Detailed Freshwater Ecological Assessment:

Proposed development of a Roundabout at the intersection of Baden Powell Drive and Macassar Road, Khayelitsha, City of Cape Town, Western Cape

Prepared for:

The Environmental Partnership (Pty) Ltd

Prepared by:

Nick Steytler
SACNASP Reg. no. 400029/02

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KHULA Environmental Consultants
T/A EnviroSwift Western Cape

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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[1]

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.

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.

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

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

CBA Critical Biodiversity Area

CSIR Council for Scientific and Industrial Research

DWA Department of Water Affairs

DWAF Department of Water Affairs and Forestry

DWS Department of Water and Sanitation

EIA Environmental Impact Assessment

EIS Ecological Importance and Sensitivity

ESA Ecological Support Area

FEPA Freshwater Ecological Support Area

GA General Authorisation

GPS Global Positioning System

HGM Hydrogeomorphic

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

REC Recommended Ecological Category

SANBI South African National Biodiversity Institute

Sub-WMA Sub - Water Management Area

WCBSP Western Cape Biodiversity Spatial Plan

WMA Water Management Area

WUA Water Use Authorisation

WULA Water Use Licence Application

INTERSECTION 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 (MSc.) 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 within their Natural Resource Management Programme and then 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 in 2007, Nick founded KHULA Environmental Consultants which has been consulting for over 10 years in environmental management sector in the Western Cape. In developing his expertise as a freshwater specialist he initially worked in the capacity of an associate to EnviroSwift Western Cape (WC) but then took over the company in 2018 and now undertakes all wetland specialist work in the Western, Southern, Eastern and Northern Cape.

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1 Introduction

1.1 Project Background

The City of Cape Town (CCT) proposes to upgrade the intersection of Baden Powell Drive and Macassar Road located at the eastern edge of Khayelitsha on Remainder of Erf 18332, Khayelitsha (RE/18332), Remainder of Farm Vergenoegd 547 (RE/547), Portion 2 of Farm 547 Vergenoegd (2/547), Portion 3 of Farm 547 Vergenoegd (3/547) and Farm 544 Driftsands (Figure 1). Based on online wetland maps (the NWM5 Map and the CCT Wetlands Layer) the proposed upgrade is likely to trigger Section 21 c and i water uses in terms of the National Water Act (NWA, Act 36 of 1998) as the road widening would encroach on existing wetlands and the working areas would place the wetlands at risk of being impacted. Section 21 c and i water uses need to be authorised via either a General Authorisation or a full Water Use License Application (WULA).

Regardless of whether the application is a GA or a full WULA, a detailed level of freshwater ecological assessment is required. Also, the assessment must include application of the Revised Risk Assessment Matrix (RAM) to determine if the development qualifies for a GA or a full WULA.

The Environmental Partnership (Pty) Ltd has, on behalf of the CCT, requested that EnviroSwift provide a quotation to provide the required freshwater ecological specialist input inclusive of a Risk Assessment. This report presents the findings of the desktop assessment and as such provides a contextual analysis from a freshwater ecological perspective.

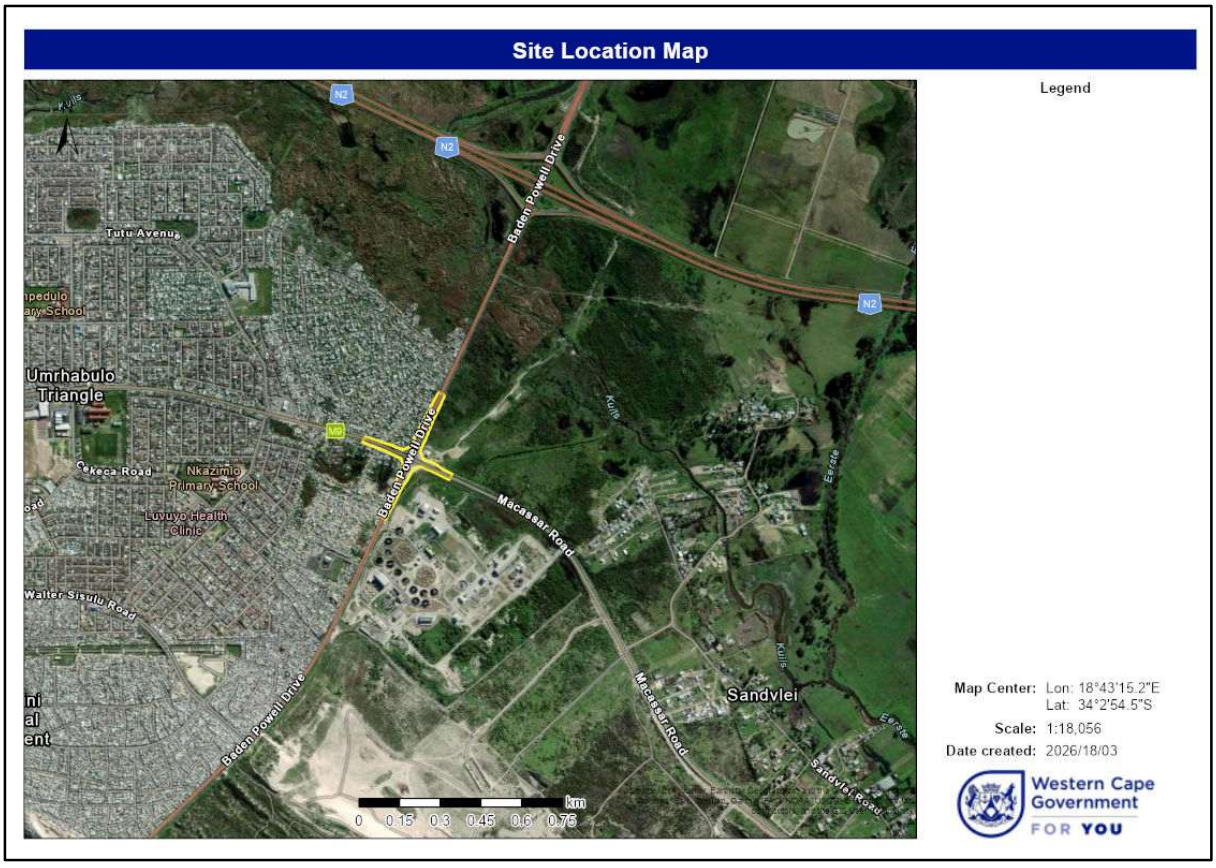


Figure 1: Location of the intersection which is proposed for upgrading. The yellow polygon indicates the disturbance footprint associated with the proposed upgrade.

1.2 Requirement for Specialist Study and Scope of Work

The scope of work for a desktop-based freshwater ecological contextual analysis is as follows:

- 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, 2023), the City of Cape Town BioNet (updated 2018), the National Geospatial Information (NGI) Service topographical maps and vector data, and pertinent academic resources;
- A site assessment to provide EnviroSwift with an opportunity to groundtruth the site to identify, delineate and describe the current status of the directly affected wetlands and their aquatic biodiversity;
- Assessment of the ecological services provided by the wetlands and the Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) of the directly affected wetlands (refer to methods section);
- Identification of the Section 21 (c) and (i) activities;
- Assessment of the significance of the identified potentially significant impacts and identification of practicable mitigation measures; and
- Completion of the Department of Water & Sanitation (DWS) Revised 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 desktop study:

- During the site assessment the proposed site and its immediate surrounds were searched for signs of natural drainage, elevated levels of soil saturation and aquatic habitat (hydrophytic vegetation). Aquatic habitat in the greater area was identified based on the available online databases, *viz-a-viz* the National Wetlands Map Version 5 (CSIR, 2018), CCT BioNet (updated 2018) and the WCBSP (2023).
- The study area lies at the edge of a large informal settlement, Khayelitsha, and as such comprises land that is almost totally transformed by informal settlements (including shacks) on the one (western) side of the intersection and undeveloped, naturally vegetated land on the other (eastern) side. The identification of wetland habitat in the largely untransformed side of the intersection is considered a relatively straight-forward case for wetland delineation. This meant that the presence of hydrophytic vegetation, in combination with soil characteristics, could be used to conclusively determine the outer boundary of the wetland temporary zone in this part of the site. Given the security risk of entering into a dense informal settlement, EnviroSwift based its wetland delineation in the area to the west of Baden Powell Drive on Google Earth aerial imagery. This is considered adequate as the presence of hydrophytic vegetation growing between the shacks could be used as an indicator of the presence and extent of remnant wetland habitat.
- Due to personal safety concerns an accurate site-based delineation was not possible as this would have entailed physically walking between the dense shacks. Rather, EnviroSwift made use of recent aerial imagery and visual confirmation of the location of the wetland remnants and used these in combination to delineate wetland extent. Due to this imitation wetland extent was over-estimated in accordance with the precautionary principle.

1.4 Legislation

1.4.1 National Water Act (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 Government Gazette No. 49833 (December 2023) 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.

The Department of Water and Sanitation (DWS) has developed a Risk Assessment Matrix (RAM) for the purpose of determining the level of risk posed by Section 21 (c) and (i) activities. If the risk to the watercourse(s) is determined to be LOW then the proposed development would qualify for a General Authorisation (GA). If the level of risk is determined to be MODERATE or greater than the proposed development would qualify for a Water Use Licence (WUL).

In terms of the National Biodiversity Offset Guideline (Government Gazette No. 48841 of June 2023), should the proposed development result in the loss of wetland habitat or function where the residual impact is assessed to be greater than LOW (-ve), the loss must be compensated by means of an offset scheme in order to secure the required environmental authorisation and Water Use Licence (WUL). An offset scheme may entail rehabilitation and management of another portion of wetland within the applicable property, or if this is not feasible or adequate, it may entail purchase, rehabilitation and

management (in perpetuity) of another wetland or property provided it constitutes a like-for-like scenario (i.e. similar wetland type in similar wetland ecosystem type).

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[2] which list activities that may be detrimental to the environment and that require prior Environmental Authorisation. The Regulations specify the level of EIA (either a Basic Assessment or a full Scoping and EIA process) that needs to be undertaken in order to obtain the required Environmental Authorisation. The proposed development does not trigger the requirement for prior Environmental Authorisation in terms of the NEMA EIA Regulations (2014, as amended).

The Environmental Partnership, has confirmed that the proposed development does require prior environmental authorisation in terms of the NEMA EIA Regulations (2014, as amended) as the following listed activities are applicable that require Basic Assessment:

- ***Activity 19,*** *Listing Notice 1. (GN R983 of 2014, as amended by GN R327): "The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse…"*
- ***Activity 13****. Listing Notice 3 (GN R985 of 2014 as amended by R324): "The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.*
  i. Western Cape: *Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; Within critical biodiversity areas identified in bioregional plans; Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.*

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*[3] when the site sensitivities are VERY HIGH, HIGH or MODERATE 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 VERY HIGH sensitivity for the aquatic biodiversity theme and accordingly the current study must meet

[2] The Regulations were amended in 2010 and in 2014, and again in 2017.
[3] Gazetted on 20 March 2020 (GN No. R320) and which came into effect in May 2020

the minimum reporting criteria as per the gazetted protocol for Aquatic Biodiversity Assessment. In undertaking this detailed Freshwater Ecological Assessment, EnviroSwift has addressed the minimum reporting criteria that are applicable as indicated in Table 1.

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.
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 site's wetland.
	(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) and findings are presented for the site's wetland.
	(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	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.
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 under assessment other than the determination of REC (see Section 3.4.4).
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.	Impacts on flood regime are addressed in Section 4.2.

No.	**Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments**	**Compliance of current report**
	suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes);	
	(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	Wetland fragmentation will not occur as a result of the proposed development.
	(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 are associated with the on-site wetland.
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?	
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?	Loss of wetland biota as a result of altered flow regime and water quality impairment has been assessed in Section 4.2.
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 2.

No.	**Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments**	**Compliance of current report**
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	N/A
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, respectively.
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	N/A
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 freshwater ecological context of the proposed site and any directly affected wetlands;
2. Site assessment to identify any on-site wetlands and delineate their current extent;
3. An assessment of the current ecological status and value of the directly affected wetlands using recognised classification systems and indices based on the information collected during the desktop assessment and site assessment;
4. An impact assessment where the potential aquatic ecological impacts (and benefits) caused by the proposed development are identified based on the desktop assessment and the site assessment, assessed in terms of their significance and the identification of mitigation and/or management measures to minimise the potentially significant negative impacts and enhance potential benefits; and
5. A Risk Assessment as required in terms of Notice No. 4167 of Government Gazette 49833 of December 2023 to determine the level of risk posed by the proposed development on freshwater resources and determine the appropriate level of Water Use Authorisation (either a GA or a full WULA).

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 National Wetlands Map 5 (CSIR, 2018), the NFEPA (2011), CCT Wetlands Layer (BioNet, updated 2018) and maps and vector data form the National Geospatial Information (NGI) directorate available on Cape Farm Mapper <https://gis.elsenburg.com/apps/cfm/>

The WCBSP (2023) identifies the biodiversity conservation importance of terrestrial and aquatic features and 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 follows (see 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 (Act No. 36 of 1998) was used to guide the site assessment. The NWA defines a water resource as a watercourse, surface water, estuary or aquifer, of which the latter two are not applicable to this assessment due to an estuary being associated with the sea (i.e. not freshwater) and, in line with best practice guidelines, wetland and riparian assessments only include the assessment of the first 50 cm from the soil surface, therefore aquifers are excluded. 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 'drainage line or riparian habitat', the definitions as drafted by the NWA (Act no. 36, 1998)[4] 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, if present, would be identified with the use of the definitions provided above and the delineation of the freshwater habitat would take 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 the temporary wetland zone. Indicators used to determine the outer 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.

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

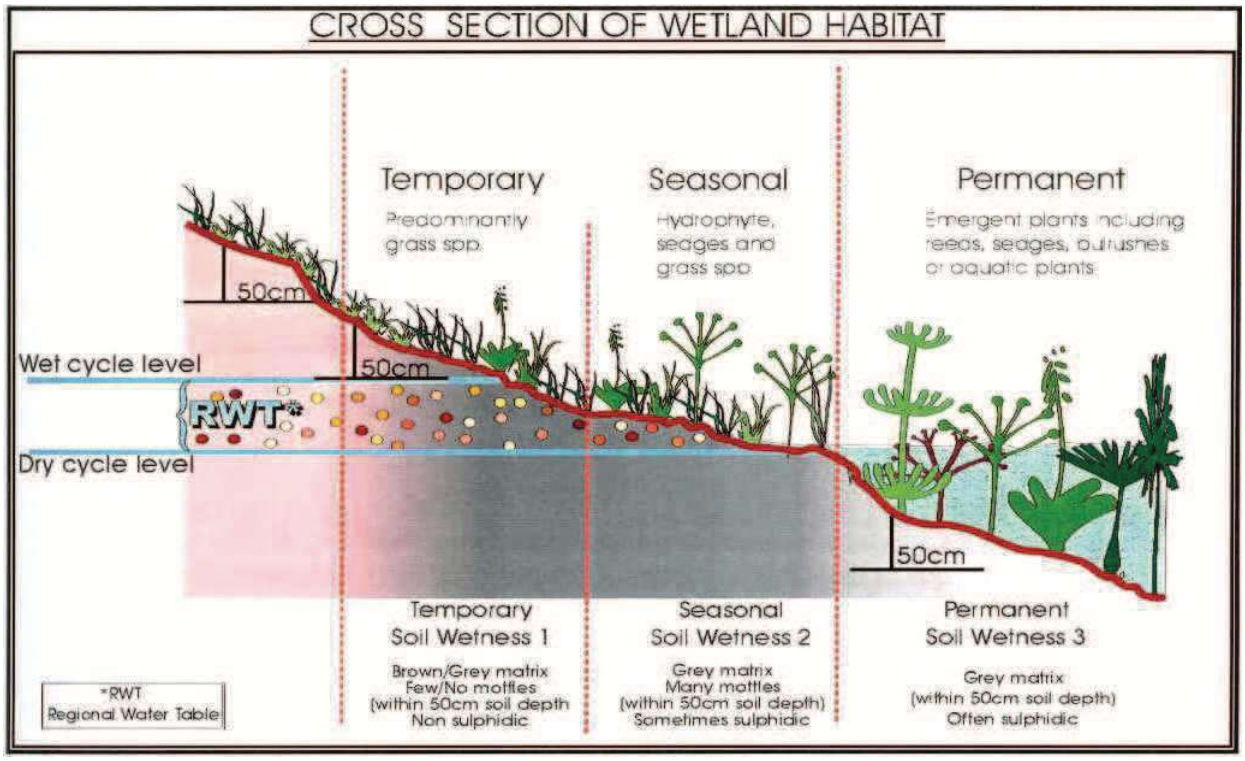


Figure 2: Cross section through a wetland (after DWAF, 2005).

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[5] 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 Figure 3 below.

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

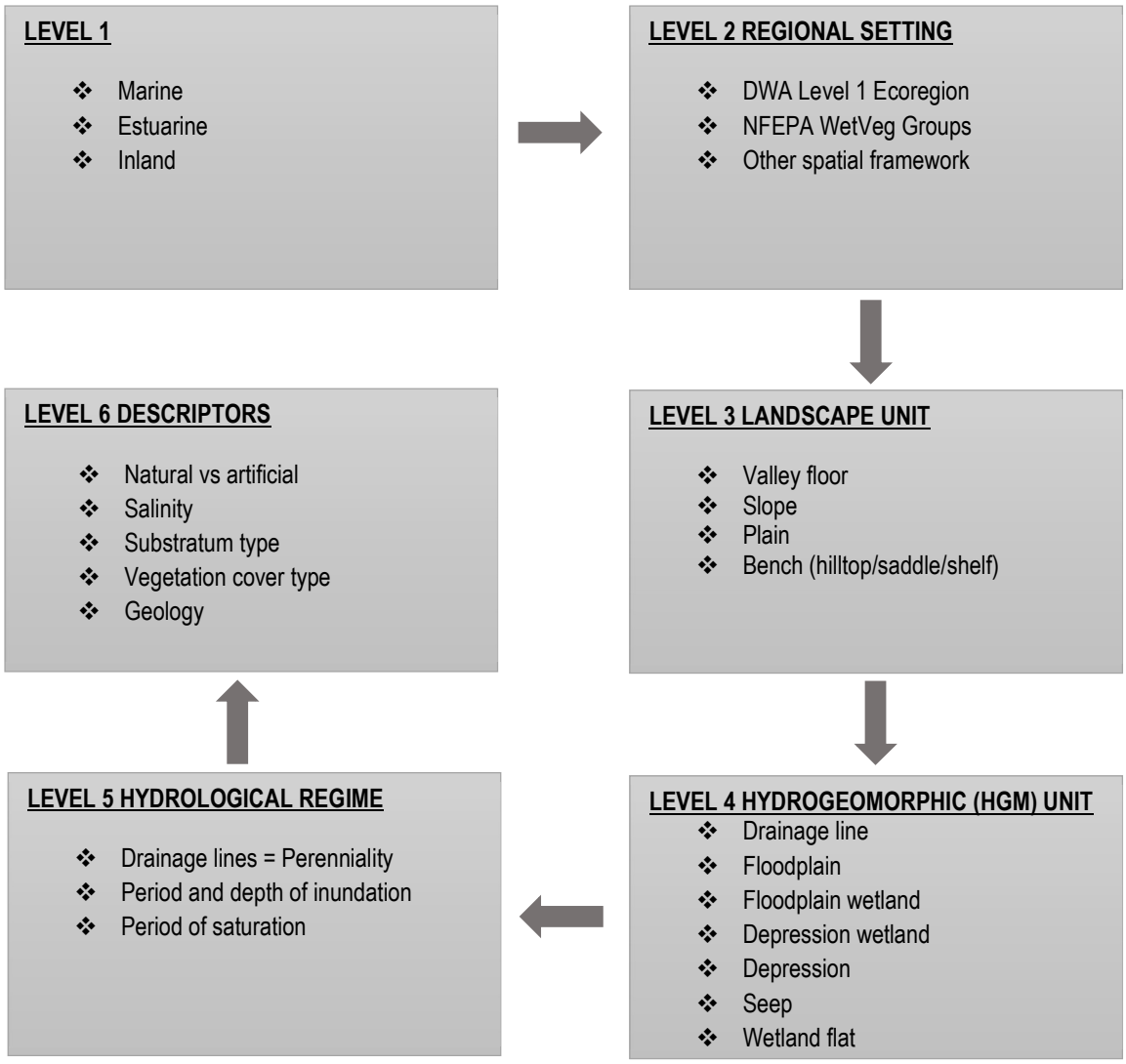


Figure 3: Classification System for wetlands and other aquatic ecosystems in South Africa.

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.

2.5.2 Present Ecological State (PES)

WET-Health (Macfarlane, 2007) is a tool designed to assess the health or integrity of a wetland (see Table 4). 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 are then combined to determine the overall Present Ecological State (PES) of the wetland. A Level 2 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 and Sanitation (DWS) 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.

2.5.5 Buffer Requirements

Buffers are not applicable to the proposed development as the wetlands lie immediately adjacent to the road reserve and therefore there is insufficient space to allow for road widening and the incorporation of a buffer.

2.6 Impact Assessment

A summary of the method of assessment is provided overpage; the detailed method is provided in Appendix 1.

The following criteria were taken into consideration when determining the significance of potential impacts associated with the proposed development:

- The nature of the potential impact (i.e. positive, negative, direct, indirect);
- The extent and location of the potential impact;

- The duration of the potential impact (i.e. short term, medium term, permanent);
- The intensity (or magnitude) of the potential impact (i.e. low, medium, high); and
- The likelihood or probability of the potential impact having occurred.

Mitigation measures were subsequently identified and recommended for the identified potential impacts with the purpose of reducing the overall impact significance to an acceptable level, where and if possible (the resultant impact significance is determined and provided in the impact rating tables). Mitigation measures were aimed to ensure that:

- Alternative and more environmentally sound designs / layouts / technologies, etc., are implemented, if feasible;
- Environmental benefits of the proposed development are enhanced;
- Negative impacts are avoided, minimised or remedied; and
- Residual negative impacts are kept within acceptable levels.

This method of assessment was applied to the proposed development (only the preferred development scheme as provided by the project team) and the No-Go alternative in accordance with accepted best-practise methods.

2.7 Risk Assessment

The risk assessment utilised the methodology stipulated by Government Notice No. 4167 (dated 8 December 2023) promulgated in terms of the NWA (Act 36 of 1998). In undertaking the risk assessment, the NWA Section 21 c and i activities are identified and their risk rated by assessing a number of criteria. The activities are assessed with the assumption that the recommended impact/risk mitigation measures are implemented (i.e. they reflect the “with mitigation” scenario).

3 Results

3.1 Desktop Assessment

3.1.1 Ecological Setting

The study area lies in the Southwestern Coastal Belt Ecoregion (Kleynhans *et al*, 2005), the main features of which are summarised in Table 5 which is adapted from Kleynhans *et al* (2005). Local climatic, topographic and soil conditions for the study area are shown in Table 6, which is adapted from the Cape Farm Mapper website. The study area is furthermore within the Breede-Olifants Water Management Area (WMA), the Greater Cape Town Sub-WMA and the G22E quaternary catchment.

According to Mucina and Rutherford (2006, updated 2012 & 2018), the proposed site is located within the Cape Flats Dune Strandveld vegetation type (see Figure 4) which is listed as Endangered (EN). The applicable wetland vegetation type is Western Strandveld (see Figure 5) which is listed as being Endangered (EN) on the NFEPA (2011).

The underlying geology is described as comprising mainly Quaternary quartz sand and calcareous dune sand of the Springfontein and Witzand Formations as well as surficial cover formed in situ on Malmesbury rocks (Cape Farm Mapper, 2026). Soils have a marked clay accumulation, are strongly structured and non-reddish in colour. In addition, one or more of vertic, melanic and plinthic soils may be present. Soil depth is typically >= 450 mm and < 750 mm and clay content is < 15%.

In terms of topography the intersection is located on a flat coastal plain with slopes of between 0 - 3 % as shown in Figure 6. A key topographical feature in the immediate surroundings is the Macassar dunes which lie between the coastal plain and coastline extending from Macassar in the east to Khayelitsha in the west. The proposed site lies landward or behind the Macassar dune system.

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

Main Attributes	South Western Coastal Belt Ecoregion
Geology	Granite, quartzitic sandstone, quartzite, conglomerate, slate
Vegetation	Sand Plain Fynbos; Mountain Fynbos; West Coast Renosterveld; Dune Thicket; Strandveld Succulent Karoo
Landscape	Closed hills; mountains; moderate and high relief
Mean altitude	300-900m AMSL

Table 6: Local climate, topography and soil conditions (adapted from Cape Farm Mapper, 2026)

Parameters	Local Conditions
Mean annual precipitation (mm)	556
Mean annual runoff (mm/annum)	102.24
Mean annual temperature (°C)	16.8
Elevation (m above mean sea level)	15
Slope classification (%)	0 – 3%
Soil characteristics	Soils with a marked clay accumulation, strongly structured and a non-reddish colour. In addition, one or more of vertic, melanic and plinthic soils may be present.
Soil depth (mm)	> 450 mm
Soil clay content (%)	< 15%

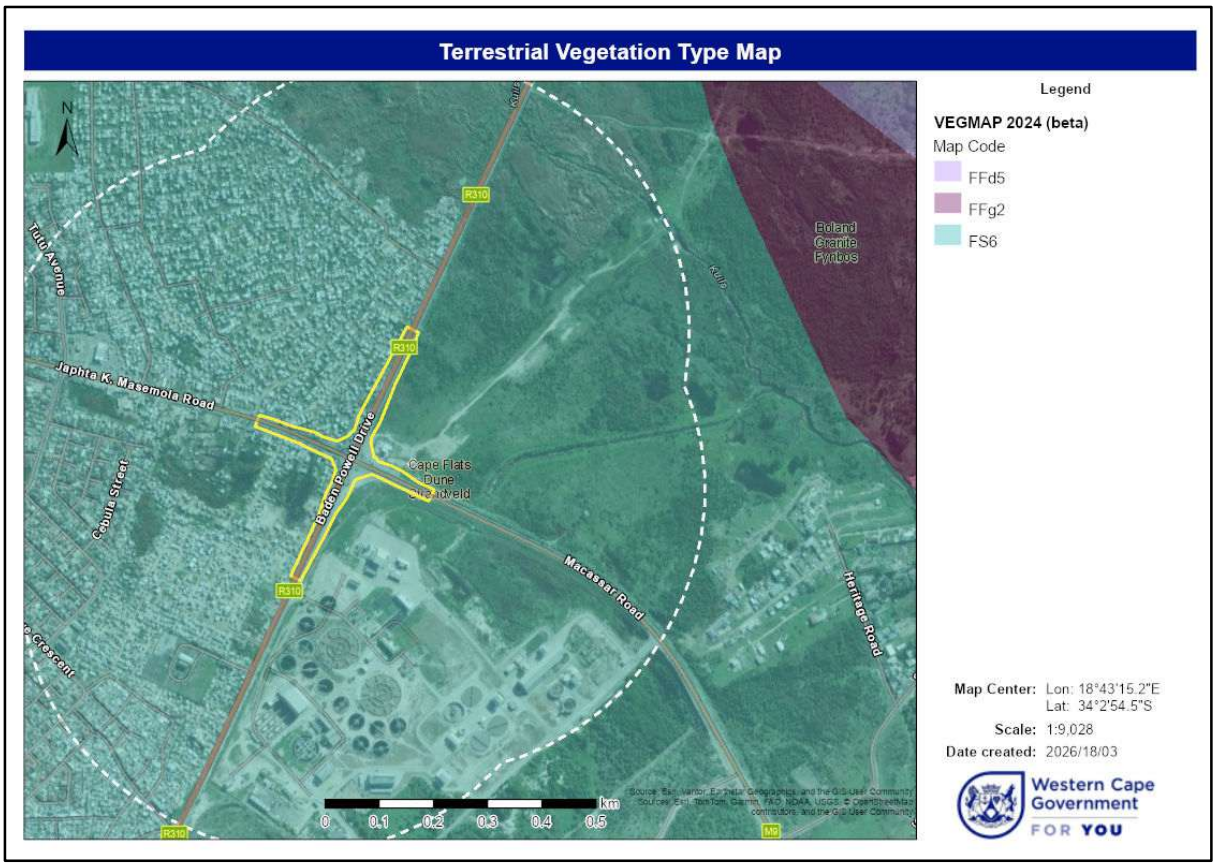


Figure 4: Terrestrial vegetation type of the proposed site (Mucina & Rutherford, 2006, updated 2018). The applicable terrestrial vegetation type is Cape Flats Dune Strandveld (EN).



Figure 5: Wetland vegetation type Map (source: NFEPA wetveg database). The dark brown polygon indicates the mapped extent of Western Strandveld (EN).

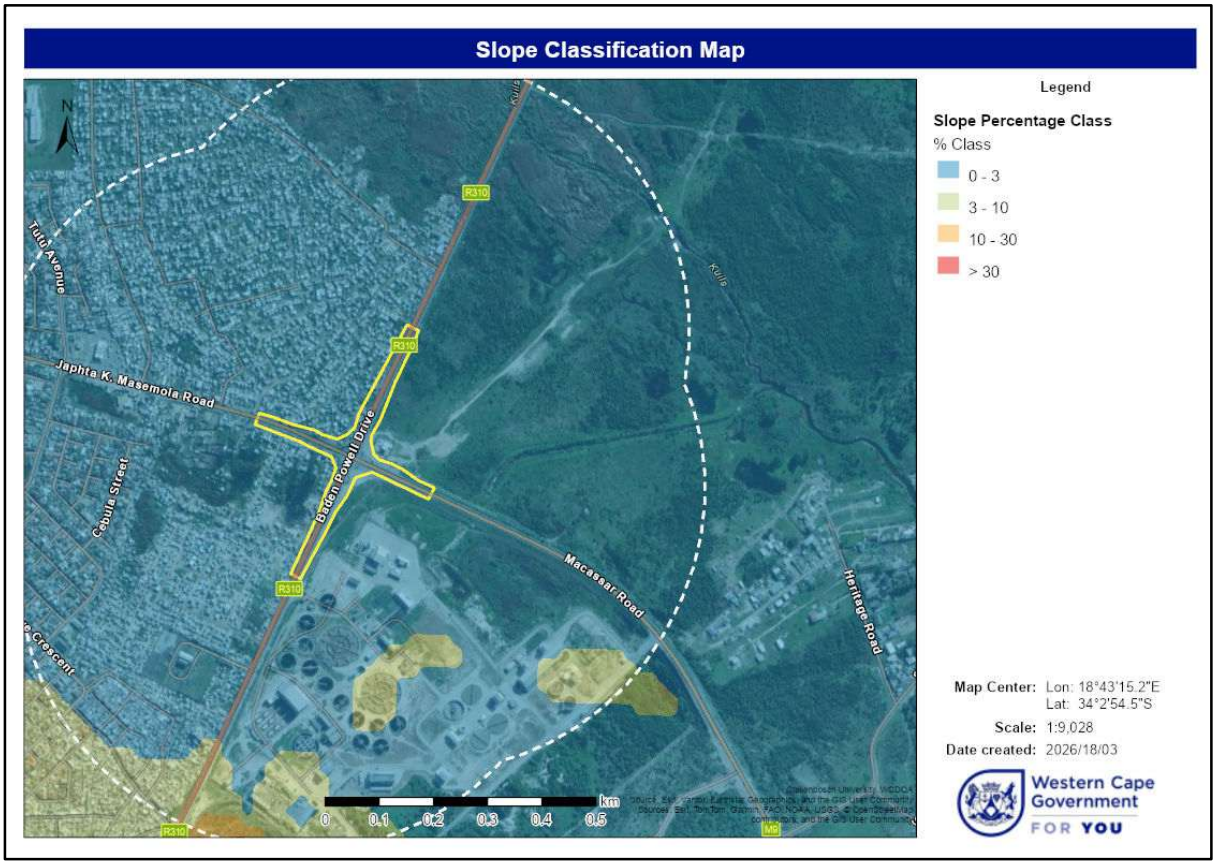


Figure 6: Slope expressed as a percentage of the vertical, such that horizontal is 0% and vertical is 100%. The slope of the proposed site is between 0 and 3% (Cape Farm Mapper, 2026).

3.1.2 Mapped Watercourses within the Study Area and within the Regulated Zone

The National Geospatial Information (NGI) Service (Cape Farm Mapper, 2026), the NFEPA Wetlands Map (Cape Farm Mapper, 2026) and the National Wetlands Map 5 (CSIR, 2018) were consulted to determine the mapped presence of watercourses within 500m of the proposed site, in accordance with the regulated zone for wetlands as defined by the NWA.

Only a single perennial river, the Kuils River, is located approximately 450m to the north west of the intersection. on the NGI Rivers database (available on Cape Farm Mapper, 2026). The NWM5 maps an extensive floodplain wetland associated with the Kuils River that is mostly located to the north west of the intersection but the lower portion extends up to the eastern edge of Baden Powell Drive including the part of Baden Powell Drive that will be widened as a result of the proposed upgrade (see Figure 7). Additionally, the NWM5 maps several depression wetlands within the Khayelitsha informal settlement to the west of Baden Powell Drive, some of which extend right up to the current road edge.

A review of the NFEPA wetlands map (available on Cape Farm Mapper, 2026) also shows the presence of a natural wetland in the vicinity of the floodplain wetland mapped on the NWM5 but with a much smaller extent and setback significantly from the area that will be transformed as a result of the proposed upgrade (see Figure 8). The NFEPA wetlands map does not map any wetlands with the area transformed by shacks which are indicted as comprising depression wetlands on the NWM5.

A review of the CCT wetlands layer (BioNet, updated 2018) indicates that the CCT wetlands layer and the NWM5 are mostly aligned insofar as the position and extent of wetland habitat is concerned near the intersection (see Figure 9). However, the CCT wetlands layer does not indicate the floodplain wetland associated with the Kuils River to reach Macassar Road but that its nearest edge is located approximately 400m north east of the intersection.

The WCBSP (2023) identifies areas of conservation importance including Protected Areas (PAs), Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). Some of the land in the immediate vicinity of the intersection has been identified as a terrestrial CBA which is clearly inconsistent with the NWM5 and CCT wetlands layer which indicate the land immediately to the north of Macassar Road and east of Baden Powell Drive comprises wetland habitat and not terrestrial habitat (see Figure 10). The nearest aquatic CBA to the proposed intersection is the part of the floodplain wetland that lies adjacent to the channel of the Kuils River approximately 450m to the north east of the site.

The discrepancies between the various online databases relating to the presence of wetland habitat immediately north of Macassar Road and immediately east of Baden Powell Drive need to be resolved through groundtruthing and in particular through determining the presence of hydrophytic vegetation and wetland soils in this area.

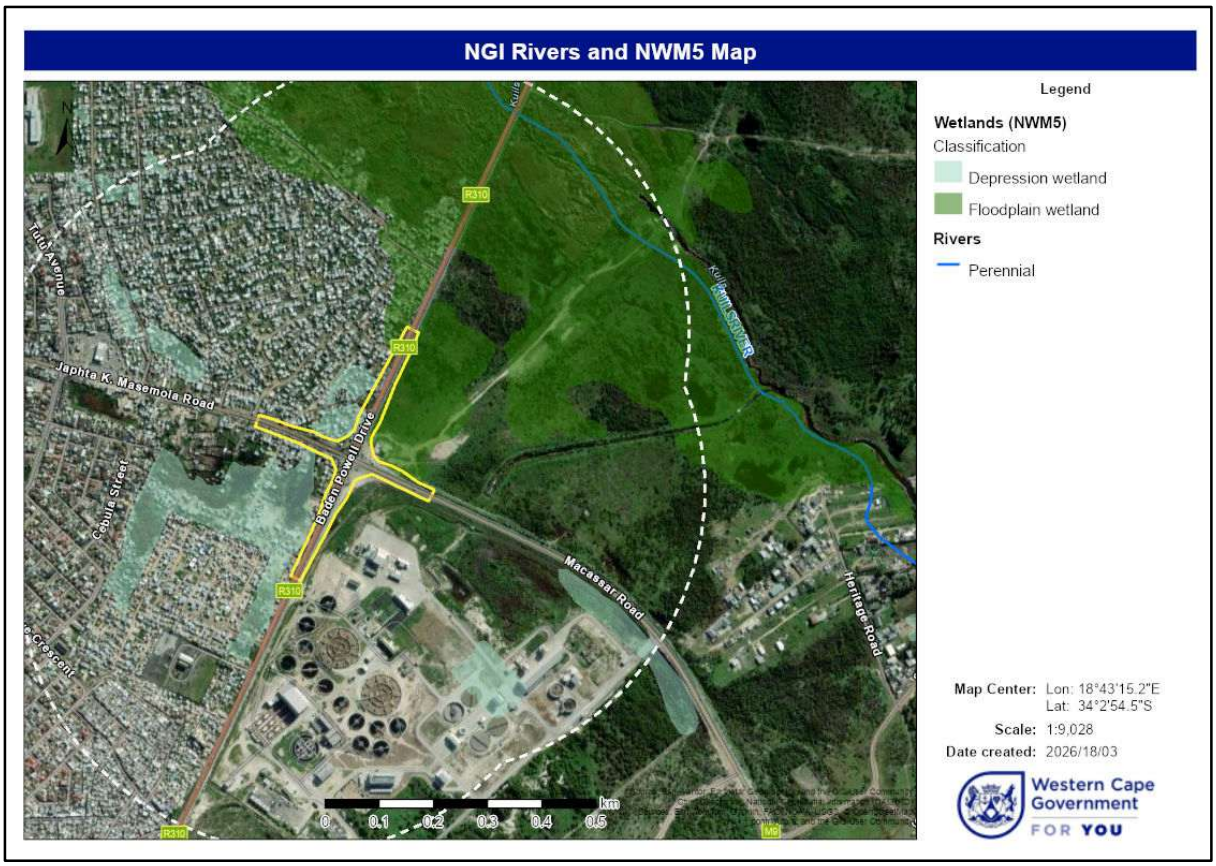


Figure 7: NGI rivers and NWM5 Map (Cape Farm Mapper, 2026).

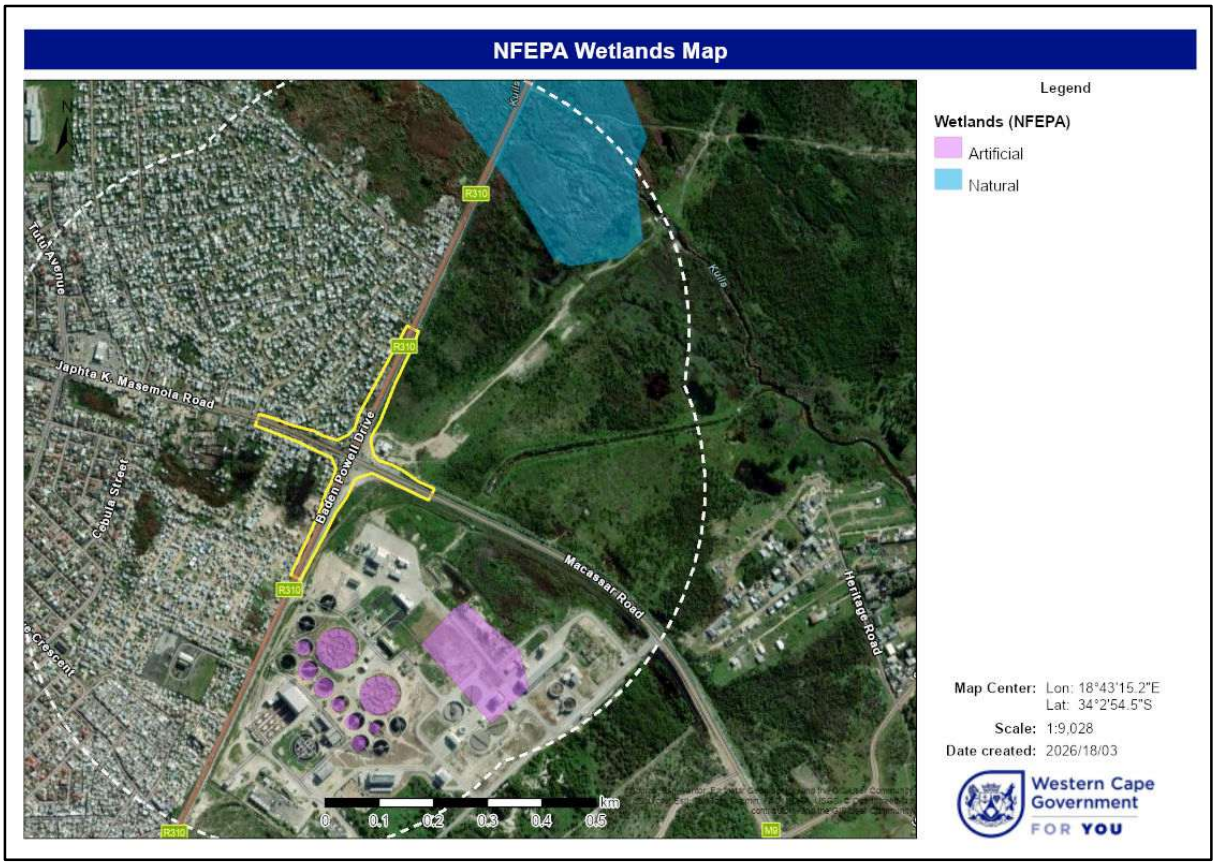


Figure 8: NFEPA Wetlands Map (2011).

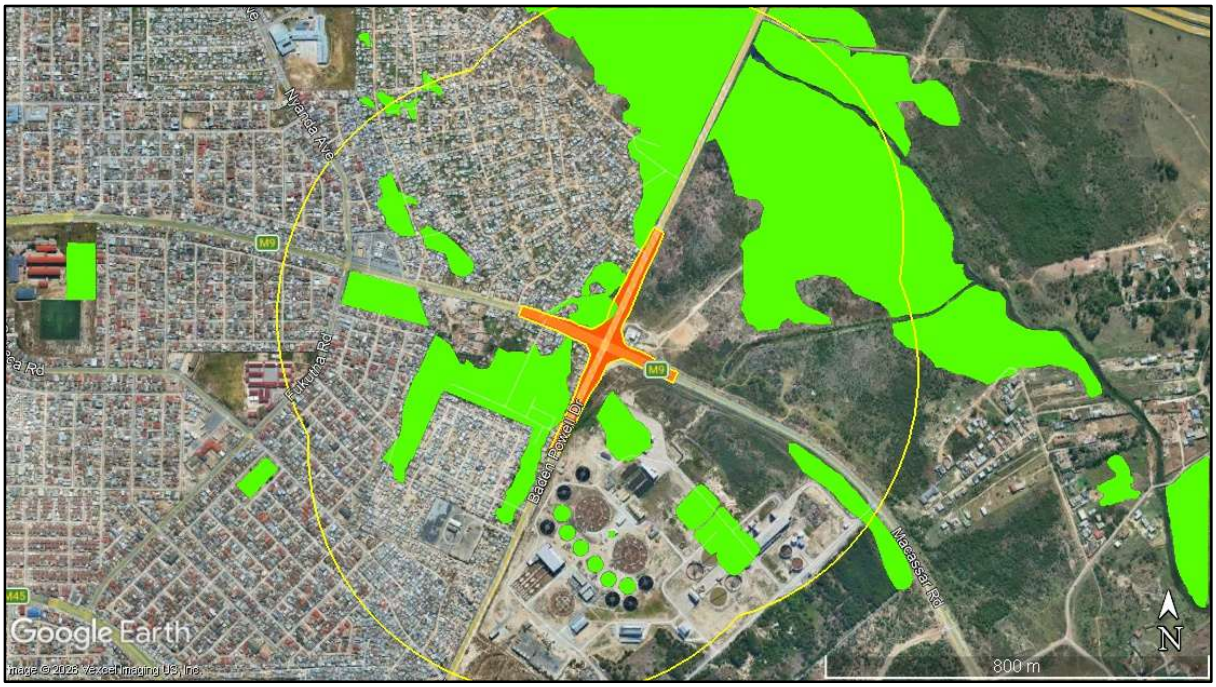


Figure 9: CCT Wetlands Map (BioNet, updated 2018).

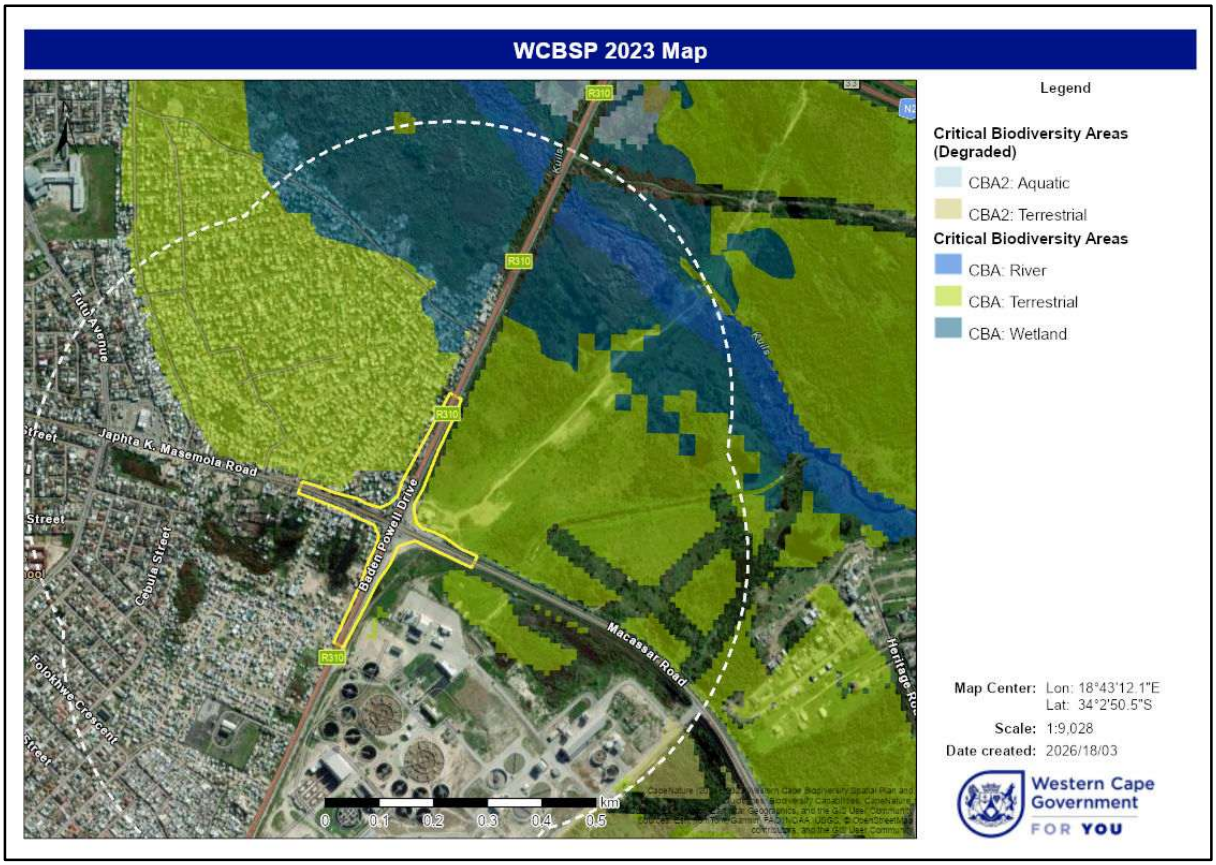


Figure 10: The WCBSP (2023) Map indicating the biodiversity conservation importance mapping of the site and immediate surrounds.

3.2 Site Investigation

3.2.1 Site Description

During the site visit conducted on 24 March 2026 the intersection comprising tarred road surfaces and compacted soils and rubble flanking the tarred road surfaces was clearly evident (see Figure 11). As such any wetland habitat that may once have occurred in the vicinity of the intersection are considered lost. Another noteworthy feature of both Baden Powell Drive and Macassar Road is the lack of any formal stormwater infrastructure or pedestrian sidewalks. As such any rainfall falling on the road surface runs off uncontrolled into the adjacent area which includes wetland habitat.

Given the intersection's location at the edge of the dense informal settlement of Khayelitsha the immediately surrounding the intersection can be described as comprising two distinctly different areas as follows:

- The area to the east of Baden Powell Drive which comprises mostly undeveloped vacant land with two significant facilities located immediately adjacent to the intersection including the relatively large Zandvliet Wastewater Treatment Works (WWTW) to the south of Macassar Road and the much smaller pumpstation which lies to the north of Macassar Road; and
- The Khayelitsha informal settlement which comprises dense shacks that lie immediately adjacent to the western edge of Baden Powell Drive. While the settlement is informal and as such most of the dwellings are constructed on imported, compacted rubble as opposed to concrete slabs as would be the case with buildings in formal settlements.

The boundary of the Zandvliet WWTW is marked by Clear-Vu security fencing (see Figures 12 & 13) and is setback from the intersection and approach roads. The setback area is naturally vegetated and include primarily terrestrial components such as the indigenous shrubs *Metalasia muricata* (Blombos) and *Sersia laevigata* (dune currant rhus) interspersed between indigenous and exotic annuals and grasses with the dominant grass species including the indigenous *Cynodon dactylon* (kweek) and alien invasive *Pennisetum clandestinum* (kikuyu), both which are known to indicate elevated levels of soil saturation.

To the north of Macassar Road, beyond the pump station which is located immediately adjacent to the intersection lies an expansive undeveloped and naturally vegetated area that extends all the way to the N2 in the north and Macassar to the east. The vegetation in this area comprises a mixture of invasive alien macrophytes, mostly *Acacia saligna* (Port Jackson), and indigenous and exotic shrubs and grasses (see Figure 14). In this area, and in particular nearer Macassar Road and Baden Powell Drive, significant deposits of rubble and solid waste are evident. Another noteworthy feature is the fact that the road edges are elevated above the surrounding natural ground levels with Macassar Road being as much as 2m higher than the land to the north (see Figure 14) and Baden Powell Drive being less elevated (see Figure 15).

By contrast the elevation of Baden Powell Drive above the current ground level where the shacks are located is significantly less than on the opposite side of the road as described above (see Figure 16). This is presumably in part due to the incremental importation and deposition of rubble as fill material to raise the floor levels of the shacks given ponding which occurs in this area during the winter. The areas where ponding occurs is evident as vacant areas between the shacks which contain in places *Typha capensis* (bullrush) which is indicative of permanently saturated soils. These areas have been mapped as comprising depression wetlands on the NWM5 and the CCT Wetlands Layer (see Figures 7 & 9).



Figure 11: Photo of the intersection between Baden Powell Drive and Macassar Road looking westwards from the Macassar Road approach.



Figure 12: The area between the intersection and the boundary fence of the Zandvliet Wastewater Treatment Works.



Figure 13: Photograph looking westwards towards the intersection showing the road verge to the south of Macassar Road and the boundary fence of the Zandvliet Wastewater Treatment Works.



Figure 14: Photograph looking towards the north west showing the area to the north of Macassar Road.



Figure 15: Photograph looking towards the north along Baden Powell Drive showing the road verge and severely degraded wetland habitat to the east of Baden Powell Drive.



Figure 16: Photograph looking towards the north along Baden Powell Drive showing the road verge and fragmented wetland remnant to the west of Baden Powell Drive.

3.2.2 Watercourse Description

Based on a combination of the findings of the desktop and site investigations the watercourses at direct risk of being impacted by the proposed upgrade are the floodplain wetland associated with the Kuils River which is mapped to occur immediately adjacent to the east of the northern approach of Baden Powell Drive and the fragmented depression wetland remnants within Khayelitsha.

The floodplain wetland is mapped to extend over an area of 187 ha extending from its end at the Kuils River estuary in Macassar all the way back to the M12 (Stellenbosch Road), spanning a distance of ±15 kilometres and crossing several significant roads including the N2, Baden Powell Drive and Spine Road to name just a few. On the basis of vegetation alone and in particular the extent of *Typha capensis* (bullrush) and *Phragmites australis* (common reed) which both indicate permanent levels of soil saturation, the wetland shows signs of having a dominant wetland permanent zone and less extensive seasonal and temporary zones. It is likely that historically the extent of the wetland's seasonal and temporary zones were more extensive but these have since been transformed as a result of the rapid expansion of informal settlement in the area as these areas can be inhabited with limited infilling.

Given that the wetland comprises a floodplain wetland associated with the Kuils River, a description of the Kuils River as it passes within 450m of the site is necessary, in addition to a description of the floodplain wetland in this area. In this area the Kuils River can be seen as flowing strongly at the end of the dry summer season when flows would be at the lowest confirming the river's perennial status (see Figure 18). The channel is well defined and comprises a series of riffles over cobbles and slower-flowing pools over sand. There is evidence of streambank erosion and sediment deposition in places but channel incision appears minimal. Solid waste and rubble can be seen in places within the channel and during the time of the site visit an individual *Scopus umbretta* (hammerhead bird) was seen feeding in riffle habitat. This species has a threat status of Least Concern (LC).

Near the site the floodplain wetland is mapped to extend from the Kuils River channel (located approximately 500m to the north west of the intersection) in a south westerly direction all the way up to the intersection including along the eastern edge of Baden Powell Drive. In this area lies a mixture of seasonal and temporary wetland habitat which is dominated by grasses and sedges (see Figure 19) and isolated areas of permanent wetland habitat, with the latter being located nearer the Kuils River channel (see Figure 20).

The fragmented wetland remnants are visible as open areas among the otherwise dense shacks which are characteristic or large informal settlements in South Africa's larger cities. At the time of the site visit there was no ponding water evident in the open areas (see Figure 16) but during the winter rainy season these areas become inundated as do some of the adjacent shacks which are often vacated during the wet season. As a result of the vacant areas not being inhabited they either remain vacant and become repositories for solid waste or are infilled with builders' rubble to allow for settlement. It is expected that in the foreseeable future these wetland remnants will be lost altogether.



Figure 17: Photograph taken from the Baden Powell Drive flyover the N2 looking towards the south west showing the largely intact floodplain wetland associated with the Kuils River.



Figure 18: Photograph of the Kuils River as it flows past the site, albeit at a distance of approximately 500m.



Figure 19: Photograph of relatively intact seasonal floodplain wetland.



Figure 20: *Phragmites australis* (common reed) and *Stenotaphrum secondatum* (buffalo grass), both hydrophytic species encountered at the site with *P. australis* being an indicator of permanent wetland zone and *S. secondatum* being an indicator of seasonal wetland habitat.

3.2.3 Vegetation associated with the Aquatic Ecosystems

In the greater area the floodplain wetland's dominant permanent zone is dominated by *Typha capensis* (bullrush) and, to a lesser extent, *Phragmites australis* (common reed). Both species are considered to be 'naturalised' and as such would not have occurred in the wetland in its reference condition. Both species favour elevated nutrient levels and given that the rivers and wetlands of the Cape Flats would have had characteristically nutrient-poor water, the occurrence of these species is indicative of water quality impairment, mostly elevated levels of phosphates. Both species are wetland obligates which only occur in soils that remain saturated for 9 – 12 months of the year.

In the vicinity of the site, the floodplain wetland's seasonal/temporary zone is more expansive, particularly east of Baden Powell Drive. This zone comprises a combination of grasses and sedges with interspersed invasive alien macrophytes. The grasses include two indigenous species *Cynodon dactylon* (kweek) and *Stenotaphrum secondatum* (buffalo grass) as well as the alien invasive *Pennisetum clandestinum* (kikuyu) and the sedges and restios including *Cyperus textilus* which is the most common, *Elegia tectorum* (Cape thatching reed), *Juncus* sp. and *Ficinia nodosa*. Of the sedge species identified *C. textilus* can be considered a wetland obligate while *F. nodosa* and *E. tectorum* can be considered wetland facultative which can also inhabit drier conditions. As such the presence of these species is indicative of wetland conditions but confirmation is required by way of soil augering (see Section 3.2.4).



Figure 21: *Cyperus textilus*, one of the hydrophytic species that is common in the seasonal/temporary wetland zone of the floodplain wetland that is a wetland obligate.



Figure 22: *Elegia tectorum* (Cape thatching reed), another hydrophytic species found in the seasonal/temporary zone of the floodplain wetland.

3.2.4 Soils and Hydrology

Soil augering was attempted at various locations near the intersection including immediately north east of the pumpstation (see Figure 23), in the area between the WWTW boundary fence and the Macassar Road and also in a depression containing hydrophytic vegetation approximately to the north east of the intersection nearer the channel of the Kuils River (see Figure 24). The initial auger attempts proved unsuccessful as the soils were sandy and dry and failed to produce an auger sample. On the contrary the soil augered near the Kuils River was moist and presented an organic surface layer indicative of wetland conditions (see Figure 25).

No soil augers were attempted within the vacant areas between the shacks to the west of Baden Powel Drive due to safety issues and also, given the volumes of builders rubble used as fill material, it is unlikely that augering would have been successful. Aerial photography in combination with visual assessment on 24 March 2026 confirmed the presence of the wetlands although there precise extent has been over-estimated in accordance with the precautionary principle.

On the basis of a combination of the online wetland maps, aerial photography and groundtruthing, which was primarily based on vegetation and backed up with augering, a wetland delineation map was prepared (see Figure 26). It is noteworthy that the delineation of the floodplain wetland aligns more so with the CCT wetlands layer (see Figure 7) and less so with the NWM5 (see Figure 9) insofar as the proximity of the floodplain wetland to the part of the northern approach of Baden Powell Drive that is proposed for widening is concerned. The area immediately east of Baden Powell Drive mapped in the NWM5 as comprising part of the floodplain wetland was found to contain mostly terrestrial elements and has also been subject to significant infilling over recent years. The area may well have been inundated by flooding of the Kuils River in the past but there is little evidence of this in recent years.

Accordingly, the wetlands at direct risk of being impacted are only the fragmented depression wetlands

that occur among the shacks in Khayelitsha immediately west of Baden Powell Drive as mapped in Figure 23. Given that it is only the widening of the Baden Powell Drive approach from the north that poses a risk to the wetlands it is unlikely that the floodplain wetland would be affected in any way.



Figure 23: Auger sample attempt in the area immediately north east of the pumpstation mapped in the NWM5 as comprising part of the floodplain wetland.



Figure 24: Auger sample successfully taken from seasonal wetland habitat within the largely intact part of the floodplain wetland.



Figure 25: Auger sample taken from within the seasonal zone of the relatively intact wetland habitat. Note the dark organic surface layer.



Figure 26: Wetland Delineation Map. The green polygon indicates the extent of the floodplain wetland nearest the site and the orange polygons indicate the extent of depression wetlands.

3.3 Watercourse Classification

In terms of wetland and aquatic ecosystem classification user manual (Ollis *et. al.* 2013) the wetlands at direct risk of being impacted are depression wetlands. Table 7 summarises the results from **Level 3** through to **Level 6** of the wetland and aquatic ecosystem classification user manual (Ollis *et. al.* 2013) applied to the fragmented depression wetland to the west of Baden Powell Drive near the intersection which are at direct risk of being impacted.

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

Level 3 (Landscape Setting)	**Plain**: an extensive area of low relief. These areas are generally characterised by relatively level, gently undulating or uniformly sloping land with a very gentle gradient that is not located within a valley. Gradient is typically less than 0.01 or 1:100.
Level 4 (Hydrogeomorphic unit)	**Depression Wetland:** a wetland or aquatic ecosystem with closed (or near-closed) elevation contours, which increases in depth from the perimeter to a central area of greatest depth and within which water typically accumulates.
Level 5 (Hydrological regime)	**Non-perennial:** does not flow continuously throughout the year, although pools may persist. (note: has become perennial due to additional input from catchment hardening and sewage and greywater inputs)
Level 6 (Descriptors)	**Natural:** may be impacted, or even realigned, but of natural origins.

The wetland has been classified as a single depression wetland that has been fragmented by encroachment by informal settlement and which the fragmented parts remain hydrologically connected via informal stormwater channels created by residents to drain the wetlands during the wet season and via interflow.

3.4 Ecological Assessment of the Depression Wetland

3.4.1 Ecosystem Services

The WET-Ecoservices tool was applied to the depression wetland indicated as a number of orange polygons in Figure 26. Fifteen Ecosystem Services were assessed with overall rating of the likelihood of the wetland providing ecosystem services being moderately low (see results presented in Figure 27 and Table 8 below). The most noteworthy results for the current condition are:

- The services of potentially greatest importance were flood attenuation, phosphate, nitrate and toxicant removal and carbon storage which were all in the intermediate range.
- The importance of the wetland to attenuate floods is mostly attributable to the inwardly draining nature of the type of HGM unit (depression) which results in little or no outward flow during storm events. Despite this score many people experience flooding of their homes during the wet season because they are located within the wetland itself.
- The importance of the wetland in the removal of phosphates, nitrates and toxicants is attributable largely to the high levels of inputs of these contaminants due to the dense settlement and lack of sanitation and not to the wetlands capacity to provide this function.
- In terms of sediment trapping and erosion control the nature of the catchment comprising dense informal settlement with areas of exposed sands were the only factors resulting in the moderately low importance rating of these services.
- The wetland is of moderately low importance in terms of maintaining biodiversity, a rating which is inflated by the level of wetland loss in the catchment. In terms of providing suitable habitat for biodiversity the wetland scores very poorly.
- The wetland does not provide any direct socio-economic benefits such as harvestable materials, production of foods, tourism and education.
- The wetland has no cultural significance and no potential to deliver research and education benefits due largely to its inaccessibility.

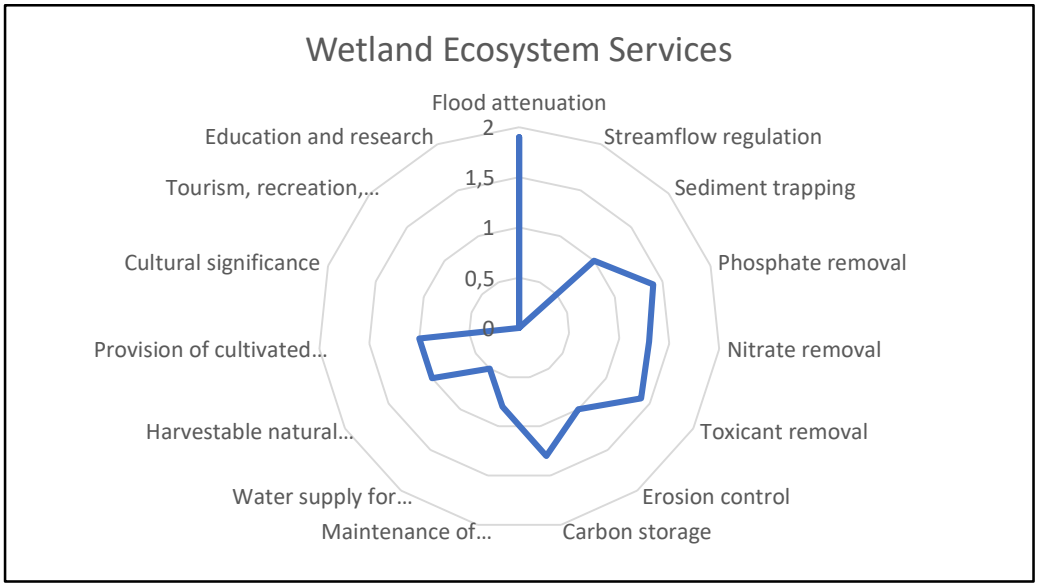


Figure 27: WET-EcoServices results for the fragmented depression wetland.

Table 8: WET-EcoServices results.

		Current
Indirect Benefits	Flood attenuation	1,9
	Streamflow regulation	0
	Sediment trapping	1
	Phosphate removal	1,4
	Nitrate removal	1,3
	Toxicant removal	1,4
	Erosion control	1
	Carbon storage	1,3
Direct Benefits	Maintenance of biodiversity	0,8
	Water supply for direct human use	0,5
	Harvestable natural resources	1
	Provision of cultivated foods	1
	Cultural significance	0
	Tourism, recreation, scenic value	0
	Education and research	0
Total		**12,6**
Average		**0,84**

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 depression wetland.

Table 9: WET-health assessment results.

Year	Ha	Extent (%)	Hydrology		Geomorphology		Vegetation	
			Impact Score	Change Score	Impact Score	Change Score	Impact Score	Change Score
Current	5,8	100	**8**	**-1,0**	**8**	**-1,0**	**8,6**	**-1,0**
PES Category			**F**	↓	**F**	↓	**F**	↓
1998	3,9	100	**7**		**7**		**7,2**	
PES Category			**E**	↓↓	**E**	↓↓	**E**	↓↓

The overall PES for the depression wetland was calculated to be 8,2 which falls within a **Category F.** This means that modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota. The key aspects to note from the PES assessment of the current scenario were as follows:

- The key hydrological impacts are the change to water input from running taps, raw effluent and sewage releases and the increases in stormwater flows due to the dense shacks within the surrounding catchment. The increased stormwater flows have caused an increase in flood peaks which results in the inundation of the surrounding areas which contain many informal dwellings.
- The density of the shacks and the extent of infilling (primarily fill platforms to raise the floor levels of the dwellings as a flood prevention method) within the wetland have resulted in reduced roughness within the wetland thereby altering the wetland's water retention and distribution

patterns.

- In terms of geomorphology the critically impacted state is attributed to the increase in run-off, due to the density of dwellings within the catchment, which has affected flows throughout the entire wetland. This increase in flow increases the wetland's capacity to transport sediment.
- In terms of vegetation most of the wetland has been transformed by the presence of shacks (±50%); infilling (±40%) and gardens (±10%).
- Hydrology, geomorphology and vegetation are predicted to continue on a rapid downward trajectory (i.e. an increasingly impacted condition in the future) until the entire wetland is occupied by informal settlement. Given the demand for housing in the City this situation is likely to occur in the short to medium term.

In summary the poor PES of the wetland is largely attributed to the transformed nature of the catchment (due largely to informal settlement) and also due to the transformed nature of the wetland itself due to encroachment by informal dwellings and infilling. Water inputs from running taps and greywater and sewage discharges have also contributed to the critically modified state.

3.4.3 Ecological Importance and Sensitivity

The EIS method applied to the depression 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 are as summarised as follows:

- The wetland is assessed as not being of any importance for biodiversity support as:
    - The wetland is not known nor is it likely to support any endangered or rare biota or populations of unique species despite falling within the historical distribution of an Endangered terrestrial vegetation type (Cape Flats Dune Strandveld) and an Endangered wetland vegetation type (Western Strandveld).
    - The wetland is not known nor is it likely to be an important site for species migration, breeding and/or feeding and no species were observed utilising the site in these ways during the site inspection.
    - The wetland is not recognised in the Western Cape Biodiversity Spatial Plan (WCBSP, 2023) or the BioNet (updated 2018) as being of conservation importance.
- At the landscape scale the wetland can be regarded as having a low/moderate level of importance particularly in terms of size and rarity (extensive habitat transformation on the Cape Flats has resulted in remnant wetlands being considered rare) and poor protection status of the surrounding vegetation type (±14 % of Cape Flats Dune Strandveld is formally conserved);
- In terms of sensitivity the wetland is not sensitive to changes in floods and is of low sensitivity to changes in low flow. Under natural conditions, this would be a low nutrient acidic wetland system, but due to constant sewage and greywater inputs has become eutrophic and more neutral and is therefore no longer sensitive to increases in nutrient load or other water quality impairment. All sensitive species have also been historically lost from the system.

Table 10: EIS Results for the Depression Wetland.

Depression Wetland	**Current status**		**1998 status**	
ECOLOGICAL IMPORTANCE AND SENSITIVITY	Score (0-4)	Confidence (1-5)	Score (0-4)	Confidence (1-5)
Biodiversity support				
Presence of Red Data species: Endangered or rare Red Data species present	0	4	0	3
Populations of unique species: Uncommonly large populations of wetland species	0	4	0	3
Migration/breeding/feeding sites: Importance of the unit for migration, breeding site and/or feeding	0	4	0	3
Landscape scale				
Protection status of the wetland: National (4), Provincial, private (3), municipal (1 or 2), public area (0-1)	1	5	1	5
Protection status of the vegetation type: SANBI guidance on the protection status of the surrounding vegetation	3	5	3	5
Regional context of the ecological integrity: Assessment of the PES (habitat integrity), especially in light of regional utilisation	0	5	1	5
Size and rarity of the wetland type/s present: Identification and rarity assessment of the wetland types	3	5	3	5
Diversity of habitat types: Assessment of the variety of wetland types present within a site	1	5	1	4
Sensitivity of the wetland				
Sensitivity to changes in floods: Floodplains at 4; valley bottoms 2 or3; pans and seeps 0 or 1	0	4	0	4
Sensitivity to changes in low flows/dry season: Unchannelled VB's probably most sensitive	1	4	1	4
Sensitivity to changes in water quality: Esp. natural low nutrient waters – lower nutrients likely to be more sensitive	1	4	1	4
ECOLOGICAL IMPORTANCE AND SENSITIVITY	Median value	1	Median value	**1**

The overall EIS category was determined to be **Low/marginal**. This means that the wetland is 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 rivers. (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 determined to be an F ecological category and therefore the EIS components need to be evaluated to determine if any of the aspects of importance and sensitivity are high or very high. Although the EIS category was determined to be **Low/marginal,** which means that the wetland is not ecologically important and sensitive at any scale, it is not acceptable for low/marginal wetlands to have a PES of less than Category D. It is however very unlikely that a PES of D may be practically achieved through rehabilitation given the wetland's location in a dense informal settlement. For this reason the specialist has elected not to recommend a Recommended Ecological Category (REC).

4 Assessment of Impacts

4.1 Activity Description & Impact Identification

4.1.1 Description of the Proposed Upgrade

The proposed upgrade entails a conversion of the existing stop-controlled intersection, which has priority flow along Baden Powell Drive and stops on the Japhta K Masemola and Macassar Road approaches, to a roundabout which would reduce the delay experienced by current and future development traffic approaching from Japhta K Masemola and Macassar Roads as well as allow for safer right turn and crossing manoeuvres at this intersection. The roundabout will have two circulatory lanes with all four approaches to the roundabout upgraded to two lanes per approach. The exits along Baden Powel Drive will also be upgraded to two lanes per exit before tapering back to the current single lane per direction road cross-section. The exits along Japhta K Masemola and Macassar Road will remain as single lanes. The proposed upgrade will also provide formalised public transport stops and block pedestrian crossings on all four legs of the intersection. The latter will improve crossing opportunities of especially Baden Powel Drive.

An engineering drawing of the proposed upgrade is presented as Figure 9.

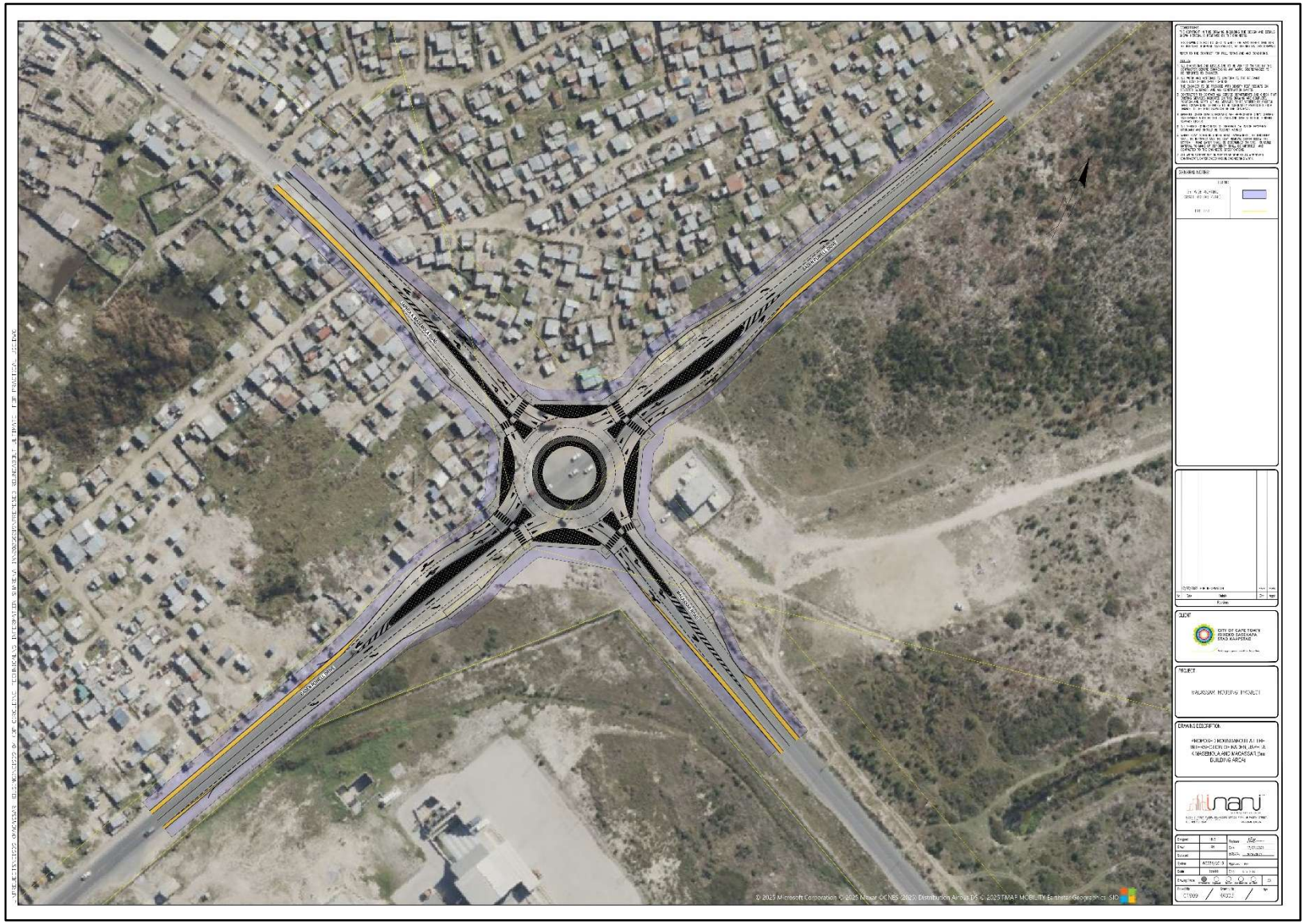


Figure 28: Engineers Drawing showing the proposed upgrade to the intersection.

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

Based on the project description provided in Section 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

- **Wetland habitat loss:** Based on the drawings provided by the engineers and the mapped extent of wetland habitat, verified from aerial imagery, it is estimated that approximately 2 000 m² of fragmented wetland habitat will be lost.
- **Wetland habitat disturbance:** Given that construction activities will be taking place along the fringe of the fragmented depression wetland, habitat would be disturbed.
- **Increased erosion and sedimentation**: The exposure of soils to erosion associated with site clearing, excavations and/or infilling would increase their erosive potential and, if coupled with rainfall, would result in sediment being deposited into the receiving wetland.
- **Water quality impairment:** The possible release of contaminants such as cement, bitumen and other building materials / chemicals into the receiving wetlands would impair water quality. In addition, potential accidental spills of chemicals and fuel may also result in contamination of the receiving wetland.
- **Biota loss:** Aquatic fauna and flora would be either displaced or suffer mortalities as a result of the infilling of part of the wetland. Also, disturbance caused by the operation of construction machinery and the inappropriate placement of construction materials near wetlands would cause mobile biota to move away. Similarly, should contaminants such as cement, fuel and other chemicals used in construction enter the receiving wetland then biota sensitive to water quality impacts may either move away or in extreme circumstances would suffer mortalities.

Operational phase

The operational phase of the proposed development is likely to generate the following impacts on the adjacent floodplain wetland:

- **Alteration of natural flow regime**: The increase in hard surfacing as a result of the road widening and construction of the traffic circle would cause increased run-off which would discharge unattenuated into the receiving floodplain wetland; and
- **Wetland habitat disturbance:** Given the proximity of the upgraded intersection and in particular the widened approach on Baden Powell Drive from the north it is likely that ongoing disturbance of wetland habitat will occur. Disturbance would be in the form of hydrocarbon contamination, given the high volume of motor vehicles that use Baden Powell Drive, the ingress of litter and presence of significant volumes of pedestrians that could disturb wetland biota.

4.2 Potential Direct Impacts associated with the proposed upgrade to the Intersection

4.2.1 Development/Construction Phase

Impact 1 – Wetland habitat loss

It is estimated that approximately 2 000 m² of the fragmented and critically impacted depression wetland habitat will be lost as a result of the widening of the Baden Powell Drive northern approach to the intersection. The PES of the fragmented depression wetland was calculated at a Category “F” which means modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota. Another important consideration is that the wetland is rapidly being infilled and it is reasonable to assume that within the next few years the wetland will be lost in totality (see Section 4.3). As a result, while parts of this wetland that still exist alongside Baden Powell Drive will be infilled, the intensity is rated as LOW, partly because of the

ongoing infilling by residents to make the wetland area inhabitable and partly because of its critical level of modification and almost total lack of any natural habitat and aquatic biota.

The impact significance rating for loss of wetland habitat and function is rated as being of LOW (-ve) significance. This impact significance rating is based on the fact that the impact will be LONG TERM, of LOW intensity (given its Low/marginal EIS) and of LOCAL extent.

The loss of wetland habitat as a result of the road widening cannot be mitigated.

Table 12: Impact significance rating for loss of wetland habitat (development phase).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	LOCAL	
Duration of impact	LONG TERM	
Consequence of impact or risk:	LOW (-ve)	
Intensity	LOW	
Probability of occurrence:	DEFINITE	
Indirect impacts:	N/A	
Cumulative impacts	HIGH	
Significance rating of impact	LOW (-ve)	
Degree to which the impact may cause irreplaceable loss of resources:	LOW (the critically modified wetland is unlikely to be associated with irreplaceable biodiversity)	
Degree to which the impact can be reversed:	IRREVERSIBLE	
Degree to which the impact can be avoided:	IMPACT CANNOT BE AVOIDED	
Degree to which the impact can be managed:	IMPACT CANNOT BE MANAGED	
Degree to which the impact can be mitigated:	HABITAT LOSS CANNOT BE MITIGATED LOSS OF WETLAND FUNCTION CAN BE MANAGED in certain cases but not the present case.	
Residual impacts:	LOW (-ve)	

Impact 2 – Wetland habitat disturbance

Given that construction activities entailing the driving of construction vehicles, operation of machinery and the placement of construction materials will take place within the immediate catchment of the floodplain wetland, wetland habitat disturbance is likely. The forms of disturbance would be either direct, as in the case of indiscriminate driving and/or placement of construction materials within and near temporary/seasonal wetland habitat which would cause soil compaction and damage to wetland vegetation or indirect such as run-off related impacts (sedimentation and/or water quality impairment).

The potential impact is rated to be of LOW (-ve) significance given the wetland's critical level of modification and almost total lack of any natural habitat and aquatic biota. Mitigation measures can be incorporated into the Construction-phase Environmental Management Plan (EMP) which aim to ensure that no vehicles or personnel enter the wetland and that all contamination pathways are contained. The implementation of the recommended management measures further reduces the significance of the potential impact to VERY LOW (-ve).

Table 13: Impact significance rating for disturbance of wetland habitat (development phase).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	LOCAL	LOCAL
Duration of impact	SHORT TERM	SHORT TERM
Consequence of impact or risk:	VERY LOW NEGATIVE	VERY LOW NEGATIVE
Intensity	LOW	LOW
Probability of occurrence:	PROBABLE	POSSIBLE
Indirect impacts:	N/A	N/A
Cumulative impacts	HIGH	HIGH
Significance rating of impact	VERY LOW (-ve)	Insignificant
Degree to which the impact may cause irreplaceable loss of resources:	LOW (the critically modified wetland is unlikely to be associated with irreplaceable biodiversity)	
Degree to which the impact can be reversed:	FULLY REVERSIBLE	
Degree to which the impact can be avoided:	MEDIUM (activities causing disturbance can be located away from sensitive habitat)	
Degree to which the impact can be managed:	MEDIUM (activities causing disturbance can be contained)	
Degree to which the impact can be mitigated:	MEDIUM (disturbed areas can be partially restored through rehabilitation)	
Residual impacts:	Insignificant	

Essential mitigation measures:

- Declare the wetland area to the west of Baden Powell Road in the vicinity of the intersection as a No-Go area to construction personnel, vehicles machinery and materials;
- Access to the No-Go area may only be authorised by the Environmental Control Officer (ECO) following the approval by the ECO of a Method Statement detailing the activity that will be undertaken in the No-Go area including how the area will be accessed;
- Contractor to regularly (i.e. daily) inspect the No-Go area and clear and remove with immediate effect any rubble or litter that may have been accidentally been deposited into the No-Go area as a result of construction activities and dispose of at an appropriate registered waste management facility;
- The ECO must advise on measures to ensure that run-off from construction areas and any stockpiles located upslope of the wetland is contained and encouraged to infiltrate rather than discharge directly into the receiving wetland.

Impact 3 – Increased erosion and sedimentation

The exposure of soils resulting from site clearing and/or excavations and/or infilling near wetlands would increase the rates of erosion and sedimentation (the deposition of sediment into the wetlands). During excavations, soils would be destabilised thereby becoming more prone to erosion. Similarly, should any soil stockpiles be left uncovered and exposed to rain then it is likely that sedimentation would occur, given the proximity of the wetland to the road edge. Exacerbating the likelihood is the high erosive potential of the site's soils.

Overall erosion and sedimentation are rated to be PROBABLE during the rainy season when areas cleared of vegetation and the excavations and/or infilling (including soil stockpiles) would be most prone to erosion. Given that the wetland is inwardly draining the extent of the potential impact is rated to be LOCAL as the sedimentation of off-site wetlands will not occur. The intensity is rated to be LOW given the small scale of the proposed development. Overall, the impact significance of erosion and sedimentation is rated to be VERY LOW (-ve) without mitigation and Insignificant if the proposed mitigation measures, which include stormwater, erosion and sediment control measures, are implemented.

Table 14: Impact significance rating for erosion and sedimentation (development phase).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	LOCAL	LOCAL
Duration of impact	SHORT TERM	SHORT TERM
Consequence of impact or risk:	VERY LOW (-ve)	VERY LOW (-ve)
Intensity	LOW	LOW
Probability of occurrence:	PROBABLE	POSSIBLE
Indirect impacts:	N/A	N/A
Cumulative impacts	HIGH	HIGH
Significance rating of impact	VERY LOW (-ve)	Insignificant
Degree to which the impact may cause irreplaceable loss of resources:	LOW (the critically modified wetland is unlikely to be associated with irreplaceable biodiversity)	
Degree to which the impact can be reversed:	REVERSIBLE (sediment can be removed from the system and eroded areas stabilised)	
Degree to which the impact can be avoided:	MEDIUM (undertaking site preparation and construction in the dry summer months would largely avoid the impact but this is not practicable given the scale of the project)	
Degree to which the impact can be managed:	MEDIUM	
Degree to which the impact can be mitigated:	MEDIUM	
Residual impacts:	Insignificant	

Essential mitigation measures:

- Avoid the impact as far as is practically possible by undertaking the construction phase during the dry summer season, where feasible.
- For all construction activities that take place during the winter rainy season, the ECO must advise on measures to ensure that run-off from cleared areas and stockpiles located upslope of the wetland is contained and encouraged to infiltrate rather than discharge directly into the receiving wetland.
- Formulate and implement a Development/Construction phase EMP which includes the following specifications:
    - No stockpiles may be located to the west of Baden Powell Drive;
    - The ECO shall approve the site for stockpiling;
    - Protect soil stockpiles during the winter rainy season from erosion using a tarp or erosion blankets;
    - Implement erosion control measures in order to prevent erosion and sedimentation of the receiving wetland as required by the ECO. For example. strategically place straw bales or sediment fences/traps, to divert stormwater away from areas susceptible to erosion etc.);
    - All sediment contaminated runoff should be contained and allowed to settle before being discharged off-site. The settled-out sediment collected in this manner should be cleared manually as needed and removed from site;
    - The ECO shall, for the duration of the winter rainy season, check erosion control measures weekly to ensure these are still intact (and cleared of sediment in accordance with the recommendations above) as needed;
    - The ECO shall check the site for erosion damage and sedimentation after heavy rainfall events. Should erosion or sedimentation be noted, immediate corrective measures must be undertaken.

Impact 4 – Water quality impairment

It is possible that unmanaged, the fragmented seep wetland would become contaminated as a result of the use of construction materials including cement, paints and solvents which would enter the wetland via run-off given that the intersection is elevated above the level of the wetlands to the west of Baden Powell Drive and in close proximity to the wetlands. In addition, the operation of vehicles and machinery might present unchecked and accidental leaks and spillages which in turn would also lead to wetland contamination. Discharge of any wash-water from construction areas into the surrounding environment would also contaminate run-off which in turn would enter and contaminate the receiving wetland.

Given that the wetland is inwardly draining, the extent of the potential impact is rated LOCAL. The proximity to the wetland and raised elevation of the Baden Powell Drive and Macassar Road at the intersection means that the likelihood would be PROBABLE. The small scale of the proposed development results in an intensity rating of LOW. Without any mitigation the potential impact is accordingly rated to be of VERY LOW (-ve) impact. With management and mitigation measures effectively implemented the probability of the impact occurring and the intensity of the impact would be reduced resulting in an Insignificant residual impact.

Table 15: Impact significance rating for water quality impairment (development phase).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	LOCAL	LOCAL
Duration of impact	SHORT TERM	SHORT TERM
Consequence of impact or risk:	VERY LOW (-ve)	VERY LOW (-ve)
Intensity	LOW	VERY LOW
Probability of occurrence:	PROBABLE	POSSIBLE
Indirect impacts:	N/A	N/A
Cumulative impacts	HIGH	HIGH
Significance rating of impact	VERY LOW (-ve)	Insignificant
Degree to which the impact may cause irreplaceable loss of resources:	LOW (the critically modified wetland is unlikely to be associated with irreplaceable biodiversity)	
Degree to which the impact can be reversed:	IRREVERSIBLE	
Degree to which the impact can be avoided:	MEDIUM	
Degree to which the impact can be managed:	MEDIUM	
Degree to which the impact can be mitigated:	MEDIUM	
Residual impacts:	Insignificant	

Essential mitigation measures:

- Formulate and implement an EMP for the development/construction phase which includes the following specifications:
    - Where cement is mixed in a cement mixer ensure that the cement mixer operates at all times within a bunded area with an impermeable base;
    - Where cement is mixed by hand, ensure that the cement is mixed at all times in impermeable containers or in a bunded area with an impermeable base;
    - All wet and dry cement deposits outside the contained areas are to be removed at the end of each day and disposed of off-site as rubble;
    - Store fuel, chemicals and other hazardous substances in suitable secure weather-proof containers with impermeable and bunded floors to limit pilferage, spillage into the environment, flooding or storm damage and to be located at least 50m from any wetland;
    - Inspect all storage facilities and vehicles daily for the early detection of deterioration or leaks;
    - Clean up any spillages (e.g. concrete, oil, fuel), immediately. Remove contaminated soil and dispose of it appropriately;
    - Dispose of used oils, wash water from cement and other pollutants at an appropriate licensed landfill site. Disposal of any of these waste materials into any wetland and associated buffer is strictly prohibited;
    - Dispose of concrete and cement-related mortars in an environmental sensitive manner (as this can be toxic to aquatic life). Washout may not be discharged into the wetland;
    - Provide an adequate number of portable toilets where work is being undertaken. These toilets must be located at least 10m from the wetland and must be serviced regularly in order to prevent leakage/spillage;
    - All contaminated soil removed from the site by excavator or hand is to be immediately placed in a skip (i.e. no stockpiling of contaminated soil on-site);

- All skips containing waste shall be immediately transported to landfill for disposal when the skip becomes full;
- Any skips containing solid waste at the end of the day shall be covered to prevent wind from blowing the waste away; and
- Receipts for the safe disposal of solid waste shall be kept on record by the Contractor.

Impact 5 – Loss of Biota

Construction activities in close proximity to wetlands inevitably cause biota loss, primarily aquatic biota that are either displaced (as in the case of mobile biota such as avifauna) or suffer mortalities (in the case of most sessile biota such as aquatic plants and fish). The manner in which biota loss would occur is primarily as a result of being crushed when the wetland is infilled and also by vehicles being driven indiscriminately or through the placement of machinery and/or construction materials in or near to wetlands. Additionally, any chemical spills or contaminated stormwater run-off that causes water quality impairment would have a negative impact on biota, particularly because the biota associated with wetlands in the region are sensitive to changes in water quality.

The impact is likely to be of a SHORT TERM duration given the limited duration of the construction/development phase and the likelihood that mobile biota would return to inhabit the remaining wetland remnants with time. The likelihood of biota loss occurring is rated to be PROBABLE. The impact intensity is rated LOW given the current critically modified state of the wetland and the very limited aquatic biota that may still survive in the wetland. Accordingly, the impact is rated to be of LOW (-ve) significance without mitigation. Wetland biota loss associated with the depression wetland due to construction activities can be mitigated by prohibiting access for construction personnel, vehicles and machinery to the wetland as well as placing restrictions on the driving of vehicles, the operation of construction machinery and the storage of construction materials. With the implementation of the recommended mitigation measures the impact significance rating is reduced to VERY LOW (-VE).

Results

Table 16: Impact significance rating for loss of biota (development phase).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	LOCAL	LOCAL
Duration of impact	SHORT TERM	SHORT TERM
Consequence of impact or risk:	VERY LOW (-ve)	VERY LOW (-ve)
Intensity	LOW	LOW
Probability of occurrence:	PROBABLE	POSSIBLE
Indirect impacts:	N/A	N/A
Cumulative impacts	HIGH	HIGH
Significance rating of impact	VERY LOW (-ve)	Insignificant
Degree to which the impact may cause irreplaceable loss of resources:	LOW (the critically modified wetland is unlikely to be associated with irreplaceable biodiversity)	
Degree to which the impact can be reversed:	IRREVERSIBLE	
Degree to which the impact can be avoided:	MEDIUM	
Degree to which the impact can be managed:	MEDIUM	
Degree to which the impact can be mitigated:	MEDIUM	
Residual impacts:	Insignificant	

Essential mitigation measures:

- Clearly demarcate the area to the west of Baden Powell Drive as a No-Go area prior to commencement of the construction phase and maintain the area as a No-Go area for the duration of the construction phase;

- Any activities within the wetland No-Go areas must be authorised by the ECO (e.g. during infilling);
- The parking of construction vehicles and storage/placement of construction machinery and the siting of stockpiles may not be located to the west of Baden Powell Drive.

Table 17: Summary of development phase impacts.

Impacts	Extent	Duration	Intensity	Probability of impact occurring	Significance
Wetland habitat loss					
Without mitigation	LOCAL	LONG TERM	LOW	DEFINITE	LOW (-ve)
With mitigation	Mitigation not possible				
Wetland habitat disturbance					
Without mitigation	LOCAL	SHORT TERM	LOW	PROBABLE	VERY LOW (-ve)
With mitigation	LOCAL	SHORT TERM	LOW	POSSIBLE	Insignificant
Increased erosion and sedimentation					
Without mitigation	LOCAL	SHORT TERM	LOW	PROBABLE	VERY LOW (-ve)
With mitigation	LOCAL	SHORT TERM	LOW	POSSIBLE	Insignificant
Water quality impairment					
Without mitigation	LOCAL	SHORT TERM	LOW	PROBABLE	VERY LOW (-ve)
With mitigation	LOCAL	SHORT TERM	LOW	POSSIBLE	Insignificant
Biota loss					
Without mitigation	LOCAL	SHORT TERM	LOW	PROBABLE	VERY LOW (-ve)
With mitigation	LOCAL	SHORT TERM	LOW	POSSIBLE	Insignificant

4.2.2 Operational Phase

Impact 1 – Alteration of flow regime

An increase in the area occupied by hard surfaces such as a tarred road increases run-off as infiltration is impeded. If the hard surfaces are located near wetlands then it is PROBABLE that the increased run-off will discharge into the wetland.

The extent of the impact is rated to be LOCAL due to the fact that the wetland is inwardly draining and the duration LONG TERM. The intensity of the potential impact is rated LOW given the small area of increased hard surfacing. The impact significance for the alteration of flow regime is, therefore, rated as LOW (-ve) without mitigation. The potential impact could be satisfactorily mitigated by containing and then attenuating the surface run-off. This is however not considered a reasonable requirement given that stormwater attenuation ponds require space which is in very limited supply in Khayelitsha and also the rapid rate of continued loss of the depression wetland with the very likely possibility that all remaining wetland habitat will be lost in the near future.

Table 18: Impact significance rating for alteration of flow regime (operational phase).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	LOCAL	No practicable mitigation
Duration of impact	LONG TERM	
Consequence of impact or risk:	LOW (-ve)	
Intensity	LOW	
Probability of occurrence:	PROBABLE	
Indirect impacts:	N/A	
Cumulative impacts	MEDIUM	
Significance rating of impact	LOW (-ve)	
Degree to which the impact may cause irreplaceable loss of resources:	LOW (the critically modified wetland is unlikely to be associated with irreplaceable biodiversity)	
Degree to which the impact can be reversed:	REVERSIBLE	
Degree to which the impact can be avoided:	LOW (Increased flow as a result of hard surfacing is an unavoidable impact)	
Degree to which the impact can be managed:	MEDIUM (by containing and attenuation run-off)	
Degree to which the impact can be mitigated:	MEDIUM (by containing and attenuation run-off)	
Residual impacts:	LOW (-ve)	

Impact 2 – Wetland Habitat Disturbance

The activity associated operational phase of transportation infrastructure such as roads that has potential to cause environmental impacts in the context of the present site is the use of the infrastructure by drivers and pedestrians. Baden Powell Drive is a road that is frequently used by commuters and the entrance to Khayelitsha off the intersection is a particularly busy access so overall the use of the intersection by motor vehicles is significant. There are also numerous pedestrians, particularly residents from Khayelitsha, who walk along the side of Baden Powell Drive either towards False Bay or towards the N2. Both vehicular traffic and pedestrians have the potential to cause wetland habitat disturbance in the following ways:

- Hydrocarbon spills from vehicles on the road surface which when exposed to rainfall will be discharged into the adjacent fragmented wetland system;
- Disposal of solid waste (including illegal dumping of builders' rubble);
- Noise from motor vehicles causing biota to relocate; and
- Poaching of wildlife.

The extent of wetland habitat disturbance is LOCAL because the effects of the disturbance would not extend beyond the site. The duration of the impact is LONG TERM and the overall intensity would be LOW taking into account the critical state of the wetland which is largely devoid of natural habitat and aquatic biota. Accordingly, the potential impact of wetland habitat disturbance is rated to be of LOW (-e) significance. Implementation of the recommended mitigation measures to address all the identified operational phase impacts would reduce the impact significance to VERY LOW (-ve).

Table 19: Impact significance rating for impacts on biota (operational phase).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	LOCAL	No practicable mitigation
Duration of impact	LONG TERM	
Consequence of impact or risk:	LOW (-ve)	
Intensity	LOW	
Probability of occurrence:	PROBABLE	
Indirect impacts:	N/A	
Cumulative impacts	HIGH	
Significance rating of impact	LOW (-ve)	
Degree to which the impact may cause irreplaceable loss of resources:	LOW (the critically modified wetland is unlikely to be associated with irreplaceable biodiversity)	
Degree to which the impact can be reversed:	LOW (once disturbance has occurred it cannot be reversed).	
Degree to which the impact can be avoided:	LOW (wetland habitat disturbance as a result of infrastructure upgrades is largely unavoidable)	
Degree to which the impact can be managed:	MEDIUM	
Degree to which the impact can be mitigated:	MEDIUM	
Residual impacts:	LOW (-ve)	

Table 20: Summary of impact assessment results for the operational phase.

Alternatives	Extent	Duration	Intensity	Probability of impact occurring	Significance
Alteration of natural flow regime					
Without mitigation	LOCAL	LONG TERM	HIGH	PROBABLE	LOW (-ve)
With mitigation	*No practicable mitigation*				
Wetland habitat disturbance					
Without mitigation	LOCAL	LONG TERM	LOW	PROBABLE	LOW (-ve)
With mitigation	LOCAL	LONG TERM	LOW	POSSIBLE	VERY LOW (-ve)

4.3 'No-Go' Scenario

The 'No-Go' alternative implies that the status quo would prevail and the existing intersection would remain as-is. As stated repeatedly in this report, the rate of loss of the fragmented depression wetland to the west of Baden Powell Drive as a result of expansion of the informal settlement. Imported fill material can be seen stockpiled alongside Baden Powell Drive which is gradually being used to infill any vacant areas which contain wetland remnants in order for these areas to become suitable for inhabitation. Accordingly, it is EnviroSwift's opinion that the remnant depression wetland will become lost in its totality within the short to medium term.

The likelihood of complete wetland loss is rated to be PROBABLE and the extent is rated to be LOCAL. The No-Go alternative is accordingly rated to have an impact significance rating of LOW (-ve). Mitigation is not applicable to the No-Go alternative.

Table 21: Impact significance rating for degradation of freshwater ecosystems associated with the No-Go alternative.

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	LOCAL	N/A to the No-Go alternative
Duration of impact	LONG TERM	
Consequence of impact or risk:	LOW (-ve)	
Intensity	LOW	
Probability of occurrence:	PROBABLE	
Indirect impacts:	N/A	
Cumulative impacts	HIGH	
Significance rating of impact	LOW (-ve)	
Degree to which the impact may cause irreplaceable loss of resources:	LOW (the critically modified wetland is unlikely to be associated with irreplaceable biodiversity)	
Degree to which the impact can be reversed:	REVERSIBLE (habitat degradation can be reversed through compliance and rehabilitation)	
Degree to which the impact can be avoided:	LOW (continued environmental degradation is an inevitable trend for aquatic biodiversity associated with urban expansion)	
Degree to which the impact can be managed:	MEDIUM (while the Municipality could undertake measures to manage ongoing fragmentation, loss and degradation this has not occurred, presumably due to a lack of resources)	
Degree to which the impact can be mitigated:	MEDIUM (while the Municipality could undertake measures to mitigate ongoing fragmentation, loss and degradation this has not occurred, presumably due to a lack of resources)	
Residual impacts:	LOW (-ve)	

4.4 Indirect Impacts

No indirect impacts were identified or considered probable, provided the suggested mitigation measures of the direct impacts are implemented and adhered to.

4.5 Cumulative Impacts

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

Cumulative loss of wetland habitat on the Cape Flats and in the Western Strandveld wetland vegetation type constitutes a highly significant cumulative impact given the demand for housing on the Cape Flats. Depression wetlands in this wetland vegetation type are also poorly protected which exacerbates the significance of the cumulative impact. The proposed upgrading of the intersection will contribute to the cumulative loss of this wetland type in the region, however, the assessment of the No-Go alternative (see Section 4.3) indicates that the wetland remnants within Khayelitsha will all be lost within the short to medium term. As such the proposed upgrading of the intersection is not the only activity that would contribute to the cumulative loss of wetland habitat in the region.

5 Key Findings and Recommendations

5.1 Key Findings

This study has confirmed the existence of fragmented remnants of a depression wetland that is located to the west of Baden Powell Drive in the Khayelitsha informal settlement which extends up to the current edge of Baden Powell Drive. As such the proposed widening of the road will result in wetland loss which has been calculated to be as much as 2 000m² of wetland loss. Ordinarily wetland loss requires the implementation of a wetland offset (National Biodiversity Offset Guidelines, Government Gazette No. 48841 of June 2023) but in this case the residual impact has been rated to be LOW (-ve) and as such a wetland offset is not required. The main reasons for this low rating for wetland loss are three-fold:

1. The PES of the wetland which was calculated to be a category "F" which means that the wetland has reached a critical stage of modification with very little to no remaining natural habitat and associated aquatic biota;
2. The EIS of the wetland was calculated to be Low/marginal which means it is not significant at the local scale and does little to contribute to the flow in major rivers; and
3. The high rate of wetland loss in the Khayelitsha informal settlement given the high demand for vacant land for inhabitation.

Despite the future of the fragmented depression wetland being uncertain, it will for the time that it remains in existence be subjected to a suite of aquatic ecological impacts such as habitat disturbance (both during the construction and operational phases), flow regime alteration (both during the construction and operational phases), erosion and sedimentation, water quality impairment and biota loss (the latter two associated with the construction phase). All of the above identified potentially significant aquatic ecological impacts are either of a LOW significance or with mitigation can be minimised to VERY LOW and, in some cases, Insignificant impact significant ratings.

5.2 Key Decision-making Factors

While wetland loss associated with the proposed upgrade has been confirmed, it is also very likely that the fragmented remnants of the depression wetland that exist currently to the west of Baden Powell Drive within the Khayelitsha informal settlement will be lost altogether as a result of incremental infilling by residents to create additional inhabitable areas given the high demand for vacant land in Khayelitsha. For this reason alone, it is strongly motivated that the proposed upgrading of the intersection be supported from an aquatic ecological perspective.

5.3 Conclusion and Recommendations

On the basis of the assessment of the potentially significant freshwater ecological impacts associated with the proposed development, the proposed development is supported from a freshwater ecological perspective. This is conditional upon the effective implementation of the following recommended mitigation measures:

Measures to mitigate construction phase wetland habitat disturbance:

- Declare the wetland area to the west of Baden Powell Road in the vicinity of the intersection as a No-Go area to construction personnel, vehicles machinery and materials;
- Access to the No-Go area may only be authorised by the Environmental Control Officer (ECO) following the approval by the ECO of a Method Statement detailing the activity that will be undertaken in the No-Go area including how the area will be accessed;
- Contractor to regularly (i.e. daily) inspect the No-Go area and clear and remove with immediate effect any rubble or litter that may have been accidentally been deposited into the No-Go area as a result of construction activities and dispose of at an appropriate registered waste management facility;
- The ECO must advise on measures to ensure that run-off from construction areas and any stockpiles located upslope of the wetland is contained and encouraged to infiltrate rather than discharge directly into the receiving wetland.

Measures to mitigate construction phase erosion and sedimentation:

- Avoid the impact as far as is practically possible by undertaking the construction phase during the dry summer season, where feasible.
- For all construction activities that take place during the winter rainy season, the ECO must advise on measures to ensure that run-off from cleared areas and stockpiles located upslope of the wetland is contained and encouraged to infiltrate rather than discharge directly into the receiving wetland.
- Formulate and implement a Development/Construction phase EMP which includes the following specifications:
    - No stockpiles may be located to the west of Baden Powell Drive;
    - The ECO shall approve the site for stockpiling;
    - Protect soil stockpiles during the winter rainy season from erosion using a tarp or erosion blankets;
    - Implement erosion control measures in order to prevent erosion and sedimentation of the receiving wetland as required by the ECO. For example. strategically place straw bales or sediment fences/traps, to divert stormwater away from areas susceptible to erosion etc.);
    - All sediment contaminated runoff should be contained and allowed to settle before being discharged off-site. The settled-out sediment collected in this manner should be cleared manually as needed and removed from site;
    - The ECO shall, for the duration of the winter rainy season, check erosion control measures weekly to ensure these are still intact (and cleared of sediment in accordance with the recommendations above) as needed;
    - The ECO shall check the site for erosion damage and sedimentation after heavy rainfall events. Should erosion or sedimentation be noted, immediate corrective measures must be undertaken.

Measures to mitigate construction phase water quality impairment:

- Formulate and implement an EMP for the development/construction phase which includes the following specifications:
    - Where cement is mixed in a cement mixer ensure that the cement mixer operates at all times within a bunded area with an impermeable base;
    - Where cement is mixed by hand, ensure that the cement is mixed at all times in impermeable containers or in a bunded area with an impermeable base;
    - All wet and dry cement deposits outside the contained areas are to be removed at the end of each day and disposed of off-site as rubble;
    - Store fuel, chemicals and other hazardous substances in suitable secure weather-proof containers with impermeable and bunded floors to limit pilferage, spillage into the environment, flooding or storm damage and to be located at least 50m from any wetland;
    - Inspect all storage facilities and vehicles daily for the early detection of deterioration or leaks;
    - Clean up any spillages (e.g. concrete, oil, fuel), immediately. Remove contaminated soil and dispose of it appropriately;
    - Dispose of used oils, wash water from cement and other pollutants at an appropriate licensed landfill site. Disposal of any of these waste materials into any wetland and associated buffer is strictly prohibited;
    - Dispose of concrete and cement-related mortars in an environmental sensitive manner (as this can be toxic to aquatic life). Washout may not be discharged into the wetland;
    - Provide an adequate number of portable toilets where work is being undertaken. These toilets must be located at least 10m from the wetland and must be serviced regularly in order to prevent leakage/spillage;
    - All contaminated soil removed from the site by excavator or hand is to be immediately placed in a skip (i.e. no stockpiling of contaminated soil on-site);
    - All skips containing waste shall be immediately transported to landfill for disposal when the skip becomes full;
    - Any skips containing solid waste at the end of the day shall be covered to prevent wind from blowing the waste away; and
    - Receipts for the safe disposal of solid waste shall be kept on record by the Contractor.

Measures to mitigate construction phase wetland biota loss:

- Clearly demarcate the area to the west of Baden Powell Drive as a No-Go area prior to commencement of the construction phase and maintain the area as a No-Go area for the duration of the construction phase;
- Any activities within the wetland No-Go areas must be authorised by the ECO (e.g. during infilling);
- The parking of construction vehicles and storage/placement of construction machinery and the siting of stockpiles may not be located to the west of Baden Powell Drive.

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.
- In completing the Risk Assessment Matrix, the impact assessment presented in Section 5 was used as a guide for assigning ratings for intensity, extent, duration and probability to ensure that the two assessments are aligned.
- All of the activities potentially generating negative freshwater ecological impacts were found to be associated with a LOW risk class. This aligns with the impact assessment which rated all potential impacts generated by the proposed development to be either of a **Very Low (-ve)** or **Low (-ve)** significance rating (see Appendix 4 and Section 5).
- All of the identified negative impacts are limited to the impact site or are site-specific because the affected wetland is inwardly draining (i.e. it has been classified as endorheic depression wetlands).
- All the identified construction phase impacts have a SHORT TERM duration due to the short term duration of the construction phase and mitigation effect of the recommended mitigation measures. The only exceptions to this is the construction phase-related impacts of wetland loss which is considered to be a Long-term impact, the duration of which cannot be reduced through mitigation.
- Both the identified operational phase-related negative impacts have a Long-term duration as there is no practicable way of mitigating these impacts.
- The construction phase-related impacts have a probability (with mitigation) of between 40 – 60% chance of occurring with the exception of wetland loss and biota loss which are considered to have probabilities of 100% and 80%, respectively.
- The operational phase-related impacts have a probability of 60% chance of occurring.
- The risk assessment was undertaken with a Medium degree of confidence due to the fact that all of the potential impacts are being predicted.

Given that all of the activities are associated with a LOW risk rating the proposed development qualifies for a GA as far as the Section 21 (c) and (i) water uses are concerned.

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

7 References

Council for Scientific and Industrial Research. 2018 National Wetland Map 5 and Confidence Map [Vector] 2018. Available from the Biodiversity GIS website.

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.

Department of Water Affairs. 2010. National Water Act waste discharge standards DWA 2010 guidelines.

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

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

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., Holness, S.D., von Hase, A., Brownlie, S. & Dini, J., 2014. Wetland offsets: a best-practice guideline for South Africa. South African National Biodiversity Institute and the Department of Water Affairs. Pretoria. 69 pages.

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.

Rountree, M.W., Malan, H.L., Weston, B.C. 2013. Manual for the Rapid Ecological Reserve Determination of Inland Wetlands (Version 2.0). WRC Report No. 1788/1/12.

South African National Biodiversity Institute (SANBI). 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria. Pp. 1-214.

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 – Impact Assessment Methodology[6]

Impact Rating Methodology

The methodology used in this EIA process to assess and rate the significance of potential impacts is outlined in this section.

The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur.

The criteria used to determine impact consequence are presented in Table 1 below.

Table 1: Criteria used to determine the Consequence of the Impact

Rating	Definition of Rating	Score
A. Extent– the area over which the impact will be experienced		
None		0
Local	Confined to project or study area or part thereof (e.g. site)	1
Regional	The region, which may be defined in various ways, e.g. cadastral, catchment, topographic	2
(Inter) national	Nationally or beyond	3
B. Intensity– the magnitude of the impact in relation to the sensitivity of the receiving environment		
None		0
Low	Natural and/or social functions and processes are negligibly altered	1
Medium	Natural and/or social functions and processes continue albeit in a modified way	2
High	Natural and/or social functions or processes are severely altered	3
C. Duration– the time frame for which the impact will be experienced		
None		0
Short-term	Up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years	3

The combined score of these three criteria corresponds to a Consequence Rating, as set out in Table 2:

Table 2: Method used to determine the Consequence Score

Combined Score (A+B+C)	0 – 2	3 – 4	5	6	7	8 – 9
Consequence Rating	Not significant	Very low	Low	Medium	High	Very high

Once the consequence is derived, the probability of the impact occurring will be considered, using the probability classifications presented in Table 3.

[6] Adapted from SRK Impact assessment methodology

Table 3: Probability Classification

Probability of impact – the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall significance of the individual impacts will be determined by considering consequence and probability using the rating system prescribed in Table 4.

Table 4: Impact Significance Ratings

Significance Rating	**Consequence**		**Probability**
Insignificant	Very Low	&	Improbable
	Very Low	&	Possible
Very Low	Very Low	&	Probable
	Very Low	&	Definite
	Low	&	Improbable
	Low	&	Possible
Low	Low	&	Probable
	Low	&	Definite
	Medium	&	Improbable
	Medium	&	Possible
Medium	Medium	&	Probable
	Medium	&	Definite
	High	&	Improbable
	High	&	Possible
High	High	&	Probable
	High	&	Definite
	Very High	&	Improbable
	Very High	&	Possible
Very High	Very High	&	Probable
	Very High	&	Definite

Finally, the impacts will also be considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The prescribed system for considering impacts status and confidence (in assessment) is laid out in Table 5.

Table 5: Impact status and confidence classification

Status of impact	
Indication whether the impact is adverse (negative) or beneficial (positive).	+ ve (positive – a 'benefit')
	– ve (negative – a 'cost')
	Neutral
Confidence of assessment	
The degree of confidence in predictions based on available information, EAP's judgment and/or specialist knowledge.	Low
	Medium
	High

The impact significance rating should be considered by the authority in their decision-making process based on the implications of ratings described below:

- **Insignificant:** the potential impact is negligible and will not have an influence on the decision regarding the proposed activity/development.
- **Very Low:** the potential impact should not have any meaningful influence on the decision regarding the proposed activity/development.
- **Low:** the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development.
- **Medium:** the potential impact should influence the decision regarding the proposed activity/development.
- **High:** the potential impact will affect the decision regarding the proposed activity/development.
- **Very High:** The proposed activity should only be approved under special circumstances.

In the EIA practicable mitigation measures will be recommended and impacts rated in the prescribed way both without and with the assumed effective implementation of mitigation measures.

Appendix 2 – CV of the Specialist

Curriculum Vitae
of
NICHOLAS STEYTLER
Director – EnviroSwift Western Cape

CONTACT DETAILS	
Address	32 Rameron Road, Imhoffs Gift, Kommetjie 7975
Email	Nick@enviroswift.co.za
Cell	082-322 4074
PERSONAL INFO	
Full Names	Nicholas Sean Steytler
Date of Birth	28 March 1970
Nationality	South African
Languages	English, Afrikaans, isiZulu (fair)
Identity Number	7003285202088

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

PUBLICATIONS
Steytler, NS and Samways, MJ. 1995. Biotope selection by adult male dragonflies (Odonata) at an artificial lake created for insect conservation in South Africa. Biological Conservation Volume 72 Issue 3, December 1995, Pages 381 – 386.
Samways, MJ and Steytler, NS. 1996. Dragonfly (Odonata) distribution patterns in urban and forest landscapes, and recommendations for riparian management. Biological Conservation Volume 78 Issue 3, December 1996, Pages 279 – 288.

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

FIELDS OF EXPERTISE	**Years experience**
Integrated Environmental Management	25 years +
Natural Resource Management Planning	25 years +

Freshwater Ecological Specialist Studies	5 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 IEM experience not listed below)	
Freshwater ecological specialist studies:	
Freshwater ecological assessment of the proposed Sandown 8 residential development, Tableview, City of Cape Town (2026)	
Freshwater ecological assessment of the proposed Rivergate 4 residential development, Tableview, City of Cape Town (2026)	
Independent Peer Review of the Aquatic Biodiversity Assessment for the proposed expansion of agricultural lands on Portion 9, Portion 10 and Remainder of Farm Zandrug No. 122, Cedarberg Municipality, Western Cape (2026).	
Wetland Rehabilitation and Management Plan for the proposed Somerset West Hotel and Casino, Portion 29 of Stellenbosch Farm No. 794, Somerset West, City of Cape Town (2026)	
Aquatic Biodiversity Compliance Statement for the proposed development of a Solar Photo-Voltaic Facility and light industrial activities on Portion 1 of Farm 189, Uyekraal near Saldanha, Saldanha Bay Local Municipality, Western Cape (2026)	
Freshwater Ecological Screening for the proposed lining of the Kromvlei Dam, Portion 2 of Farm 76 Namaquasfontein, Piketberg, Western Cape (2026).	
Freshwater Ecological Screening for the proposed development of a new shopping centre on Erf 578 Schaapkraal, City of Cape Town, Western Cape (2026)	
Detailed Freshwater Ecological Assessment for the proposed development of a Roundabout on Baden Powell Drive, Macassar, City of Cape Town, Western Cape (2026)	
Independent Peer Review of the Aquatic Biodiversity Assessment undertaken by Enviro-EAP for the proposed Vredenburg Revitalisation Project Phases 3 and 4 Louwville, Erf 16604 and Erf 16606, Vredenburg, Saldanha Bay Municipality, Western Cape (2026)	
Independent Peer Review of the Aquatic Biodiversity Assessment undertaken by Enviro-EAP for the proposed development of Erf 141 Philippi, City Of Cape Town, Western Cape (2026)	
Aquatic Biodiversity Compliance Statement for the proposed George Kerridge Housing Development, Erf No. 8270 and Portion 4 of Farm 132, Vredenburg, Saldanha Bay Municipality, Western Cape (2026)	
Aquatic Biodiversity Assessment for the proposed upgrading of the Raithby Wastewater Treatment Works, Erf 271 Raithby, Stellenbosch Municipality, Western Cape (2026)	
Aquatic Biodiversity Compliance Statement for the proposed residential development on Remainder Erf 22, Riversdale, Hessequa Municipality, Western Cape (2025)	
Aquatic Biodiversity Compliance Statement for the proposed development of low-cost housing opportunities, Remainder of Erf 551, Darling, Swartland Municipality, Western Cape (2025)	
Independent Peer Review of the Aquatic Biodiversity Assessment undertaken by Enviro-EAP for the proposed Upgrading of a Bulk Water Supply from Alfa Street, Malmesbury to District Road 1111, Swartland Municipality Western Cape (2025)	
Aquatic Biodiversity Assessment and preparation of a River Rehabilitation and Maintenance Management Plan for the proposed development of affordable housing opportunities, Erven 5636, 5637, 4061 & 4062, Hout Bay, City of Cape Town, Western Cape (2025)	
Freshwater Ecological Screening for the proposed development tourism accommodation and hospitality facilities on Erf 789, 76 & Portion 4 of the Farm 983, Scarborough City of Cape Town, Western Cape (2025)	
Aquatic Biodiversity Compliance Statement for the proposed residential development on Remainder Erf 22, Riversdale, Hessequa Municipality, Western Cape (2025)	
Aquatic Biodiversity Assessment for the proposed development of a Petroport at on Portion 7 of the Farm Jacobus Kraal No. 544, near Yzerfontein, Western Cape (2025)	
Aquatic Biodiversity Compliance Statement for the proposed affordable/low-cost housing in Nuwerus, Northern Cape (2025)	
Independent Peer Review of the Aquatic Biodiversity Compliance Statement undertaken by Enviro-EAP for the proposed development of a Water Treatment Works for Heidelberg, Western Cape (2025)	
Independent Peer Review of the Aquatic Biodiversity Assessment undertaken by Enviro-EAP for the proposed development of affordable/low-cost housing in two areas in Clanwilliam, Western Cape (2025)	
Independent Peer Review of the Aquatic Biodiversity Assessment undertaken by Enviro-EAP for the proposed development of affordable/low-cost housing including the development of a new water supply reservoir in Citrusdal, Western Cape (2025)	

Aquatic Biodiversity Compliance Statement for the proposed residential development of Remainder Erf 474 St. Helena Bay, Saldanha Bay Municipality, Western Cape (2025)
Aquatic Biodiversity Compliance Statement for the proposed development of an off-stream dam of storage capacity of 125 500m³ on Portion 24 of the Farm Misgunt No. 499, Citrusdal, Western Cape (2025)
Freshwater Screening Study for Erf 9882 Hout Bay, City of Cape Town (2025)
Freshwater ecological impact assessment of the development of housing opportunities on Portion 22 of the Farm Koopmans Kloof No. 221, Kraaifontein, City of Cape Town (2025)
Freshwater ecological impact assessment to support a S24G Rectification Application for the development of a residential dwelling on Farm 1620 Stellenbosch, Western Cape (2025)
Freshwater ecological risk assessment and preparation of a Rehabilitation Plan for the establishment of a Construction Site Camp in a wetland on Erf 65266 Wynberg, City of Cape Town (2025)
Freshwater ecological impact assessment for the proposed residential development of Erf 534 Bantry Bay, City of Cape Town (2025)
Freshwater ecological impact assessment for the proposed residential development of Erf 2534 Yzerfontein, Western Cape (2025)
Freshwater screening study for the proposed redevelopment of Erf 3129 Oranjezicht, City of Cape Town (2025)
Freshwater screening study for the proposed agricultural expansion at Rio Largo Olive Farm (Farms 757 and 758), Scherpenheuwel, Worcester, Western Cape (2025)
Freshwater screening study for the proposed residential development of Remainder Erf 474 St. Helena Bay, Western Cape (2025)
Freshwater screening study for the proposed residential development of Erf 919 Constantia, City of Cape Town (2025)
Freshwater screening study for the proposed redevelopment of Erf 2762 Camps Bay, City of Cape Town (2025)
Freshwater screening study for the proposed expansion of a school at Erf 4929 Lekkerwater Road, Sunnydale, City of Cape Town (2025)
Freshwater ecological impact assessment for the proposed residential development of Erf 3368 Higgovale, City of Cape Town (2025)
Freshwater screening study for the proposed residential development of Erf 17678 Capri, City of Cape Town (2024)
Freshwater screening study for the proposed Eersteriver Station Development, Erven 18-21, 25-29 and 1072, Eersteriver, City of Cape Town (2024)
Freshwater ecological impact assessment as part of a NEMA Section 24G Rectification process for the unlawful expansion of an egg-laying poultry farm on Portion 128 of the Farm Stocklands and Oatlands No. 878, Currys Post, KwaZulu-Natal (2024)
Freshwater ecological impact assessment as part of a NEMA Section 24G Rectification process for the unlawful clearance of indigenous vegetation on Portion 48 of the Farm 708, Franskraal, Overstrand Municipality (2024)
Freshwater ecological impact assessment for the proposed single residential development of Portions 125 & 126 of Farm 599 Bettys Bay, Overstrand Municipality (2024)
Freshwater ecological impact assessment for the proposed development 4 residential dwellings and associated infrastructure on Portion 86 of the Farm Bosjesmans Valley No. 218, Worcester (2024)
Freshwater screening study for the proposed development of Erf 1847 Hout Bay, City of Cape Town (2024)
Freshwater screening study as part of a NEMA Section 24G Rectification process for the proposed single residential development of Erf 5629 Bettys Bay, Overstrand Municipality (2024)
Freshwater ecological impact assessment for the proposed development of Erf 8384 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed development of Erf 4502 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed subdivision of Erf 4476 in Waterfall Lane, Hout Bay, City of Cape Town (2024)
Freshwater ecological impact assessment as part of a NEMA Section 24G Rectification process for the unlawful development of tourism accommodation facilities at the Portion 1 of Farm 866, Bot River, Theewaterskloof Municipality (2024)
Freshwater screening study for the proposed development of Erf 1472 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed expansion of the Montana Seed Processing Facility, Joostenbergvlakte, City of Cape Town (2024)
Freshwater screening study for the German School, Kloof Neck, City of Cape Town (2024)
Freshwater screening study for the proposed telecommunications mast on Portion 6 of the Farm Harkerville No 423, Knysna Road, Plettenberg Bay (2024)
Freshwater screening study for the proposed residential development of Erven 3233 and 3234 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed residential development of Portion 3 of Farm 1643, Franschhoek, Drakenstein Municipality (2024)
Freshwater screening study for the proposed new in-stream dam on the Remaining extent of Farm Sevilla No. 135, Clanwilliam (2024)
Freshwater screening study for the proposed Morning Star affordable housing scheme, Durbanville, City of Cape Town (2024)

Freshwater screening study for the proposed temporary staging facility for the proposed Wynberg IRT bus depot, City of Cape Town (2024)
Freshwater screening study for the proposed subdivision of Erf 4795 Noordhoek, City of Cape Town (2024)
Freshwater screening study for the proposed single residential development of Erf 88844 Clovelly, City of Cape Town (2023)
Wetland delineation at the propsoed Eagles Rest Private Nature Reserve, Cape Point (2024)
Freshwater ecological impact assessment for external services for Welmoed Urban Node, Stellenbosch (2024)
Freshwater screening study for 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 for the proposed development of Erf 325 Atlantis, City of Cape Town (2023)
Freshwater screening study for the proposed development of solar PV facilities on Farms 788-6 and 792-RE, Philippi, City of Cape Town (2023)
Freshwater screening study for the Proposed development of solar PV facilities on Erven 551 and 553, Schaapkraal, City of Cape Town (2023)
Freshwater ecological impact assessment for the proposed expansion of the Rusty Gate Mountain Retreat, Greyton (2023)
Freshwater screening study of the proposed redevelopment of portions of Stikland Hospital, Erf 6300 Stikland, Bellville (2023)
Freshwater ecological specialist review & assessment for the proposed amendment to the scope of the authorised extension of Erica Drive, Belhar, City of Cape Town (2023)
Freshwater Screening study for the proposed telecommunications base station on Portion 20 of the Farm Matroosberge No. 57, De Doorns (2023)
Freshwater ecological impact assessment for the proposed subdivision of Erf 10546 Hout Bay (2023)
Freshwater screening study for the proposed expansion of Louwville township, Vredenburg (2023)
Freshwater ecological impact assessment for the residential development of Erf 178092 Newlands, City of Cape Town (2023)
Freshwater screening study for Erf 2068 Somerset West, City of Cape Town (2023)
Freshwater screening study for Portion 3 of Farm 1025 Wemmershoek, Stellenbosch Municipality (2023)
Freshwater ecological impact assessment for a new Wastewater Treatment Works for Matjiesfontein, Laingsburg Municipality (2023)
Freshwater ecological impact assessment for the development of tourism accommodation facilities at the Farm Hemelrand, Hemel en Aarde Valley, Overstrand Municipality (2023)
Freshwater screening study for residential development at Oude Bosch, Hermanus Lagoon, Overstrand Municipality (2022)
Freshwater ecological impact assessment for a proposed shopping centre at Erf 666 Hout Bay, City of Cape Town (2022)
Freshwater screening study for the proposed formalisation of the Valhalla Park informal settlement, Cape Flats, City of Cape Town (2022)
Freshwater screening study for a proposed telecommunications mast, Overhex, Breede Valley Winelands Municipality (2022)
Freshwater ecological impact assessment for the proposed expansion of the Leopard Rock residential estate, Onrusrivier, Overstrand Municipality (2022)
Freshwater screening study for the proposed low cost housing development at Wolwerivier, City of Cape Town (2022)
Freshwater ecological impact assessment for the proposed low cost housing development of Erf 148 Philadelphia, City of Cape Town (2022)
Freshwater screening study of Erf 10932 Constantia, City of Cape Town (2022)
Freshwater screening study of Erf 49 Faure, City of Cape Town (2021)
Freshwater screening study for a proposed concrete factory on the Remainder of the Farm Bultfontyn 128, near Middelburg in the Eastern Cape (2021)
Freshwater ecological impact assessment for the proposed expansion of vineyards at Mountain Rose Farm, Hemel en Aarde Valley, Overstrand Municipality (2022)
Freshwater ecological impact assessment for unlawful agricultural expansion at Plennegy Farm, Oudtshoorn, Western 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)
Freshwater screening study for the proposed redevelopment of the Mowbray Golf Course, Pinelands, City of Cape Town (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 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, Maqinqi 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)

Environmental Planning and 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 Invasive Alien Plant Clearing Plan for the Farm Wildschutsbrand, Cape Point (2017).
Preparation of an Invasive Alien Plant Clearing Plan 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)
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)
Faunal specialist assessment for the proposed N2 by-pass, Natal Drakensberg, KwaZulu-Natal (1997).
Freshwater specialist assessment for the proposed construction of a bridge over the Msunduzi River, Voortrekker Highschool, Pietermaritzburg (1997)
Strategic Planning of a proposed community based indigenous forest management project, Eastern Cape (1998)
Preparation of a decision support manual for community-based urban riparian systems management (RIPARI-MAN) (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)
Evaluating community-based wildlife management projects in the SADC region as part of the international project by IIED / IUCN called “Evaluating Eden” (1996)

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: 31.03.26

Appendix 4 – Risk Assessment Matrix

PROJECT: Proposed upgrading of the Baden Powell Drive and Macassar Road Intersection, Khayelitsha, City of Cape Town, Western C

RISK ASSESSMENT MATRIX for Section 21 (c) and (i) Water Use activities - Version 2.1.1

Name of Assessor: Nick Steytler
SACNASP Registration Number: 400029/02
Date of assessment: 31-Mar-26

Phase	Activity	Impact	Significance (max = 100)	Risk Rating	Confidence level
CONSTRUCTION	Site preparation including vegetation removal	Loss of wetland habitat & function	26	L	Medium
		Disturbance of wetland habitat	12,8	L	Medium
		Erosion and sedimentation	12,8	L	Medium
		Biota loss	16	L	Medium
	Operation of construction machinery and storage of construction materials	Disturbance of wetland habitat	16	L	Medium
		Water quality impairment	9,6	L	Medium
		Biota loss	9,6	L	Medium
OPERATIONAL	Presence of hard surfaces	Alteration of flow regime	16	L	Medium
	Residential land use	Disturbance of wetland habitat	14,4	L	Medium
	Residential land use	Water quality impairment	14,4	L	Medium
		Biota loss	14,4	L	Medium

END OF REPORT