sets out the need to determine the regulated area of a watercourse, as well as the degree of risk posed by an activity/ies related to a particular water use. In accordance with GN 4167 of December 2023, the regulated area of a watercourse for section 21c and 21i of the NWA, 1998 is defined as: ➢ the outer edge of the 1 in 100-year flood line 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; ➢ in the absence of a determined 1 in 100-year flood line or riparian area the area within 100 m distance from the edge of a watercourse where the edge of the watercourse (excluding flood plains) is the first identifiable annual bank fill flood bench; or ➢ In respect of a wetland, a 500 m radius around the delineated boundary (extent) of any wetland, including pans. The GA only applies to the use of water in terms of Section 21(c) and (i) of the NWA where the risk class is **LOW** as determined through the application of the Risk Matrix as prescribed in the Notice. The GA also does not apply where other Section 21 water uses are triggered, does not apply for most sewage infrastructure and pipelines carrying hazardous materials, water uses associated with hazardous materials, water uses associated with water and wastewater treatment works, and for most mining-related water uses. The GA may be exercised as follows: i) Section 21(c) or (i) water use activities that are determined to pose a LOW Risk as determined through the application of the Risk Matrix as prescribed in the Notice can be undertaken subject to the general conditions of the GA;

	ii) Section 21(c) or (i) water use activities set out in Appendix D1 of the Notice can be undertaken *without* being subject to the requirement of a risk assessment and subject to the general conditions of the GA. Such water use activities in Appendix D1 include *inter alia* emergency river crossings, fence erection, solar renewable infrastructure that has no direct impact on watercourses and mini-scale hydropower developments; iii) Prescribed water use activities undertaken by certain State Owned Entities as detailed in Appendix D2 of the Notice can be undertaken *without* being subject to the requirement of a risk assessment and subject to the general conditions of the GA; iv) Maintenance work associated an existing lawful water use in terms of section 21(c) or (i) of the Act that has a LOW risk class as determined through the Risk Matrix can be undertaken ; v) River and stormwater management activities including maintenance of infrastructure as contained in a river management plan or similar management plan, may be conducted subject to the approval of such a plan by the relevant DWS regional office or catchment management agency; vi) Rehabilitation of wetlands or rivers where such rehabilitation activities has a LOW risk class as determined through the Risk Matrix can be conducted; and vii) Emergency work arising from an emergency situation and or incident associated with the persons' existing lawful water use entitlement can be undertaken, provided that all work is executed and reported in the manner prescribed in the Emergency protocol contained in Appendix C of the GA. A General Authorisation (GA) issued as per this notice will require the proponent to adhere with specific conditions, rehabilitation criteria and monitoring and reporting programme. Furthermore, the water user must ensure that there is a sufficient budget to complete, rehabilitate and maintain the water use as set out in this GA. Upon completion of the registration, the responsible authority will provide a certificate of registration to the water user within 30 working days of the submission. On written receipt of a registration certificate from the Department, the person will be regarded as a registered water user and can commence within the water use as contemplated in the GA.

APPENDIX C – Freshwater System Method of Assessment

1. Desktop Study

Prior to the commencement of the field assessment, a background study, including a literature review, was conducted in order to determine the ecoregion and ecostatus of the larger aquatic system within which the freshwater resources and drainage line features present in close proximity of the proposed development are located. Aspects considered as part of the literature review are discussed in the sections that follow.

1.1 National Freshwater Ecosystem Priority Areas (NFEPA; 2011)

The NFEPA project is a multi-partner project between the Council of Scientific and Industrial Research (CSIR), Water Research Commission (WRC), South African National Biodiversity Institute (SANBI), DWA, South African Institute of Aquatic Biodiversity (SAIAB) and South African National Parks (SANParks). The project responds to the reported degradation of freshwater ecosystem condition and associated biodiversity, both globally and in South Africa. It uses systematic conservation planning to provide strategic spatial priorities of conserving South Africa's freshwater biodiversity, within the context of equitable social and economic development.

The NFEPA project aims to identify a national network of freshwater conservation areas and to explore institutional mechanisms for their implementation. Freshwater ecosystems provide a valuable, natural resource with economic, aesthetic, spiritual, cultural and recreational value. However, the integrity of freshwater ecosystems in South Africa is declining at an alarming rate, largely as a consequence of a variety of challenges that are practical (managing vast areas of land to maintain connectivity between freshwater ecosystems), socio-economic (competition between stakeholders for utilisation) and institutional (building appropriate governance and co-management mechanisms).

The NFEPA database was searched for information in terms of conservation status of rivers, wetland habitat and wetland features present in the vicinity of the proposed development.

2. Classification System for Wetlands and other Aquatic Ecosystems in South Africa

The freshwater resources encountered in close proximity to the proposed development were assessed using the Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems (Ollis *et al*., 2013), hereafter referred to as the "Classification System". A summary of Levels 1 to 4 of the classification system are presented in Table C1 and C2, below.

Table C1: Proposed classification structure for Inland Systems, up to Level 3.

<table>
<tr><th colspan="3">WETLAND / AQUATIC ECOSYSTEM CONTEXT</th></tr>
<tr><th>LEVEL 1:
SYSTEM</th><th>LEVEL 2:
REGIONAL SETTING</th><th>LEVEL 3:
LANDSCAPE UNIT</th></tr>
<tr><td rowspan="4">Inland Systems</td><td rowspan="4">DWA Level 1 Ecoregions

OR

NFEPA WetVeg Groups

OR

Other special framework</td><td>Valley Floor</td></tr>
<tr><td>Slope</td></tr>
<tr><td>Plain</td></tr>
<tr><td>Bench
(Hilltop / Saddle / Shelf)</td></tr>
</table>

Table C2: Hydrogeomorphic (HGM) Unit for the Inland System, showing the primary HGM Types at Level 4A and the subcategories at Level 4B to 4C.

FUNCTIONAL UNIT		
LEVEL 4: HYDROGEOMORPHIC (HGM) UNIT		
HGM type	Longitudinal zonation/ Landform / Outflow drainage	Landform / Inflow drainage
A	**B**	**C**
River	Mountain headwater stream	Active channel
		Riparian zone
	Mountain stream	Active channel
		Riparian zone
	Transitional	Active channel
		Riparian zone
	Upper foothills	Active channel
		Riparian zone
	Lower foothills	Active channel
		Riparian zone
	Lowland river	Active channel
		Riparian zone
	Rejuvenated bedrock fall	Active channel
		Riparian zone
	Rejuvenated foothills	Active channel
		Riparian zone
	Upland floodplain	Active channel
		Riparian zone
Channelled valley-bottom wetland	(not applicable)	(not applicable)
Unchannelled valley-bottom wetland	(not applicable)	(not applicable)
Floodplain wetland	Floodplain depression	(not applicable)
	Floodplain flat	(not applicable)
Depression	Exorheic	With channelled inflow
		Without channelled inflow
	Endorheic	With channelled inflow
		Without channelled inflow
	Dammed	With channelled inflow
		Without channelled inflow
Seep	With channelled outflow	(not applicable)
	Without channelled outflow	(not applicable)
Wetland flat	(not applicable)	(not applicable)

Level 1: Inland systems

From the Classification System, Inland Systems are defined as aquatic ecosystems that have no existing connection to the ocean[5] (i.e. characterised by the complete absence of marine exchange and/or tidal influence) but which are inundated or saturated with water, either permanently or periodically. It is important to bear in mind, however, that certain Inland Systems may have had a historical connection to the ocean, which in some cases may have been relatively recent.

Level 2: Ecoregions & NFEPA Wetland Vegetation Groups

For Inland Systems, the regional spatial framework that has been included at Level 2 of the classification system is that of DWA's Level 1 Ecoregions for aquatic ecosystems (Kleynhans *et al.,* 2005). There are a total of 31 Ecoregions across South Africa, including Lesotho and Swaziland. DWA Ecoregions have

[5] Most rivers are indirectly connected to the ocean via an estuary at the downstream end, but where marine exchange (i.e. the presence of seawater) or tidal fluctuations are detectable in a river channel that is permanently or periodically connected to the ocean, it is defined as part of the estuary.

most commonly been used to categorise the regional setting for national and regional water resource management applications, especially in relation to rivers.
The Vegetation Map of South Africa, Swaziland and Lesotho (Mucina & Rutherford, 2006) groups vegetation types across the country according to Biomes, which are then divided into Bioregions. To categorise the regional setting for the wetland component of the National Freshwater Ecosystem Priority Areas (NFEPA) project, wetland vegetation groups (referred to as WetVeg Groups) were derived by further splitting bioregions into smaller groups through expert input (Nel *et al*., 2011). There are currently 133 NFEPA WetVeg Groups. It is envisaged that these groups could be used as a special framework for the classification of wetlands in national- and regional-scale conservation planning and wetland management initiatives.

Level 3: Landscape Setting
At Level 3 of the Classification System, for Inland Systems, a distinction is made between four Landscape Units (Table C1) on the basis of the landscape setting (i.e. topographical position) within which an HGM Unit is situated, as follows (Ollis *et al.,* 2013):

- Slope: an included stretch of ground that is not part of a valley floor, which is typically located on the side of a mountain, hill or valley.
- Valley floor**:** The base of a valley, situated between two distinct valley side-slopes.
- Plain**:** an extensive area of low relief characterised by relatively level, gently undulating or uniformly sloping land.
- Bench (hilltop/saddle/shelf): an area of mostly level or nearly level high ground (relative to the broad surroundings), including hilltops/crests (areas at the top of a mountain or hill flanked by down-slopes in all directions), saddles (relatively high-lying areas flanked by down-slopes on two sides in one direction and up-slopes on two sides in an approximately perpendicular direction), and shelves/terraces/ledges (relatively high-lying, localised flat areas along a slope, representing a break in slope with an up-slope one side and a down-slope on the other side in the same direction).

Level 4: Hydrogeomorphic Units
Seven primary HGM Types are recognised for Inland Systems at Level 4A of the Classification System (Table C2), on the basis of hydrology and geomorphology (Ollis *et al*., 2013), namely:

- River**:** a linear landform with clearly discernible bed and banks, which permanently or periodically carries a concentrated flow of water.
- Channelled valley-bottom wetland**:** a valley-bottom wetland with a river channel running through it.
- Unchannelled valley-bottom wetland**:** a valley-bottom wetland without a river channel running through it.
- Floodplain wetland**:** the mostly flat or gently sloping land adjacent to and formed by an alluvial river channel, under its present climate and sediment load, which is subject to periodic inundation by over-topping of the channel bank.
- Depression: a landform with closed elevation contours that increases in depth from the perimeter to a central area of greatest depth, and within which water typically accumulates.
- Wetland Flat: a level or near-level wetland area that is not fed by water from a river channel, and which is typically situated on a plain or a bench. Closed elevation contours are not evident around the edge of a wetland flat.
- Seep: a wetland area located on (gently to steeply) sloping land, which is dominated by the colluvial (i.e. gravity-driven), unidirectional movement of material down-slope. Seeps are often located on the side-slopes of a valley but they do not, typically, extend into a valley floor.

The above terms have been used for the primary HGM Units in the classification system to try and ensure consistency with the wetland classification terms currently in common usage in South Africa. Similar terminology (but excluding categories for “channel”, “flat” and “valleyhead seep”) is used, for example, in the recently developed tools produced as part of the Wetland Management Series including WET-Health (Macfarlane *et al*., 2008), WET-IHI (DWAF, 2007) and WET-EcoServices (Kotze *et al*., 2009).

3. Freshwater ecosystem Delineation

The wetland delineation took place according to the method presented in the “Updated manual for the identification and delineation of wetland and riparian resources” (DWAF, 2008). The foundation of the method is based on the fact that wetlands have several distinguishing factors including the following:

- The presence of water at or near the ground surface;
- Distinctive hydromorphic soils;
- Vegetation adapted to saturated soils; and
- The presence of alluvial soils in stream systems.

By observing the evidence of these features in the form of indicators, wetlands and riparian zones can be delineated and identified. If the use of these indicators and the interpretation of the findings are applied correctly, then the resulting delineation can be considered accurate (DWA, 2005 & 2008).

Riparian and wetland zones can be divided into three zones (DWAF, 2005 & 2008). The permanent zone of wetness is nearly always saturated. The seasonal zone is saturated for a significant part of the rainy season and the temporary zone surrounds the seasonal zone and is only saturated for a short period of the year, but is saturated for a sufficient period, under normal circumstances, to allow for the formation of hydromorphic soils and the growth of wetland vegetation. The object of this study was to identify the outer boundary of the temporary zone and then to identify a suitable buffer zone around the wetland area.

APPENDIX E – Specialists' Details

1. (a) (i) Details of the specialist who prepared the report

Amanda Mileson	Postgraduate Diploma (Nature Conservation) (UNISA)
Stephen van Staden	MSc Environmental Management (University of Johannesburg)

1.(a).(ii) The expertise of that specialist to compile a specialist report including a curriculum vitae

Company of Specialist:	Freshwater Ecological Network (Pty) Ltd Consulting		
Name / Contact person:	Amanda Mileson		
Postal address:	221 Riverside Lofts, Tygerfalls Boulevard, Bellville,		
Postal code:	7539	Cell:	082 569 9052
Telephone:	011 616 7893	Fax:	086 724 3132
E-mail:	amanda@sasenvgroup.co.za		
Qualifications	Postgraduate Diploma (Nature Conservation) (UNISA)		
Registration / Associations	Registered Professional Natural Scientist at South African Council for Natural Scientific Professions (SACNASP) Member of the South African Wetland Society Member of the Gauteng, Western Cape and Northern Cape Wetland Forums		

1. (b) a declaration that the specialist is independent in a form as may be specified by the competent authority

I, Amanda Mileson, declare that -

- 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 relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, 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.

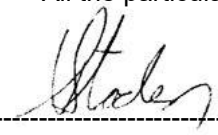


Signature of the Specialist

1. (c) a declaration that the specialist is independent in a form as may be specified by the competent authority

I, Stephen van Staden, declare that –

- I act as the independent specialist **(reviewer)** 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 relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, 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



Signature of the Specialist

FEN ENVIRONMENTAL GROUP OF COMPANIES –
SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF AMANDA MILESON

PERSONAL DETAILS

Position in Company	Senior Ecologist: Wetland Ecology
Joined SAS Environmental Group of Companies	2013

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Registered Professional Natural Scientist at South African Council for Natural Scientific Professions (SACNASP)v
Member of the South African Wetland Society (SAWS)

Member of the International Society of Wetland Scientists

Member of the Gauteng, Western Cape and Northern Cape Wetland Forums

EDUCATION

Qualifications

N. Dip Nature Conservation (UNISA)	2017
Advanced Diploma Nature Conservation (UNISA)	2020
Postgraduate Diploma Nature Conservation (UNISA)	2023

Short Courses

Wetland Management: Introduction and Delineation (University of the Free State)	2018
Tools for Wetland Assessment (Rhodes University)	2017
Wetland Rehabilitation (University of the Free State)	2015

AREAS OF WORK EXPERIENCE

South Africa – All Provinces

Africa – Democratic Republic of the Congo (DRC), Zimbabwe, Zambia

KEY SPECIALIST DISCIPLINES

Freshwater Assessments

- Desktop Watercourse Delineation
- Watercourse Verification Assessment
- Watercourse (wetland / riparian) Delineation and Assessment
- Watercourse EcoService and Status Determination
- Watercourse Rehabilitation Assessment / Planning
- Watercourse Maintenance and Management Plans
- Watercourse Plant Species Plans
- Watercourse Offset Plans

Biodiversity Assessments

- Biodiversity Ecological Assessments
- Biodiversity Offset Plans

SAS ENVIRONMENTAL GROUP OF COMPANIES –

SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF STEPHEN VAN STADEN

PERSONAL DETAILS

Position in Company	Group CEO, Water Resource Discipline Lead, Managing Member, Ecologist, Aquatic Ecologist
Joined SAS Environmental Group of Companies	2003 (year of establishment)

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP)
Accredited River Health Practitioner by the South African River Health Program (RHP)
Member of the South African Soil Surveyors Association (SASSO) Member of the Gauteng Wetland Forum
Member of the Gauteng Wetland Forum
Member of International Association of Impact Assessors (IAIA) South Africa;
Member of the Land Rehabilitation Society of South Africa (LaRSSA)

EDUCATION

Qualifications

MSc Environmental Management (University of Johannesburg)	2003
BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg)	2001
BSc (Zoology, Geography and Environmental Management) (University of Johannesburg)	2000

Short Courses

Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017
Tools for Wetland Assessment (Rhodes University)	2017
Legal liability training course (Legricon Pty Ltd)	2018
Hazard identification and risk assessment training course (Legricon Pty Ltd)	2018
Wetland Management: Introduction and Delineation (WLID1502S) (University of the Free State)	2018
Hydropedology and Wetland Functioning (TerraSoil Science and Water Business Academy)	2018

AREAS OF WORK EXPERIENCE

South Africa – All Provinces
Southern Africa – Lesotho, Botswana, Mozambique, Zimbabwe Zambia
Eastern Africa – Tanzania Mauritius
West Africa – Ghana, Liberia, Angola, Guinea Bissau, Nigeria, Sierra Leone
Central Africa – Democratic Republic of the Congo

DEVELOPMENT SECTORS OF EXPERIENCE

1. Mining: Coal, chrome, Platinum Group Metals (PGMs), mineral sands, gold, phosphate, river sand, clay, fluorspar
2. Linear developments (energy transmission, telecommunication, pipelines, roads)
3. Minerals beneficiation
4. Renewable energy (Hydro, wind and solar)
5. Commercial development
6. Residential development
7. Agriculture
8. Industrial/chemical

KEY SPECIALIST DISCIPLINES

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Environmental and Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions

Freshwater Assessments

- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Maintenance and Management Plans
- Plant Species and Landscape Plans
- Freshwater Offset Plans
- Hydropedological Assessment
- Pit Closure Analysis

Aquatic Ecological Assessment and Water Quality Studies

- Habitat Assessment Indices (IHAS, HRC, IHIA & RHAM)
- Aquatic Macro-Invertebrates (SASS5 & MIRAI)
- Fish Assemblage Integrity Index (FRAI)
- Fish Health Assessments
- Riparian Vegetation Integrity (VEGRAI)
- Toxicological Analysis
- Water quality Monitoring
- Screening Test
- Riverine Rehabilitation Plans

Biodiversity Assessments

- Floral Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Terrestrial Monitoring
- Biodiversity Offset Plan

Soil and Land Capability Assessment

- Soil and Land Capability Assessment
- Hydropedological Assessment

Visual Impact Assessment

- Visual Baseline and Impact Assessments
- Visual Impact Peer Review Assessments