Freshwater Ecological Assessment:

Proposed development of tourism accommodation facilities at Rusty Gate Mountain Retreat comprising Farm No. 824, Remainder Farm No. 826 and Farm No. 887, Caledon, Theewaterskloof Municipality

Prepared for:

Rusty Gate Mountain Retreat

Prepared by:

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SACNASP Reg. no. 400029/02

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KHULA Environmental Consultants
T/A EnviroSwift Western Cape

Executive Summary

Background

The new owner of Rusty Gate Mountain Retreat proposes to expand the tourist accommodation offered at the retreat by constructing several new accommodation units and a new campsite as well as a new primary dwelling for private residential purposes.

Given the requirement for prior environmental authorisation in terms of the NEMA EIA Regulations (2014, as amended), the owner appointed Lornay Environmental Consulting ("Lornay") as the Environmental Assessment Practitioner (EAP) to undertake the applications for environmental authorisation in terms of the NEMA EIA Regulations (2014, as amended) and the National Water Act, Act 36 of 1998 (NWA). Following a freshwater screening study EnviroSwift Western Cape ("EnviroSwift") confirmed the presence of wetlands and drainage lines and the strong likelihood that due to the proximity of wetlands to the proposed accommodation sites, that the proposed development would pose a level of risk to the site's wetlands and secondarily to the drainage lines. As a result, a detailed ecological assessment of the potentially affected wetlands is required in order to determine the level of risk posed by the proposed development and accordingly determine the required level of authorisation in terms of the National Water Act, Act 36 of 1998 (NWA)[1].

In terms of the NEMA EIA Regulations (2014, as amended), given the presence of wetlands and drainage lines on the proposed site, the site has been determined to have a High sensitivity for aquatic biodiversity and accordingly it is necessary to comply with the gazetted Protocol for Aquatic Biodiversity Assessment.

Desktop Assessment

The following information was gleaned from available online databases, sourced mostly via Cape Farm Mapper:

- The study area lies in the Southern Coastal Belt Ecoregion, the Breede Water Management Area (WMA), the Riviersonderend sub-Water Management Area (sub-WMA) and the G22C and H60D quaternary catchments (NFEPA, 2011 and Kleynhans et al, 2005).
- Wetlands associated with the proposed site fall within Southwest Sandstone Fynbos (Endangered) and Southwest Shale band Vegetation (Least Threatened).
- The geological map of the area indicates that the site is predominantly underlain by sandstone with the band of shale running through the site in an east to west alignment.
- According to the National Geospatial Information (NGI) topo-cadastral map and the National Wetlands Map Version 5 (CSIR, 2018) the only perennial drainage line, the Elandskloof River, is mapped as an unchannelled valley bottom wetland within the site. In addition, numerous non-perennial drainage lines as well as an extensive seep wetland are mapped to occur within the site.
- According to the Western Cape Biodiversity Spatial Plan (2017), the site lies adjacent to a Protected Area and contains CBAs and ESAs. Of particular interest is the designation of the Elandskloof River as an Aquatic CBA within the site and also the lower, eastern part of the mapped on-site seep as a CBA wetland, parts of which are also identified as Aquatic ESAs. Restorable Aquatic ESAs are also associated with the seep wetland, particular the areas upslope of the seep which have drainage lines leading to the seep.

Site Assessment and Groundtruthing

EnviroSwift visited the site on 29 September 2023 in order to confirm whether any watercourses, as defined in terms of the NWA, are present within or immediately adjacent to the sites where new accommodation units and the camp sites are proposed. Based primarily on vegetation and soils, the groundtruthing confirmed the presence of the mapped features but identified additional hillslope seep wetlands including an upslope extension of the mapped large seep wetland. The presence and/or extent

[1] If the level of risk for all development-related activities are determine to be LOW then a General Authorisation (GA) would apply. If any of the activities are determined to have a level of risk greater than LOW (i.e. MODERATE or HIGH) then a Water Use Licence Application (WULA) would be required.

of the unchannelled valley bottom wetland associated with the perennial Elandskloof River was not groundtruthed because this area is not hydrologically coupled with the proposed development sites.

Based on the groundtruthing, EnviroSwift concluded that only the mapped large hillslope weep, which was determined to extend further upslope than mapped on the NWM5, was potentially at risk from sites 2, 3A and 3B and three other smaller hillslope seeps, at risk from sites 26 and 27 respectively, are at direct risk of being impacted. Accordingly, the detailed ecological assessment focussed on only these freshwater features.

Detailed Ecological Assessment of the Large Hillslope Seep

In terms of wetland and aquatic ecosystem classification user manual (Ollis *et. al.* 2013) the large on-site wetland at direct risk due to the construction of the new residential dwelling (Site 2), the campsite (Site 3A) and the Site 3B which is proposed for two Eco Pods, is classified as a hillslope seep wetland.

In order to determine the ecological services supplied by the wetland the WET-Ecoservices was applied to the on-site hillslope seep wetland. The results indicated that the wetland was in the **Intermediate** category. It was found to be most effective in providing the services of erosion control, maintenance of biodiversity and nitrate removal all of which scored **High**. Erosion control achieves this score due to there being evidence of erosion, significant levels of soil disturbance in close proximity to the wetland as a result of the historical agricultural use of the farm, the moderate erosivity of the site's soils and the high degree of surface roughness attributed to the vegetation present within the wetland. The high score for maintenance of biodiversity is attributed to the threat status of the wetland vegetation and surrounding terrestrial vegetation, the size of the wetland and its vegetation cover which is dominated by indigenous species. The capacity to provide nitrate removal can be attributed to the representation of all three hydrological regimes within the wetland, the extent of vegetation cover and the fact that the lower portion of the wetland downstream of the dam is identified as an aquatic CBA in the WCBSP (2017).

The assessment of PES using the WET-Health method was applied to the on-site hillslope seep wetland. The wetland was determined to have a PES of Category C which means that a moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact. While changes in the water inputs due to activities in the wetland's catchment have been negligible, the presence of an impoundment in the central part of the wetland as well as farm roads and historically cultivated fields have impacted on the water distribution and retention characteristics within the wetland. The geomorphology of the wetland is almost intact with only slight increases in run-off due to cultivated fields and cleared areas (dirt tracks) within the wetland and minor evidence of erosion and sedimentation. The changes in vegetation composition have been brought about by historical fruit tree cultivation within the wetland, minor levels of erosion and sedimentation, deep flooding of a small part of the wetland by the dam and likely seepage from below the dam. The result is that approximately 50% of the wetland remains untransformed.

The Ecological Importance and Sensitivity (EIS) Assessment as applied to the hillslope seep wetland is based on the assessment tool developed by Rountree *et. al.* (2013). Overall, the wetland was found to be of **Moderate** EIS which means that the wetland is ecologically important and sensitive on a provincial or local scale. The biodiversity of the system is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major drainage lines.

Recommended Ecological Category for the Large Hillslope Seep

Given that the EIS category was determined to be **Moderate**, the REC remains at a Category C. As such there is no requirement to improve the PES but no deterioration in the ecological integrity of the wetland should be tolerated. This means that no impacts on the wetland that decrease the PES should be permitted. Given that the moderate EIS suggests that the wetland is not usually sensitive to flow and habitat modifications, minor flow regime and water quality impacts could be tolerated.

Buffer Determination for the Large Hillslope Seep

Each of the proposed sites for the tourism accommodation units have been located more than 32m

from any mapped drainage line and furthermore greater than 20m from any wetland edge. This exceeds the recommended minimum buffer for low impact residential land-use which is the land-use category most applicable to the proposed tourism development (Macfarlane and Bredin, 2017).

Detailed Ecological Assessment of the Small Hillslope Seeps

The WET-Ecoservices tool was applied to the 3 minor hillslope seeps. This is considered appropriate given the small size of the seeps and their relative homogeneity. The most important ecosystem service provided by the hillslope seeps is erosion control which scored High. Erosion control achieves this score due to there being limited evidence of erosion despite moderate levels of soil disturbance within the wetlands, the moderate erosivity of the site's soils and the extensive level of vegetation cover, albeit it not all indigenous, present within the wetland. Maintenance of biodiversity achieved the second highest score (also High), attributed partly to the extent of vegetation cover but also by the relatively large size of the HGM type and its likelihood to contain red data species or provide suitable habitat for such species.

The overall PES for the hillslope seeps was calculated to be 1,0 which equates to a **Category B** (Largely natural with few modifications). These wetlands exhibit a slight change in ecosystem processes and a small loss of natural habitats and biota have taken place. While changes in the water inputs due to activities in the wetlands' catchment have been negligible, surface roughness has been slightly reduced due to historical disturbance as a result of cultivation within one of the seeps and the presence of farm roads and pedestrian pathways and low levels of infilling and sediment deposition associated with the farm roads. The geomorphology of the wetlands is almost intact with only slight increases in run-off due to reduced surface roughness as a result of historical cultivation and small cleared areas (dirt roads and pedestrian pathways) within the wetland and evidence, albeit minor, of erosion and sedimentation. Very minor changes in vegetation composition have been brought about by historical cultivation within one of the wetlands and minor levels of erosion and sedimentation in all wetlands. The result is that approximately 90% of the wetlands remain untransformed.

The overall EIS category for the small hillslope seep wetlands was determined to be **Low/marginal** which in this case means that the wetlands are not ecologically important and sensitive at any scale. The biodiversity of these systems is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major drainage lines.

Recommended Ecological Category for the small Hillslope Seeps

The PES has been calculated as falling within a Category B. Due to the fact that the small hillslope seeps have been determined to have a Low/marginal EIS some degree of disturbance would be considered acceptable. The REC would therefore be set at a Category C. This means that a degree of modification of the wetlands could be tolerated provided that the PES does not fall below a Category C.

Buffer Determination for the Small Hillslope Seeps

Each of the proposed sites for the tourism accommodation units have been located more than 32m from any mapped drainage line and furthermore greater than 20m from any wetland edge. This exceeds the recommended minimum buffer for low impact residential land-use which is the land-use category most applicable to the proposed tourism development (Macfarlane and Bredin, 2017).

Impact Assessment

Based on the project description provided by the property owner and due to the location of some of the new accommodation sites near wetlands, the following potentially significant, direct freshwater ecological impacts have been identified to be associated with the proposed development:

Planning, design and development/construction phase

- **Disturbance of wetland habitat:** The groundtruthed hillslope seep wetlands may be disturbed as a result of construction activity (driving of construction vehicles and storage of construction materials and spoil).

- **Loss of biota:** Mortality and displacement of organisms may occur as a result of site clearing, stockpiling of soils and construction materials within or near the wetlands, as well as the operation of machinery and the driving of vehicles within or near the wetlands.
- **Alteration of flow regime**: Reduced catchment roughness as a result of the clearing of vegetation may cause an increase in stormwater run-off as well as an increase in flood peaks in the receiving watercourses.
- **Increased erosion and sedimentation**: The exposure of soils to erosion associated with site clearing, excavations and/or infilling would increase erosivity and, if coupled with rainfall, may result in sediment loading of receiving watercourses.
- **Water quality impairment:** Water quality impairment may arise as a result of the release of contaminants such as cement and other building materials / chemicals into the downstream receiving watercourses via stormwater run-off. In addition, potential accidental spills of chemicals and fuel may also result in contamination of stormwater and ultimately contaminate the receiving watercourse.

Operational phase

The operational phase of the proposed tourism development is likely to generate the following direct impacts on the site's hillslope seeps and also, secondarily, the downstream receiving watercourse (*viz-a-viz* the Elandskloof River which is identified as an Aquatic CBA):

- **Wetland habitat disturbance:** Edge effects associated with occupation and maintenance of the accommodation units including trampling of wetland vegetation, compaction of soils due to the requirement for tanker access to empty the conservancy tanks and possible indiscriminate sold waste disposal (i.e. littering).
- **Alteration of natural flow regime**: Flow and flood peaks would increase as a result of the increased extent of hard surfaces and reduced infiltration brought about by the proposed development which includes roofed buildings and in two cases new access roads.
- **Water quality impairment:** In the event that the proposed sewerage treatment and disposal system fails or is damaged or conservancy tanks not emptied timeously then contamination of the receiving watercourses is highly likely.
- **Biota loss:** If the receiving watercourses receive contaminants, particularly in the form of raw sewage from a failed, damaged or poorly maintained sewerage treatment and disposal system then it is likely that biota loss will take place, owing to the sensitivity of the aquatic ecosystems to water quality changes.

All of the identified impacts were rated to be **Low** (-ve) significance, with the only exception being the construction phase impact of alteration of flow regime which unmitigated was rated to be **Very low** (-ve), mostly attributed to the very limited disturbance footprints of the new accommodation units which will minimally reduce surface roughness and hence infiltration. Implementation of the recommended mitigation measures, which in the case of the construction phase-related impacts would be mostly achieved through well-managed construction methods, and in the case of the potential operational phase impacts would be achieved through effective management of the services infrastructure and through rainwater harvesting, would reduce all the impacts to a **Very Low** (-ve) significance.

Conclusion

Given that all identified freshwater ecological impacts have been rated to be of **Very Low (-ve)** significance with the assumption that all the recommended mitigation measures will be issued, the specialist reasoned opinion is that the proposed new tourism accommodation facilities and the new private residence be approved from a freshwater ecological/aquatic biodiversity perspective.

Risk Assessment and authorisation requirements in terms of the NWA

All of the activities potentially generating negative freshwater ecological impacts were found to be associated with a LOW risk class. Most of the identified negative impacts are limited to the impact site or are site-specific with the exception of water quality impairment because of the slope of the wetland which causes the contaminants to potentially migrate off-site. All the identified negative impacts have a duration of one month to one year and impact on the PES, EIS and/or REC but with no change in status.

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Disclaimer

EnviroSwift Western Cape has exercised all due care in the reviewing of all available information and the delineation of the watercourse boundaries. The accuracy of the results and conclusions from the assessment are entirely reliant on the accuracy and completeness of available desktop information, site conditions at the time of the assessment and professional judgment. EnviroSwift Western Cape does not accept responsibility for any errors or omissions in the assessment and therefore does not accept any consequential liability arising from commercial decisions made, which are based on the information contained in this report. Opinions presented in this report apply to conditions/site conditions applicable at time of review and those conditions which are reasonably foreseeable.

Glossary[2]

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 drainage lines.

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 contributing to runoff at a particular point in a drainage line system.

Chroma: The relative purity of the spectral colour which decreases with increasing greyness.

Critical Biodiversity Areas: Areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.

Delineation (of a wetland): To determine the boundary of a wetland based on soil, vegetation and/or hydrological indicators.

Ecoregion: A recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region.

Non-perennial stream: A stream that has transitory or short-lived flow.

Groundwater: Subsurface water in the saturated zone below the water table.

Habitat: The natural home of species of plants or animals.

Hue (of colour): The dominant spectral colour.

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.

Hydrophytes: Also called obligate wetland plants - plants that are physiologically bound to water where at least part of the generative cycle takes place in the water or on the surface.

Halophytes: Salt tolerant plants.

[2] As provided by DWA (2005) and WRC Report No. TT 434/09.

Helophytes: Also called facultative wetland plants - essentially terrestrial plants of which the photosynthetically active parts tolerate long periods of submergence or floating on water.

Indicator species: A species whose presence in an ecosystem is indicative of particular conditions (such as saline soils or acidic waters).

Intermittent flow: Flows only for short periods.

Macrophyte: A large plant - in wetland studies usually a large plant growing in shallow water or waterlogged soils.

Perennial: Permanent - persisting from year to year.

Riparian area delineation: The determination and marking of the boundary of the riparian area.

Riparian habitat: Includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils (deposited by the current drainage line system) 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.

Shrub: A shrub is a small to medium-sized woody plant.

Temporary zone: The zone that is alternately inundated and exposed.

Terrain unit morphological classes: Areas of the land surface with homogenous form and slope.

Watercourse (NWA):

(a) A drainage line or spring;
(b) A natural channel in which water flows regularly or intermediately;
(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.

Water table: The upper surface of groundwater or that level below which the soil is saturated with water. The water table feeds base flow to the drainage line channel network when the drainage line channel is in contact with the water table.

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

Acronyms

CCT	City of Cape Town
CBA	Critical Biodiversity Area
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EIS	Ecological Importance and Sensitivity
FEPA	Freshwater Ecological Support Area
GPS	Global Positioning System
HGM	Hydrogeomorphic
IHI	Index of Habitat Integrity
IHIA	Intermediate Habitat Integrity Assessment
MAP	Mean Annual Participation
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act
OESA	Other Ecological Support Area
PES	Present Ecological State

QDS	Quarter Degree Square
REC	Recommended Ecological Category
SANBI	South African National Biodiversity Institute
Sub-WMA	Sub - Water Management Area
TMNP	Table Mountain National Park
VEGRAI	Riparian Vegetation Response Assessment Index
WCBF	Western Cape Biodiversity Framework
WMA	Water Management Area
WUL	Water Use Licence
WWTW	Wastewater Treatment Works

Specialist Details and Experience

Nick Steytler (Pr.Sci.Nat. 400029)

Nick Steytler is a registered Professional Natural Scientist (Pr.Sci.Nat) with the South African Council for Natural Scientific Professions (SACNASP) and is also a certified Environmental Assessment Practitioner (EAP) with over 20 years' experience in the field of environmental management. He holds a Masters of Science (M.Sc.) degree in the field of Entomology (University of KwaZulu-Natal, Pietermaritzburg campus). His employment record includes several years with the Institute of Natural Resources in KwaZulu-Natal where he worked in their Natural Resource Management Programme and with SRK Consulting in Cape Town where he worked as an Environmental Scientist in the field of environmental management (i.e. undertaking Environmental Impact Assessment [EIA] and the like). After leaving SRK, Nick founded KHULA Environmental Consultants and holds the position of Director. In developing his expertise as a freshwater specialist, he initially worked in the capacity of an associate to EnviroSwift Western Cape (WC) but took over the company in 2019 and now undertakes all wetland specialist work in the Western, Southern, Eastern and Northern Cape. Nick is partnered by Louise Santana who is the owner/director of EnviroSwift KZN. Nick Steytler's CV is attached as Appendix 1.

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1 Introduction

1.1 Project Background

Rusty Gate Mountain Retreat comprising Farm No. 824, Remainder Farm No. 826 and Farm No. 887, Caledon in the Theewaterskloof Municipality (see Figure 1 for site location) was purchased by the current owners as a going tourism concern with existing tourist accommodation units and associated utilities and infrastructure. The owner now wants to expand the tourist accommodation offered at the retreat by constructing several new accommodation units and a new campsite as well as a new primary dwelling for private residential purposes.

Given the requirement for prior environmental authorisation in terms of the NEMA EIA Regulations (2014, as amended), the owner appointed Lornay Environmental Consulting ("Lornay") as the Environmental Assessment Practitioner (EAP) to undertake the applications for environmental authorisation in terms of the NEMA EIA Regulations (2014, as amended) and the National Water Act, Act 36 of 1998 (NWA). Given the likely presence of wetlands and drainage lines across the site, Lornay in turn appointed EnviroSwift Western Cape (EnviroSwift) to conduct an aquatic biodiversity screening study of the proposed site to determine if there are any aquatic biodiversity constraints which need to be taken into consideration in planning the development. Additionally, any authorisation requirements in terms of the NEMA EIA Regulations (2014, as amended) and the NWA relating to the presence of aquatic habitat, need to be confirmed.

In order to provide this input EnviroSwift conducted a site visit on 29 September 2023 and also undertook a desktop review of available information including the National Geospatial Information (NGI) Rivers database (available on Cape Farm Mapper), the National Wetlands Map (CSIR, 2018) and the Western Cape Biodiversity Spatial Plan (WCBSP, 2017). The screening level study confirmed the presence of wetlands and drainage lines and the strong likelihood that due to the proximity of wetlands to the proposed accommodation sites, that the proposed development would pose a level of risk to the site's wetlands and secondarily to the drainage lines.

As a result, a detailed ecological assessment of the potentially affected wetlands is required in order to determine the level of risk posed by the proposed development and accordingly determine the required level of authorisation in terms of the National Water Act, Act 36 of 1998 (NWA)[3]. This report presents the methods used and results of the detailed ecological assessment including an assessment of the risk posed to the directly affected wetlands. It is not considered necessary to assess the level of risk posed to the site's drainage line, most of which are non-perennial, as these will not be directly impacted.

In terms of the NEMA EIA Regulations (2014, as amended), if following the application of the national web-based screening tool the proposed site is determined to have a Medium sensitivity or greater for the aquatic biodiversity theme then a specialist assessment must be conducted in accordance with the gazetted Protocol of Aquatic Biodiversity Assessment. Given the presence of wetlands and drainage lines on the proposed site, the site has been determined to have a High sensitivity for aquatic biodiversity and accordingly it is necessary to comply with the Protocol.

[3] If the level of risk for all development-related activities are determine to be LOW then a General Authorisation (GA) would apply. If any of the activities are determined to have a level of risk greater than LOW (i.e. MODERATE or HIGH) then a Water Use Licence Application (WULA) would be required.

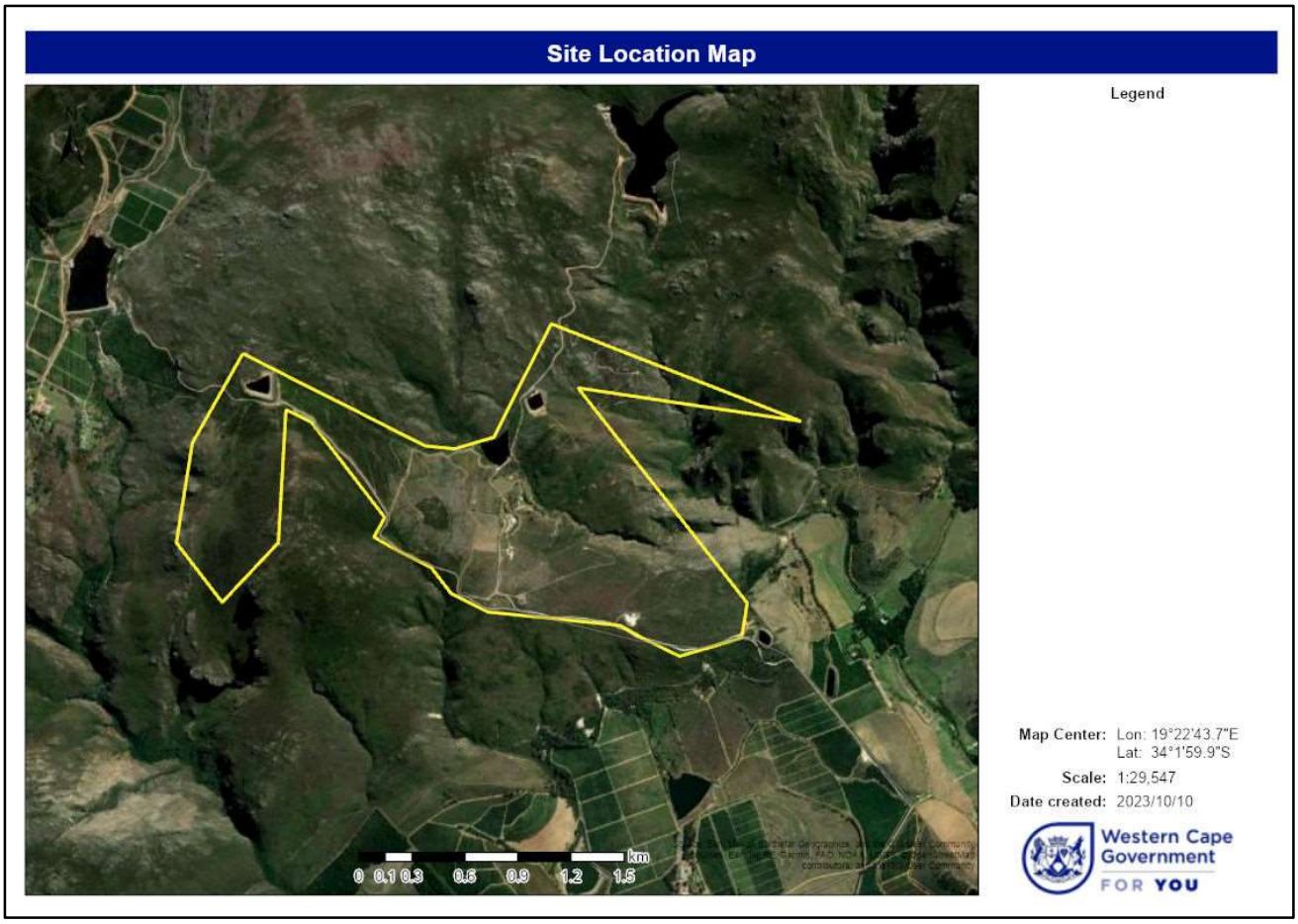


Figure 1: The location of Rusty Gate Mountain Retreat indicated by the yellow polygon.

1.2 Scope of Work

The scope of work which informed this assessment includes:

- Assessment of relevant background information including the National Freshwater Ecological Database (NFEPA, 2011), the National Wetlands Map Version 5 (CSIR, 2018), the Western Cape Biodiversity Spatial Plan (WCBSP, 2017), the National Geospatial Information (NGI) Service topographical maps and vector data, and pertinent academic resources;

- A site assessment including identification of wetlands and drainage lines and the delineation of the wetland temporary boundary and any riparian zones associated with any drainage lines in accordance with best practice methods (refer to methods section);

- Assessment of the Present Ecological State (PES), Ecological Importance and Sensitivity (EIS) and wetland ecosystem services for the on-site wetlands and the Intermediate Habitat Integrity Assessment (IHIA) method for the on-site drainage lines according to best practice methods (refer to methods section);

- Identification of the Section 21 (c) and (i) activities;

- Assessment of potentially significant impacts and identification of practicable mitigation measures including determination of the appropriate buffer width in terms of the MacFarlane *et. al*. (2015) buffer zone guidelines;

- Completion of the Department of Water & Sanitation (DWS) Risk Assessment Matrix to determine the level of risk posed to the directly affected watercourses and the relevant level of Water Use

application;

1.3 Limitations and Assumptions

The following limitations apply to this study:

- The current extent of the site's wetlands and alignment of drainage lines have been delineated using a Garmin Etrex 20 with an expected accuracy of 3 to 5 metres. It is however the opinion of the specialist that this limitation is of no material significance and that the legislative requirements and freshwater-related impacts have been adequately identified.
- In determining the current extent of the wetlands the methods used were limited to the upper 50cm of soil in accordance with the Updated Manual for Identification and Delineation of Wetland and Riparian Areas (Department of Water Affairs and Forestry - DWAF, 2008) and the Application of the DWAF (2008) Method to Wetland Soils of Western Cape (Job *et. al.* 2009).
- A site assessment was conducted on 29 September 2023 which was late in the wet season. This is the best time of year to determine wetland hydrology and wetland seasonality and accordingly the timing of the site assessment presents no limitations to the accuracy of the study.

1.4 Overview of Applicable Legislation

1.4.1 National Water Act (36 of 1998)

The purpose of the NWA is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors -
(g) protecting aquatic and associated ecosystems and their biological diversity; and
(h) reducing and preventing pollution and degradation of water resources.

In order to understand and interpret the Act correctly, the following definitions are applicable to this project:
``**pollution"** means the direct or indirect alteration of the physical, chemical or biological properties of a water resource;
``**protection",** in relation to a water resource, means -
(a) maintenance of the quality of the water resource to the extent that the water resource may be used in an ecologically sustainable way;
(b) prevention of the degradation of the water resource; and
(c) the rehabilitation of the water resource;
``**resource quality"** means the quality of all the aspects of a water resource including -
(a) the quantity, pattern, timing, water level and assurance of instream flow;
(b) the water quality, including the physical, chemical and biological characteristics of the water;
(c) the character and condition of the instream and riparian habitat; and
(d) the characteristics, condition and distribution of the aquatic biota;
"watercourse" means -
(a) a drainage line 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; and
``**water resource"** includes a watercourse, surface water, estuary, or aquifer.

The NWA deals with pollution prevention, and in particular the situation where pollution of a water resource occurs or might occur as a result of activities on land. The person who owns, controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources.

The measures may include measures to -
(a) cease, modify or control any act or process causing the pollution;
(b) comply with any prescribed waste standard or management practice;
(c) contain or prevent the movement of pollutants;
(d) eliminate any source of the pollution;
(e) remedy the effects of the pollution; and

(f) remedy the effects of any disturbance to the bed and banks of a watercourse.
Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. In general, a water use must be licensed unless it is listed in Schedule I, is an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a licence.

Notice No. 4167 of GG No. 49833 promulgated in terms of the NWA makes allowance for a regulated area around all watercourses within which the risk of an activity in terms of water uses (c) and (i) under section 21 of the Act must be assessed. The stipulated regulated areas include everything within 500m of the boundary of wetland, and everything within 100m or the 1:100 year flood-line (whichever is the greater distance) of a river, stream or drainage line.

1.4.2 National Environmental Management Act (107 of 1998)

The NEMA states the following:

"Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment."

The Act also makes special mention of the importance of the protection of wetlands:
"Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure."

Environmental Impact Assessment (EIA) Regulations have been promulgated under NEMA since 2006[4] which list activities that may be detrimental to the environment and that require prior Environmental Authorisation. The appointed EAP, Lornay, has confirmed that the proposed development does require prior environmental authorisation in terms of the NEMA EIA Regulations (2014, as amended) as listed activities are applicable.

In accordance with the *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*[5] when the site sensitivities are VERY HIGH or HIGH for any particular specialist theme then the applicable protocol for specialist assessment must be applied. In terms of NEMA, wetlands and drainage lines fall under the identified theme of Aquatic Biodiversity. In this case the Screening Tool identified the site as having a HIGH sensitivity for the aquatic biodiversity theme. Before the requirement for compliance with the applicable protocol can be enforced, the site sensitivities need to be groundtruthed via a Site Sensitivity Verification (SSV). This is usually undertaken by the EAP, but in instances where the EAP does not have the requisite expertise then the SSV can be informed by specialist groundtruthing. The SSV confirmed that the site does have a HIGH sensitivity for the Aquatic Biodiversity theme.

In terms of these mandatory procedures for specialist assessment and reporting, the current study must meet the minimum reporting criteria for an Aquatic Biodiversity Specialist study. In undertaking this Specialist Freshwater Ecological Assessment, EnviroSwift will address the minimum reporting criteria that are applicable as indicated in Table 1.

[4] Regulations were promulgated in 2006, 2010 and 2014 and amended in 2017.
[5] Gazetted on 20 March 2020 (GN No. R320) and which came into effect in May 2020

Table 1: Compliance with the reporting requirements as per the Protocol for Aquatic Biodiversity Assessments

No.	**Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments**	**Compliance of current report**
1	The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:	
1.1	a description of the aquatic biodiversity and ecosystems on the site, including;	See Section 3.
	(a) aquatic ecosystem types; and	See Section 3.
	(b) presence of aquatic species, and composition of aquatic species communities, their habitat, distribution and movement patterns	See Section 3.
1.2	the threat status of the ecosystem and species as identified by the Screening Tool	Ecosystem threat status is presented in Section 3.1.1. No aquatic species were identified as requiring assessment by the Screening Tool.
1.3	an indication of the national and provincial priority status of the aquatic ecosystem, including a description of the criteria for the given status (i.e. if the site includes a wetland or a river freshwater ecosystem priority area or sub catchment, a strategic water source area, a priority estuary, whether or not they are free -flowing rivers, wetland clusters, a critical biodiversity or ecologically sensitivity area)	See Section 3.1. where the presence of CBAs and ESAs are described as identified in the WCBSP (2017).
1.4	a description of the Ecological Importance and Sensitivity (EIS) of the aquatic ecosystem including:	See Section 3.4 where the EIS method based on the assessment tool developed by Rountree *et. al.* (2013) is applied to the large hillslope seep and Section 3.5 where it is applied to the 3 minor seeps.
	(a) the description (spatially, if possible) of the ecosystem processes that operate in relation to the aquatic ecosystems on and immediately adjacent to the site (e.g. movement of surface and subsurface water, recharge, discharge, sediment transport, etc.); and	See Section 3.4 where the WET-Health method (Macfarlane, 2007) is presented and where the pre-development PES is determined for the large hillslope seep and Section 3.5 for the 3 minor seeps.
	(b) the historic ecological condition (reference) as well as Present Ecological State (PES) of rivers (in- stream, riparian and floodplain habitat), wetlands and/or estuaries in terms of possible changes to the channel and flow regime (surface and groundwater).	The pre-development PES is assessed using the WET-Health method (Macfarlane, 2007) and is presented in Section 3.4.2 for the large seep and 3.5.2 for the smaller seeps.
2	The assessment must identify alternative development footprints within the preferred site which would be of a "low" sensitivity as identified by the screening tool and verified through the site sensitivity verification and which were not considered appropriate.	No alternative scheme is being assessed.
3	Related to impacts, a detailed assessment of the potential impacts of the proposed development on the following aspects must be undertaken to answer the following questions:	See Section 4 for Impact Assessment.
3.1	Is the proposed development consistent with maintaining the priority aquatic ecosystem in its current state and according to the stated goal?	See Section 5 for key findings and recommendations.

No.	**Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments**	**Compliance of current report**
3.2	Is the proposed development consistent with maintaining the resource quality objectives for the aquatic ecosystems present?	No resource quality objectives have been established for the aquatic ecosystems present.
3.3	How will the proposed development impact on fixed and dynamic ecological processes that operate within or across the site? This must include:	
	(a) impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes);	Impacts on flood regime are addressed in Section 4.2.
	(b) will the proposed development change the sediment regime of the aquatic ecosystem and its sub - catchment (e.g. sand movement, meandering river mouth or estuary, flooding or sedimentation patterns);	Erosion and sedimentation are addressed in Section 4.2.
	(c) what will the extent of the modification in relation to the overall aquatic ecosystem be (e.g. at the source, upstream or downstream portion, in the temporary / seasonal / permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.); and	See Section 4 where the potential impacts of the proposed development are assessed.
	(d) to what extent will the risks associated with water uses and related activities change	See Section 6 for Risk Assessment.
3.4	How will the proposed development impact on the functioning of the aquatic feature? This must include:	
	(a) base flows (e.g. too little or too much water in terms of characteristics and requirements of the system);	See Section 4.2.
	(b) quantity of water including change in the hydrological regime or hydroperiod of the aquatic ecosystem (e.g. seasonal to temporary or permanent; impact of over -abstraction or instream or off stream impoundment of a wetland or river);	See Section 4.2.
	(c) change in the hydrogeomorphic typing of the aquatic ecosystem (e.g. change from an unchannelled valley-bottom wetland to a channelled valley -bottom wetland); (d) quality of water (e.g. due to increased sediment load, contamination by chemical and/or organic effluent, and/or eutrophication);	See Section 4.2.
	(e) fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal); and	While new minor gravelled access roads are proposed at 2 sites, the low impact nature and materials proposed for surfacing mean that wetland fragmentation will be negligible.
	(f) the loss or degradation of all or part of any unique or important features associated with or within the aquatic ecosystem (e.g. waterfalls, springs, oxbow lakes, meandering or braided channels, peat soils, etc.);	N/A as no such unique or important features present on the site.
3.5	How will the proposed development impact on key ecosystems regulating and supporting services especially:	See Section 4.
	(a) flood attenuation;	
	(b) streamflow regulation;	
	(c) sediment trapping;	
	(d) phosphate assimilation;	
	(e) nitrate assimilation;	
	(f) toxicant assimilation;	
	(g) erosion control; and	
	(h) carbon storage?	

No.	**Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments**	**Compliance of current report**
3.6	How will the proposed development impact community composition (numbers and density of species) and integrity (condition, viability, predator - prey ratios, dispersal rates, etc.) of the faunal and vegetation communities inhabiting the site?	This has not been identified as a potential impact given that the receiving watercourses will be adequately buffered by the proposed set-backs and with most potential impacts being as a result of stormwater flows from the development site to the receiving watercourses which the buffering effect of the set-back will effectively mitigate the impact.
No.	**Minimum information requirements for an Aquatic Biodiversity Specialist Assessment Report**	
1	contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae	Contact details, SACNASP registration number and field of expertise provided in cover pages and preface of the report. CV provided as Appendix 2.
2	a signed statement of independence by the specialist	Statement of Independence provided as Appendix 3.
3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment	See Section 1.3.
4	the methodology used to undertake the site inspection and the specialist assessment, including equipment and modelling used, where relevant	See Section 1.3 and Section 3.
5	a description of the assumptions made, any uncertainties or gaps in knowledge or data	See Section 1.3.
6	the location of areas not suitable for development, which are to be avoided during construction and operation, where relevant	The set-backs (>20m from the seeps and >32m from the drainage lines) and the watercourses themselves are the only part of the site not suitable for development.
7	additional environmental impacts expected from the proposed development	See Section 4.2
8	any direct, indirect and cumulative impacts of the proposed development on site	See Sections 4.2, 4.4 and 4.5.
9	the degree to which impacts and risks can be mitigated, reversed and can cause loss of irreplaceable resources	See Section 4.2
10	a suitable construction and operational buffer for the aquatic ecosystem, using the accepted methodologies	See Sections 3.4.5 and 3.5.5.
11	proposed impact management actions and impact management outcomes for inclusion in the Environmental Management Programme (EMPr)	See Section 4.2 and Section 5
12	a motivation must be provided if there were development footprints identified as per requirement No. 2 above that were identified as having a "low" aquatic biodiversity sensitivity and that were not considered appropriate	N/A
13	a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability or not of the proposed development and if the proposed development should receive approval or not	See Section 5.
14	any conditions to which this statement is subjected	See Section 5.

2 Method of Assessment

2.1 Overview

The methods used in this freshwater specialist study entailed the following:

1. A desktop assessment to determine the conservation importance of the affected watercourses (wetlands and drainage lines);
2. Site assessment to identify the site's watercourses (wetlands and drainage lines);
3. An assessment of the current ecological status and value of the wetlands (as these are the primarily affected features) using recognised classification systems and indices based on the information collected during the desktop assessment and site assessment;
4. A buffer determination based on the currently accepted best practise method;
5. An impact assessment where the impacts caused by the resort development are identified based on historic aerial imagery and the site assessment, assessed and mitigation and/or management measures are recommended to minimise the potentially significant negative impacts and enhance potential benefits; and
6. A risk assessment using the revised Risk Assessment Matrix (December 2023).

These methods are discussed in more detail in the following sections.

2.2 Desktop Assessment

The scope of work includes a desktop assessment using available national and provincial databases including the Western Cape Biodiversity Spatial Plan (WCBSP, 2017), the National Wetlands Map Version 5 (CSIR, 2018) and maps and vector data form the National Geospatial Information (NGI) directorate.

The WCBSP (2017) categorises natural features into Protected Areas (PAs), Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), and Other Natural Areas (ONAs), which are defined in the plan as indicated in Table 2.

Table 2: WCBSP category definitions and management objectives.

MAP CATEGORY	DEFINITION	DESIRED MANAGEMENT OBJECTIVE	SUB-CATEGORY
Protected Area	Areas that are proclaimed as protected areas under national or provincial legislation.	Must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity. A benchmark for biodiversity.	n/a
Critical Biodiversity Area 1	Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.	CBA: River CBA: Estuary CBA: Wetland CBA: Forest CBA: Terrestrial
Critical Biodiversity Area 2	Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a functional, natural or near-natural state, with no further loss of natural habitat. These areas should be rehabilitated.	CBA: Degraded
Ecological Support Area 1	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.	ESA: Foredune ESA: Forest ESA: Climate Adaptation Corridor ESA: Coastal Resource Protection ESA: Endangered Ecosystem ESA: River ESA: Estuary ESA: Wetland ESA: Watercourse Protection ESA: Water Source Protection ESA: Water Recharge Protection
Ecological Support Area 2	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.	Restore and/or manage to minimise impact on ecological infrastructure functioning; especially soil and water-related services.	ESA: Restore from NN
ONA: Natural to Near-Natural	Areas that have not been identified as a priority in the current systematic biodiversity plan, but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although they have not been prioritised for biodiversity, they are still an important part of the natural ecosystem.	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land uses, but some authorisation may still be required for high-impact land uses.	ONA: Natural to Near-Natural ONA: Degraded
No Natural Remaining	Areas that have been modified by human activity to the extent that they are no longer natural, and do not contribute to biodiversity targets. These areas may still provide limited biodiversity and ecological infrastructure functions, even if they are never prioritised for conservation action.	Manage in a biodiversity-sensitive manner, aiming to maximise ecological functionality. Offers the most flexibility regarding potential land uses, but some authorisation may still be required for high-impact land uses.	No Natural Remaining

2.3 Watercourse Identification and Delineation

For the purpose of the identification of water resources, the definition as provided by the NWA was used to guide the site assessment. The NWA defines a water resource as a watercourse, surface water, estuary, or aquifer. In the context of this study, it is only the former two that are the focus of the

assessment. Aquifers are excluded because wetland and riparian assessments, in line with best practise guidelines, only include the assessment of the first 50 cm from the soil surface. In addition, reference to a watercourse as provided above includes, where relevant, its bed and banks.

In order to establish if the watercourses in question can be classified as 'wetland habitat' or 'riparian habitat', the definitions as drafted by the NWA (Act No. 36, 1998)[6] were taken into consideration:

- A 'wetland' 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; and
- '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'.

Freshwater habitat was identified with the use of the definitions provided above and the delineation took place according to the method supplied by DWAF (2005, updated 2008). Several indicators are prescribed in the watercourse delineation guideline to facilitate the delineation of either the temporary wetland zone or the drainage lines riparian zone.

Indicators used to determine the boundary of the wetland temporary zone include:

1) The position in the landscape;
2) The type of soil form;
3) The presence of wetland vegetation species; and
4) The presence of redoximorphic soil features, which are morphological signatures that appear in soils with prolonged periods of saturation.

Indicators used to determine the boundary of the riparian zone include:

1) Landscape position;
2) Alluvial soils and recently deposited material;
3) Topography associated with riparian areas; and
4) Vegetation associated with riparian areas.

A site visit was conducted on the 29 September 2023. Wetlands were identified and delineated using the methods defined in the Updated Manual for Identification and Delineation of Wetlands (DWAF, 2008) and the Application of the DWAF 2008 method to wetland soils of Western Cape (Job, 2009). Delineation was undertaken by means of a GPS.

The proposed site has two distinctly different soil types *viz-a-viz* quartzitic sands with low clay content which is the dominant soil type and shale-derived soils with a high clay content. The quartzitic sands do not readily exhibit typical wetland soil indicators and mottling is frequently absent due to a lack of iron in the soil. Terrestrial quarzitic sands tend to be of a low chroma falling within the 'gley' colour group, so 'gleying' cannot be used as a wetland indicator. Job (2009) identifies a high organic soil content (permanent zone), and dark, high carbon surface layers over low chroma sand (temporary zone) as alternative indicators, used in conjunction with the presence of wetland vegetation, as an alternative method for identification of the presence of wetland habitat in the quarzitic sands.

[6] The definitions as provided by the NWA (Act No. 36 of 1998) are the only legislated definitions of wetlands in South Africa.

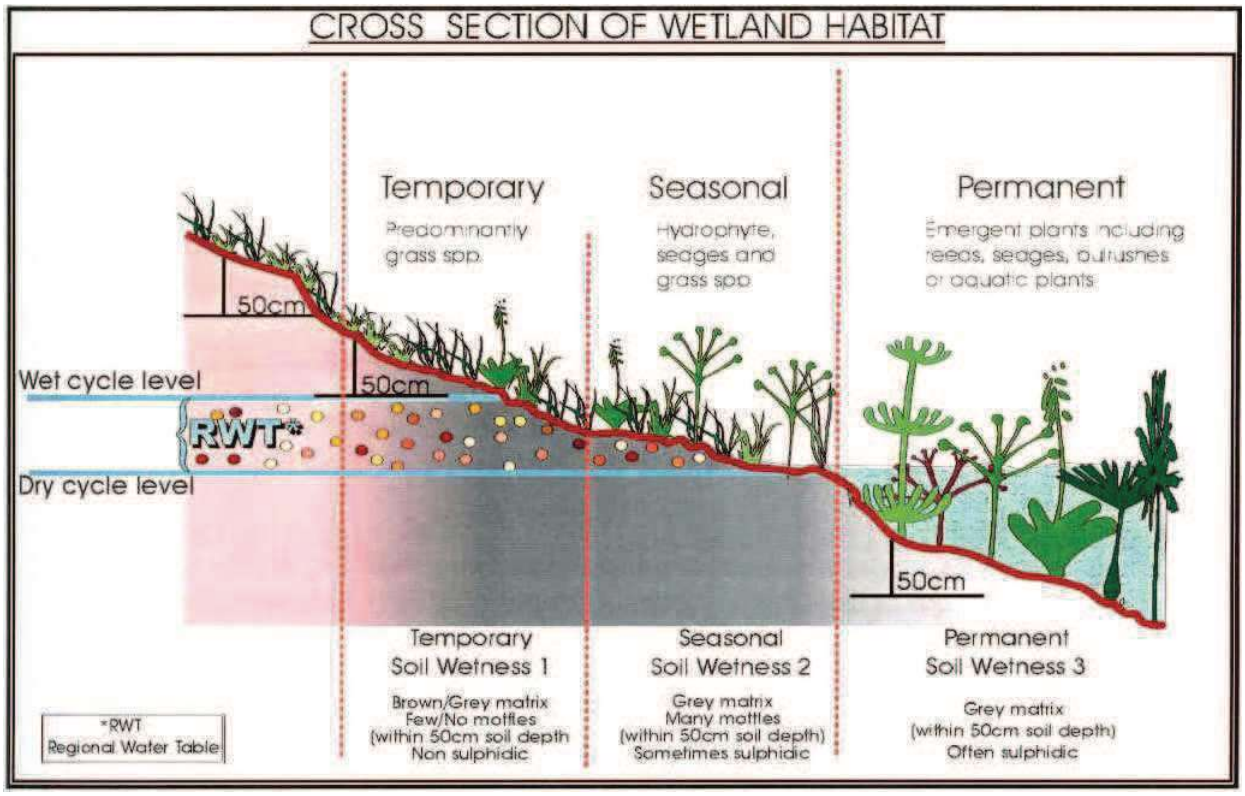


Figure 2: Cross section through a wetland (after DWAF, 2005).

Table 3: Vegetation characteristics used in the delineation of wetlands (after DWAF, 2005).

Terrestrial / Non wetland	Temporary	Seasonal	Permanent / Semi-permanent
Dominated by plant species which occur extensively in non-wetland areas; hydrophytic[7] species may be present in very low abundance	Predominantly grass species; mixture of species which occur extensively in non-wetland areas and hydrophytic plant species which are restricted largely to wetland areas	Hydrophytic sedge and grass species which are restricted to wetland areas	Dominated by emergent plants, including reeds, sedges and bulrushes or floating or submerged aquatic plants

2.4 Freshwater Feature Classification

Ecosystems included within the 'Classification System for Wetlands and other Aquatic Ecosystems in South Africa' (hereafter referred to as 'the Classification System') developed by Ollis *et. al*., (2013) encompass those that the Ramsar Convention defines, rather broadly, as 'wetlands', namely areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres (cited by Ramsar Convention Secretariat, 2011). The inland component of the Classification System has a six-tiered structure presented in the figure overpage.

[7] Plants that are physiologically bound to water where at least part of the generative cycle takes place in the water or on the surface.

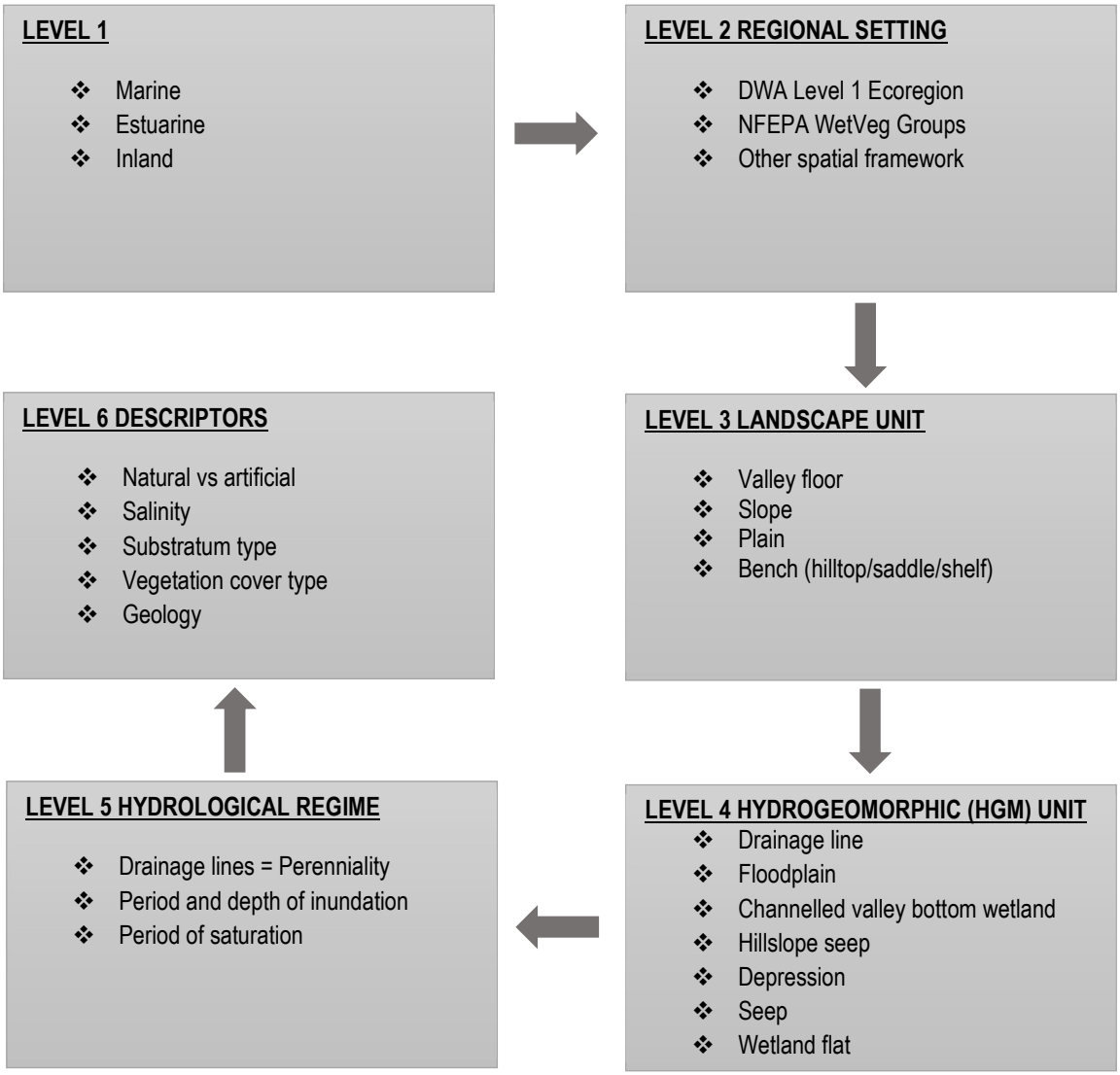


Figure 3: Classification System for wetlands and other aquatic ecosystems in South Africa.

2.5 Ecological Assessment Methodology for Wetlands

2.5.1 Ecosystem Services

WET-EcoServices (Kotze *et. al.* 2007) was designed for inland palustrine wetlands and has been developed to help assess 15 key goods and services that individual wetlands provide in order to allow for more informed planning and decision making. Central to WET-EcoServices is the characterisation of Hydrogeomorphic (HGM) units by which the wetland can be divided into units of a similar character. The rationale behind characterising the HGM units of a wetland is that areas belonging to the same HGM type and falling within a similar geological and climatic setting are likely to have a similar structure and exhibit similar processes.

In addition, WET-EcoServices allows for the assessment of potential and actual ecosystem service outcomes of rehabilitation projects by applying the assessment to 'with rehabilitation' and 'without rehabilitation' situations and comparing the difference between the two.

2.5.2 Present Ecological State (PES)

WET-Health (Macfarlane, 2007) is a tool designed to assess the health or integrity of a wetland. Wetland health is defined as a measure of the deviation of wetland structure and function from the wetland's natural reference condition. This technique attempts to assess hydrological, geomorphological and vegetation health in three separate modules. The modules may then be combined to determine the overall Present Ecological State (PES) of the wetland. A Level 1 WET-Health assessment was undertaken as part of this assessment.

Table 4: PES categories as defined in WET-Health (Macfarlane, 2007).

Description	Combined impact score	PES Category
Unmodified, natural.	0-0.9	A
Largely natural with few modifications. A slight change in ecosystem processes is discernable and a small loss of natural habitats and biota may have taken place.	1-1.9	B
Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact	2-3.9	C
Largely modified. A large change in ecosystem processes and loss of natural habitat and biota and has occurred.	4-5.9	D
The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable.	6-7.9	E
Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8 - 10	F

2.5.3 Ecological Importance and Sensitivity (EIS)

The EIS method applied to wetlands is based on the assessment tool developed by Rountree *et. al.* (2014) and was used to determine the ecological importance and sensitivity of wetlands, incorporating the traditionally examined criteria used in EIS assessments of other water resources by the Department of Water Affairs (DWA) and thus enabling consistent assessment approaches across water resource types.

Hydro-functional importance and basic human needs have been assessed as part of the WET-EcoServices and were therefore excluded. In the method a series of determinants are assessed on a scale of 0 to 4, where "0" indicates no importance and "4" indicates very high importance.

2.5.4 Recommended Ecological Category (REC)

The Recommended Ecological Category (REC) is determined by the PES score as well as importance and/or sensitivity. Water resources which have a PES falling within an E or F ecological category are deemed unsustainable. In such cases the REC must automatically be increased to a D. Where the PES is determined to be within an A, B, C or D ecological category, the EIS components must be evaluated to determine if any of the aspects of importance and sensitivity are high or very high. If this is the case, the feasibility of increasing the PES (particularly if the PES is in a low C or D category) should be evaluated and either set at the same ecological category or higher depending on feasibility. This is recommended to enable important and/or sensitive water resources to maintain their functionality and continue to provide the goods and services for the environment and society.

2.6 Buffer Determination

While a buffer determination using the method described in the Buffer Zone Guidelines for Rivers, Wetlands and Estuaries (Macfarlane and Bredin, 2016) was not undertaken, the guidelines for minimum buffers for various land uses as presented in Annexure 16 of the Guidelines was used to recommend the buffers. The applicable land-use is residential low impact/residential only which applies to the proposed tourism accommodation units. For this land-use category a 10m minimum buffer width is recommended with a worse case for residential land-use being 15m. Such a buffer would require a

commitment to manage the buffer zones to ensure that these areas function optimally and also assume that the mitigation measures recommended in this study to mitigate key threats to the water resource will be implemented.

2.7 Impact Assessment

A summary of the method of assessment is provided below; the detailed method is provided in Appendix 2.

The following criteria were taken into consideration when determining the impact of the proposed activities:

- The nature of the impact i.e. positive, negative, direct, indirect;
- The extent and location of the impact;
- The duration of the impact i.e. short term, long term, intermittent or continuous;
- The magnitude/intensity of the impact i.e. high, medium, low; and
- The likelihood or probability of the impact occurring.

Mitigation measures were subsequently identified and recommended for all impacts to reduce the overall impact significance to an acceptable level, where and if possible. Mitigation measures were aimed to ensure that:

- More environmentally sound designs / layouts / technologies, etc., are investigated and implemented, if feasible;
- Environmental benefits of a proposed activity are enhanced;
- Negative impacts are avoided, minimised or remedied; and
- Residual negative impacts are within acceptable levels.

3 Results

3.1 Desktop Assessment

3.1.1 Regional Setting

The proposed site is situated within the Southern Coastal Belt Ecoregion, the main attributes of which are listed in Table 5 below. It is furthermore within the Breede Water Management Area (WMA), the Riviersonderend sub-Water Management Area (sub-WMA) and the G22C and H60D quaternary catchments (NFEPA, 2011 and Kleynhans et al, 2005).

Table 5: Main attributes of the Southern Coastal Belt Ecoregion (Kleynhans *et. al*., 2005).

Main Attributes	Southern Coastal Belt Ecoregion
Terrain Morphology: Broad division (dominant types in bold) (Primary)	Plains; Low Relief; Plains Moderate Relief; Open Hills; Lowlands; Mountains; Moderate to High Relief; Closed Hills; Mountains; Moderate and High Relief
Vegetation types (dominant types in bold) (Secondary)	South and South West Coast Renosterveld; Central Mountain Renosterveld; Limestone fynbos; Mountain Fynbos; Laterite Fynbos (limited); Dune Thicket; Patches Afromontane Forest
Altitude (m a.m.s.l) (Primary)	0-700; 700-1500 (limited)
Mean annual precipitation (mm)	300 to 1000
Coefficient of Variation (% of annual precipitation)	<20 to 40
Rainfall concentration index	<15 to 50
Rainfall seasonality	Winter to all year
Mean annual temp. (°C)	10 to 20
Mean daily max. temp. (°C): February	22 to 30
Mean daily max. temp. (°C): July	12 to 20
Mean daily min. temp. (°C): February	10 to 18
Mean daily min temp. (°C): July	4 to 10
Median annual simulated runoff (mm) for quaternary catchment	10 to >250

3.1.2 Local Setting & Land Use

Rusty Gate Mountain Retreat, consisting of three farm portions, spans 290 hectares including mountainous topography peaking at 870 m above sea level (a.s.l.) and the lowest point at 330 m a.s.l. The combination of its remote location, topography and varying geology on the farm results in a wide range of natural terrestrial and aquatic habitat for indigenous fauna and flora. Rusty Gate Farm, and some of the existing infrastructure, was developed in the mid 1980's as a commercial nursery for apple and pear trees, and during its peak production years the nursery produced between 200 000 and 250 000 saplings per annum.

Commercial agricultural production on the farm ceased in the early 2000's with change of ownership to non-farming owners who purchased and used the property for recreational purposes only. In 2006 the previous owners purchased the property for personal use, and circa 2013 / 2014 these owners started using existing buildings infrastructure for commercial tourism as a self-catering guest farm. The current owners purchased the business (including properties) in June 2019 as a going concern and has been operating as a self-catering guest farm with focus on eco-tourism since then under the re-branded registered trade name Rusty Gate Mountain Retreat. The existing buildings infrastructure is used as follows:

- 5 self-catering cottages with 22 beds.
- 2 cottages for owners' and caretaker's accommodation.
- Eagle Eyrie self-catering accommodation with 20 beds.

Today only limited sections of the sapling orchards (approx. 3 Ha) remain which have not been tended to since production stopped in early 2000's. The remainder of approx. 30 Ha of production orchards are now mostly covered with indigenous flora with exception of the "overflow parking area" of approx. 2 Ha

which is planted with grass. There is also a large irrigation dam and some smaller dams on the property but the use of the properties for agricultural purposes has all but ceased. Additional attributes of the property according to Cape Farm Mapper (2023) are presented in Table 6.

Table 6: Main attributes applicable to the proposed site according to Cape Farm Mapper (2023).

Main Attributes	Rusty Gate Mountain Retreat
Terrain:	Slope of between 0 and 40% but predominantly mountainous. Refer to Figure 3.
Geology:	Quartzitic sandstone of the Peninsula Formation in the north and east and of the Nardouw Subgroup in the south and west, separated by a band of shale of the Cedarberg Formation, Table Mountain Group.
Soils:	Rocky areas with minimal soils Depth: <450mm Clay: <15% Erodibility: Moderate (0.48).
Vegetation types:	South Sonderend Sandstone Fynbos (Critically Endangered) and Western Coastal Shale Band vegetation (Endangered). Refer to Figure 5.
Wetland vegetation type:	Southwest Sandstone Fynbos (Endangered) and Southwest Shale band Vegetation (Least Threatened). Refer to Figure 6.
Altitude:	330 to 870 m a.s.l.
Mean annual precipitation:	590 mm
Mean annual temp:	16.3°C
Mean daily max. temp: February	28.3°C
Mean daily max. temp: July	16.9°C
Mean daily min. temp: February	15.3°C
Mean daily min temp: July	6.7°C
Mean annual runoff	163.08 mm

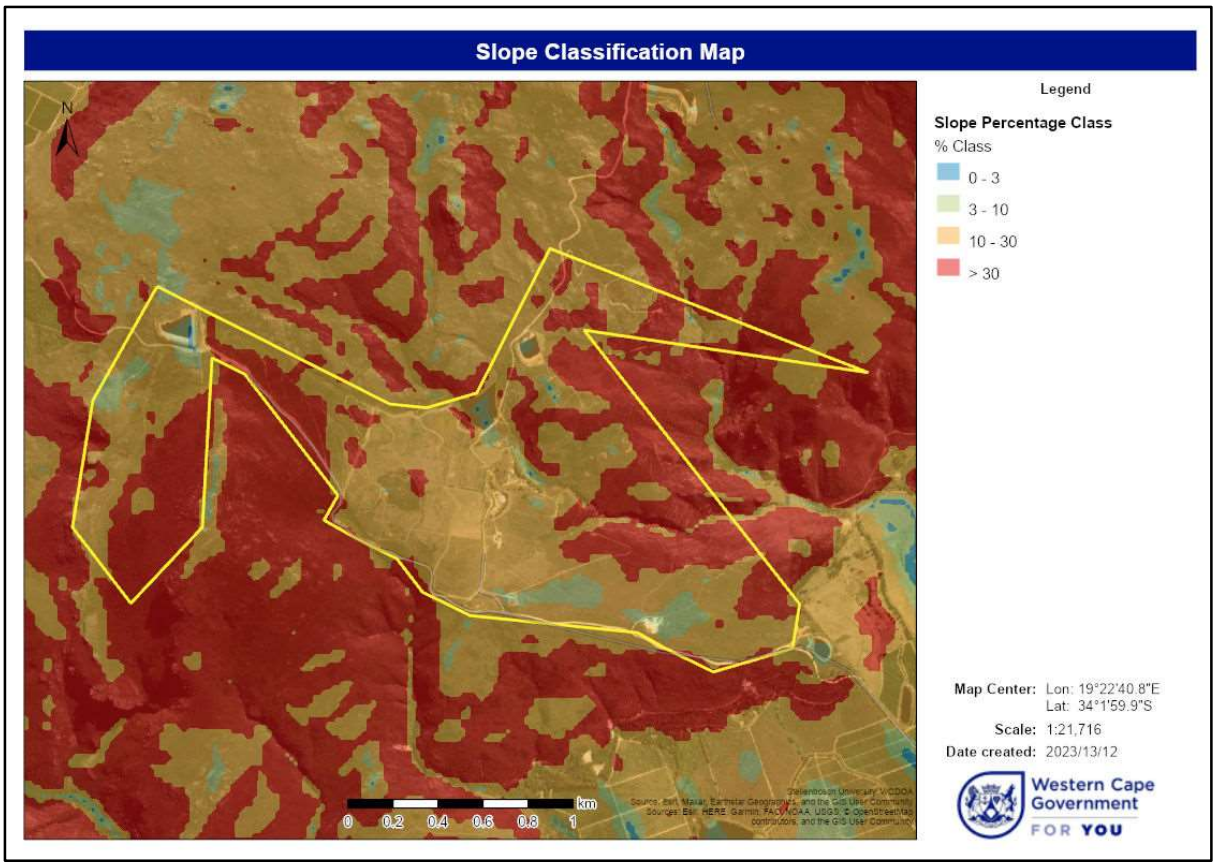


Figure 4: Slope Classification Map of Rusty Gate Mountain retreat and surrounds (Cape Farm Mapper, 2023).

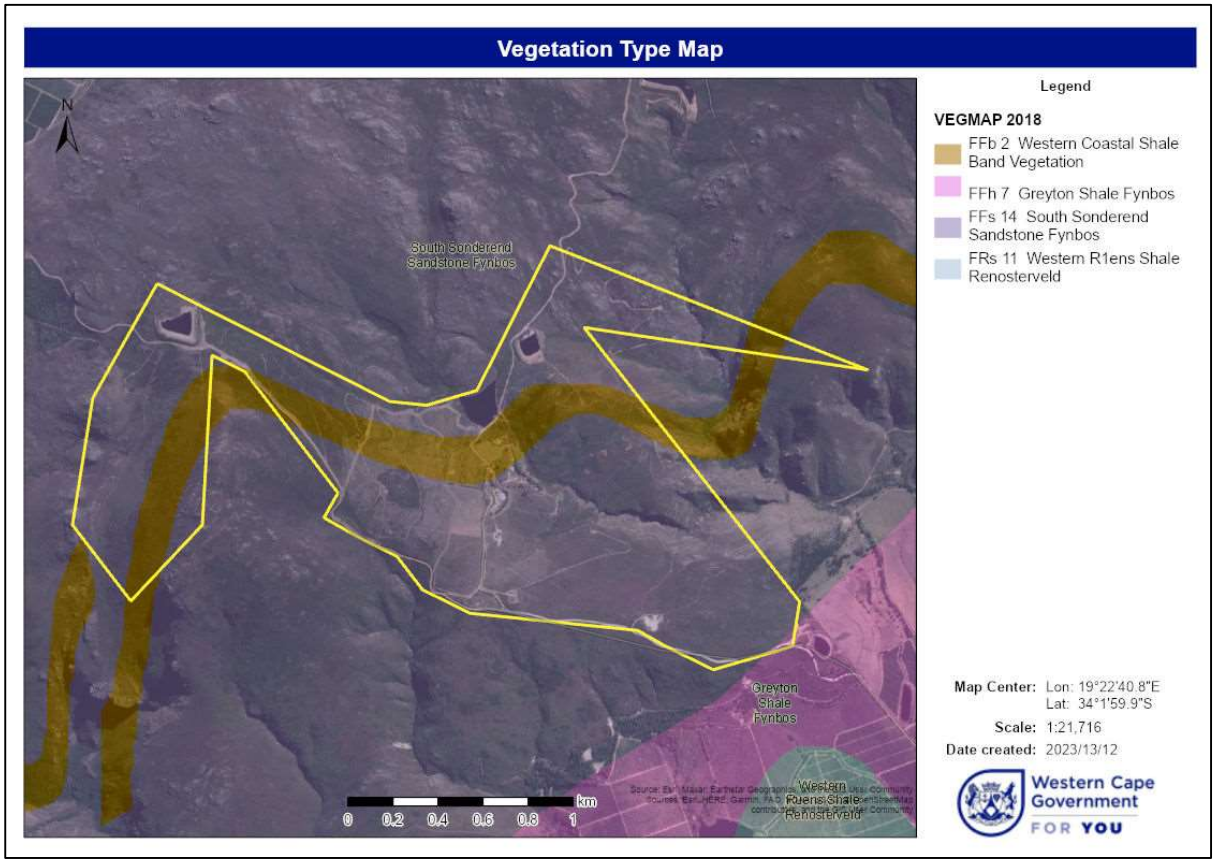


Figure 5: Vegetation Type Map (2018).

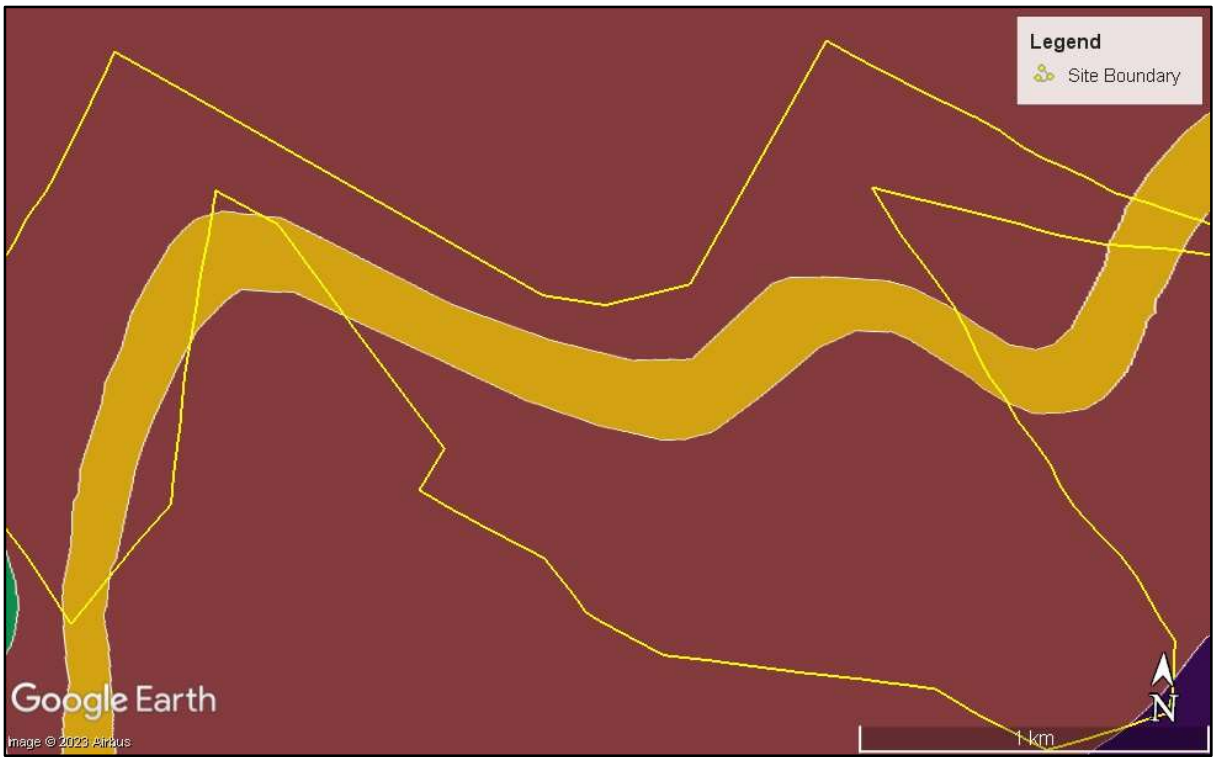


Figure 6: Wetland Vegetation Type Map (NFEPA, 2011). The dominant type is Southwest Sandstone Fynbos (purple) and the secondary type is Southwest Shale band Vegetation (yellow).

3.1.3 Watercourses within the proposed site and within the regulated zone

According to the NGI Rivers database (Cape Farm Mapper, 2023) and the National Wetlands Map Version 5 (CSIR, 2018) the site's only perennial drainage line, the Elandskloof River, is mapped as an unchannelled valley bottom wetland and numerous non-perennial drainage lines as well as an extensive seep wetland occur within the site (see Figure 7).

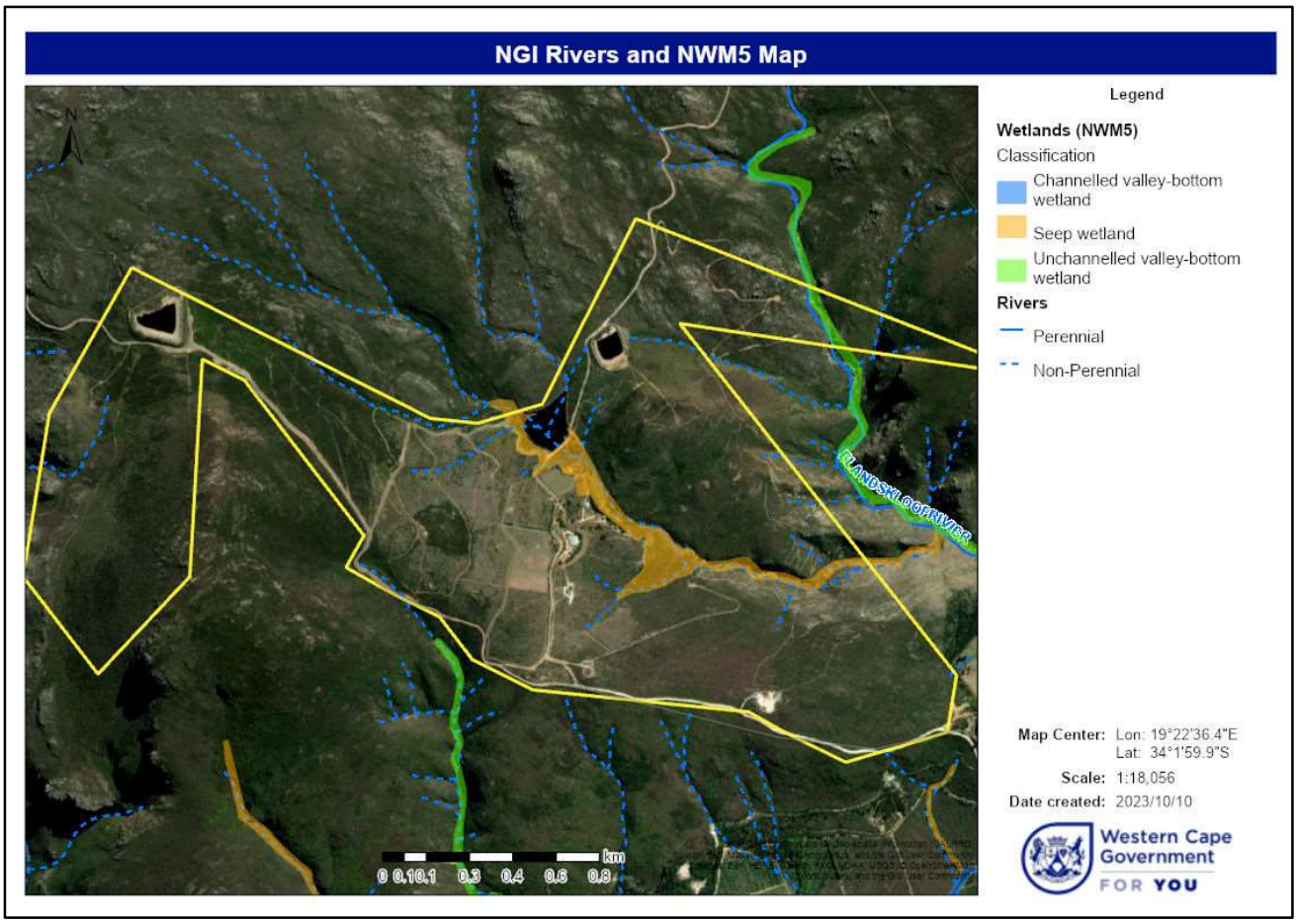


Figure 7: NGI Rivers and the National Wetlands Map Vers. 5 (CSIR, 2018). The yellow polygon indicates the proposed site.

The WCBSP (2017) was also consulted to determine whether the site or any nearby land is identified as having any biodiversity conservation significance (i.e. presence of Protected Areas, Critical Biodiversity Areas and Ecological Support Areas). According to the WCBSP, the site lies adjacent to a Protected Area and contains CBAs and ESAs (see Figure 8). Of particular interest is the designation of the Elandskloof River as an Aquatic CBA within the site and also the lower, eastern part of the mapped on-site seep as a CBA wetland, parts of which are also identified as Aquatic ESAs. Restorable Aquatic ESAs are also associated with the seep wetland, particular the areas upslope of the seep which have drainage lines leading to the seep.

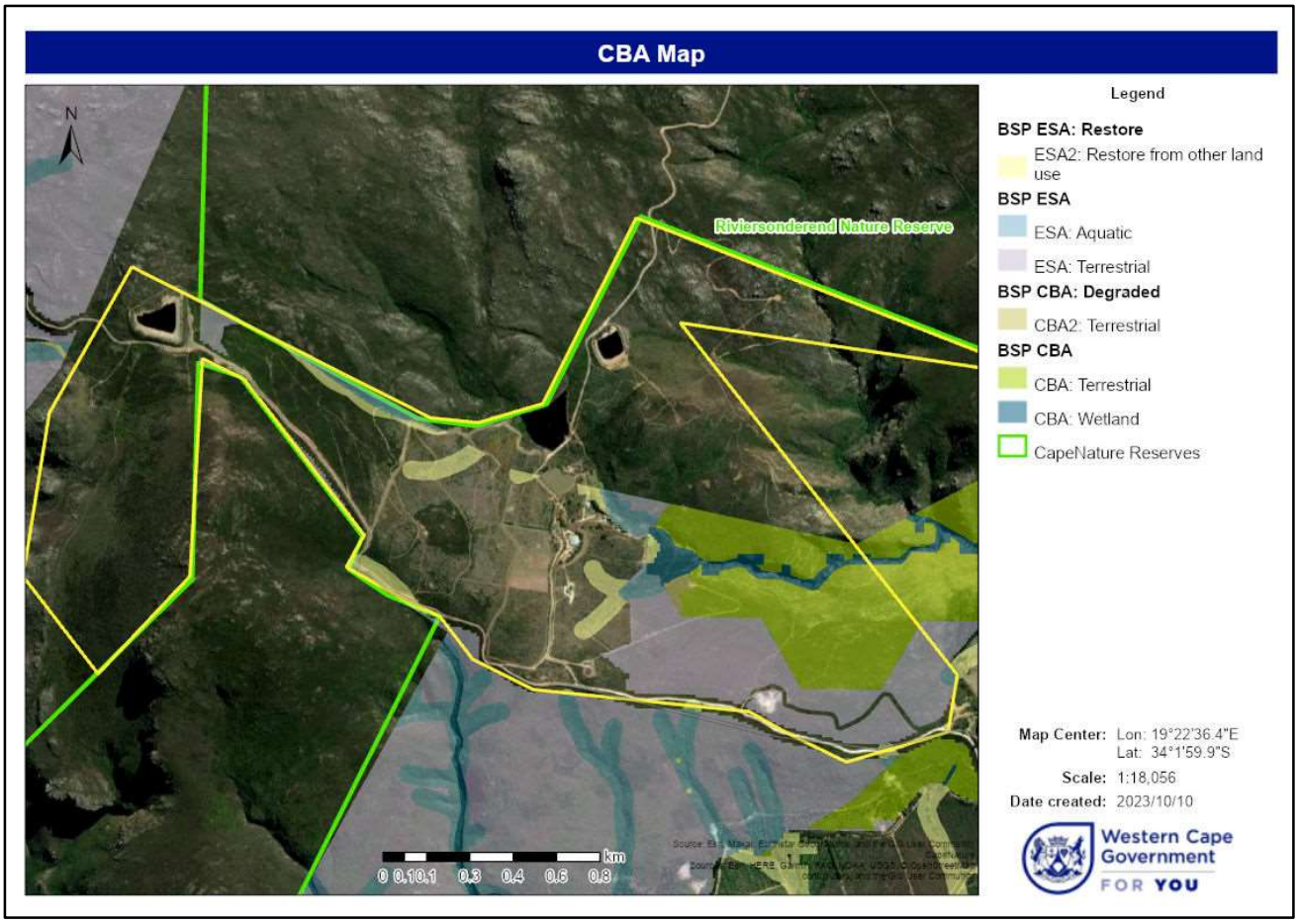


Figure 8: Conservation Importance Map (WCBSP, 2017).

3.2 Description and Delineation of Watercourses

3.2.1 Groundtruthing Findings

EnviroSwift visited the site on 29 September 2023 in order to confirm whether any watercourses, as defined in terms of the NWA, are present within or immediately adjacent to the sites where new accommodation units and the camp sites are proposed. Based primarily on vegetation and soils, the groundtruthing confirmed the presence of the mapped features but identified additional hillslope seep wetlands including an upslope extension of the mapped large seep wetland. The presence and/or extent of the unchannelled valley bottom wetland associated with the perennial Elandskloof River was not groundtruthed because this area is not hydrologically coupled with the proposed development sites.

The nature of the vegetation at each of the proposed development sites is discussed in further detail in Section 3.2.2.

Augering across Rusty Gate Mountain Retreat revealed two distinct soil types. In the extreme west near Sites 26 and 27 the soils were found to be quartzitic with a low clay content. The seeps identified in this area were characterised by dark, low chroma soils with a high organic content (see Figure 9). The soils augered from the central part of the site in the vicinity of the proposed campsite (Site 3A) were reddish indicative of a high clay content (see Figure 10). These two soil types are largely aligned with the two differing areas of underlying geology *viz-a-viz* quartzitic sandstone and shale as indicated in Table 6.

Figure 9: Soil auger sample taken from within the seep identified at Site 27. The dark, low chroma and high organic content is characteristic of wetland soils in quarzitic sands.

Figure 10: Reddish soils with a high in clay content as augered near Site 3A.

Available desktop resources map several watercourses within the Rusty Gate Mountain Retreat property including numerous non-perennial drainage lines, a single perennial drainage line (Elandskloof River mapped as an unchannelled valley bottom wetland) and a large hillslope seep. When groundtruthed by the specialist on 29 September 2023 some of the proposed sites for new accommodation units (Sites 26 and 27) as well as the site for the new primary residential dwelling (Site 2), the proposed campsite and associated site for 2 Eco Pods (Sites 3A and 3B) and the site for the boma (Site 29) were confirmed to be located near and upslope of wetland habitat. When compared to the mapped wetlands, groundtruthing confirmed that the property was found to be associated with additional hillslope seeps and, in the case of the mapped hillslope seep, was found to be extend further upslope than mapped. The results of the site investigation insofar as delineating any aquatic habitat potentially at risk of being impacted by the proposed tourism expansion project are presented in Figure 11.

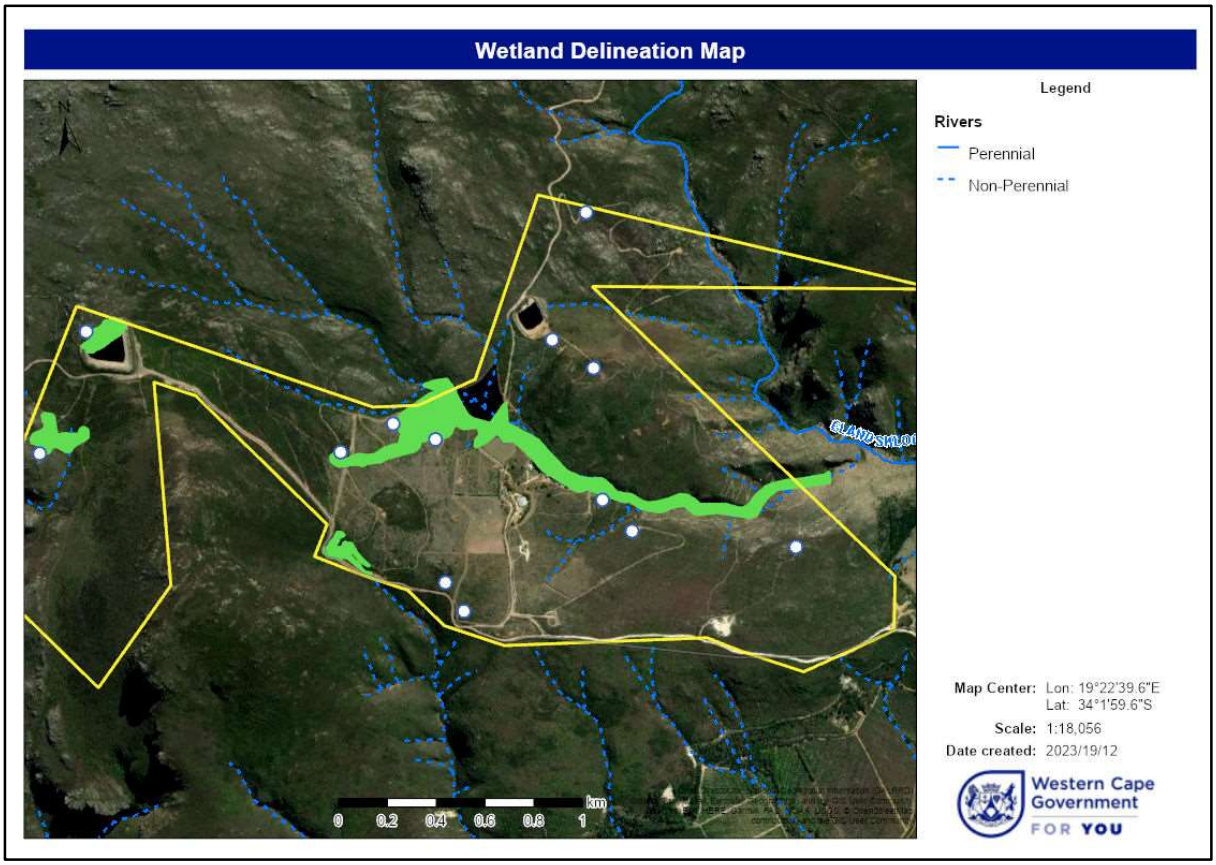


Figure 11: Wetland Delineation Map showing the on-site delineated wetlands and the mapped drainage lines. The white dots indicate the position of the proposed accommodation unit sites and the green polygon the groundtruthed hillslope seep wetlands.

3.2.2 Detailed Description for each Development Site

Given that single or double unit accommodation units are proposed in various locations across the site which is extensive and includes several minor catchments, it is considered appropriate to provide a brief description of the each proposed site with specific reference to the presence of wetlands and drainage lines. Note that only the directly affected aquatic feature is discussed, if any. The various sites proposed for development are shown in Figure 12 below.

Figure 12: Proposed location of new accommodation units and the new campsite.

Each site is discussed in detail below.

Site 26:

Two Eco Cabins are proposed at Site 26 which is positioned to the north of and overlooking a dam (see Figure 13). A hillslope is situated between the proposed cabin site and the dam. The presence of the wetland obligate *Berzelia lanuginosa* was the primary informant in determining the existence of the seep (see Figure 14).

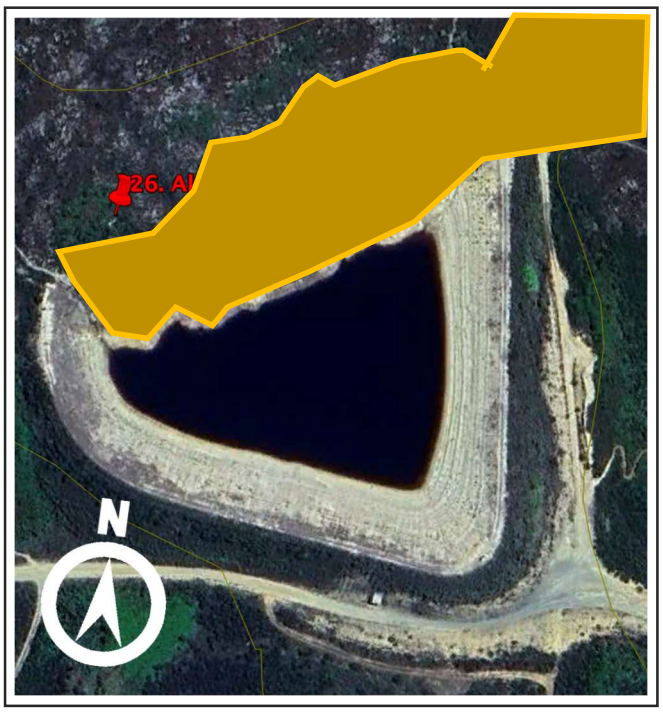


Figure 13: Proposed location of the site of the 2 Eco Cabins (Site 26) in relation to the dam and seep wetland.

Figure 14: Photos of the proposed site for 2 Eco Cabins (left) and the seep which lies downslope from the site indicated by the presence of *Berzelia lanuginosa*.

Site 27:

Two Eco Cabins are proposed as Site 27 which is located on the east-facing side of a small valley that contains a mapped non-perennial drainage line that flows in a southerly direction. A significant part of the drainage line extending up and down the valley from the proposed site was determined to comprise a hillslope seep (see Figure 15) which becomes an unchannelled valley bottom wetland as the valley drops off to the south. Vegetation including the presence of *B. lanuginosa*, *Pteridium* sp. (bracken) and the grass *Pennisetum macrourum* (see Figure 16) as well as auger samples which revealed dark soils high in organic matter and very wet (see Figure 9) were the primary informants in confirming the existence of the seep.

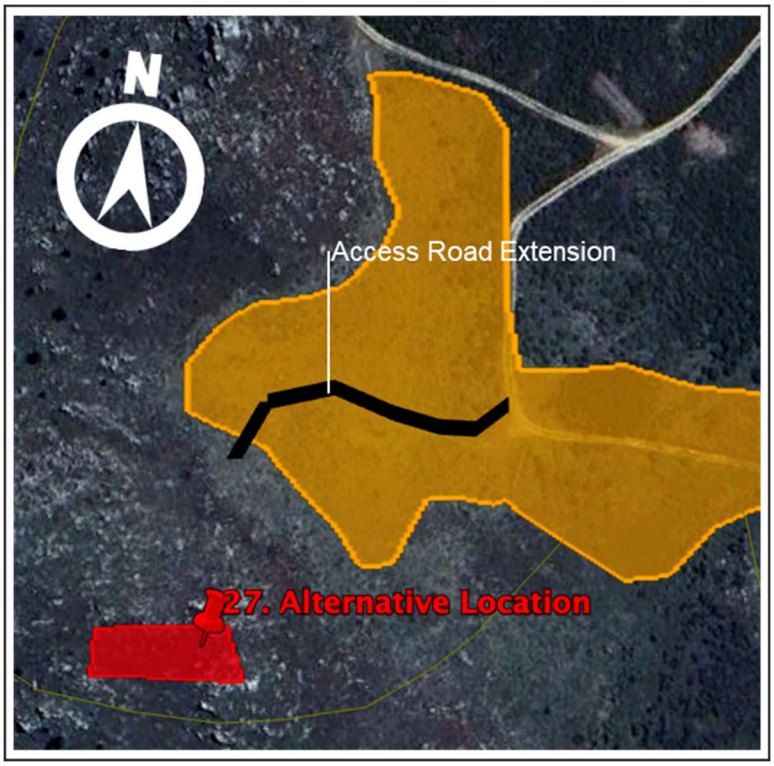


Figure 15: Proposed location of the site of the 2 Eco Cabins (Site 27) in relation to the delineated seep wetland (indicated as an orange polygon).

Figure 16: Photos of the wetland seep indicated by various grasses interspersed with *Berzelia lanuginosa.*

Site 2:

Site 2 is the proposed location of a new residence for the landowner. A bracken-dominated hillslope seep was identified approximately 25m south east of the site (see Figure 17) and extending down the slope towards the proposed campsite site (Site 3A). This seep comprises the upslope part of the large hillslope seep that is identified in the NWM5 Map (see Figure 7).

Figure 17: Bracken-dominated seep identified near the proposed location of the new primary dwelling (Site 2).

Site 25:

Site 25 is the proposed location of a single Eco Cabin. The site and its immediate surroundings showed no signs of the presence of aquatic habitat (see Figure 18). Utilisation of this site presents no risks to aquatic habitat.

Figure 18: Photos of the proposed location of Site 25 showing the terrestrial habitat that comprises the site and its immediate surroundings.

Site 24:

A single Eco Cabin is proposed at Site 24 which is located on the upper slope of a valley which falls away to the south from the proposed site. The site and its immediate surrounds were confirmed to comprise only terrestrial habitat (see Figure 19). The nearest aquatic habitat is located beyond the property boundary approximately 110m to the south west. Utilisation of this site presents negligible risks the buffering effect of the ±110m set-back from the watercourse, the intact indigenous vegetation present in the set-back area and also the small footprint of the proposed unit at Site 24 which is limited a single Eco Cabin (±120 m²).

Figure 19: Photos of the proposed location of Site 24 showing the terrestrial habitat that comprises the site and its immediate surroundings.

Sites 3A & 3B:

Site 3A comprises the site of the proposed new campsite which is located approximately 35 m to the south of a mapped non-perennial drainage line and also approximately 25 m to the west of a groundtruthed hillslope seep. Site 3B which is located ±50m downslope and east of the groundtruthed hillslope seep is the proposed site of 2 new Eco Pods. Groundtruthing revealed the presence of wetland habitat in close proximity to both sites. This wetland comprises an upslope extension of the large hillslope seep indicated on the NWM5 (CSIR, 2018). Hydrology, soils and vegetation were used in combination to determine the existence and extent of the wetland. Hydrophytic vegetation encountered

in this area comprised *Pennisetum macrourum*, *Pteridium* sp (bracken)., *Restio panniculatus, Plecostachys serpyllifolia* and *Watsonia barbonica*. (see Figure 21).

Figure 20: Proposed location of the campsite (Site 3A) and 2 Eco Pods (Site 3B) in relation to rhe groundtruthed hillslope seep.

Figure 21: Photos of the campsite (Site 3A). Note *Watsonia barbonica* in the photo on the right.

Site 28:

Two new Eco Pods are proposed at Site 28 which lies on a ridge just upslope of a distinct finger-like rock structure. The site itself and the surrounding area showed no signs of the presence of aquatic habitat (see Figure 22). The nearest watercourse comprises a non-perennial drainage line which lies approximately 220m to the south west. The perennial Elandskloof River which is mapped as an unchannelled valley bottom wetland on the NWM5 is located approximately 360m to the east of the proposed site and in a separate catchment (i.e. utilisation of this site presents negligible risk to aquatic habitat).

Figure 22: Photos of Site 28 indicating the terrestrial nature of the site and its immediate surroundings.

Site 6:

Site 6 comprises the proposed site for a new Eco Cabin. The site is north-facing and overlooks a small off-stream dam which shows no signs of any aquatic habitat within or near the site (see Figure 23). The nearest watercourse is a non-perennial drainage line approximately 130m north east of the proposed site. Utilisation of this site presents negligible risk to any aquatic habitat.

Figure 23: Photo of the dam with Site 6 located beyond and upslope of the dam. The site and its immediate surroundings comprise terrestrial habitat and the dam is an off-stream dam and as such is not deemed to be a watercourse.

Site 7:

Site 7 is the site of two new Eco Cabins. It lies approximately 200m south east of Site 6 on a hillock with east-facing views. The site contains no signs of aquatic habitat near or immediately down-slope of the site (see Figure 24). Utilisation of this site presents zero risk to any aquatic habitat.

Figure 24: Photos of Site 7 which exists on the top of a hillock and contained indigenous terrestrial grasses and shrubs.

Site 29:

A new sundowner boma and fire pit is proposed at Site 29. The site lies adjacent and to the south east of a levelled, lawned area which is used for events. Site 29 revealed no signs of aquatic habitat as the vegetation on the site and immediate surrounds is dominated by terrestrial species (see Figure 25). The utilisation of this site presents zero risk to any aquatic habitat.

Figure 25: Photos of the proposed site of the sundowner boma and fire pit. All vegetation growing in and near the site comprises terrestrial species.

Site 31

Site 31 comprises a grass-dominated spur overlooking the valley that is the proposed site of 2 new Eco Cabins. The site contains no aquatic habitat and the nearest watercourse, the same non-perennial drainage line referred to in Site 6, lies approximately 220m to the north-east (see Figure 26). Utilisation of this site presents zero risk to any aquatic habitat.

Figure 26: Photo of Site 31 which comprises a grass-dominated spur with exceptional views.

Site 30:

Site 30 is the site of a new Eco Pod. The site lies on a north-east facing slope of a small valley that contains a non-perennial drainage line which is located approximately 60m north of the proposed site. The site and its immediate surrounds contains no signs of aquatic habitat (see Figure 27). The drainage line to the north contains *B. lanuginosa* indicating the presence of riparian habitat associated with the drainage line. Utilisation of this site however is unlikely to present any risk to any aquatic habitat given that the site is suitably set-back from the drainage line.

Figure 27: Photos of the proposed site of a new Eco Pod. The vegetation within and surrounding the site comprises terrestrial vegetation. Note the valley in the photo on the left which contains a non-perennial drainage line and associated riparian habitat approximately 50m downslope of the site.

3.3 Watercourse Classification

The study area falls within the Southern Coastal Belt Ecoregion, Breede Water Management Area (WMA) and the Riviersonderend sub-Water Management Area (sub-WMA) as defined by NFEPA (2011). The table below summarise the results from **Level 3** through to **Level 6** of the wetland and aquatic ecosystem classification user manual (Ollis *et. al.* 2013) as applied to the four hillslope seeps in close proximity to the proposed tourism accommodation facilities. Given that the mapped unchannelled valley bottom wetland associated with the Elandskloof River is not hydrologically coupled with the proposed development sites, it has been excluded from detailed assessment. As such Table 7 presents the classification system as applied to the site's groundtruthed hillslope seeps which are the water resources at direct risk of being impacted by the proposed development.

Table 7: Level 3, 4, 5 and 6 of the wetland and aquatic ecosystem classification.

Level 3 (Landscape Setting)	**Slope:** an inclined stretch of ground typically located on the side of a mountain, hill or valley, not forming part of a valley floor. Includes scarp slopes, mid-slopes and foot-slopes.
Level 4 (Hydrogeomorphic unit)	**Hillslope seep:** a wetland area located on gently to steeply sloping land and dominated by colluvial (i.e. gravity-driven), unidirectional movement of water and material down-slope.
Level 5 (Hydrological regime)	**Perennial:** Flows continuously throughout the year, in most years**.** **Non-perennial:** does not flow continuously throughout the year, although pools may persist.
Level 6 (Descriptors)	**Natural:** may be impacted, or even realigned, but of natural origins.

3.4 Ecological Assessment of the large Hillslope Seep

3.4.1 Ecosystem Services

The WET-Ecoservices tool was applied to the large hillslope seep (large green polygon in Figure 11). Fifteen Ecosystem Services were assessed with overall rating of the likelihood of the wetland providing ecosystem services being intermediate (see results presented in Figure 28 and Table 8 below). The most noteworthy results are:

- The most important ecosystem services provided by the large seep wetland are erosion control, maintenance of biodiversity and nitrate removal all of which scored **High**. Erosion control achieves this score due to there being evidence of erosion, significant levels of soil disturbance in close proximity to the wetland as a result of the historical agricultural use of the farm, the moderate erosivity of the site's soils and the high degree of surface roughness attributed to the vegetation present within the wetland. The high score for maintenance of biodiversity is attributed to the threat status of the wetland vegetation and surrounding terrestrial vegetation, the size of the wetland and its vegetation cover which is dominated by indigenous species. The capacity to provide nitrate removal can be attributed to the representation of all three hydrological regimes within the wetland, the extent of vegetation cover and the fact that the lower portion of the wetland downstream of the dam is identified as an aquatic CBA in the WCBSP (2017) as indicated in Figure 7.
- The services of flood attenuation, streamflow regulation, sediment trapping, phosphate and toxicant removal), toxicant removal and carbon storage were all assessed to be **Intermediate**. In all cases this can be attributed to the lower part of the wetland being identified as an aquatic CBA and the extent of vegetation cover in the wetland.
- The wetland provides a water supply for tourism-related activities as there is an in-stream dam located within the wetland which provides irrigation water for the farm. Other than this service which is rated **Intermediate**, the wetland provides zero to **Low** level direct socio-economic benefits such as harvestable materials, production of foods, tourism and education and has no cultural significance. The wetland has some potential to deliver research and education benefits due largely to its accessibility and reference site suitability.

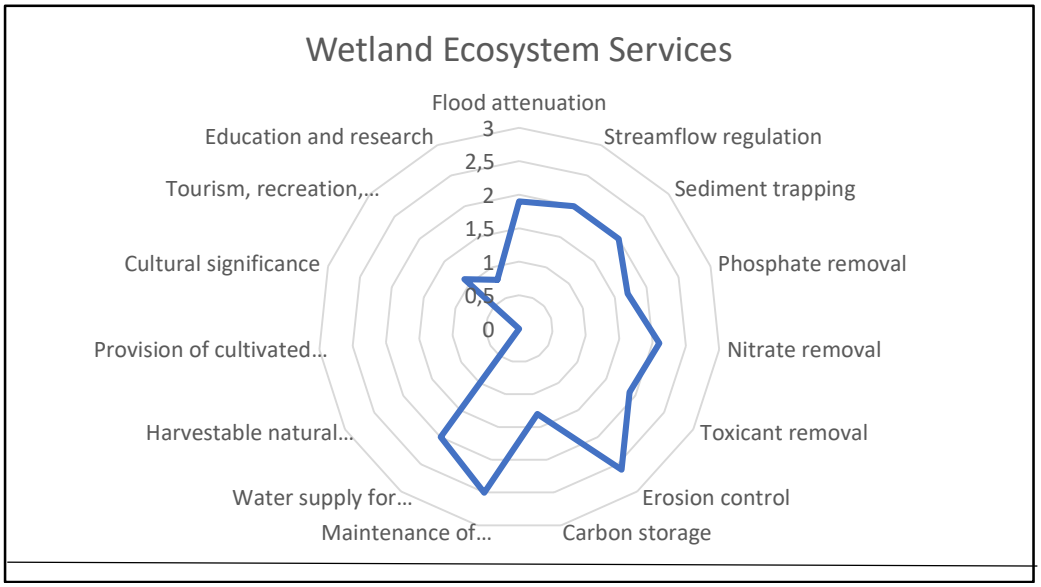


Figure 28: WET-EcoServices results

Table 8: WET-EcoServices results.

Wetland Ecosystem Services		
		Pre-Development
Indirect Benefits	Flood attenuation	1,9
	Streamflow regulation	2
	Sediment trapping	2
	Phosphate removal	1,7
	Nitrate removal	2,1
	Toxicant removal	1,9
	Erosion control	2,6
	Carbon storage	1,3
Direct Benefits	Maintenance of biodiversity	2,5
	Water supply for direct human use	2
	Harvestable natural resources	0
	Provision of cultivated foods	0
	Cultural significance	0
	Tourism, recreation, scenic value	1,1
	Education and research	0,8
	Total	21,9
	Average	1,46

3.4.2 Present Ecological State

Table 9 presents the impact scores for hydrology, geomorphology and vegetation condition and the trajectory of change for the large seep wetland (Figure 11).

Table 9: WET-health assessment results.

HGM Unit	Ha	Extent (%)	Hydrology		Geomorphology		Vegetation	
			Impact Score	Change Score	Impact Score	Change Score	Impact Score	Change Score
Seep		100	3.5	-	0.6	-	3.7	-
PES Category			**C**	**-**	**A**	**-**	**C**	**-**

The overall PES for the large hillslope seep was calculated to be 2.6 which equates to a **Category C** (Moderately modified). This means that a moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact. The key aspects impacting on the state of the wetland are as follows:

- **Hydrology:** While changes in the water inputs due to activities in the wetland's catchment have been negligible, the presence of an impoundment in the central part of the wetland as well as farm roads and historically cultivated fields has impacted on the water distribution and retention characteristics within the wetland.
- **Geomorphology:** The geomorphology of the wetland is almost intact with only slight increases in run-off due to cultivated fields and cleared areas (dirt tracks) within the wetland and minor evidence of erosion and sedimentation.
- **Vegetation:** The changes in vegetation composition have been brought about by historical fruit tree cultivation within the wetland, minor levels of erosion and sedimentation, deep flooding of a small part of the wetland by the dam and likely seepage from below the dam. The result is that approximately 50% of the wetland remains untransformed.

3.4.3 Ecological Importance and Sensitivity

The EIS method applied to the large hillslope seep wetland is based on the assessment tool developed by Rountree *et. al.* (2013). The key aspects considered during the EIS assessment are presented in Table 10 and summarised below:

- The wetland is unlikely to support endangered or rare biota or populations of unique species and falls within a Critically Endangered terrestrial vegetation type (South Sonderend Sandstone Fynbos) and an Endangered vegetation type (Western Coastal Shale Band vegetation) and contains an Endangered wetland vegetation type (Southwest Sandstone Fynbos).
- The wetland is not known to be an important site for species migration but it may be used for breeding and/or feeding given its size and intact condition;
- The wetland is recognised in the Western Cape Biodiversity Spatial Plan (2017) as being of conservation importance given the designation of CBA to the lower portion of the wetland;
- While the wetland is relatively large (>10 ha), it is not considered to be of a rare type (hillslope seeps are common in the steeper sloping terrain in areas where the underlying geology is sandstone);
- The wetland can be regarded as being insensitive to changes in hydrology due to it being a seep wetland which is largely driven by subsurface water inputs but on the contrary, it is regarded as being sensitive to changes in water quality due to the water driving the wetland system being acidic and low in nutrients.

Table 10: EIS Results.

	Large Hillslope Seep Wetland	
ECOLOGICAL IMPORTANCE AND SENSITIVITY	Score (0-4)	Confidence (1-5)
Biodiversity support	**Moderate**	
Presence of Red Data species: Endangered or rare Red Data species present	3	2
Populations of unique species: Uncommonly large populations of wetland species	2	2
Migration/breeding/feeding sites: Importance of the unit for migration, breeding site and/or feeding	2	1
Landscape scale	**Moderate**	
Protection status of the wetland: National (4), Provincial, private (3), municipal (1 or 2), public area (0-1)	0	5
Protection status of the vegetation type: SANBI guidance on the protection status of the surrounding vegetation	3	5
Regional context of the ecological integrity: Assessment of the PES (habitat integrity), especially in light of regional utilisation	2	5
Size and rarity of the wetland type/s present: Identification and rarity assessment of the wetland types	2	5
Diversity of habitat types: Assessment of the variety of wetland types present within a site	3	5
Sensitivity of the wetland	**Moderate**	
Sensitivity to changes in floods: Floodplains at 4; valley bottoms 2 or3; pans and seeps 0 or 1	1	4
Sensitivity to changes in low flows/dry season: Unchannelled VB's probably most sensitive	2	4
Sensitivity to changes in water quality: Esp natural low nutrient waters – lower nutrients likely to be more sensitive	4	4
ECOLOGICAL IMPORTANCE AND SENSITIVITY	Median value =	**2**

The overall EIS category was determined to be **Moderate** which means that the wetland is ecologically important and sensitive on a provincial or local scale. The biodiversity of the system is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major drainage lines (see Table 11).

Table 11: EIS Category definitions.

EIS Category definitions	Range of EIS score
Very high: Wetlands that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these systems is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major drainage lines	>3 and <=4
High: Wetlands that are considered to be ecologically important and sensitive. The biodiversity of these systems may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major drainage lines.	>2 and <=3
Moderate: Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major drainage lines.	>1 and <=2
Low/marginal: Wetlands that are not ecologically important and sensitive at any scale. The biodiversity of these systems is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major drainage lines.	>0 and <=1

3.4.4 Recommended Ecological Category

The PES has been calculated as falling within a Category C. Since the EIS has been determined to be Moderate the REC remains at a Category C. As such there is no requirement to improve the PES but no deterioration in the ecological integrity of the wetland should be tolerated. This means that no impacts on the wetland that decrease the PES should be permitted. Given that the moderate EIS suggests that the wetland is not usually sensitive to flow and habitat modifications, minor flow regime and water quality impacts could be tolerated.

3.4.5 Buffer Determination

Each of the proposed sites for the tourism accommodation units have been located more than 32m from any mapped drainage line and furthermore greater than 20m from any wetland edge. This exceeds the recommended minimum buffer for low impact residential land-use which is the land-use category most applicable to the proposed tourism development (Macfarlane and Bredin, 2017).

3.5 Ecological Assessment of the three minor Hillslope Seeps

3.5.1 Ecosystem Services

The WET-Ecoservices tool was applied to the 3 minor hillslope seeps (small green polygons in Figure 11) as if they were a single HGM unit. This is considered appropriate given the small size of the seeps and their relative homogeneity. Fifteen Ecosystem Services were assessed with an overall rating of the likelihood of the wetland providing ecosystem services being **Moderately low** (see results presented in Figure 29 and Table 12 below). The most noteworthy results are:

- The most important ecosystem service provided by the hillslope seeps is erosion control which scored High. Erosion control achieves this score due to there being limited evidence of erosion despite moderate levels of soil disturbance within the wetlands, the moderate erosivity of the site's soils and the extensive level of vegetation cover, albeit it not all indigenous, present within the wetland.
- Maintenance of biodiversity achieved the second highest score (also **High**), attributed partly to the extent of vegetation cover but also by the relatively large size of the HGM type and its likelihood to contain red data species or provide suitable habitat for such species.
- The services of flood attenuation, sediment trapping, nutrient assimilation (phosphate and nitrate removal), toxicant removal and carbon storage were all assessed to be **Intermediate**. In all cases this can be attributed to the extensive vegetation cover which contributes to the high surface roughness is largely intact and the presence of important aquatic ecosystems downstream including aquatic CBAs associated with the large hillslope seep which is downstream of two of the three small seeps.

- The small seep wetlands provide zero to negligible direct socio-economic benefits such as water supply for human use, harvestable materials, production of foods, tourism and education and has no cultural significance. The wetlands have some, albeit limited, potential to deliver research and education benefits due largely to its accessibility and reference site suitability.

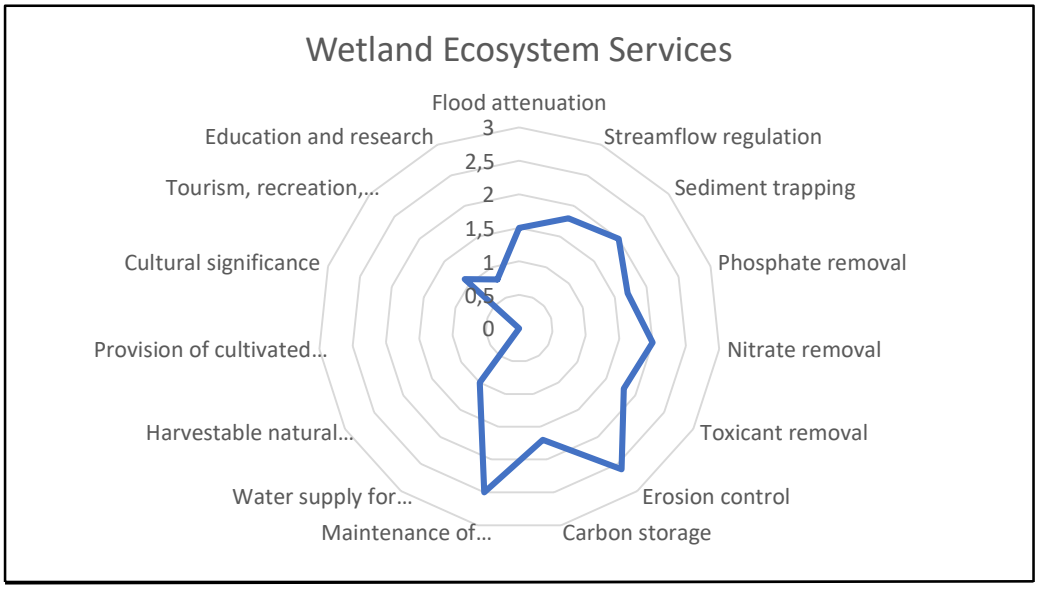


Figure 29: WET-EcoServices results.

Table 12: WET-EcoServices results.

Wetland Ecosystem Services		
		Pre-Development
Indirect Benefits	Flood attenuation	1,5
	Streamflow regulation	1,8
	Sediment trapping	2
	Phosphate removal	1,7
	Nitrate removal	2
	Toxicant removal	1,8
	Erosion control	2,6
	Carbon storage	1,7
Direct Benefits	Maintenance of biodiversity	2,5
	Water supply for direct human use	1
	Harvestable natural resources	0
	Provision of cultivated foods	0
	Cultural significance	0
	Tourism, recreation, scenic value	1,1
	Education and research	0,8
	Total	20,8
	Average	1,4

3.5.2 Present Ecological State

Table 13 presents the impact scores for hydrology, geomorphology and vegetation condition and the trajectory of change for the three small hillslope seeps (small green polygons in Figure 11).

Table 13: WET-health assessment results.

HGM Unit	Ha	Extent (%)	Hydrology		Geomorphology		Vegetation	
			Impact Score	Change Score	Impact Score	Change Score	Impact Score	Change Score
Seep	23,4	100	1,0	-	0,6	-	1,4	-
PES Category			**B**	**-**	**A**	**-**	**B**	**-**

The overall PES for the hillslope seeps was calculated to be 1,0 which equates to a **Category B** (Largely natural with few modifications). The wetlands exhibit a slight change in ecosystem processes and a small loss of natural habitats and biota have taken place. The key aspects impacting on the state of the wetland are as follows:

- **Hydrology:** While changes in the water inputs due to activities in the wetlands' catchment have been negligible, surface roughness has been slightly reduced due to historical disturbance as a result of cultivation within one of the seeps and the presence of farm roads and pedestrian pathways and low levels of infilling and sediment deposition associated with the farm roads.
- **Geomorphology:** The geomorphology of the wetlands is almost intact with only slight increases in run-off due to reduced surface roughness as a result of historical cultivation and small cleared areas (dirt roads and pedestrian pathways) within the wetland and evidence, albeit minor, of erosion and sedimentation.
- **Vegetation:** Very minor changes in vegetation composition have been brought about by historical cultivation within one of the wetlands and minor levels of erosion and sedimentation in all wetlands. The result is that approximately 90% of the wetlands remain untransformed.

3.5.3 Ecological Importance and Sensitivity

The EIS method applied to the hillslope seeps is based on the assessment tool developed by Rountree *et. al.* (2013). The key aspects considered during the EIS assessment are summarised below and in Table 14 are as follows:

- Biodiversity support is considered **Low/marginal** because:
    - The wetlands are unlikely to support endangered or rare biota or populations of unique species given their small size but the threat status of the surrounding terrestrial vegetation (critically endangered) and wetland vegetation present within the wetlands (Endangered) elevates the score;
    - The wetlands are also unlikely to be an important site for species migration, breeding and/or feeding due to their small size and no species were observed utilising the site in these ways during the site inspection;
- The ecological importance of the seep wetlands at the landscape scale is considered to be **Moderate** because:
    - While the wetlands themselves have no conservation status and are small and locally common, the threat status of the surrounding terrestrial vegetation type and the ecological integrity of the three seeps (PES Category B) as well as the moderate diversity of habitat types present within the wetlands increases the rating;
- The sensitivity of the wetlands is regarded as **Low/marginal** because:
    - They are not considered to be sensitive to changes in hydrology due to their classification as hillslope seeps (e.g. reduced surface flows would not lead to desiccation of the wetland as the wetland type is mostly sustained by subsurface flow). They are however considered to be sensitive to changes in water quality due to the water driving the wetland system being characteristically acidic and low in nutrients.

Table 14: EIS Results.

	Small Hillslope Seep Wetlands	
ECOLOGICAL IMPORTANCE AND SENSITIVITY	Score (0-4)	Confidence (1-5)
Biodiversity support	**Low/marginal**	
Presence of Red Data species: Endangered or rare Red Data species present	2	2
Populations of unique species: Uncommonly large populations of wetland species	1	2
Migration/breeding/feeding sites: Importance of the unit for migration, breeding site and/or feeding	1	1
Landscape scale	**Moderate**	
Protection status of the wetland: National (4), Provincial, private (3), municipal (1 or 2), public area (0-1)	0	5
Protection status of the vegetation type: SANBI guidance on the protection status of the surrounding vegetation	3	5
Regional context of the ecological integrity: Assessment of the PES (habitat integrity), especially in light of regional utilisation	3	5
Size and rarity of the wetland type/s present: Identification and rarity assessment of the wetland types	1	5
Diversity of habitat types: Assessment of the variety of wetland types present within a site	2	5
Sensitivity of the wetland	**Low/marginal**	
Sensitivity to changes in floods: Floodplains at 4; valley bottoms 2 or3; pans and seeps 0 or 1	0	4
Sensitivity to changes in low flows/dry season: Unchannelled VB's probably most sensitive	1	4
Sensitivity to changes in water quality: Esp natural low nutrient waters – lower nutrients likely to be more sensitive	3	4
ECOLOGICAL IMPORTANCE AND SENSITIVITY	Median value =	**2**

The overall EIS category for the small hillslope seep wetlands was determined to be **Low/marginal** which in this case means that the wetlands are not ecologically important and sensitive at any scale. The biodiversity of these systems is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major drainage lines (see Table 15).

Table 15: EIS Category definitions.

EIS Category definitions	Range of EIS score
Very high: Wetlands that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these systems is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major drainage lines	>3 and <=4
High: Wetlands that are considered to be ecologically important and sensitive. The biodiversity of these systems may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major drainage lines.	>2 and <=3
Moderate: Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major drainage lines.	>1 and <=2
Low/marginal: Wetlands that are not ecologically important and sensitive at any scale. The biodiversity of these systems is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major drainage lines.	>0 and <=1

3.5.4 Recommended Ecological Category

The PES has been calculated as falling within a Category B. Due to the fact that the small hillslope seeps have been determined to have a Low/marginal EIS some degree of disturbance would be considered acceptable. The REC would therefore be set at a Category C. This means that a degree of modification of the wetlands could be tolerated provided that the PES does not fall below a Category C.

3.5.5 Buffer Determination

Each of the proposed sites for the tourism accommodation units have been located more than 32m from any mapped drainage line and furthermore greater than 20m from any wetland edge. This exceeds the recommended minimum buffer for low impact residential land-use which is the land-use category most applicable to the proposed tourism development (Macfarlane and Bredin, 2017).

4 Assessment of Impacts

4.1 Description of the proposed development activities & Impact Identification

4.1.1 Description of the Proposed Development

The proposed new development at Rusty Gate Mountain Retreat comprises the development of the following as shown in Figure 29:

- 9 Eco Cabins (2 per site at sites 7, 26 & 27 and 1 per site at sites 6, 24 & 25) each with a development footprint of 120 m² (see Figure 31);
- 5 Eco Pods (2 per site at sites 3B and 28 and 1 at site 30) each with a development footprint of 60 m²(see Figure 32);
- A sundowner boma and fire pit at site 29;
- A campsite which provides 6 individually serviced camping sites (each 225 m²) each with an ablution and scullery at site 3A (see Figure 33); and
- A new primary residence with a footprint of approximately 120 m² at site 2 (see Figure 34).

Each site will be serviced in the following manner:

- Power supply: Each accommodation unit and the ablution facilities at the camp site will be supplied with an off-grid Solar PV power generating system;

- Water supply: Some accommodation units and the ablutions at the campsite will be connected via HDPE pipelines to the farm's potable water supply while other higher elevated sites (Sites 28, 27, 25 and 31) will be provided with a tanker supply;
- Sewerage: All effluent from the accommodation units and ablutions for the campsite will be discharged via buried HDPE pipes leading to conservancy tank systems. The conservancy tanks will be serviced and emptied by using municipal or 3rd party service providers that can collect, remove, and dispose of the sewage at appropriate disposal sites.

New dirt access roads only required for sites 27 (new road length 92 m), 3a (124 m), 3b (48 m) as indicated in Figures 15 and 20 respectively. All other sites are currently accessible via existing roads infrastructure and do not require upgrading.

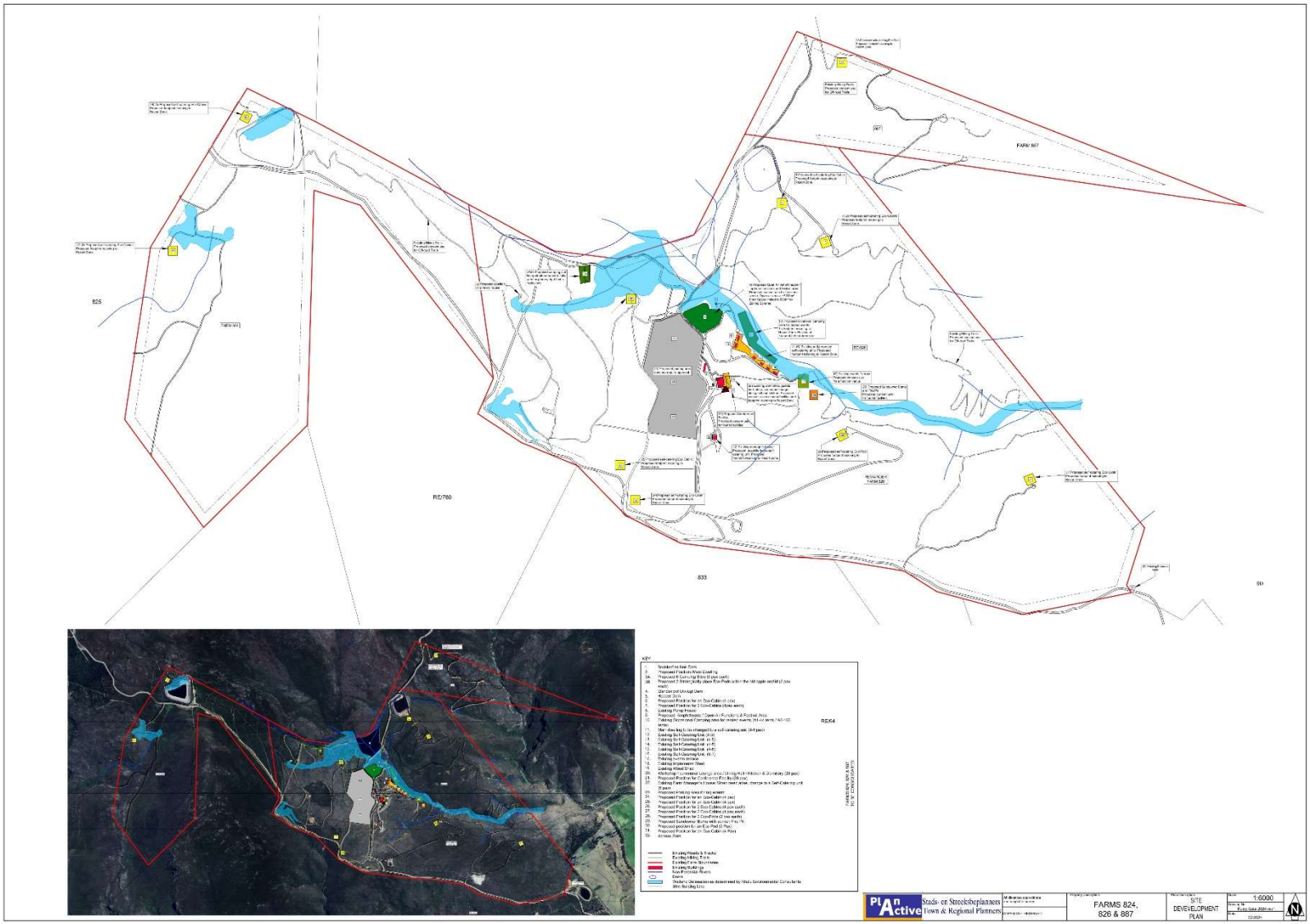


Figure 30: Site Development Plan showing the location of the proposed new tourist accommodation structures.

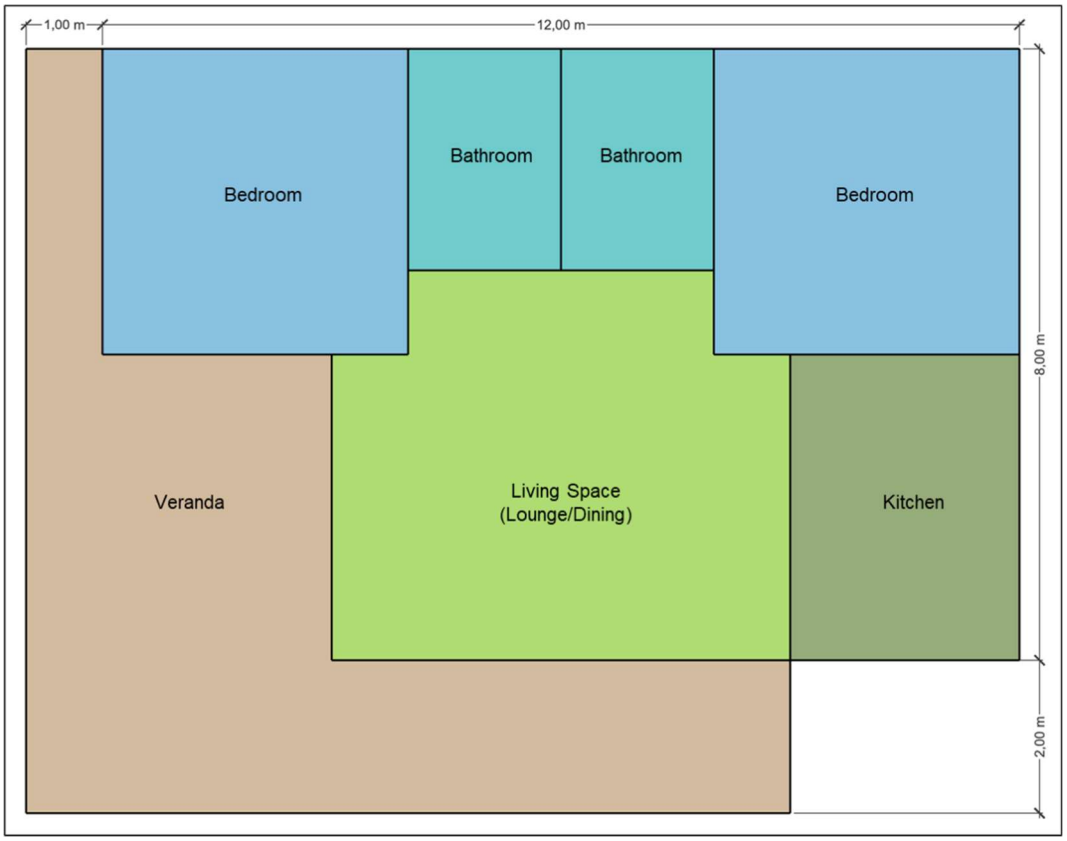


Figure 31: Eco Cabin floor plan.

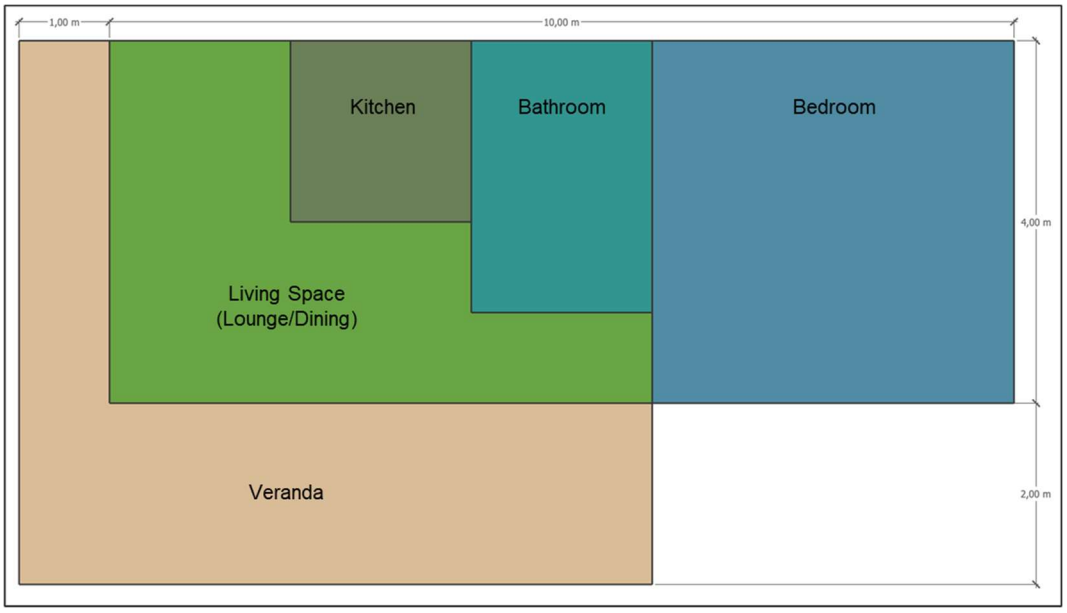


Figure 32: Eco Pod floor plan.

Figure 33: Campsite layout plan.

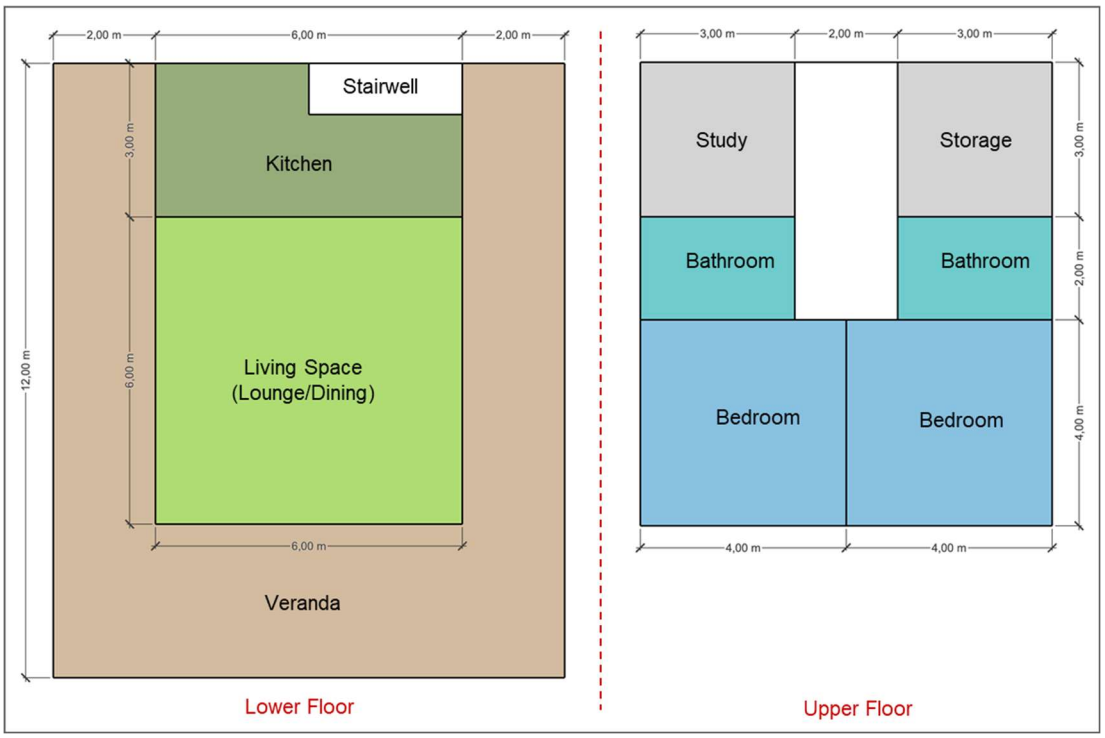


Figure 34: New main dwelling floor plan.

4.1.2 Identification of potential freshwater ecological impacts associated with the proposed development

Based on the project description provided in Sections 4.1.1 the following potentially significant, direct freshwater ecological impacts have been identified per phase of the proposed development:

Planning, design and development/construction phase

- **Disturbance of wetland habitat:** The groundtruthed hillslope seep wetlands may be disturbed as a result of construction activity (driving of construction vehicles and storage of construction materials and spoil).
- **Loss of biota:** Mortality and displacement of organisms may occur as a result of site clearing, stockpiling of soils and construction materials within or near the wetlands, as well as the operation of machinery and the driving of vehicles within or near the wetlands.
- **Alteration of flow regime**: Reduced catchment roughness as a result of the clearing of vegetation may cause an increase in stormwater run-off as well as an increase in flood peaks in the receiving watercourses.
- **Increased erosion and sedimentation**: The exposure of soils to erosion associated with site clearing, excavations and/or infilling would increase erosivity and, if coupled with rainfall, may result in sediment loading of receiving watercourses.
- **Water quality impairment:** Water quality impairment may arise as a result of the release of contaminants such as cement and other building materials / chemicals into the downstream receiving watercourses via stormwater run-off. In addition, potential accidental spills of chemicals and fuel may also result in contamination of stormwater and ultimately contaminate the receiving watercourse.

Operational phase

The operational phase of the proposed tourism development is likely to generate the following impacts on the site's hillslope seeps and also the downstream receiving watercourse (*viz-a-viz* the Elandskloof River which is identified as an Aquatic CBA):

- **Wetland habitat disturbance:** Edge effects associated with occupation and maintenance of the accommodation units including trampling of wetland vegetation, compaction of soils due to the requirement for tanker access to empty the conservancy tanks and possible indiscriminate sold waste disposal (i.e. littering).
- **Alteration of natural flow regime**: Flow and flood peaks would increase as a result of the increased extent of hard surfaces and reduced infiltration brought about by the proposed development which includes roofed buildings and in two cases new access roads.
- **Water quality impairment:** In the event that the proposed sewerage treatment and disposal system fails or is damaged or conservancy tanks not emptied timeously then contamination of the receiving watercourses is highly likely.
- **Biota loss:** If the receiving watercourses receive contaminants, particularly in the form of raw sewage from a failed, damaged or poorly maintained sewerage treatment and disposal system then it is likely that biota loss will take place, owing to the sensitivity of the aquatic ecosystems to water quality changes.

4.2 Assessment of the potential impacts associated with the proposed development of new tourist accommodation facilities

4.2.1 Construction Phase

Impact 1 –Disturbance to wetland habitat

Construction activity and particularly the operation of construction machinery and vehicles within and near wetland habitat can cause significant disturbance to wetland habitat. Most of the impacts arise

when wetland vegetation is damaged and topsoil compacted as a result of the driving of construction vehicles in and near wetland areas. Also inappropriately located construction materials such as soil and sand stockpiles, bricks, steel and timber would similarly crush wetland vegetation and cause disturbance of the habitat.

Given that the footprint of the individual units and campsite is small and each new accommodation unit is setback by at least 32m from the site's drainage lines and at least 20m from any delineated wetland edge, the likelihood of wetland habitat being disturbed is improbable which results in an impact significance rating of **Low** (-ve). Through clearly demarcating the edge of the development site with visible and weather-proof markers and designating the wetland area and the 32m buffer as a No-Go area during the construction phase, minimal disturbance of wetland habitat would occur (see Table 16 below).

Results

Table 16: Impact significance rating for the disturbance of wetland habitat (construction phase).

Alternatives	Intensity	Extent	Duration	Probability of impact occurring	Significance
Without mitigation	Low	Site specific	Short term	Probable	Low (-ve)
With mitigation	Medium	Site specific	Short term	Improbable	Very low (-ve)

Essential mitigation measures:

- Clearly demarcate the edge of the development footprint of each accommodation area using weather-proof markers for the full duration of the construction phase and ensure that construction activities are limited to within the designated area; and
- Designate a 20m setback from the delineated wetland edges for sites 26, 27, 2, 3A, 3B and 28 and the 32m setback for the remaining sites as a No-Go area during the construction phase (i.e. the setback areas and their associated watercourses must be off-limits to construction workers, vehicles and machinery unless authorised by the ECO).

Impact 2 – Alteration of Flow Regime

In order to construct the accommodation units and layout the campsite and boma area indigenous terrestrial vegetation would have to be cleared and this would have the effect of reducing catchment roughness. The reduced catchment roughness would cause an increase in run-off peak flows as a result of the accelerated run-off and reduced infiltration. Minimising the intensity of the impact is the very limited area that will be cleared relative to the size of the catchment of the wetlands and drainage lines (i.e. the reduction in catchment roughness is minimal).

Overall, the alteration of flow regime associated with the removal of vegetation during the construction phase is rated to be of **Very low (-ve)** significance (see Table 17 below) without mitigation. It is not considered necessary to mitigate the impact.

Results

Table 17: Impact significance rating for alteration of flow regime (construction phase).

Alternatives	Intensity	Extent	Duration	Probability of impact occurring	Significance
Without mitigation	Low	Site specific	Short term	Probable	Very low (-ve)
With mitigation	*Mitigation not required*				

Impact 3 – Increased sedimentation

Sediment loading of the hillslope seeps and the downstream receiving watercourses could arise if sediment-laden run-off from the construction sites reaches any of the downslope wetlands and drainage lines. Sediment loading of run-off would typically be associated with the following aspects of the construction project:

- Clearing of vegetation resulting in the exposure of the site's moderately erosive soils to stormwater

erosion;
- Importation of fill material to construct new access roads (applicable to sites 27, 3A and 3B which all require new relatively short access roads) which would also be temporarily vulnerable to stormwater erosion;
- Soil, sand and stone (if fines are present) stockpiles which, if exposed to rain, would be susceptible to erosion; and
- Repeated driving of construction vehicles on the site which would result in disturbance of vegetation thereby exposing the underlying moderately erosive soils to erosion and causing the concentration of run-off which would exacerbate erosion.

Given the slope of the site, moderate erosivity of the site's soils and the fact that some of the hillslope seep wetlands are relatively close to wetlands and drainage lines, it is considered probable that sediment loading of the receiving hillslope seep wetlands and non-perennial drainage lines would take place in this manner. However, minimal soil disturbance will occur due to the proposed design to incorporate "stilt" or "pillar and beam" type foundations which will significantly limit excavations, the potential impact of increased sedimentation is rated to be of a **Low** (-ve) significance, without mitigation and of a **Very Low** (-ve) significance with the implementation of the recommended mitigation measures (see Table 18 below).

Results

Table 18: Impact significance rating for potential sedimentation (construction phase).

Alternatives	Intensity	Extent	Duration	Probability of impact occurring	Significance
Without mitigation	Low	Local	Short Term	Probable	Low (-ve)
With mitigation	Very low	Local	Short Term	Improbable	Very low (-ve)

Essential mitigation measures:
- Limit the construction phase to the dry summer months when rainfall is at its lowest;
- Make use of "stilt" or "pillar and beam" type foundations where the structure of accommodation units will be built on an elevated platform placed on top of the raised pillar/stilt foundation;
- Minimise the time that exposed soils are potentially exposed to the elements (as far as practically possible);
- Cover all soil, sand and stone stockpiles with plastic sheeting to ensure that the stockpiles are protected from rain;
- Actively repair any erosion runnels and prevent any sediment-laden run-off from exiting the construction through placement of sandbags or similar; and
- Immediately after construction of the buildings and associated infrastructure is complete, revegetate any exposed areas with locally occurring indigenous plant species.

Impact 4 – Water quality impairment

During the construction phase there is a reasonable likelihood that as a result of the operation of machinery and vehicles, and if oil leaks remain unchecked and fuel spillages occur during refuelling, then contamination of the stormwater would occur. Cement, which will be utilised for the foundations and some of the infrastructure is alkaline and can significantly impair water quality. This is a particular concern given the sensitivity of the wetlands to changes in water quality and also the fact that surface water in the region is characteristically acidic. Any contaminated stormwater from the site would flow towards the hillslope wetlands and drainage lines downslope of the construction sites and potentially cause water quality impairment.

The impact is rated to be of low intensity due to the limited scale of the construction project and limited requirement for cement due to the "stilt" or "pillar and beam" type foundations, local in extent and of a short-term duration. The impact significance rating is accordingly determined to be **Low** (-ve) if unmitigated and **Very Low** (-ve) if mitigated (see Table 19).

Results

Table 19: Impact significance rating for potential water quality impairment (construction phase).

Alternatives	Intensity	Extent	Duration	Probability of impact occurring	Significance
Without mitigation	Low	Local	Short term	Probable	Low (-ve)
With mitigation	Very low	Site-specific	Short term	Improbable	Very Low (-ve)

Essential mitigation measures:

- Undertake the construction project during the dry summer months and ensure that all construction vehicles and machinery cease from operating during the rainy winter period.
- Make use of "stilt" or "pillar and beam" type foundations where the structure of accommodation units will be built on an elevated platform placed on top of the raised pillar/stilt foundation.
- Ensure that all construction machinery and vehicles are checked for oil leaks and are in good working order before being permitted onto the development site;
- Use drip-trays at all times when operating petrochemical driven construction machinery (e.g. generators and cement mixers);
- Use drip trays and other appropriate containment methods while refuelling of vehicles and machinery;
- Demarcate an area for the refuelling of machinery and vehicles (this is recommended to be at the existing farm shed);
- Ensure that hazardous substances and chemicals are stored in a contained, impermeable area which has the capacity to contain at least 110% of the total volume of stored substances.
- Store cement is a secure weather-proof area (e.g. shipping container) and ensure that used cement bags are placed in plastic bin-bags prior to placement in the on-site solid waste storage area;
- All cement batching on the site must be undertaken on impermeable and bunded batching boards to ensure cement slurry is contained; and
- Any cement residues and concrete waste within the construction site must be removed at the end of every working day and disposed of as rubble.

Impact 5 – Loss of Biota

Construction activities within and/or in close proximity to watercourses inevitably cause biota loss, primarily biota mortality as a result of being crushed by vehicles or through the indiscriminate placement of machinery and/or construction materials. Given the small scale of the construction project, the setting back of the building platforms by a distance of at least 20m from the site's wetlands and at least 32m from the drainage lines, it is probable that only localized and very limited (i.e. low impact intensity) biota loss may take place. Most of the biota at risk would be terrestrial flora and fauna but it is likely that some of the more mobile wetland fauna may use the terrestrial areas for feeding and dispersal purposes and may be crushed during construction. Accordingly, the impact is rated to be of **Low** (-ve) significance without mitigation (see Table 20). The impact can be effectively mitigated to a **Very Low** (-ve) significance through the designation of the wetland and a 20m set-back as a No-Go area during construction and ensuring that construction materials stockpiles are maximally setback away from any wetland and drainage line.

Results

Table 20: Impact significance rating for impact on biota (construction phase).

Alternatives	Intensity	Extent	Duration	Probability of impact occurring	Significance
Without mitigation	Low	Site specific	Permanent	Probable	Low (-ve)
With mitigation	Very low	Site specific	Permanent	Improbable	Very low (-ve)

Essential mitigation measures:

- Clearly demarcate the edge of the development site using weather-proof markers for the full duration of the construction phase;
- Designate a 20m setback from the delineated wetland edges for sites 26, 27, 2, 3A, 3B and 28 and the 32m setback for the remaining sites as a No-Go area during the construction phase (i.e. the

setback areas and their associated watercourses must be off-limits to construction workers, vehicles and machinery unless authorised by the ECO); and
- Keep construction material stockpiles as far from the wetlands and drainage lines as possible and where possible do not place these immediately upslope of any of the hillslope seeps.

4.2.2 Operational Phase

Impact 1 – Alteration of Flow Regime

The presence of hard surfaces as a result of the development (comprising dwellings with roofs which are impermeable and new compacted gravel access roads for two of the sites which retards stormwater infiltration) increases run-off from the site. This then causes increased flow and increases flood peaks in the downstream, receiving watercourse.

The overall intensity of the impact is rated to be low due to the minimal development footprint and associated roof surface area which, coupled with the long-term duration of the impact and definite probability of occurrence, results in an impact significance rating of **Low (-ve)**. The impact can be mitigated through collecting the rainwater off the roofs of the dwellings and storing it in tanks for domestic use. This will result in the potential impact having a significance rating of **Very Low** (-ve).

Results

Table 21: Impact significance rating for the alteration of flow regime (operational phase).

Alternatives	Intensity	Extent	Duration	Probability of impact occurring	Significance
Without mitigation	Low	Local	Long Term	Definite	Low (-ve)
With mitigation	Very low	Local	Long Term	Definite	Very low (-ve)

Essential mitigation measures:
- Collect rainwater off the roofs of the dwellings and store the water in rainwater tanks for domestic use.

Impact 2 – Erosion and Sedimentation

The increase in run-off and flood peaks brought about by the increase in hard surfaces increases the erosive capacity of stormwater run-off. Exacerbating the erosive potential of run-off during the operational phase is the moderately erosive nature of the site's soils (derived from quartzitic sandstone) and the steep slopes of the portions of the site where the development is located. Any erosion that take's place during the operational phase would cause sediment loading of the run-off which would have a high likelihood of reaching the hillslope seep wetlands at sites 26, 27, 2, 3A, 3B and 28 because these are immediately downslope of the construction area.

The likelihood of operational-phase erosion taking place would be reduced if the roof run-off was captured and stored in rainwater tanks with the water being available for domestic use (e.g. for flushing of toilets etc). The impact significance is rated to be **Low** (-ve) and with the harvesting of rainwater would be reduced to a **Very low** (-ve) significance.

Results

Table 22: Impact significance rating for potential erosion and sedimentation (operational phase).

Alternatives	Intensity	Extent	Duration	Probability of impact occurring	Significance
Without mitigation	Low	Local	Long Term	Definite	Low (-ve)
With mitigation	Very low	Local	Long Term	Definite	Very low (-ve)

Essential Mitigation Measures
- Collect rainwater off the roofs of the dwellings and store the water in rainwater tanks for domestic use.

Impact 3 – Water quality impairment

Domestic effluent (including sewage) generated by the proposed accommodation units will be temporarily stored on-site in dedicated conservancy tanks which will be periodically emptied by either the municipal sewage disposal tanker or by a contractor. The proposed system, if operating efficiently, has a low likelihood of causing nutrient and toxicant loading of the downslope wetlands. However, if the system fails and results in spillages of raw effluent into the surrounding area, the potential impact would be highly significant, particularly given the high sensitivity of the wetland system to changes in water quality. The ways in which the system could fail include:

- Allowing the tank to overflow because the tanks have not been emptied on-time;
- Spillages during the emptying of the conservancy tank; and
- Leakages in the system due to damaged pipework and/or conservancy tank.

In order to minimise the risk of the conservancy tank overflowing it is essential that the tank is appropriately sized and that an operational agreement, specifying the timing of tank emptying, is formalised between the owner/s and the municipality / 3rd party contractor. Because most of the proposed sewerage system's pipework and the conservancy tank will be installed below-ground, it will be difficult to detect any leakages in the system. Operational phase monitoring of the system by being alert to odorous liquids emanating from the ground downslope of the conservancy tank site is recommended as the only practicable measure to mitigate the impact associated with leakages from the system. This could be carried out by the farm's maintenance workers or by a 3rd party.

The potential impact is rated to have a medium intensity and a long-term duration but is considered improbable thereby resulting in an impact significance rating of **Low** (-ve). Should the proposed measures to minimise the risk of the conservancy tank overflowing and timeously detect possible leaks be implemented then the significance of the potential impact would be reduced to **Very low** (-ve).

Results

Table 23: Impact significance rating for potential water quality impairment (operational phase).

Alternatives	Intensity	Extent	Duration	Probability of impact occurring	Significance
Without mitigation	Medium	Local	Long Term	Improbable	Low (-ve)
With mitigation	Low	Local	Short Term	Improbable	Very low (-ve)

Essential Mitigation Measures

- Ensure that the conservancy tank is appropriately sized (input should be obtained from a professional civils engineer and the calculation endorsed by the municipality).
- Formalise an operational agreement between the owner/s and the municipality/3rd party contractor that specifies the timing of tank emptying; and
- During the operational phase, monitor the site for any odorous liquids possibly being associated with a leaking sewerage system.

Impact 4 – Loss of Biota

Any discharge of untreated effluent, whether from an overflowing conservancy tank or leakages from the sewerage system, would cause some loss of wetland biota as the contaminants would reach the wetland downslope of the development site. Given that the wetland type is highly sensitive to changes in water quality, it is reasonable to assume that the biota associated with the wetland are equally sensitive. While the likelihood is improbable, should any discharges occur then the impact would be highly significant. However, the proposed sewerage system will be professionally designed and constructed with the best available materials and technology and therefore should not fail. As such the impact is rated to be of medium intensity if it occurs, due in part to the sensitivity of the system.

The potential impact of loss of biota as a result of failure of the sewerage system is rated to have a significance of **Low** (-ve). The impact can be effectively mitigated through appropriate design, effective operational management and monitoring for early leak detection. The implementation of these

measures would reduce the impact significance to **Very low** (-ve).

Results

Table 24: Impact significance rating for loss of biota (operational phase).

Alternatives	Intensity	Extent	Duration	Probability of impact occurring	Significance
Without mitigation	Medium	Local	Long Term	Improbable	Low (-ve)
With mitigation	Low	Local	Short Term	Improbable	Very low (-ve)

Essential Mitigation Measures

- Ensure that the conservancy tank is appropriately sized (input should be obtained from a professional civil engineer and the calculation endorsed by the municipality).
- Formalise an operational agreement between the owner/s and the municipality that specifies the timing of tank emptying; and
- During the operational phase, monitor the site for any odorous liquids possibly being associated with the sewerage system.

4.3 'No-Go' Scenario

The 'No-Go' alternative implies that no further development would take place at Rusty Gate Mountain Retreat and the current uses (primarily low intensity tourism) would prevail into the foreseeable future. While the historic (fruit tree cultivation) and current uses have had an impact on the site's aquatic ecosystems, it is the specialist's opinion that should the current activities continue, there will be no further deterioration in the ecological integrity or the level of ecosystem services currently provided by these ecosystems. This is primarily based on the fact that the activities are of a low intensity nature and the opinion by the specialist that a state of stasis has been reached. Accordingly, the 'No-Go' alternative is determined to be associated with a **Very low** (-ve) impact significance (see Table 25).
Results

Table 25: Impact significance rating for the 'No-Go' alternative.

Alternatives	Intensity	Extent	Duration	Probability of impact occurring	Significance
Without mitigation	Low	Local	Long Term	Probable	Very low (-ve)
With mitigation	*Mitigation Not Applicable to the 'No-Go' alternative*				

4.4 Indirect Impacts

No indirect impacts are deemed to have occurred.

4.5 Cumulative Impacts

Cumulative impacts are impacts that result from the incremental impact of the activity on freshwater systems within a greater catchment, ecoregion and vegetation group when added to the impacts of other past, present or reasonably foreseeable future activities.

Considering the historic, wide-scale and highly significant cumulative impact that agriculture in the Overberg has caused, the significance of the cumulative impact on the region's freshwater is rated to be **High** (-ve). The potential impacts associated with the proposed tourism expansion project would contribute to this significant cumulative impact in the future, albeit only in a minor way. Should the recommended mitigation measures presented in this report be implemented then the contribution to the highly significant, historical cumulative impact associated with the historic and proposed activities would be negligible.

5 Conclusion and Recommendations

Rusty Gate Mountain Retreat, situated in the mountainous interior of the Overberg Region, comprises a modest tourism concern in a spectacular natural setting characterised by fynbos covered mountain slopes and drainage lines running at the base of incised valleys. In addition to the drainage lines, online databases indicate the presence a large hillslope seep wetland in the centre of the property and an unchannelled valley bottom wetland draining from the more remote northern part of the property. Groundtruthing undertaken immediately after a very wet winter and extreme regional flooding revealed the presence of additional seeps and resulted in a fine-tuning of the extent and location of the mapped large hillslope seep.

The owner now proposes to increase the accommodation offered. The location of some of the proposed accommodation units and their associated infrastructure (conservancy tanks, water supply tanks and in some cases new gravelled access roads) lies in close proximity to the hillslope seeps which are at risk of being impacted. Initial planning of the development resulted in the setting back of the units by a distance of at least 32 m from the mapped drainage lines so direct impacts on these drainage lines are considered to be of negligible significance. After EnviroSwift undertook the groundtruthing some units were relocated to ensure that at least a 20m set-back is achieved from any wetland. This exceeds the guideline for the recommended minimum buffer for low impact residential use which would be 10m and 15m which is the recommended worse case buffer width for residential use. These set-backs play a major mitigatory role in minimising the significance of the potential impacts on the site's aquatic ecosystems, as reflected in the without mitigation rating of all impacts being **Low** (-ve) at worst.

Table 26 lists the findings of the impact assessment for the construction and operational phases respectively. All of the identified impacts were rated to be **Low** (-ve) significance, with the only exception being the construction phase impact of alteration of flow regime which unmitigated was rated to be **Very low** (-ve), mostly attributed to the very limited disturbance footprints of the new accommodation units which will minimally reduce surface roughness and hence infiltration. Implementation of the recommended mitigation measures, which in the case of the construction phase-related impacts would be mostly achieved through well-managed construction methods, and in the case of the potential operational phase impacts would be achieved through effective management of the services infrastructure and through rainwater harvesting, would reduce all the impacts to a **Very Low** (-ve) significance.

Table 26: Summary of the impact significance ratings.

Impact*	Without mitigation	With mitigation
Construction phase:		
Disturbance of wetland habitat	**Low**	**Very low**
Alteration of Flow Regime	**Very low**	*N/A*
Erosion and sedimentation	**Low**	**Very low**
Water quality impairment	**Low**	**Very low**
Loss of Biota	**Low**	**Very low**
Operational phase:		
Alteration of flow regime	**Low**	**Very low**
Erosion and sedimentation	**Low**	**Very low**
Water quality impairment	**Low**	**Very low**
Loss of Biota	**Low**	**Very low**

*note: all impacts are negative unless indicated as a benefit.

It is accordingly the specialist's reasoned opinion that provided the recommended mitigation measures are implemented, the proposed tourism development should be supported from a freshwater ecological perspective.

The recommended mitigation measures are as follows:

Essential measures to minimise construction disturbance to wetland habitat:

- Clearly demarcate the edge of the development footprint of each accommodation area using a weather-proof markers for the full duration of the construction phase and ensure that construction activities are limited to within the designated area; and
- Designate a 20m setback from the delineated wetland edges for sites 26, 27, 2, 3A, 3B and 28 and the 32m setback for the remaining sites as a No-Go area during the construction phase (i.e. the setback areas and their associated watercourses must be off-limits to construction workers, vehicles and machinery unless authorised by the ECO).

Essential measures to mitigate construction phase alteration of flow regime:

- Limit the construction phase to the dry summer months when rainfall is at its lowest;
- Make use of "stilt" or "pillar and beam" type foundations where the structure of accommodation units will be built on an elevated platform placed on top of the raised pillar/stilt foundation;
- Minimise the time that exposed soils are potentially exposed to the elements (as far as practically possible);
- Cover all soil, sand and stone stockpiles with plastic sheeting to ensure that the stockpiles are protected from rain;
- Actively repair any erosion runnels and prevent any sediment-laden run-off from exiting the construction through placement of sandbags or similar; and
- Immediately after construction of the buildings and associated infrastructure is complete, revegetate any exposed areas with locally occurring indigenous plant species.

Essential measures to address the construction phase increased sedimentation:

- Limit the construction phase to the dry summer months when rainfall is at its lowest;
- Make use of "stilt" or "pillar and beam" type foundations where the structure of accommodation units will be built on an elevated platform placed on top of the raised pillar/stilt foundation;
- Minimise the time that exposed soils are potentially exposed to the elements (as far as practically possible);
- Cover all soil, sand and stone stockpiles with plastic sheeting to ensure that the stockpiles are protected from rain;
- Actively repair any erosion runnels and prevent any sediment-laden run-off from exiting the construction through placement of sandbags or similar; and
- Immediately after construction of the buildings and associated infrastructure is complete, revegetate any exposed areas with locally occurring indigenous plant species.

Essential measures to minimise impairment of water quality during the construction phase:

- Undertake the construction project during the dry summer months and ensure that all construction vehicles and machinery cease from operating during the rainy winter period.
- Make use of "stilt" or "pillar and beam" type foundations where the structure of accommodation units will be built on an elevated platform placed on top of the raised pillar/stilt foundation.
- Ensure that all construction machinery and vehicles are checked for oil leaks and are in good working order before being permitted onto the development site;
- Use drip-drays at all times when operating petrochemical driven construction machinery (e.g. generators and cement mixers);
- Use drip trays and other appropriate containment methods while refuelling of vehicles and machinery;
- Demarcate an area for the refuelling of machinery and vehicles (this is recommended to be near the main farmstead and cellar);
- Ensure that hazardous substances and chemicals are stored in a contained, impermeable area which has the capacity to contain at least 110% of the total volume of stored substances.
- Store cement is a secure weather-proof area (e.g. shipping container) and ensure that used cement bags are placed in plastic bin-bags prior to placement in the on-site solid waste storage area;
- All cement batching on the site must be undertaken on impermeable and bunded batching boards to ensure cement slurry is contained; and

- Any cement residues and concrete waste within the construction site must be removed at the end of every working day and disposed of as rubble.

Essential measures to minimise loss of biota during the construction phase:

- Clearly demarcate the edge of the development site using a weather-proof markers for the full duration of the construction phase;
- Designate a 20m setback from the delineated wetland edges for sites 26, 27, 2, 3A, 3B and 28 and the 32m setback for the remaining sites as a No-Go area during the construction phase (i.e. the setback areas and their associated watercourses must be off-limits to construction workers, vehicles and machinery unless authorised by the ECO); and
- Keep construction material stockpiles as far from the wetlands and drainage lines as possible and where possible do not place these immediately upslope of any of the hillslope seeps.

Essential measures to minimise operational phase alteration and flow regime and associated increased erosion and sedimentation:

- Collect rainwater off the roofs of the dwellings and store the water in rainwater tanks for domestic use.

Essential measures to minimise toxicant loading and associated biota loss during the operational phase:

- Ensure that the conservancy tank is appropriately sized (input should be obtained from a professional civils engineer and the calculation endorsed by the municipality).
- Formalise an operational agreement between the owner/s and the municipality/3rd party contractor that specifies the timing of tank emptying; and
- During the operational phase, monitor the site for any odorous liquids possibly being associated with a leaking sewerage system.

6 Risk Assessment

The approach taken in completing the Risk Assessment Matrix is summarised below:

- The assessment is based on the assumption that the recommended mitigation measures will be effectively implemented and as such the risk assessment reflects the “with mitigation” scenario.
- All of the proposed activities potentially generating negative impacts were found to be associated with a LOW risk class
- Most of the identified negative impacts are limited to the impact site or are site-specific with the exception of the alteration of flow regime and water quality impairment (both phases in the project life-cycle) because the impacts would transfer to off-site receiving watercourses.
- All the identified negative impacts have a duration of one month to one year and impact on the PES, EIS and/or REC but with no change in status.
- All the development/construction activities generating potentially significant negative impacts have been rated to occur either 6 monthly or annually or less to reflect the short-term duration of the development/construction phase. While some activities will no doubt occur daily or even regularly during the course of a day during the development/construction phase, it is the overall frequency over the lifetime of the development that has resulted in the frequency being rated in this way.
- The operational phase-related negative impacts have been rated to occur at a greater frequency of monthly which also reflects the frequency over the lifetime of the development.
- In rating the frequency of the impacts, the likelihood of the impact occurring has been the primary consideration. As such most of the identified impacts have been rated to have a likelihood of highly unlikely or unlikely / seldom which reflects the effect of the recommended mitigation measures as unmitigated these negative impacts would have been rated to have been likely / possible.

Given that all of the proposed activities are associated with a LOW risk rating the proposed development qualifies for a General Authorisation (GA) insofar as the Section 21 (c) and (i) water uses are concerned. If the competent authority deems otherwise and that a Water Use Licence Application (WULA) is required then operational phase monitoring entailing water quality sampling of the receiving freshwater

system (in this case the Elandskloof River) would typically be a standard condition of a Section 21 (c) and (i) WUL, this is not considered necessary in this instance.

Please refer to the Risk Assessment Matrix provided in Appendix 4 for further detail.

7 References

Department of Water Affairs and Forestry. 2005. A practical field procedure of identification and delineation of wetlands and riparian areas. DWA, Pretoria, RSA.

Department of Water Affairs and Forestry. 2008. Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas, prepared by M. Rountree, A. L. Batchelor, J. MacKenzie and D. Hoare. Stream Flow Reduction Activities, Department of Water Affairs and Forestry, Pretoria, South Africa.

Job, N. 2009. Application of the Department of Water Affairs and Forestry (DWAF) wetland delineation method to wetland soils of the Western Cape.

Kleynhans, C.J., 1999. Resource Directed Measures for the Protection of Water Resources: River Ecosystems. Department of Water Affairs

Kleynhans, C.J., Thirion, C. and Moolman, J. 2005. A Level I Drainage line Ecoregion Classification System for South Africa, Lesotho and Swaziland. Report No. N/0000/00/REQ0104. Resource Quality Services, Department of Water Affairs and Forestry, Pretoria, South Africa.

Kotze, D.C., Marneweck, G.C., Batchelor, A.L., Lindley, D.S., and Collins, N.B., 2007. Wet-EcoServices: A technique for rapidly assessing ecosystem services supplied by wetlands. WRC Report No TT 339/09, Water Research Commission, Pretoria.

Macfarlane, D.M. and Bredin, I.P. 2016. Buffer zone guidelines for drainage lines, wetlands and estuaries. Part 1: Technical Manual. WRC Report No (tbc), Water Research Commission, Pretoria.

Macfarlane, D.M. and Bredin, I.P. 2016. Buffer zone guidelines for drainage lines, wetlands and estuaries. Part 2: Practical Guide. WRC Report No (tbc), Water Research Commission, Pretoria.

Macfarlane, D.M., Kotze, D.C., Ellery, W.N., Walters, D., Koopman, V., Goodman, P. and Goge, C. 2007. WET-Health: A technique for rapidly assessing wetland health. WRC Report No TT 340/09, Water Research Commision, Pretoria.

Mucina, L. and Rutherford, M.C. (EDS.). 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitizia 19. South African National Biodiversity Institute, Pretoria, South Africa.

Nel, JL, Driver, A., Strydom W.F., Maherry, A., Petersen, C., Hill, L., Roux, D.J, Nienaber, S., Van Deventer, H., Swartz, E. & Smith-Adao, L.B. 2011a. 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, Water Research Commission, Pretoria, RSA.

Ollis, D.J., Snaddon, C.D., Job, N.M. and Mbona, N. 2013 Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African National Biodiversity Institute, Pretoria.

Kemper, N. 1999. Intermediate Habitat Integrity assessment for use in rapid and intermediate assessments. RDM Manual version 1.0.

Van Ginkel, et. al., 2011. Easy Identification of Some South African Wetland Plants. Water Research Commission report no. TT479/10.

WCBSP. 2017. Western Cape Biodiversity Spatial Plan. Department of Environmental Affairs and Development Planning. Cape Town.

Appendix 1 – CV of the Specialist

Curriculum Vitae
of
NICHOLAS STEYTLER
Director – EnviroSwift Western Cape

ACADEMIC QUALIFICATIONS		
BSc	University of Natal (Pmb)	1990
BSc Honours (Zoology & Entomology) ***Cum Laude***	University of Natal (Pmb)	1991
MSc (Entomology)	University of Natal (Pmb)	1994

MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS
Registered Environmental Scientist (Pr Sci Nat 400029/02)
Member of IAIA SA

FIELDS OF EXPERTISE	**Years experience**
Integrated Environmental Management	20 years +
Natural Resource Management Planning	20 years +
Freshwater Ecological Specialist Studies	4 years +
Public Participation Facilitation	20 years +
Project Management	20 years +

EMPLOYMENT HISTORY
2019 – present: EnviroSwift Western Cape. Director / owner
2007 – present: KHULA Environmental Consultants. Director / owner
2005 – 2009: DJ Environmental Consultants. Associate Consultant.
2000 – 2005: SRK Consulting, Cape Town, Environmental Department. Senior Environmental Scientist.
1996 – 2000: Institute of Natural Resources, Pietermaritzburg. Associate Researcher: Natural Resources Management Programme.

WORK EXPERIENCE (note freshwater ecological specialist-related experience listed below)
Freshwater ecological specialist studies:
Freshwater screening study of a proposed solar PV facilities on the Remainder of Portion 5 of the Farm Rietvallei No. 167, Montagu (2023)
Amendments to freshwater specialist reports submitted in support of the applications for environmental approval for the Calcutta Cemetery, Farm 29 Stellenbosch (2023)
Freshwater screening study of Erf 325 Atlantis, City of Cape Town, Western Cape (2023)
Freshwater screening study for the proposed development of solar PV facilities on Erven 551 and 553, Schaapkraal, City of Cape Town (2023)
Freshwater screening study for the proposed redevelopment of the Stikland Hospital North Precinct, Remainder Erf 6300 Stikland, City of Cape Town (2023)
Freshwater Ecological Specialist Review & Assessment for the amendment to the scope of the authorised extension of Erica Drive, Belhar, City of Cape Town (2023)
Wetland delineation for the proposed purchase and development of Portion 3 of Farm 1025 Wemmershoek, Drakenstein Municipality (2023)
Freshwater ecological assessment for the proposed upgrading of the Matjiesfontein Wastewater Treatment Works (WWTW), Matjiesfontein, Northern Cape (2023)
Freshwater ecological assessment for the proposed development of 7 tourism accommodation units and associated infrastructure Hemelrand Farm No. 971, Caledon (2022)
Wetland delineation for the proposed development of two additional dwellings on Portion 4 of Farm 637 Oude Bosch, Hermanus (2022)
Freshwater screening study for the proposed upgrade to the 8ste Laan informal settlement, Valhalla Park, City of Cape Town (2022)
Wetland delineation for the proposed expansion of vineyards at Remainder Farm 585 Caledon, Hemel and Aarde Valley, Hermanus (2022)
Freshwater screening study of a proposed telecommunications mast at Remainder of the Farm Alma No. 363 Worcester (2022)
Wetland delineation for the proposed expansion of Leopard Rock Mountain Estate, Onrusrivier, Overstrand Municipality, Western Cape (2022)
Freshwater ecological impact assessment for the proposed residential development of Erf 148 Philadelphia, Northern District, City of Cape Town (2022)
Freshwater screening study for the proposed residential development of Portion 5 of Farm 101, Wolwerivier, Northern District, City of Cape Town (2022)
Wetland delineation of the Farm Kleyn Hagel Kraal, Pearly Beach, Overstrand Municipality, Western Cape (2022)
Freshwater screening study for the proposed residential development of Erf 10932 Constantia, City of Cape Town (2022)
Freshwater screening study for the proposed removal of approximately 850 m³ of fill material adjacent to the Eerste River on Erf 49 Faure, City of Cape Town (2022).
Freshwater ecological impact assessment for unlawful agricultural expansion at Plennegy Farm, Oudtshoorn, Western Cape (2021)
Aquatic Biodiversity Compliance Statement for a proposed concrete batch plant and pre-cast facility, Remainder of the Farm Bultfontyn 128, Middelburg, Eastern Cape (2021)
Freshwater screening study for the development of erven 41 and 59, Knole Park, City of Cape Town (2021)
Freshwater ecological impact assessment for proposed truck stop on Portion of Erf 10229, Beaufort West, Western Cape (2021)
Provision of rehabilitation specifications for the unlawful excavation of a trench in a non-perennial drainage line at the Farm Vergelegen, Robertson, Western Cape (2021)
Freshwater ecological impact assessment for unlawful agricultural expansion at Samber Farms, Riversdale, Western Cape (2021)
Freshwater screening study for the proposed redevelopment of the Mowbray Golf Course, Pinelands, City of Cape Town (2021)
Freshwater ecological impact assessment for proposed expansion of an in-stream irrigation dam at Farm Hartebeest Kuil, George, Western Cape (2021)
Freshwater screening study for the proposed residential development of Erf 208 Bishopscourt, City of Cape Town (2021)
Freshwater screening study for the proposed agricultural processing facility, Maqingqi communal area, Port St. Johns Municipality, Eastern Cape (2021)

Freshwater ecological impact assessment for the proposed agricultural expansion at the Farm Vergelegen, Robertson, Western Cape (2021)
Freshwater ecological impact assessment for a proposed residential development in Plattekloof, City of Cape Town (2021)
Freshwater ecological screening study for the proposed sewerage pipeline for Schulz Vlei development, Philippi, City of Cape Town (2021)
Freshwater ecological impact assessment for the proposed development of an agro-industrial facility, Wemmershoek, Western Cape (2021)
Freshwater ecological screening study for a proposed filling station in Eerste River, City of Cape Town (2020)
Freshwater ecological impact assessment for an unlawfully constructed tourist accommodation facility, Tulbagh, Western Cape (2020)
Freshwater ecological screening study and risk assessment for additions and alterations to an existing residential dwelling, Breede River, Western Cape (2020)
Freshwater ecological screening study for a proposed truck depot and filling station, Paarl, Western Cape (2020)
Freshwater ecological screening study for a proposed phosphate mine, Saldanha, Western Cape (2020)
Freshwater ecological screening study for a single residential development at Oppi Berg, Ceres, Western Cape (2020)
Freshwater ecological screening study for a proposed industrial area expansion, Bredasdorp, Overberg, Western Cape (2020)
Freshwater ecological impact assessment for proposed Canola plant at Erf 15711 Wellington, Drakenstein Municipality (2020)
Freshwater ecological impact assessment for single residential development of Ptn 13 of Farm 563 Kleinmond (2020)
Freshwater ecological impact assessment for new IRT bus depot, Wynberg, City of Cape Town (2019)
Freshwater ecological screening study for Blackheath Printers, Blackheath, City of Cape Town (2019)
Freshwater ecological screening study for La Motte residential extension, Franschoek (2019)
Freshwater ecological impact assessment for Vloedbos Resort, Overberg (2019)
Freshwater ecological screening study for Erf 3660 Hout Bay, City of Cape Town (2019)
Freshwater ecological screening study for Erf 2145 Constantia, City of Cape Town (2019)
Freshwater ecological impact assessment for low-cost housing development in Khayelitsha (2019)
Freshwater ecological impact assessment for Kommetjie Vineyards Estate, City of Cape Town (2018)
Freshwater ecological screening study for Remainder Erf 177887 Ottery, City of Cape Town (2018)
Natural Resources Management:
Preparation of an Invasive Alien Plant Clearing Plan for Erf 6289 Hout Bay, City of Cape Town (2021)
Preparation of an Invasive Alien Plant Clearing Plan for Shamballah Tea House, Cape Point, City of Cape Town (2019)
Preparation of an Invasive Alien Plant Clearing Plan for Imhoff Farm, Southern Peninsula, City of Cape Town (2018)
Preparation of a River Maintenance Management Plan for the Jakkals River, Elgin, Theewaterskloof Municipality (2018)
Preparation of a River Maintenance Management Plan for wetlands associated with the Bottelary River, Hazendal Wine Farm, Stellenbosch (2017)
Preparation of an Alien Plant Clearing Programme for the Farm Wildschutsbrand, Cape Point (2017).
Preparation of an Alien Plant Clearing Programme for Lalapanzi Farm, Cape Point (2017).
Preparation of a River Maintenance Management Plan for the Dawidskraal River, Bettys Bay, Overstrand (2016)
Preparation of a Site Rehabilitation and Management Plan for wetlands at Kraaifontein Shooting club, Northern Cape Metro (2015)
Preparation of a Wetland Maintenance and Management Plan for De Goede Hoop Estate, Noordhoek, South Peninsula (2014)
Application for Off-Road Vehicle Regulations licence for boat launching facility, Oceana Power Boat Club slipway, V&A Waterfront (2014)
Preparation of a Maintenance Management Plan for the Silvermine River, Clovelly Country Club, South Peninsula (2014)
Preparation of a Maintenance Management Plan for the rehabilitation and maintenance of an unnamed stream and associated infrastructure, Klein Constantia Winefarm, Cape Metropole (2014)

Environmental Screening for the proposed redevelopment of the Tygerberg Hospital, Northern Cape Metropole (2014)
Establishment of a Permanent Coastal Development Setback Line for the V&A Waterfront, City of Cape Town (2014)
Preparation of a Maintenance Management Plan for the ongoing maintenance of the access road to the West Coast Rock Lobster holding facility, Witsand Island, Scarborough, City of Cape Town (2013)
Preparation of a Maintenance Management Plan for the Kromboom River, Erf 117459 Lansdowne, Cape Metropole (2013)
Preparation of a Rehabilitation Plan for the remediation of unlawful infilling of a wetland at Lalapanzi Farm, Cape Point (2012)
Preparation of a Rehabilitation Plan for the remediation of unlawful construction of a parking area at Erf 935 Noordhoek Farm Village, City of Cape Town (2012)
Preparation of a rehabilitation plan for the closure of the Retreat Filling Station, City of Cape Town (2012)
Khayeltisha Wetlands Park – Park Delineation and Management Review, City of Cape Town (2010)
Preparation of the Coast & Estuaries Theme for the 1st review of Eastern Cape State of the Environment Report (2009)
Preparation of 2010 FIFA World Cup Greening Business Plan for Polokwane, Limpopo Province (2008)
Preparation of 2010 FIFA World Cup Greening Business Plan for Rustenburg, North West Province (2008)
Revision of the Table Mountain National Park Conservation Development Framework, City of Cape Town (2006)
Comparative Evaluation of alternative venues for the 2010 FIFA World Cup Stadium, City of Cape Town (2006)
Preparation of a Strategic Management Framework for the Kogelberg Biosphere Reserve, Overberg (2005 – 2006)
Preparation of concept document and proposal to undertake a SADC regional market survey of the indigenous fibre trade, SADC Region (2006)
Strategic Planning of Cemeteries in the Drakenstein Municipality (2006)
Environmental assessment of overnight sites for the Hoerikwaggo Trails, Table Mountain National Park, Western Cape (2005)
Preparation of the Year 1 State of the Environment Report for the Western Cape (2005)
Preparation of a Water Resources Management Strategy for Mozambique (2004)
Due Diligence Study for the proposed Mozaq Limitada Prawn Farm, Mozambique (2003)
Preparation of the Culemborg Development Framework, City of Cape Town (2001)
Restoration Planning of the Bokramspruit River, Kommetjie, City of Cape Town (2001)
Management and Maintenance Planning of the Dwars River, Ceres (2001)
Preparation of the Garden Route Spatial Development Framework, Southern Cape (2001)
Evaluating community-based wildlife management projects in the SADC region as part of the international project by IIED / IUCN called “Evaluating Eden” (2000)
Strategic Planning of the information needs of a Medicinal Plants Network in the SADC region (1999)
Research to determine potential commercial products from the Wild - Medicinal Plants component, South Africa (1999)
Economic Evaluation of the Cultivation of Nine Species of Medicinal Plants Indigenous to South Africa (1998)
Strategic Planning of a proposed community based indigenous forest management project, Eastern Cape (1998)
Preparation of a decision-support manual (“RIPARI-MAN”) for community-based urban riparian systems management (1998)
Preparation of an Integrated Catchment Management Plan for the Msunduzi River Catchment, Pietermaritzburg (1997)
Development of Flood Response Strategies for the Msunduzi River Catchment, Pietermaritzburg (1997)

Appendix 2 – Impact Assessment Criteria[8]

The criteria used to determine impact consequence are presented in the tables below.

Table 1: Description of criteria considered when assessing potential impacts.

CRITERIA	DESCRIPTION OF ELEMENTS THAT ARE CENTRAL TO EACH ISSUE	
Extent of the impact	SITE SPECIFIC	Site specific/Local: Extends only as far as the activity
	LOCAL	Limited to the site and its immediate surroundings
	REGIONAL	Regional/Provincial: Will have an impact on the region/province
	NATIONAL	National: Will have an impact on a national scale – particularly if an ecosystem or species of national significance is affected
Duration of impact	SHORT TERM	Construction phase
	MEDIUM TERM	Operational phase
	LONG TERM	Where the impact will cease after the operational or working life of the activity, either due to natural processes or by human intervention
	PERMANENT	Where mitigation or moderation by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient or temporary
Intensity of impact	VERY LOW INTENSITY	Natural, cultural and social functions and processes are not affected
	LOW INTENSITY	Affects the environment in such a way that natural, cultural and social functions and processes continue, although in a slightly modified way
	MEDIUM INTENSITY	Affects the environment in such a way that natural, cultural and social functions and processes continue, although in a modified way
	HIGH INTENSITY	Natural, cultural or social functions or processes are altered to the extent that they will temporarily or permanently cease
Probability of impact occurring	LOW	Improbable
	MEDIUM	Probable
	HIGH	Highly probable
	DEFINITE	Impact will occur regardless of any prevention methods
Determination of significance		
	LOW	The impacts will have a minor or insignificant influence on the watercourse.
	MEDIUM	The impacts will have a moderate influence on the watercourse. The impact can be ameliorated (lessened or improved) by a modification in the project design or implementation of effective mitigation measures.
	HIGH	The impacts will have a high influence on the watercourse. The impact can be ameliorated (lessened or improved) by a modification in the project design or implementation of effective mitigation measures. Should have an influence on decision, unless it is mitigated
	VERY HIGH	The impacts will have a major influence on the watercourse. The impacts could have the no-go implications on portions of the development regardless of any mitigation measures that could be implemented. Influence decision, regardless of any possible mitigation.

[8] Adapted from SRK Impact assessment methodology

SIGNIFICANCE RATING	LIST OF CRITERIA USED IN ASSIGNING A SPECIFIC SIGNIFICANCE RATING		
	INTENSITY	**EXTENT**	**DURATION**
Very High	High	National	Permanent / Long Term
	High	Regional	Permanent / Long Term
	Medium	National / Regional	Permanent
High Significance	High	Regional	Medium Term
	High	National	Short Term
	High	Local	Long Term / Permanent
	Medium	National	Medium Term
	Medium	Regional	Long Term
Medium Significance	High	Local	Medium Term
	Medium	Local	Permanent
	High	Regional	Short Term
	Medium	National	Short Term
	Medium	Regional	Medium Term
	Medium	Local	Long Term / Permanent
	Low	National	Medium Term
	Low	Regional	Long Term
Low Significance	High	Local	Short term
	Medium	Local	Short Term / Medium Term
	Medium	Regional	Short Term
	Low	National	Short Term
	Low	Regional	Medium Term
	Low	Local / Site specific	Long Term
	Low	Local	Permanent
Very Low Significance	Very Low	Local	Long Term / Permanent
	Low	Local	Short term
	Low	Site specific	Medium / Short Term
	Very low	Site specific / Local	Short Term

Appendix 3 – Declaration of Independence

I, Nick Steytler, as the appointed independent specialist, in terms of the 2014 EIA Regulations (as amended), hereby declare that:

I act as the independent specialist in this application;

I 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 regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 (as amended) and any specific environmental management Act;

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, Regulations and all other applicable legislation;

I have no, and will not engage in, conflicting interests in the undertaking of the activity; I have no vested interest in the proposed activity proceeding;

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;

I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;

I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

All the particulars furnished by me in this specialist input/study are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Name of Specialist: Nick Steytler

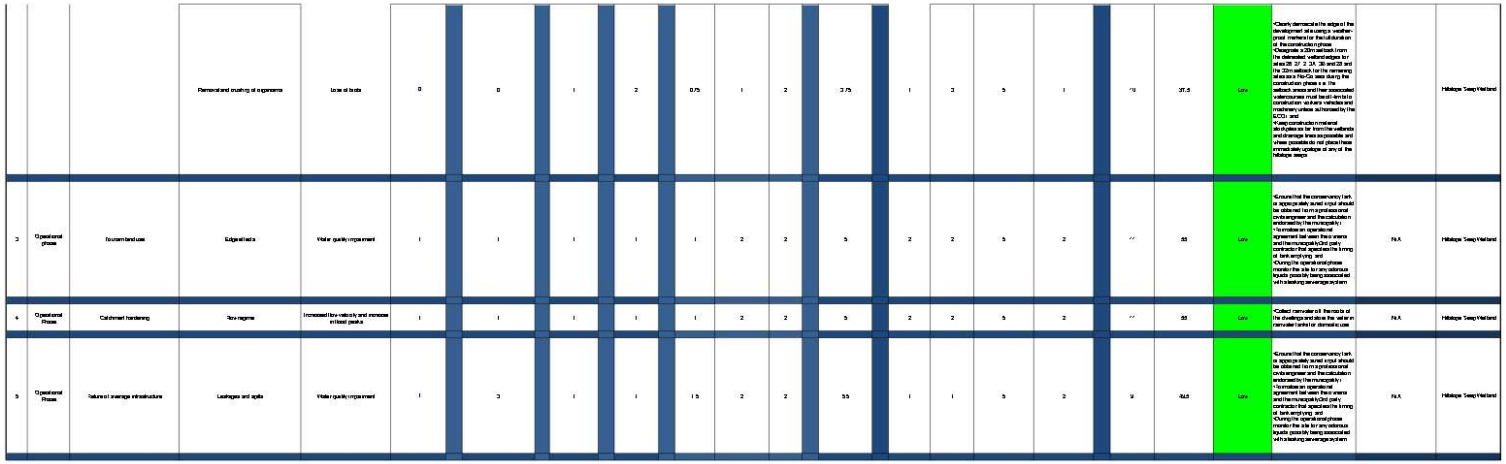
Date: 19/02/2024

Appendix 4 – Risk Assessment Matrix

RISK ASSESSMENT MATRIX
Author: [illegible]

Rusty Gate Mountain Retreat

Nr.	Phases	Activity	Aspect	Impact	Flow Regime	Physical & Chemical (Water Quality)	Habitat (Geomorph+Vegetation)	Biota	Severity	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Control Measures	Borderline LOW MODERATE Rating Classes	Type Watercourse
1	Construction Phase	Site preparation and clearing of vegetation	Flow regime	Increased flow velocity and increase in flood peaks	1	1	1	0	0.75	2	2	4.75	1	3	5	1	10	47.5	Low	•Limit the construction phase to the dry summer months when rainfall is at its lowest; •Make use of "stilt" or "pillar and beam" type foundations where the structures of accommodation units will be built on an elevated platform placed on top of the raised pillar/stilt foundation; •Minimise the time that exposed soils are potentially exposed to the elements as far as practically possible; •Cover all soil, sand and stone stockpiles with plastic sheeting to ensure that the stockpiles are protected from rain; •Actively repair any erosion runnels and prevent any sediment-laden runoff from exiting the construction through placement of sandbags or similar; and •Immediately after construction of the buildings and associated infrastructure, completely revegetate any exposed areas with locally occurring indigenous plant species	N/A	Hillslope Seep Wetland
			Exposure of sediment	Erosion and sediment loading	1	2	1	0	1	1	2	4	1	3	5	1	10	40	Low	•Limit the construction phase to the dry summer months when rainfall is at its lowest; •Make use of "stilt" or "pillar and beam" type foundations where the structures of accommodation units will be built on an elevated platform placed on top of the raised pillar/stilt foundation; •Minimise the time that exposed soils are potentially exposed to the elements as far as practically possible; •Cover all soil, sand and stone stockpiles with plastic sheeting to ensure that the stockpiles are protected from rain; •Actively repair any erosion runnels and prevent any sediment-laden runoff from exiting the construction through placement of sandbags or similar; and •Immediately after construction of the buildings and associated infrastructure, completely revegetate any exposed areas with locally occurring indigenous plant species	N/A	Hillslope Seep Wetland
			Removal and crushing of organisms	Loss of biota	0	0	1	2	0.75	1	2	3.75	1	3	5	1	10	37.5	Low	•Clearly demarcate the edge of the development site using a weather-proof markers for the full duration of the construction phase; •Designate a 20m setback from the delineated wetland edges for sites 26, 27, 2, 3A, 3B and 28 and the 32m setback for the remaining sites as a No-Go area during the construction phase, i.e. the setback areas and their associated watercourses must be off-limits to construction workers, vehicles and machinery unless authorised by the ECO; and •Keep construction material stockpiles as far from the wetlands and drainage lines as possible and where possible do not place these immediately upslope of any of the hillslope seeps		Hillslope Seep Wetland
			Concrete leaching and chemical spillage	Water quality impairment	0	1	1	1	0.75	2	2	4.75	2	2	5	2	11	52.25	Low	[illegible]	N/A	Hillslope Seep Wetland
2	Construction Phase	Operation of construction machinery, vehicles and construction activities	Exposure of sediment and stockpiles	Erosion and sediment loading	0	1	1	0	0.5	1	2	3.5	2	2	5	1	10	35	Low	•Limit the construction phase to the dry summer months when rainfall is at its lowest; •Make use of "stilt" or "pillar and beam" type foundations where the structures of accommodation units will be built on an elevated platform placed on top of the raised pillar/stilt foundation; •Minimise the time that exposed soils are potentially exposed to the elements as far as practically possible; •Cover all soil, sand and stone stockpiles with plastic sheeting to ensure that the stockpiles are protected from rain; •Actively repair any erosion runnels and prevent any sediment-laden runoff from exiting the construction through placement of sandbags or similar; and •Immediately after construction of the buildings and associated infrastructure, completely revegetate any exposed areas with locally occurring indigenous plant species	N/A	Hillslope Seep Wetland



			Removal and crushing of organisms	Loss of biota	0	0	1	2	0.75	1	2	3.75	1	3	5	1	10	37.5	Low	•Clearly demarcate the edge of the development site using a weather-proof markers for the duration of the construction phase •Designate a 20m setback from the delineated wetland edges for sites 28, 27, 3, 34, 36 and 28 and the 32m setback for the remaining sites as a No-Go area during the construction phase i.e. the setback areas and their associated watercourses must be off-limits to construction workers vehicles and machinery unless authorised by the ECO; and •Keep construction material and debris away from the wetlands and drainage lines as much as and where possible do not place these materials outside of any of the Hillslope Seeps		Hillslope Seep Wetland
3	Operational phase	Invasive land use	Edge effects	Water quality impairment	1	1	1	1	1	2	2	5	2	2	5	2	11	55	Low	•Ensure that the conservancy tank is appropriately sized input should be obtained from professional civils engineer and the calculation endorsed by the municipality ; •Is in place an operational agreement list ween the owners and the municipality/3rd party contractor that specialise the liming of tank emptying; and •During the operational phase monitor the site for any odorous liquids possibly being associated with a holding sewerage system	PAA	Hillslope Seep Wetland
4	Operational Phase	Catchment hardening	flow regime	Increased flow velocity and increase in flood peaks	1	1	1	1	1	2	2	5	2	2	5	2	11	55	Low	•Collect rainwater off the roofs of the dwellings and store the water in rainwater tanks for domestic use	PAA	Hillslope Seep Wetland
5	Operational Phase	failure of sewage infrastructure	Leakages and spills	Water quality impairment	1	3	1	1	1.5	2	2	5.5	1	1	5	2	9	49.5	Low	•Ensure that the conservancy tank is appropriately sized input should be obtained from professional civils engineer and the calculation endorsed by the municipality ; •Is in place an operational agreement list ween the owners and the municipality/3rd party contractor that specialise the liming of tank emptying; and •During the operational phase monitor the site for any odorous liquids possibly being associated with a holding sewerage system	PAA	Hillslope Seep Wetland