



FEN CONSULTING

Freshwater Impact Assessment

**AS PART OF THE S24G RECTIFICATION PROCESS
CONCERNING THE PROPOSED MIXED-USE
DEVELOPMENT ON ERVEN 3303 AND 3304
(SUBDIVIDED FROM ERF 776), MANDALAY,
WESTERN CAPE PROVINCE.**

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EXECUTIVE SUMMARY

In October 2011, Communicare (Pty) Ltd, the then owner of Erf 776, Mandalay, was granted EA by the Department of Environmental Affairs and Development Planning (DEADP) to undertake listed activities in terms of National Environmental Management Act, 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014, as amended, for the establishment of a residential development. A Freshwater Ecological Assessment was conducted in 2008 by Environmental Monitoring Consulting (T. Belcher), to inform the EIA process. Additionally, a Wetland Offset Report was developed (Belcher, 2015) to compensate for the perceived loss of functional wetland habitat for the entire development area, with the wetland offset area identified as an existing stormwater pond located adjacent to the development area.

As per the then approved Spatial Development Plan (SDP), sections of a feature identified as a wetland ("Wetland 7"), designated as open space, were to be retained as open stormwater channels, while portions within the development footprint itself were approved for infilling and sub surface piping through an existing Water Use Licence (WUL). However, during the implementation of the EA, an alleged non-compliance occurred in 2017/2018, whereby "Wetland 7" was piped beyond the approved piping extent.

FEN Consulting was approached by PHS Consulting to undertake a Freshwater Impact Assessment for the piping of "Wetland 7" as well as the proposed densification of the mixed-use housing development on Erven 3303 and 3304 in Mandalay, to inform the S24G Rectification Process.

A field assessment was undertaken on the 10th of June 2026 (winter wet season), during which the presence of any natural freshwater ecosystem characteristics as defined by the DWAF (2008) and the NWA (1998) were noted (please refer to Section 4 of this report). The field assessment confirmed that no natural freshwater ecosystems were associated with the study area. Additionally, the feature identified and labelled as "Wetland 7" was erroneously identified as a wetland in the Freshwater Ecological Assessment compiled in 2008. This feature was clearly not a natural channel and at best could be classified as a water resource in the form of a stormwater channel. The site assessment further confirmed that the entire area associated with this stormwater channel ("Wetland 7"), including the alleged unlawfully piped areas, has been piped and infilled with these areas displaying no indications of hydromorphy, i.e., hydromorphic soil characteristics and/or hydrophytes (indicative of wetland conditions) were absent. Subsequently the entire area associated with this stormwater channel has reverted to a terrestrial nature which supports the opinion of the author that this area was most likely never a true watercourse but that this stormwater channel functioned as a waterway and thus a water resource.

The outcome of the pre-defined impact assessment undertaken as part of the NEMA S24G rectification process for the commencement of the piping and infilling of the stormwater channel ("Wetland 7") resulted in an overall *Low Negative Impact* on the hydrology of the study area. Additionally, the proposed rehabilitation and maintenance of the Wetland Offset Area as part of the development proposal to compensate for the loss of functional wetland habitat from the existing and currently proposed mixed-use development was also assessed to have a *Low Negative Impact* during active rehabilitation, whilst the post-rehabilitation is perceived to have an overall *Nett Positive Impact* on the ecological condition and ecoservice provisioning of this offset area (stormwater pond).

Conclusion:

From a Water Resource Management perspective, the current status quo concerning the piping of "Wetland 7" (stormwater channel) should remain in place as per the legal, technical, environmental and safety reasoning mentioned in Section 1.1. Furthermore, it is the author's professional recommendation that the functional loss of wetland habitat as a result of the proposed mixed use housing development on Erven 3303 and 3304 in Mandalay, is to be consolidated into a single wetland offset area as described and identified in the Wetland Offset Report compiled by T. Belcher, dated March 2015. It is also the opinion of the author that the ecoservices provided by the then open stormwater channel in the form of stormwater polishing can and will be catered for in the proposed wetland offset area, provided this offset area is adequately managed.

As such, it is strongly recommended that a Maintenance Management Plan (MMP) be compiled and approved by DEADP for the proposed development's open space areas as well as the wetland offset area, in order to ensure that these areas are managed and maintained in order to enhance the biodiversity value and ecoservice provisioning of these areas to the broader surrounding landscape.



MANAGEMENT SUMMARY

In October 2011, Communicare (Pty) Ltd, the then owner of Erf 776, Mandalay, was granted EA by DEADP to undertake listed activities in terms of NEMA and the EIA Regulations, 2014, as amended, for the establishment of a residential development. A Freshwater Ecological Assessment was conducted in 2008 by Environmental Monitoring Consulting (T. Belcher), to inform the EIA process. Additionally, a Wetland Offset Report was developed (Belcher, 2015) to compensate for the perceived loss of functional wetland habitat for the entire development area, with the wetland offset area identified as an existing stormwater pond located adjacent to the development area.

As per the then approved Spatial Development Plan (SDP), sections of a feature identified as a wetland ("Wetland 7"), designated as open space, were to be retained as open stormwater channels, while portions within the development footprint itself were approved for infilling and sub surfaced piping through an existing Water Use Licence (WUL). However, during the implementation of the EA, a non-compliance occurred in 2017/2018, whereby this feature ("Wetland 7") was piped beyond the approved piping extent.

PHS Consulting liaised with DEADP to facilitate a NEMA Section 24G Rectification Process for the sections of "Wetland 7" that was unlawfully piped during 2017 to 2018.

DEADP issued a Pre-Compliance Notice to the developer on 29 April 2026, identifying non-compliances associated with the piping of portions of "Wetland 7" beyond the extent authorised under the existing Environmental Authorisation and providing rehabilitation as an option to address the identified non-compliance. It is the opinion of the author that this rehabilitation requirement as specified by the Department is not feasible / reasonable, for the reasons outlined in Section 1.1 of this report.

A field assessment was undertaken on the 10th of June 2026 (winter wet season), during which the presence of any natural freshwater ecosystem characteristics as defined by the DWAF (2008) and the NWA (1998) were noted (please refer to Section 4 of this report). The field assessment confirmed that no natural freshwater ecosystems were associated with the study area. Additionally, the feature identified and labelled as "Wetland 7" was erroneously identified as a wetland in the Freshwater Ecological Assessment compiled in 2008. This feature was clearly not a natural channel and at best could be classified as a water resource in the form of a stormwater channel. The site assessment further confirmed that the entire area associated with this stormwater channel ("Wetland 7"), including the alleged unlawfully piped areas, has been piped and infilled with these areas displaying no indications of hydromorphy, i.e., hydromorphic soil characteristics and/or hydrophytes (indicative of wetland conditions) were absent. Subsequently the entire area associated with this stormwater channel has reverted to a terrestrial nature which supports the opinion of the author that this area was most likely never a true watercourse but that this stormwater channel functioned as a waterway and thus a water resource.

A Stormwater pond is located immediately south of the study area bordering Stinkwood Road, which is artificial in nature and forms part of the previously approved wetland offset area authorized by DWS in 2015. The wetland offset area was identified in a Wetland Offset Report compiled by Belcher in 2015 in order to compensate for the piping of perceived loss of functional wetland habitat for the entire development area together with the piping of the stormwater channel ("Wetland 7"). At the time those reports were written, the development



area encompassed the study area and the established and functional residential estate to the immediate south.

The outcome of the pre-defined impact assessment undertaken as part of the NEMA S24G rectification process for the commencement of the piping and infilling of the stormwater channel ("Wetland 7") resulted in an overall **Low Negative Impact** on the hydrology of the study area. Additionally, the proposed rehabilitation and maintenance of the Wetland Offset Area as part of the development proposal to compensate for the loss of functional wetland habitat from the existing and currently proposed mixed-use development on Erven 3303 and 3304 in Mandalay was assessed to have a **Low Negative Impact** during active rehabilitation, whilst the post-rehabilitation is perceived to have an overall **Nett Positive Impact** on the ecological condition and ecoservice provisioning of this offset area (stormwater pond).

Hence, from a Water Resource Management perspective, the current status quo concerning the piping of "Wetland 7" (stormwater channel) should remain in place as per the legal, technical, environmental and safety reasoning mentioned in Section 1.1. Furthermore, it is the author's professional recommendation that the functional loss of wetland habitat as a result of the proposed mixed use housing development on Erven 3303 and 3304 in Mandalay, is to be consolidated into a single wetland offset area as described and identified in the Wetland Offset Report compiled by (Belcher, 2015). It is also the opinion of the author that the ecoservices provided by the then open stormwater channel in the form of stormwater polishing can and will be catered for in the proposed wetland offset area, given this offset area is adequately managed.

As such, it is strongly recommended that a Maintenance Management Plan (MMP) be compiled and approved by DEADP for the proposed development's open space areas as well as the wetland offset area, in order to ensure that these areas are managed and maintained in order to enhance the biodiversity value and ecoservice provisioning of these areas to the broader surrounding landscape.

Although it is the author's understanding that the development proposal obtained a WUL in 2015, the Department of Water and Sanitation (DWS), as custodians of the water resources in South Africa, should preferably be consulted to advise if any amendment(s) to the WUL are applicable, given the current proposed densification of the development proposal over and above the originally approved spatial layout.



DOCUMENT GUIDE

The table below provides the specialist report requirements for the assessment and reporting of impacts on aquatic biodiversity in terms of Government Notice 320 as promulgated in Government Gazette 43110 of 20 March 2020 in line with the Department of Environmental Affairs screening tool requirements, as it relates to the National Environmental Management Act, 1998 (Act No. 107 of 1998).

No.	Requirements	Section in report
2.1	Assessment must be undertaken by a suitably qualified SACNASP registered specialist.	Appendix G
2.2	Description of the preferred development site, including the following aspects-	-
2.2.1	a. Aquatic ecosystem type b. Presence of aquatic species and composition of aquatic species communities, their habitat, distribution and movement patterns.	Section 4.2
2.2.2	Threat status, according to the national web based environmental screening tool of the species and ecosystems, including listed ecosystems as well as locally important habitat types identified.	Section 3
2.2.3	National and Provincial priority status of the aquatic ecosystem (i.e. is this a wetland or river Freshwater Ecosystem Priority Area (FEPA), a FEPA sub- catchment, a Strategic Water Source Area (SWSA), a priority estuary, whether or not they are free-flowing rivers, wetland clusters, etc., a CBA or an ESA; including for all a description of the criteria for their given status.	Section 3
2.2.4	A description of the Ecological Importance and Sensitivity of the aquatic ecosystem including: 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.); 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, flow regime (surface and groundwater).	Section 4.2
2.3	Identify any alternative development footprints within the preferred development site. which would be of a "low" sensitivity as identified by the national web based environmental screening tool and verified through the Initial Site Sensitivity Verification.	Section 5
2.4	Assessment of impacts - a detailed assessment of the potential impact(s) of the proposed development on the following very high sensitivity areas/ features:	Section 6
2.4.1	Is the development consistent with maintaining the priority aquatic ecosystem in its current state and according to the stated goal?	Section 7 & 8
2.4.2	Is the development consistent with maintaining the Resource Quality Objectives for the aquatic ecosystems present?	Section 7 & 8
2.4.3	How will the development impact on fixed and dynamic ecological processes that operate within or across the site, including: a. Impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes); b. Change in the sediment regime (e.g. sand movement, meandering river mouth/estuary, changing flooding or sedimentation patterns) of the aquatic ecosystem and its sub-catchment; c. The extent of the modification in relation to the overall aquatic ecosystem (i.e. 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.). d. Assessment of the risks associated with water use/s and related activities.	Section 7 & 8
2.4.4	How will the development impact on the functionality of the aquatic feature including: a. Base flows (e.g. too little/too much water in terms of characteristics and requirements of system); 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);	Section 7 & 8



	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); and e. Fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal).	
2.4.5	How will the development impact on the functionality of the aquatic feature including: a. 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); b. Change in the hydrogeomorphic typing of the aquatic ecosystem (e.g. change from an unchannelled valley-bottom wetland to a channelled valley-bottom wetland); c. Quality of water (e.g. due to increased sediment load, contamination by chemical and/or organic effluent, and/or eutrophication); d. Fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal); and e. The loss or degradation of all or part of any unique or important features (e.g. waterfalls, springs, oxbow lakes, meandering or braided channels, peat soil, etc.) associated with or within the aquatic ecosystem.	Section 7 & 8
2.4.6	How will the development impact on key ecosystem regulating and supporting services especially Flood attenuation; Streamflow regulation; Sediment trapping; Phosphate assimilation; Nitrate assimilation; Toxicant assimilation; Erosion control; and Carbon storage.	Section 7 & 8
2.4.7	How will the 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?	Section 7 & 8
2.4.9	A motivation must be provided if there were development footprints identified as per paragraph 2.3 above that were identified as having a "low" biodiversity sensitivity and were not considered appropriate.	Section 3, Appendix E
3.	The report must contain as a minimum the following information:	
3.1	Contact details and curriculum vitae of the specialist including SACNASP registration number and field of expertise and their curriculum vitae.	Appendix G
3.2	A signed statement of independence by the specialist.	Appendix G
3.3	The duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment.	Section 2.2
3.4	The methodology used to undertake the impact assessment and site inspection, including equipment and modelling used, where relevant.	Appendix D
3.5	A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Section 5
3.6	Areas not suitable for development, to be avoided during construction and operation (where relevant).	Section 5
3.7	Additional environmental impacts expected from the proposed development based on those already evident on the site and a discussion on the cumulative impacts.	Section 7
3.8	A suitable construction and operational buffer for the aquatic ecosystem, using the accepted protocol.	Section 5.2
3.9	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the EMPr.	Section 6
3.10	A motivation where the development footprint identified as per 2.3 were not considered stating reasons why these were not being considered.	Section 5
3.11	A reasoned opinion, based on the finding of the specialist assessment, regarding the acceptability or not, of the development and if the development should receive approval, and any conditions to which the statement is subjected.	Section 8



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GLOSSARY OF TERMS

Alien vegetation:	Plants that do not occur naturally within the area but have been introduced either intentionally or unintentionally. Vegetation species that originate from outside of the borders of the biome - usually international in origin.
Biodiversity:	The number and variety of living organisms on earth, the millions of plants, animals and micro-organisms, the genes they contain, the evolutionary history and potential they encompass and the ecosystems, ecological processes and landscape of which they are integral parts.
Buffer:	A strip of land surrounding a wetland or riparian area in which activities are controlled or restricted, in order to reduce the impact of adjacent land uses on the wetland or riparian area.
Catchment:	The area where water is collected by the natural landscape, where all rain and run-off water ultimately flows into a river, wetland, lake, and ocean or contributes to the groundwater system.
Delineation (of a wetland):	To determine the outer boundary of a wetland based on soil, vegetation and/or hydrological indicators.
Ecoregion:	An ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region".
Facultative species:	Species usually found in wetlands (76%-99% of occurrences) but occasionally found in non-wetland areas
Fluvial:	Resulting from water movement.
Groundwater:	Subsurface water in the saturated zone below the water table.
Hydromorphic soil:	A soil that in its undrained condition is saturated or flooded long enough to develop anaerobic conditions favouring the growth and regeneration of hydrophytic vegetation (vegetation adapted to living in anaerobic soil).
Hydrology:	The study of the occurrence, distribution and movement of water over, on and under the land surface.
Indigenous vegetation:	Vegetation occurring naturally within a defined area.
Land Type:	Distinct areas defined as part of the Land Type Survey of South Africa based on a unique combination of soil pattern, macroclimate and terrain form.
Perennial:	Flows all year round.
Redoximorphism:	Features within soil that are a result of the reduction, translocation and oxidation (precipitation) of Fe (iron) and Mn (manganese) oxides that occur when soils are saturated for sufficiently long periods of time to become anaerobic
Seasonal zone of wetness:	The zone of a wetland that lies between the Temporary and Permanent zones and is characterised by saturation of the upper 50 cm of the soil from three to ten months of the year.
Temporary zone of wetness:	the outer zone of a wetland characterised by saturation within 50 cm of the surface for less than three months of the year
Watercourse:	In terms of the definition contained within the National Water Act, a watercourse means: • A river or spring; • A natural channel which water flows regularly or intermittently; • A wetland, dam or lake into which, or from which, water flows; and • Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse; • and a reference to a watercourse includes, where relevant, its bed and banks
Wetland Vegetation (WetVeg) type:	Broad groupings of wetland vegetation, reflecting differences in regional context, such as geology, climate, and soil, which may in turn have an influence on the ecological characteristics and functioning of wetlands.



ACRONYMS

CBA	Critical Biodiversity Area
COCT	City of Cape Town
DEADP	Department of Environmental Affairs and Development Planning
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EPL	Ecosystem Protection Level
ES	Ecological Sensitivity
ESA	Ecological Support Area
ETS	Ecosystem Threat Status
FEPA	Freshwater Ecosystem Priority Areas
GIS	Geographic Information System
GN	Government Notice
GPS	Global Positioning System
ha	hectares
HGM	Hydrogeomorphic
LC	Least Concern
mm	Millimeter
MMP	Maintenance Management Plan
m.a.m.s. l	Meters above mean sea level
MAP	Mean Annual Precipitation
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act
PES	Present Ecological State
QDS	Quarter Degree Squares
REC	Recommended Ecological Category
RMO	Recommended Management Objective
RQS	Research Quality Services
RQIS	Research Quality Information Services
SACNASP	South African Council for Natural Scientific Professions
SSV	Site Sensitivity Verification
SWSA	Strategic Water Source Area
SQR	Sub quaternary catchment reach
subWMA	Sub-Water Management Area
WCBSP	Western Cape Biodiversity Spatial Plan
WetVeg Groups	Wetland Vegetation Groups
WMA	Water Management Areas
WUA	Water Use Authorisation
WUL	Water Use License
ZoR	Zone of Regulation



1 INTRODUCTION

1.1 Background

In October 2011, Communicare (Pty) Ltd, the then owner of Erf 776, Mandalay, was granted Environmental Authorisation (EA) by the Department of Environmental Affairs and Development Planning (DEADP) to undertake listed activities in terms of the National Environmental Management Act, 1998 (NEMA) and the Environmental Impact Assessment (EIA) Regulations, 2010. A Freshwater Ecological Assessment was conducted in 2008 by Environmental Monitoring Consulting (*T. Belcher*), to inform the Environmental Impact Assessment (EIA) process, with the mapped wetland features identified visually illustrated in Figure 1 below.



Figure 1: Mapped wetland features on the property concerned (Belcher, 2008)

As per the then approved Spatial Development Plan (SDP), sections of “Wetland 7” (Feature 7 in Figure 1 above), designated as open space, were to be retained as open stormwater channels, while portions within the development footprint itself were approved for infilling and sub surfaced piping. However, during the implementation of the EA, a non-compliance occurred in 2017/2018, whereby “Wetland 7” was piped beyond the approved piping extent.

Findings from an External Audit completed at that time indicated that only the southernmost section of “Wetland 7” was retained in accordance with the approved spatial layout (Figure 2 overleaf). The sections highlighted in red in Figure 3 appear to have been piped without the necessary approvals in place in terms of NEMA. Additionally, the piping of “Wetland 7” was authorised under a Water Use Licence (WUL) issued by the Department of Water and Sanitation (DWS) in 2015, and a Wetland Offset Report was developed in the same year (Belcher, 2015) to compensate for the perceived loss of functional wetland habitat for the entire development area.





Figure 2: In 2017 to 2018 “Wetland 7” was piped up to the offset area indicated by the blue circle (Infinity Environmental, 2025)



Figure 3: Portions of “Wetland 7” encircled in red were not approved for piping in terms of NEMA.



PHS Consulting liaised with the Department of Environmental Affairs and Development Planning (DEADP) to facilitate a NEMA Section 24G Rectification Process for the sections of “Wetland 7” that was unlawfully piped during 2017 to 2018.

Pre-Compliance Notice:

DEADP issued a Pre-Compliance Notice to the developer on 29 April 2026, identifying non-compliances associated with the piping of portions of “Wetland 7” beyond the extent authorised under the existing Environmental Authorisation and providing rehabilitation as an option to address the identified non-compliance. It is the opinion of the author that this rehabilitation requirement as specified by the Department is not feasible/reasonable, for the reasons outlined below.

Independent Audit Findings and Admissions:

An independent environmental audit conducted noted three specific technical deviations from the originally approved EA for the development proposal:

- “Wetland 7”: Piped beyond the scope approved in the original EA;
- “Wetland 3”: Encroachment into the recommended 30-metre buffer zone by infrastructure associated with the existing housing development; and
- Maintenance Management Plan (MMP): No MMP has been finalized or submitted to DEADP to date for the development proposal.

Definition of a watercourse as per the National Water Act, 1998 (Act No. 36 of 1998) as amended.

The definition of a watercourse as per the National Water Act, 1998 (Act No. 36 of 1998) was considered. The definition is as follows:

(a) a river or spring;

(b) a natural channel in which water flows regularly or intermittently;

(c) a wetland, lake or dam into which or from which water flows; and

(d) any collection of water which the minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

Following the site assessment undertaken by FEN Consulting on the 10th of June 2026, review of previously compiled specialist reports, as well as visual analyses of historical satellite imagery of the concerned properties, it is the opinion of the author that the feature identified and labelled as “Wetland 7” was erroneously identified as a wetland. This feature was clearly not a natural channel and at best could be classified as a water resource in the form of a **stormwater channel**. Additionally, this feature was specifically referred to as a stormwater channel in the Freshwater Ecological Assessment compiled in 2008.

Substantiated Grounds against Rehabilitation of unlawfully piped portions of “Wetland 7”:

The current onsite conditions and approved spatial layouts cannot be reverted to the original EA specifications due to the following:

- Stormwater System Design Integrity & Localised Flooding Risk (“Wetland 7”): The unlawful piping of portions of “Wetland 7” was completed between 2017 and 2018 at



the specific instruction of the City of Cape Town (CoCT) – Stormwater Management Branch, to align with their Master Stormwater Management Plan;

- A site assessment facilitated by FEN Consulting on the 10th of June 2026 confirmed that the concerned portions of “Wetland 7”, that were unlawfully piped displays no indication of hydromorphy, with no hydromorphic soil characteristics and/or hydrophytes (indicative of wetland conditions) identified within these areas. This area thus most likely was never a true watercourse, but the stormwater channel functioned as a waterway and thus a water resource. A water resource does enjoy protection in terms of the National Water Act, 1998 (Act No. 36 of 1998) as amended, but not to the same extent as a watercourse. Similarly, the feature does not enjoy protection as a watercourse in terms of NEMA;
- Rehabilitation of the unlawfully piped sections of the stormwater channel (“Wetland 7”) has the potential to create extreme localized flooding hazards, due to hydraulic bottlenecks caused by *Typha capensis* (Bulrush) and litter accumulation, thereby restricting stormwater flow during major rainfall events. Additionally, rehabilitation of these unlawfully piped sections will remain susceptible to sediment build-up as well as clogging by overgrown vegetation growth, illegal dumping, and associated debris blockages;
- Prior Legislative Alignment & Offsets: A March 2015 specialist report by T. Belcher classified “Wetland 7” as a highly degraded, largely artificial stormwater channel. The condition of the wetlands on site was therefore clear. Consequently, a WUL was successfully obtained in November 2015 under the National Water Act, which approved the piping and establishing a formal ecological wetland offset for the loss of functional wetland habitat as part of the proposed development. An April 2017 Blue Science Water Quality Monitoring report echoed that the piping of “wetland 7” will contribute to the reduction in the dumping of solid waste on the site and contribute to improved water quality downstream within the wetland offset area;
- Ecological and Hydraulic Stability: The functional stormwater infrastructure and its corresponding ecological offset have been established for eight years since 2018. Reversing this layout poses a severe, quantifiable risk to both the surrounding environment and the physical safety of urban occupants by potential localised flooding events. there is also then subsequent risk to the system which forms part of the approved offset;
- Trying to rehabilitate the unlawfully piped sections of “Wetland 7” back to pre-development conditions is not considered to be a rational approach especially given that a wetland offset area has already been identified and established that caters for the loss of ecoservice provision historically associated with this stormwater channel. Additionally, the identified wetland offset area will be maintained and managed by the implementation of a Maintenance Management Plan (MMP) once approved by DEADP, thereby contributing to increased biodiversity and ecoservice provision to the surrounding landscape; and
- Keeping the status quo is the only reasonable alternative.

Following the submission of the abovementioned recommendations by the author to DEADP via PHS Consulting, DEADP submitted a formal response indicating that the unlawful piping



of “Wetland 7” to facilitate the establishment of the proposed mixed-use housing development on Erven 3303 and 3304, needs to be subjected to a Section 24G Rectification Process as it pertains to the NEMA. Additionally, this S24G Rectification Process needs to assess the potential impact of the proposed densification of the mixed-use housing development over and above the densities approved in the original Environmental Authorisation (EA).

FEN Consulting was approached by PHS Consulting, to undertake a Freshwater Impact Assessment for the piping of “Wetland 7” as well as the proposed densification of the mixed-use housing development on Erven 3303 and 3304 in Mandalay, to inform the S24G Rectification Process. Technical details of the proposed mixed-use housing development is provided in Section 1.2 of this report.

In order to identify all freshwater ecosystems that may potentially be impacted by the proposed mixed-use housing development, a 500 m “zone of investigation” around the study area, in accordance with Government Notice (GN) 4167 of 2023 as it relates to the National Water Act, 1998 (Act No. 36 of 1998), as amended (NWA), was used as a guide in which to assess possible sensitivities of the receiving freshwater environment. This area – i.e. the 500 m zone of investigation around the study area – will henceforth be referred to as the “investigation area”.



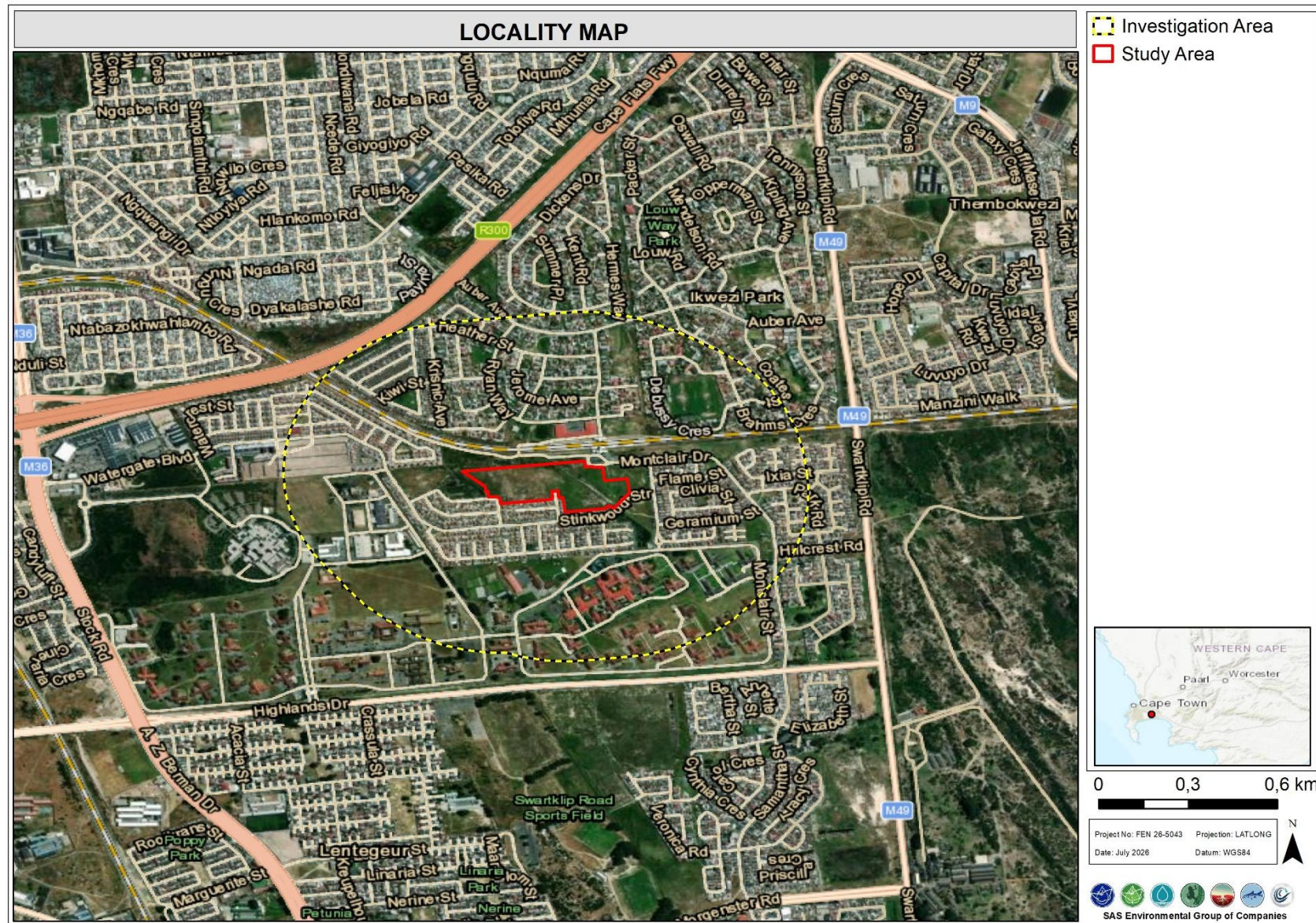


Figure 4: Digital satellite image depicting the study and investigation areas.



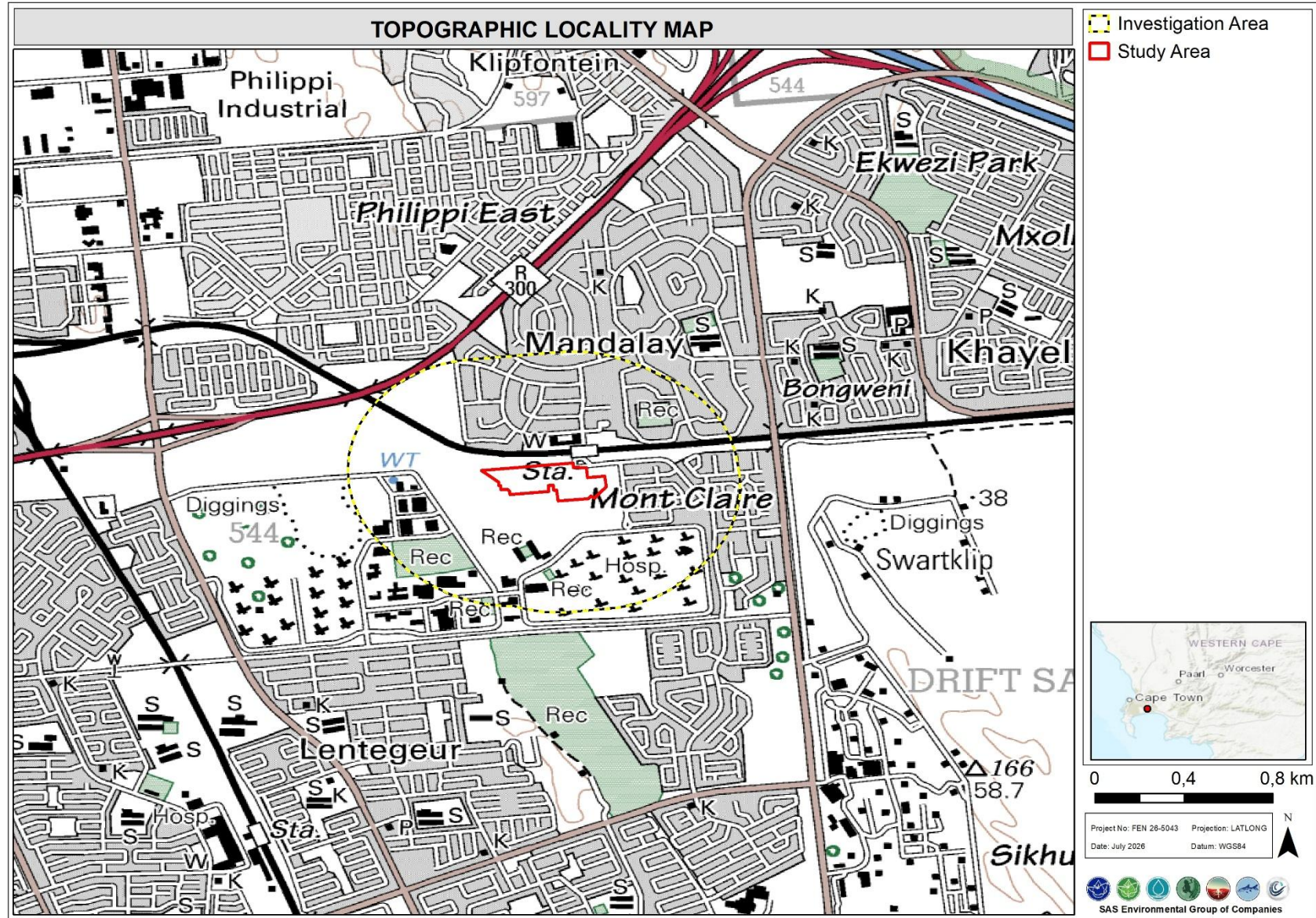


Figure 5: Study and investigation areas depicted on a topographic map in relation to the surrounding area.



1.2 Project Description¹

The current proposal is to establish a mixed-use housing development on Erven 3303 and 3304 in Mandalay, Western Cape Province. The consolidation of Erven 3303 and 3304 in order to establish this housing development has been approved by the City of Cape Town in terms of Section 98 of the City of Cape Town Municipal Planning By-Law, 2015, subject to specific conditions. Erf 3303 covers an extent of approximately 2.28 ha whilst Erf 3304 covers an area of approximately 2.69 ha. The consolidated Erven 3303 and 3304 is represented visually in Figure 6 below.

The proposed mixed-use housing development on consolidated Erven 3303 and 3304 will consist of numerous residential apartment blocks with a total residential unit number of 770 units. The Block A unit type will consist of 32 one-bedroom units and 24 two-bedroom units per Block A unit type, of which there will be 12 Block A units. The proposed Block B unit type will consist of 24 one-bedroom units and 18 two-bedroom units, of which there will be one Block B unit. The total site development will cover approximately 49 882 m² with a total floor space of 37 135 m². Additionally, a crèche and ground floor retail area will be incorporated into the ground floor level of Block B.

The proposed mixed-use housing development will also incorporate private internal access roads, parking spaces, play/recreational areas, refuse storage areas, braai facility areas, a security administration office inclusive of a kitchen, bathroom and data room as well as all required bulk civil services infrastructure.

Additionally, a densification of the originally approved design is proposed from 518 units / 4.9882 ha with a density of 103.84 du/ha to 770 units / 4.9882 ha with a new proposed density of 154.36 du/ha.

The currently proposed Spatial Development Plan (SDP) is represented visually in Figure 6 below.



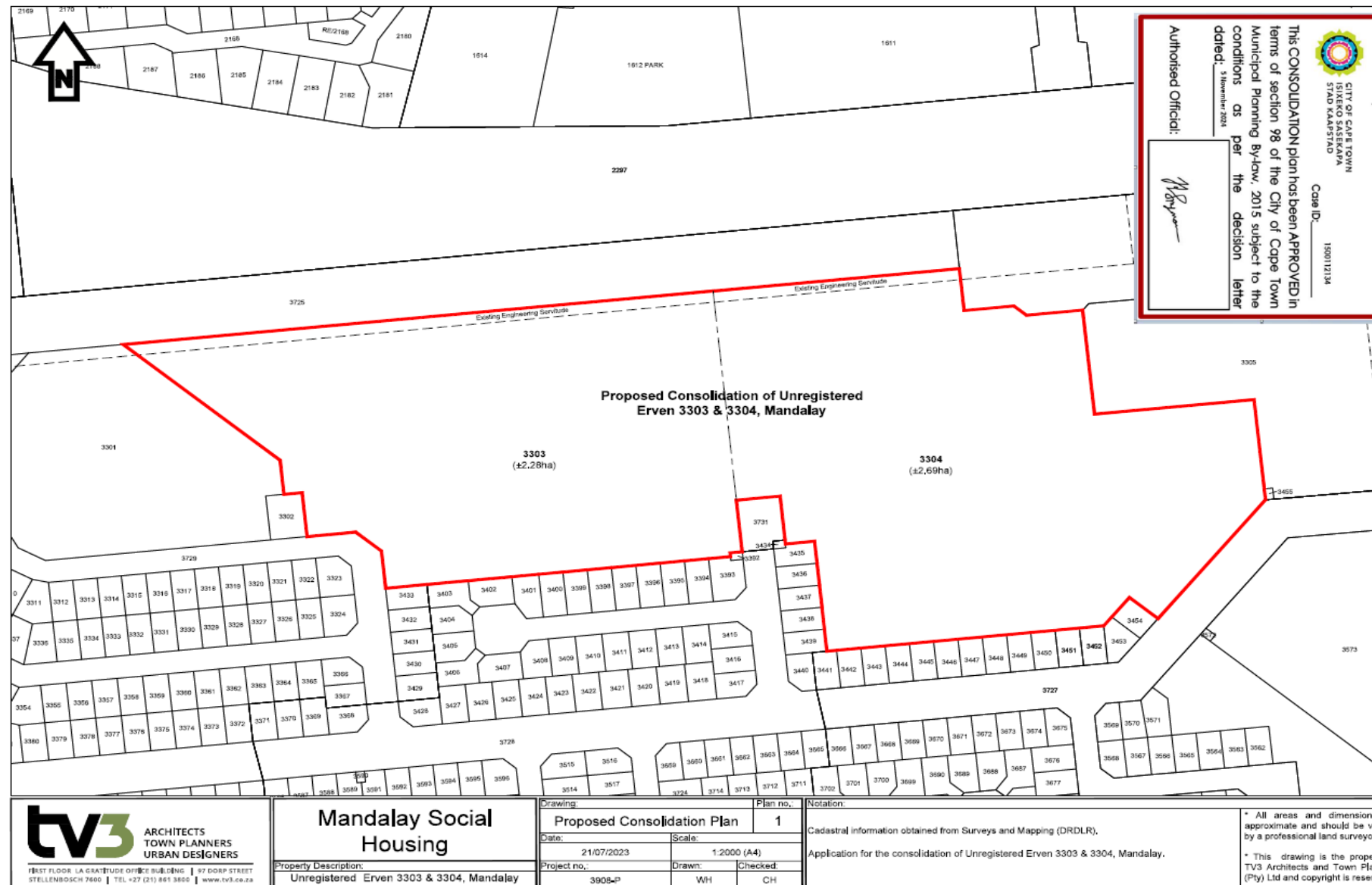


Figure 6: Consolidation of Erven 3303 and 3304 in Mandalay as approved by the City of Cape Town.





1.3 Scope of Work

Specific outcomes in terms of this report are outlined below:

- A background study of relevant national, provincial and municipal datasets (such as the National Freshwater Ecosystem Priority Areas (NFEPA) 2011 database, the National Biodiversity Assessment (NBA) 2018 database, including the draft National Wetland Map 6 (2024) dataset, and the City of Cape Town Biodiversity Network (CoCT BioNet) 2023 database) was undertaken to aid in the identification of freshwater ecosystems associated with the study and investigation areas;
- All freshwater ecosystems associated with the study and associated investigation area were delineated using desktop methods in accordance with GN 4167 of 2023 as it relates to activities as stipulated in the NWA and verified according to the “Department of Water Affairs and Forestry (DWAF)² (2008)³: “A practical field procedure for identification of wetlands and riparian areas”. Aspects such as soil morphological characteristics and wetness along with vegetation types were used to verify the freshwater ecosystems;
- The freshwater ecosystem classification assessment was undertaken according to the Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland systems (Ollis *et al.*, 2013), where applicable;
- The freshwater ecosystems were mapped in relation to the study and associated investigation area. In addition to the freshwater ecosystem boundaries and legislated zones of regulation were depicted where applicable;
- The freshwater PES was assessed according to indices such as the Wet-Health (Level 1) / Index of Habitat Integrity as advocated by Macfarlane *et al.* (2008) and Kleynhans (2008), respectively, where applicable;
- The freshwater EIS was determined based on the method described by Rountree & Kotze, (2013), where applicable;
- The ecosystem services provided by the freshwater ecosystems associated with the proposed development was assessed according to the method of Kotze *et al* (2020) in which services to the ecology of the site will be defined and services to the people of the area are defined, where applicable; and
- Based on the findings during the desktop and field assessments and based on the project Spatial Development Plan (SDP) as provided by the proponent, a detailed impact on all identified significant risks has taken place including cumulative impacts on freshwater ecosystems assemblages in the region. This includes the application of a pre-defined Impact Assessment; and
- Recommendations on management and mitigation measures (including opportunities and constraints) with regards to the development and operation of the proposed development in order to improve manage and mitigate impacts on the freshwater

² The Department of Water Affairs and Forestry (DWAF) was formerly known as the Department of Water Affairs (DWA) and subsequently as the Department of Water and Sanitation (DWS). For the purposes of referencing in this report, the name under which the Department was known during the time of publication of reference material, will be used.

³ Even though an updated manual is available since 2008 (Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas), this is still considered a draft document currently under review.



ecology of the area has been provided. All results were compiled into a comprehensive freshwater impact assessment report.

1.4 Assumptions and Limitations

The following assumptions and limitations are applicable to this report:

- The freshwater ecosystem verification is confined to the study area (Erven 3303 and 3304) and the associated 500 m investigation area as illustrated in Figure 4 and Figure 5 and does not include the surrounding properties outside of the investigation area. The general surroundings were, however considered in the desktop assessment of the investigation area;
- All freshwater ecosystems identified within the investigation area were delineated as far as possible using desktop methods including the use of topographic maps and data, historical and current digital satellite imagery;
- Global Positioning System (GPS) technology is subject to a minor level of inaccuracies due to the use of handheld GPS instrumentation that may potentially lead to small discrepancies in the mapping of the features. Notwithstanding this, and the points above, the delineations are considered adequate for the purposes of informing the S24G Rectification Process;
- At the interface between freshwater ecosystems and terrestrial zones there is a transitional area where an ecotone is formed as vegetation species community structures change from terrestrial to wetland facultative species through to wetland obligate species. Within this transition zone, some variation of opinion on the watercourse boundaries may occur. However, if the DWAF (2008) method is followed, all assessors should get largely similar results; and
- With ecology being dynamic and complex, certain aspects (some of which may be important) may have been overlooked. However, it is expected that the watercourses have been accurately assessed and considered, based on the field observations and the consideration of existing studies and monitoring data in terms of riparian and wetland ecology.

2 ASSESSMENT APPROACH

2.1 Freshwater Ecosystem Definition

The National Water Act, 1998 (Act No. 36 of 1998), as amended is aimed at the protection of the country's water resources, defined in the Act as "a watercourse, surface water, estuary or aquifer". According to the National Water Act, 1998 (Act No. 36 of 1998) a **watercourse** means:

- (a) a river or spring;
- (b) a natural channel in which water flows regularly or intermittently;
- (c) a wetland, lake or dam into which, or from which, water flows; and
- (d) any collection of water which the Minister may, by notice in the *Gazette*, declare a watercourse.

It should be noted that in this report "freshwater ecosystem" is used and carries the same meaning as "watercourse" as defined by the NWA.



The Act further provides definitions of wetland and riparian habitats as follows:

Wetland habitat is “land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.”

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

2.2 Freshwater Ecosystem Field Verification

A field assessment was undertaken on the 10th of June 2026 (winter wet season), during which the presence of any natural freshwater ecosystem characteristics as defined by the DWAF (2008) and the NWA (1998) were noted (please refer to Section 4 of this report).

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

- Terrain unit indicators (Landscape position);
- Soil wetness indicators (The presence of water at or near the ground surface);
- Soil form indicators (Distinctive hydromorphic soils); and
- Vegetation indicators (Vegetation adapted to seasonally and/or permanently saturated soils).

In preparation for the field verification, aerial photographs, digital satellite imagery and provincial and national freshwater ecosystem databases (as outlined in Section 4.1 of this report) were used to identify points of interest in the surrounding area at a desktop level. In this regard, specific mention is made of the following:

- Linear features: since water flows/moves through the landscape, freshwater ecosystems often have a distinct linear element to their signature which makes them discernible on aerial photography or satellite imagery;
- Vegetation associated with freshwater ecosystems: a distinct increase in density as well as shrub size near flow paths;
- Hue (i.e., colour tones): wetland areas often show distinct colour changes induced by cyclic seasonal soil inundation that can be discerned on aerial imagery and usually represent visually as white/grey or black. In colour imagery these areas mostly show up as darker green and olive colours or brighter green colours in relation to adjacent areas where there is less soil moisture or surface water present; and
- Texture: with areas displaying various textures, created by varying vegetation cover and soil conditions.

The desktop databases, aerial photographs and digital satellite imagery was then utilised to identify points of interest for the site assessment. In addition to the delineation process, a



detailed assessment of the delineated freshwater ecosystems was undertaken where applicable. Factors affecting the integrity of the freshwater ecosystems were taken into consideration and aided in the determination of the functioning and the ecological and socio-cultural services provided by the freshwater ecosystems. A detailed explanation of the methods of assessment undertaken is provided in Appendix C of this report.

2.3 Sensitivity Mapping

All freshwater ecosystems associated with the study and investigation areas were delineated according to the method described above with either desktop mapping (investigation area) or the use of a handheld GPS (study area). Geographic Information System (GIS) software was used to project these features onto digital satellite imagery. The delineation and Zone of Regulation (ZoR) maps is presented in Section 4 and 5 respectively.

2.4 Impact Assessment and Recommendations

Following the completion of the site assessment, an impact assessment was conducted (please refer to Appendix D for the method of approach) to ascertain the potential ecological risks as a result of the piping of the stormwater channel ("Wetland 7") and densification of the development proposal. General management measures, to address and mitigate impacts associated with the proposed development has been outlined in Appendix F.



3 CONSIDERATION AND APPLICATION OF THE DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT SCREENING TOOL

The protocol for the assessment of freshwater and aquatic biodiversity prepared in support of the Department of Forestry, Fisheries and Environment (DFFE) (previously the Department of Environmental Affairs (DEA)) National Web-based Environmental Screening Tool (2020), provides the criteria for the assessment and reporting of impacts on aquatic/freshwater biodiversity for activities requiring EA. For the aquatic biodiversity (freshwater) theme, the requirements are for sites which support various levels of biodiversity. The relevant aquatic biodiversity (freshwater) theme in the National Web-based Environmental Screening Tool (2020) has been provided by the South African National Biodiversity Institute (SANBI). Based on the sensitivity rating, a suitably qualified specialist must prepare the relevant report or opinion memorandum which is to be submitted as part of the EA application.

As part of the process of background information gathering, the screening tool was applied to the study and investigation areas. According to the guidelines, an applicant intending to undertake an activity on a site identified as being of “very high sensitivity” for an aquatic biodiversity theme must submit an Aquatic Biodiversity Impact Assessment, or if the area is identified as being of “low sensitivity” then an Aquatic Biodiversity Compliance Statement must be compiled and submitted to the competent authority.

According to the screening tool, some areas within the study area and the associated investigation area are indicated to be of very high aquatic biodiversity sensitivity, as these areas overlap with freshwater features indicated as depressions (per the draft National Wetland Map 6; 2024) (Figures 9 and 13). The remaining areas are considered to be of low aquatic biodiversity sensitivity.

The designation of very high sensitivity for freshwater features by the DFFE Screening Tool is disputed with a reduction to low sensitivity through the findings of the freshwater assessment, given that no natural freshwater features were identified within the study area. The low aquatic biodiversity sensitivity designation for the remainder of the study and investigation areas where no freshwater ecosystems have been delineated is not disputed by the site verification. In these areas, the designation of low sensitivity is confirmed. Please refer to the site sensitivity verification report contained in Appendix E.



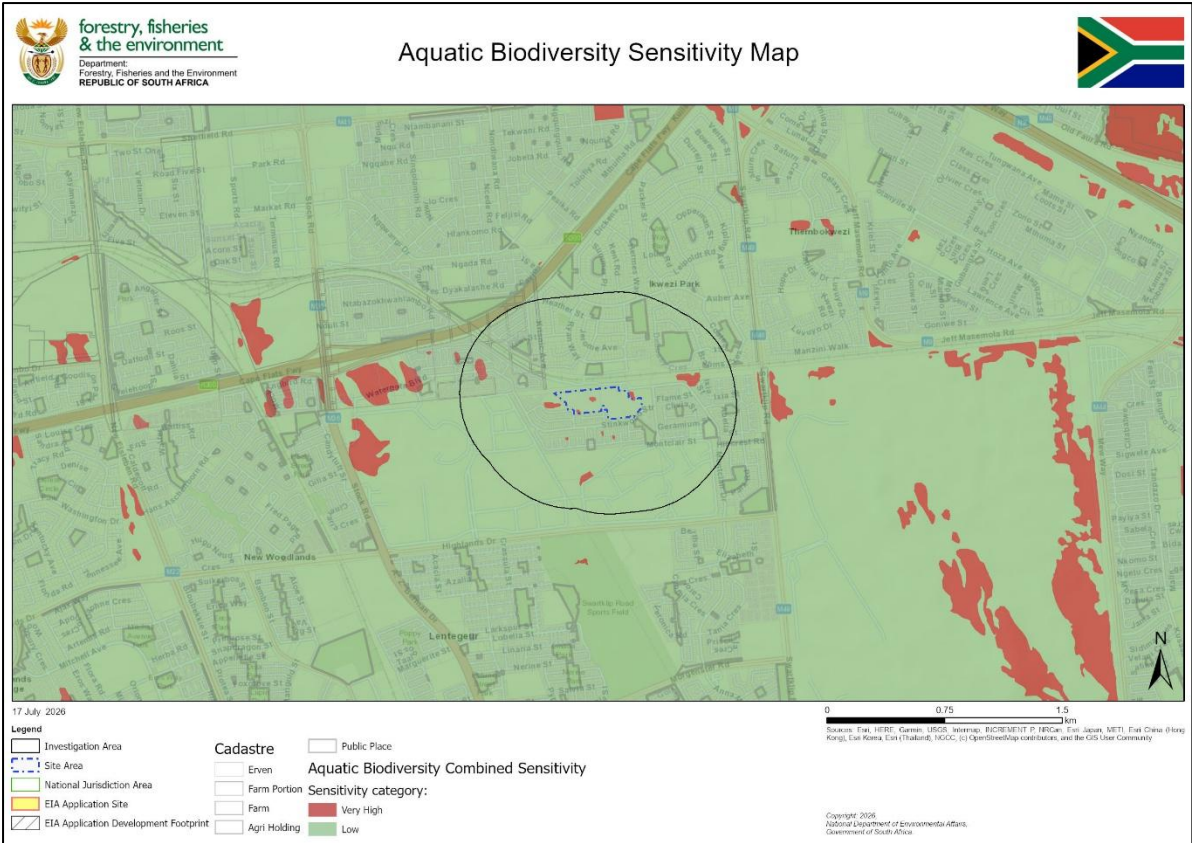


Figure 8: Map of aquatic biodiversity related sensitivity theme for the study and investigation areas according to the National Web-Based Environmental Screening Tool (2020).

4 ASSESSMENT RESULTS

4.1 Ecological Importance and Sensitivity of the Investigation Area Based on National and Provincial Datasets

The following table contains data accessed as part of the desktop assessment and presented as a “dashboard-style” report below (Table 1). The dashboard report aims to present concise summaries of the data on as few pages as possible in order to allow for the integration of results by the reader to take place.

It is important to note that although all data sources used to provide useful and verifiable, high-quality data, the various databases used do not always provide an entirely accurate indication of the actual field characteristics associated with the proposed study area at the scale required to inform the EA and/or water use authorisation (WUA) processes. Consequently, the desktop information is used primarily as contextual and screening-level input, assisting in the identification of areas of potential ecological importance and sensitivity that warrant focused attention during field verification. Where discrepancies arise between desktop datasets and field-verified conditions, field observations and specialist verification take precedence and carry greater weight in the assessment and decision-making process.



Table 1: Desktop data indicating the characteristics of the study and associated investigation area. Quarter Degree Square (QDS) 3418 BA).

Aquatic ecoregion and sub-regions in which the investigation area is located		Detail in terms of the National Freshwater Ecosystem Priority Area (NFEPA) (2011) database	
Ecoregion	South-Western Coastal Belt	FEPACODE	The study area and associated investigation area is not located in a sub-quaternary catchment considered of importance as freshwater ecological priority areas.
Catchment	Berg/Bot/Potberg		
Quaternary Catchment	G22D	Wetland	The entire study area and associated investigation area are located within the Western Strandveld wetland vegetation (WetVeg) type, which is considered to be endangered (EN) according to Mbona <i>et al.</i> (2015).
WMA	Berg	Vegetation	
subWMA	Greater Cape Town	Type	
Dominant characteristics of the Ecoregion Level II (Kleynhans <i>et al.</i> 2007)		NFEPA	According to the NFEPA database, no natural or artificial wetlands are indicated to occur within the study area and associated investigation area.
Code	24.03	Wetlands	
Dominant primary terrain morphology	Plains, Moderately Undulating Plains	NFEPA Rivers	As per the NFEPA database (2011), no rivers are indicated to occur within the study and investigation areas.
Dominant primary vegetation types	Sand Plain Fynbos, Dune Thicket, West Coast Renosterveld, Strandveld Succulent Karoo.		
Altitude (m a.m.s.l)	0-100	National Biodiversity Assessment (2018): South African Inventory of Inland Aquatic Ecosystems (SAIIAE) Rivers, Artificial Wetlands, and National Wetland Map 6 (2024) (Figure 9)	
MAP (mm)	100 - 400	According to the NBA Rivers database, no rivers are indicated to occur within the study and investigation areas. According to the National Wetland Map 6 Database, three natural depression wetlands are indicated to occur in the western, central, and eastern portions of the study area. Furthermore, six natural depression wetlands and a seep wetland are indicated to occur within the investigation area. The systems are indicated to be in a largely to critically modified (PES D/E/F) ecological condition, except for the depression wetland situated in the eastern portion of the investigation area which is considered to be in a natural to largely natural (PES A/B) ecological condition and the seep wetland situated in the southern portion of the investigation area which is considered to be in a moderately modified (PES C) ecological condition. The Ecological Threat Status (ETS) of these systems is critically endangered (CR) and the Ecological Protection Level (EPL) of all wetlands is poorly protected (PP). According to the artificial wetlands database, no dams or reservoirs are indicated to occur within the study and investigation areas.	
Coefficient of Variation (% of MAP)	30 - 40		
Rainfall concentration index	50 - 60		
Rainfall seasonality	Winter		
Mean annual temp. (°C)	16 - 18		
Winter temperature (July)	6 - 20		
Summer temperature (Feb)	14 - 30		
Median annual simulated runoff (mm)	<5 - 60		
Strategic Water Source Areas for Surface Water (SWSA) (2017 & 2021)			
Surface water SWSAs are defined as areas of land that supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size. The SWSA for groundwater reflect areas that have high groundwater recharge and where the groundwater forms a nationally important resource. The database developed jointly by the Mpumalanga Tourism and Parks Agency (MTPA) and the Council for Scientific and Industrial Research (CSIR) (Lötter, M.C. and Le Maitre, D., 2021) was consulted for surface water, while the Water Research Commission (WRC) developed database (Le Maitre, D.C. et al., 2017) was consulted for the groundwater SWSAs.			
According to the SWSA databases, the entire study area and investigation area are not located within a surface water SWSA. However, they are located within the Cape Peninsula and Cape Flats groundwater SWSAs.			
Detail of the area in terms of the Land Type Data (Job <i>et al.</i> , 2019)		Importance according to the City of Cape Town (CoCT) Biodiversity Network (2023) (Figure 10 and Figure 11)	
		The CoCT BioNet Dataset (2023) indicates three Critical Ecological Support Areas (CESA) in the western, central, and eastern portions of the study area. An Other Ecological Support Area (OESA) is indicated to bisect the eastern portion of the study area. Seven CESAs are indicated to occur in the investigation area, Four OESAs are indicated to occur in the northern portion of the investigation area and one OESA in the eastern portion of the investigation area. According to the CoCT wetlands and watercourses dataset (2023), four Dune Strandveld isolated depressions are indicated to occur within the study area, and eleven Dune Strandveld isolated depressions are indicated to occur in the investigation area. One Dune strandveld isolated seep wetland is indicated to occur within the southern portion of the investigation.	



The potential presence of wetlands in the vicinity of the study and investigation areas can be examined in the context of the land type for the area. The entire study area and associated investigation area fall within the Ha7 Land Type grouping. These Land Types accommodate land in which deep grey sands of the Fernwood are a prominent feature. Constantia and Shepstone and Vilafontes forms are also included. Ha indicates land where these soils occupy more than 80% of the area.		Critical Biodiversity Areas are High ranking “natural or semi-natural” wetlands within each type (top quarter of total scores = CBA1 (rank 1); second quarter = CBA2 (rank 2)). CBA2s are restorable irreplaceable sites, which are needed for biodiversity targets but not for management consolidation, connectivity, or viability of priority Biodiversity Network sites. CESAs are high ranking artificial wetlands or middle ranking natural or semi-natural wetlands that are not considered important for connectivity or as support areas for wetlands classified as CBAs. CBA and CESA wetlands should be managed as close to natural or near natural states as possible. OESAs are transformed (e.g. extensive agriculture) sites with conservation importance for ecological function, faunal movement, and viability of CBAs biodiversity elements. This includes canalised rivers and wetlands in poor ecological condition. OESAs can contain other natural areas (mostly degraded) located in an extensive or intensive agricultural matrix as the dominant land use. National web based environmental screening tool (2020) (Accessed 2026) (Figure 13) The screening tool is intended for pre-screening of sensitivities in the landscape for assessment within the EIA process and assists with implementing the migration hierarchy, allowing developers to adjust their proposed development footprint to avoid sensitive areas.
Ecological Status of the proximal sub-quaternary reach (SQR) (DWS, 2014) (Figure 12)		
Sub-quaternary reach	G22E-09207 (Kuil's River)	
Proximity to the study area	±4 km east of the study area	
Assessed by an expert?	Yes	
Stream Order	2	
PES Category Median	Seriously Modified (Class E)	
Mean Ecological Importance (EI)	Moderate	
Mean Ecological Sensitivity (ES)	High	
Default Ecological Class	B (High)	
Summary	Considering the study area is more than 4 km west from the SQR monitoring point, it is highly unlikely that similar fish and aquatic macro invertebrate species will be found in the study area, considering the lack of hydrological connectivity. As a result, the ecological status and related background information pertaining to the PES and EIS for the G22E-09207 (Kuil's River) are not provided in this report.	The small areas within the study area and the associated investigation area are considered to be of very high aquatic biodiversity sensitivity by the screening tool. The majority of the study and investigation areas are however considered to be of low aquatic biodiversity sensitivity. The sensitivity feature triggering the very high sensitivity for the study and investigation areas is being within wetlands (depressions).

CBA = Critical Biodiversity Area; CESA = Critical Ecological Support Area; Class AB = Natural/Near-Natural; Class C = Moderately Modified; Class D = Largely Modified; and Class D/E/F = Largely/Seriously to Critically Modified; CR = Critically Endangered; CVB = Channelled Valley-bottom; EI = Ecological Importance; EN = Endangered; EPL = Ecosystem Protection Level; ES = Ecological Sensitivity; ESA = Ecological Support Area; ETS = Ecosystem Threat Status; FEPA = Freshwater Ecosystem Priority Area; m.a.m.s.l = Metres above mean sea level; MAP = Mean Annual Precipitation; NFEPA = National Freshwater Ecosystem Priority Area; NP = Not Protected; OESA = Other Ecological Support Area; ONA = Other Natural Area; PA = Protected Area; PES = Present Ecological State; PP = Poorly Protected; VU = Vulnerable; WMA = Water Management Area; WP = Well Protected



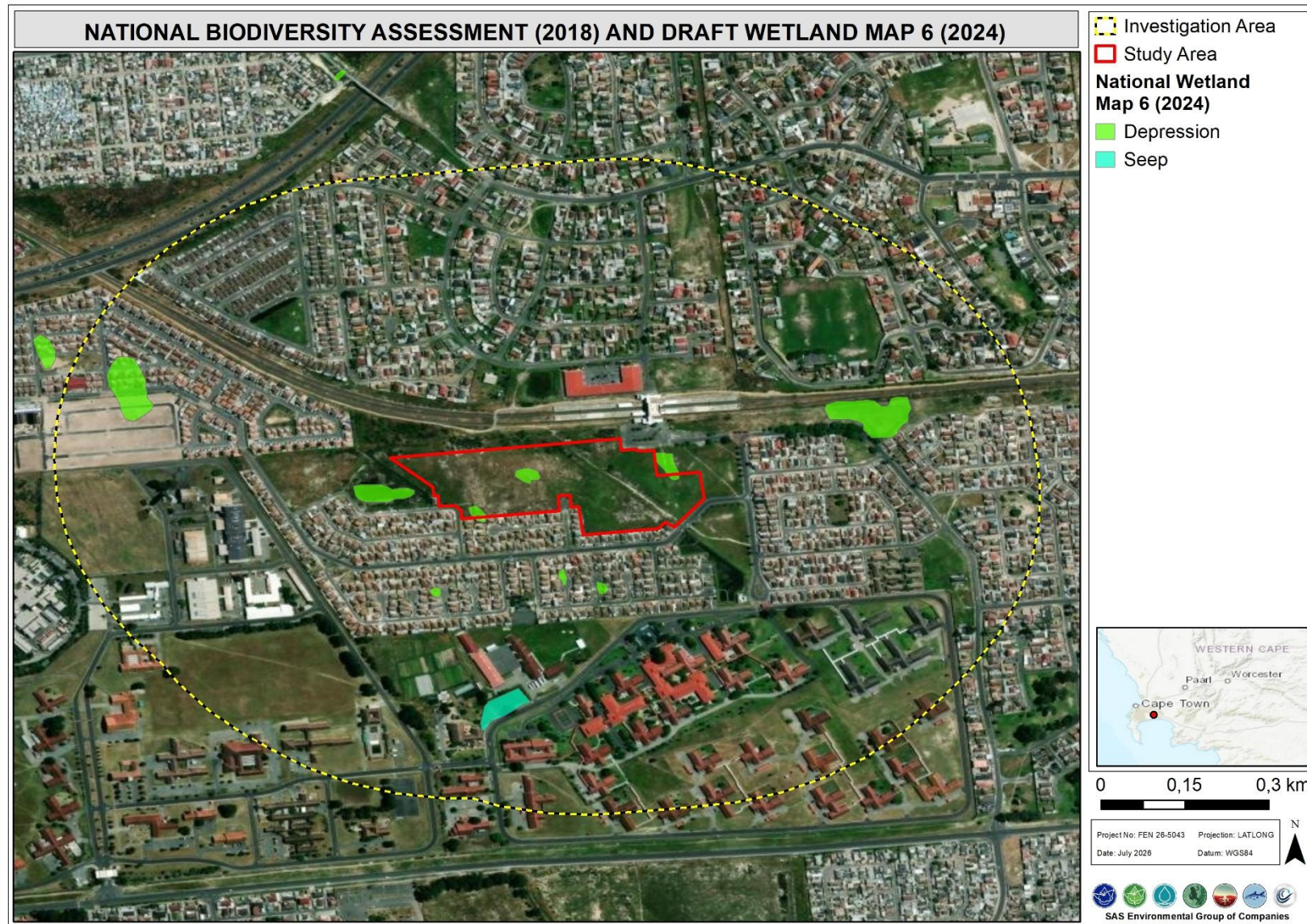


Figure 9: Different hydrogeomorphic (HGM) units associated with the study and investigation areas as indicated by the NBA (2018) and National Draft Wetland Map 6 (2024).



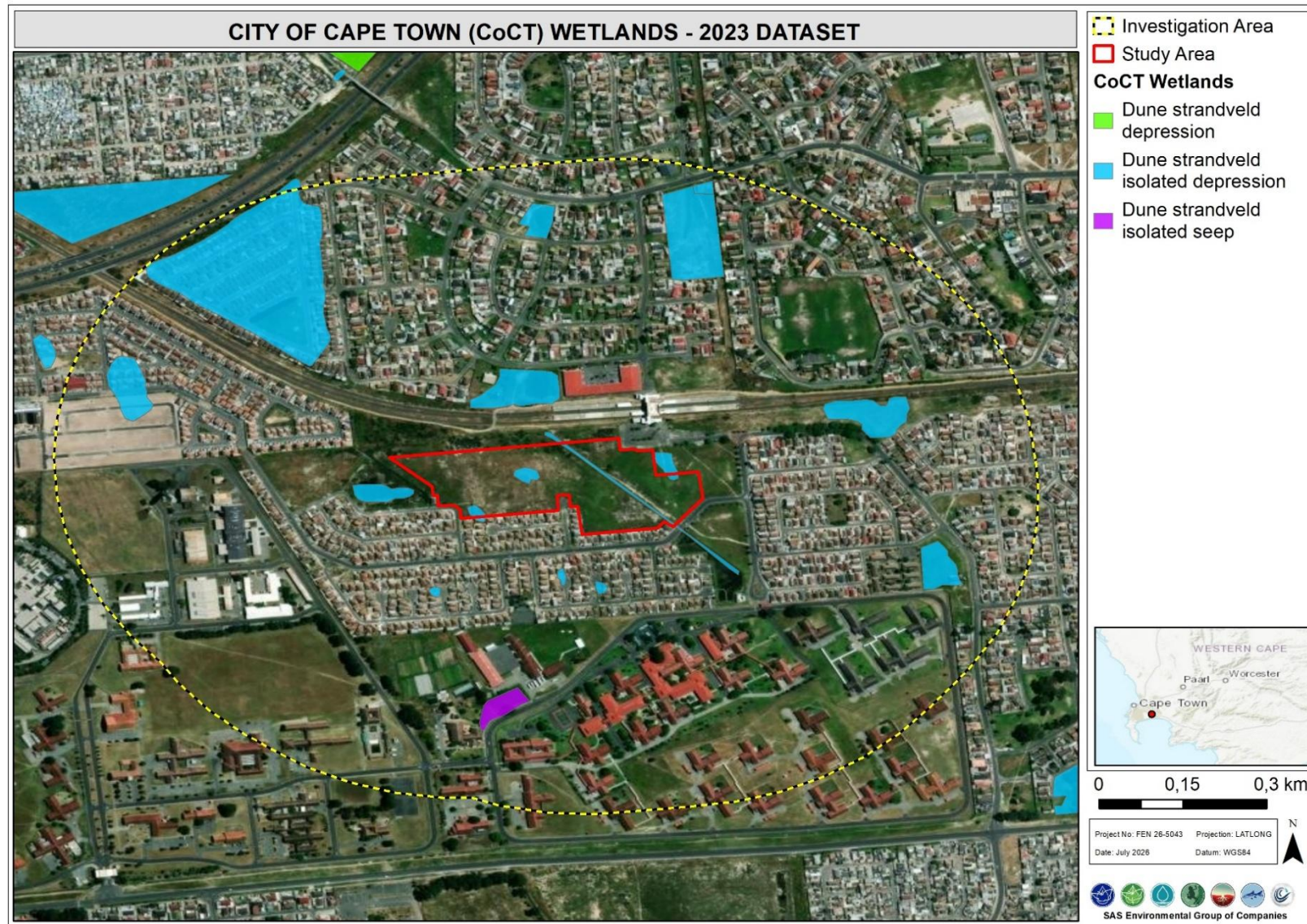


Figure 10: Different hydrogeomorphic (HGM) units associated with the study and investigation areas as indicated by the CoCT BioNet database (2023).



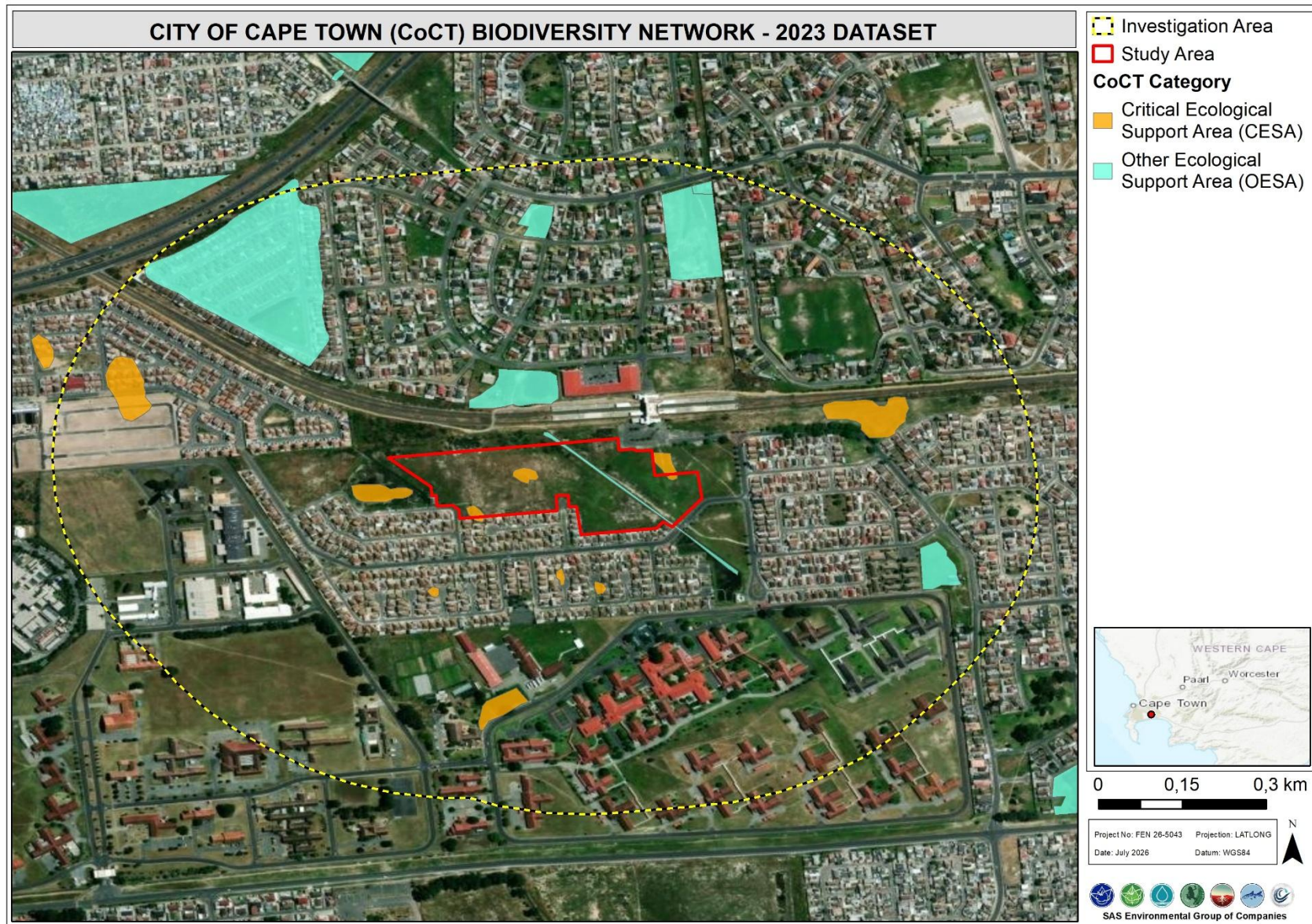


Figure 11: Areas of ecological importance associated with the study and investigation areas as indicated by the CoCT BioNet database (2023).



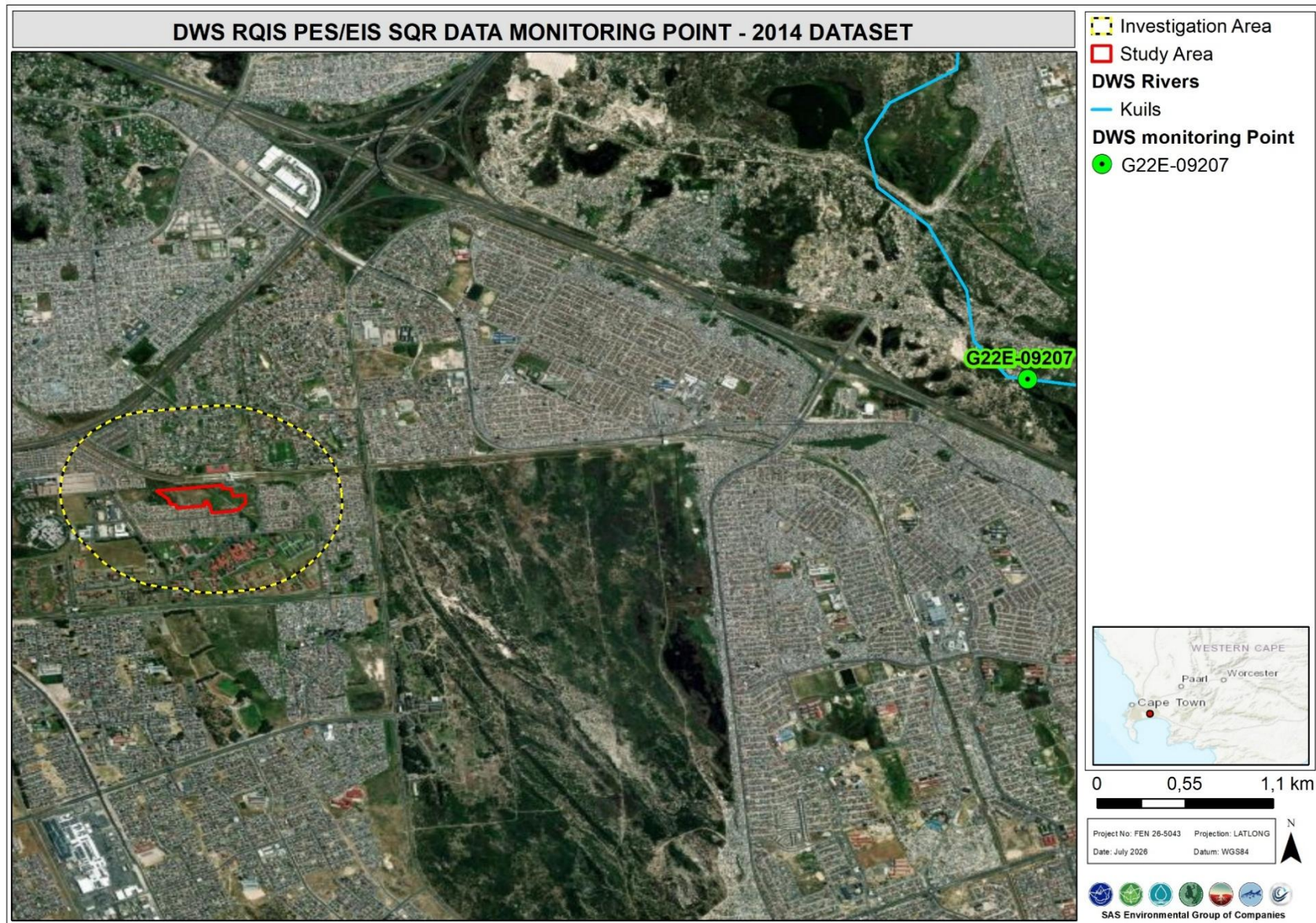


Figure 12: Study and investigation areas in relation to the most proximal DWS RQIS PES/EIS SQR data monitoring point, 2014 dataset.



Aquatic Biodiversity Sensitivity Map



17 July 2026

Legend

-  Investigation Area
-  Site Area
-  National Jurisdiction Area
-  EIA Application Site
-  EIA Application Development Footprint

Cadastre

-  Erven
-  Farm Portion
-  Farm
-  Agri Holding

Public Place

-  Aquatic Biodiversity Combined Sensitivity
-  Sensitivity category: Very High
-  Low

0 0.75 1.5 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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National Department of Environmental Affairs,
Government of South Africa.

Figure 13: Areas indicating very high aquatic biodiversity theme sensitivity (red area) and low sensitivity (green areas) associated with the study area (dashed blue outline) and investigation area (black outline) extracted from the National web based environmental screening tool (2020).



4.2 Freshwater Ecosystem Characterisation and Assessment

Possible freshwater ecosystems associated with the study and investigation areas were initially identified using desktop methods (use of aerial photographs, digital satellite imagery and topographical maps) and subsequently ground-truthed during the site assessment on the 10th of June 2026. The delineations as presented in this report are thus regarded as a best estimate of the freshwater ecosystem boundaries based on the site conditions present at the time of assessment and are considered adequate to inform the S24G Rectification process.

The following indicators were used to identify and, where relevant, delineate the boundaries of the identified freshwater ecosystems:

- Terrain units were used to determine in which parts of the landscape freshwater ecosystems would most likely occur. Elevation profiles and 5 m contours were utilised to identify these low-lying areas;
- Vegetation indicators were used, particularly distinct differences in floral community structure and species composition. This can be discerned in digital satellite imagery where there is a distinct increase in density and shrub size near flow paths, as well as either darker or brighter green colours where increased soil moisture is present;
- Although soil morphological characteristics such as mottling and gleying (associated with wetland features) or alluvial deposits (associated with riverine systems) cannot be identified using desktop techniques, areas displaying varying chroma and/or texture can be indicative of changes in geology and soil conditions, which when viewed in combination with the above, can be useful indicators of freshwater ecosystems in the landscape; and
- During the field verification, these indicators (terrain, vegetation and soil morphology) were ground-truthed at various pre-selected points and utilised in conjunction with digital satellite imagery to confirm and refine the boundaries of the freshwater ecosystems where feasible.

The GPS tracks of the specialist and verification waypoints recorded during the field survey are depicted in Appendix E. The data collected is deemed sufficient to draw conclusions as to the presence or absence of freshwater ecosystems within the study area and all the pre-determined points of interest identified by the specialist were verified.



Classification of the water resources identified within the study area and freshwater ecosystems immediately adjacent thereto was undertaken at Levels 1 - 4 of the Classification System (Ollis *et al.*, 2013) as outlined in Appendix C. A single natural freshwater ecosystem was identified along the western boundary of the study area and was classified as an Inland System, located within the Western Strandveld vegetation (WetVeg) type, which is classified as Endangered (EN). Table 2 below presents the classification of this wetland HGM unit(s) from levels 3 to 4 of the Classification System (Ollis *et al.*, 2013), whilst Figure 14 below depicts the location of the identified freshwater ecosystem and water resources in relation to the study area.

Table 2: Characterisation at Levels 3 and 4 of the Classification System (Ollis *et al.*, 2013) of the freshwater ecosystems associated with the study and associated investigation area.

Freshwater ecosystem	Level 3: Landscape unit	Level 4: Hydrogeomorphic (HGM) Type
Depression Wetland	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 and they are generally greater than 50 ha in extent.	Depression Wetland: A wetland 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, giving rise to vertical water fluctuations. Depressions may be linked to a river and have channelled in and out flow (exorheic), but may also form in the absence of a river where the water table (groundwater input) intercepts the land surface, with no in and outflow channel present (known as endorheic isolated depressions).

The following were noted during the site assessment of the study area:

- **No natural freshwater ecosystems were identified within the study area;**
- The study and investigation areas have been seriously modified and, in some areas, completely transformed due to urban residential expansion and densification together with associated bulk civil services infrastructure;
- A single Depression wetland was identified and delineated immediately west but outside of the study area within part of the established, fully functional residential estate bordering the southern edge of the study area. This depression wetland forms part of the estate's public open space;
- The feature identified and labelled as "Wetland 7" was erroneously identified as a wetland in the Freshwater Ecological Assessment compiled in 2008. This feature was clearly not a natural channel and at best could be classified as a water resource in the form of a stormwater channel. Additionally, this feature was specifically referred to as a stormwater channel in the assessment report compiled in 2008. The site assessment further confirmed that the entire area associated with this stormwater channel ("Wetland 7"), including the unlawfully piped areas, has been piped and infilled with these areas displaying no indication of hydromorphy with no hydromorphic soil characteristics and/or no hydrophytes (indicative of wetland conditions). Subsequently the entire area associated with this stormwater channel has reverted to a terrestrial nature which supports the opinion of the author that this area was most likely never a



true watercourse but that this stormwater channel functioned as a waterway and thus a water resource; and

- A Stormwater pond is located immediately south of the study area bordering Stinkwood Road, which is artificial in nature and forms part of the previously approved wetland offset area authorized by DWS in 2015. The wetland offset area was identified in a Wetland Offset Report compiled by Belcher in 2015 in order to compensate for the piping of “Wetland 7” and the perceived loss of functional wetland habitat for the entire development area (Figure 15 overleaf). At the time those reports were written, the development area encompassed the study area and the established and functional residential estate to the immediate south.

Please refer to the photographs below depicting the conditions of the area associated with the stormwater channel (Wetland 7), at the time the site assessment was facilitated on the 10th of June 2026 by FEN Consulting (Pty) Ltd.



Figure 14: Photographs depicting the existing conditions along the piped stormwater channel (“Wetland 7”) including the areas that were not approved for piping in terms of NEMA.

Figure 14 above depicts the current onsite conditions along the route of the piped stormwater channel (“Wetland 7”) with the top right and bottom left photograph depicting the portions of the piped stormwater channel that was not approved in terms of the EA, adjacent to Stinkwood Road and along the northern boundary of the study area respectively. It is evident from the photographs that the current onsite conditions along the route of the stormwater channel displays no indications of hydromorphy. The area along the route of the stormwater channel that was piped sometime during 2017 to 2018 has completely reverted to terrestrial conditions.





Figure 15: Representative photographs of the stormwater pond located south of the study area which was identified as the wetland offset area for the development proposal to compensate for the perceived loss of functional wetland habitat.



Figure 16: Representative photographs of the depression wetland identified and delineated immediately west (outside) of the study area.

Figure 16 above depicts the depression wetland area identified and delineated west of the study area, within the established, fully functional residential estate bordering the study area. This depression wetland forms part of the existing estate's public open space and is separated from the proposed mixed-use development on consolidated Erven 3303 and 3304 by means of a fixed boundary wall. The proposed development is not envisaged to present any significant quantum of risk to this feature, given the proposed development's stormwater discharge will be routed to the identified stormwater pond forming part of the wetland offset area, and hence this natural freshwater feature is not assessed further in this report.

The delineated freshwater ecosystems and artificial features are conceptually depicted in Figure 17, overleaf.



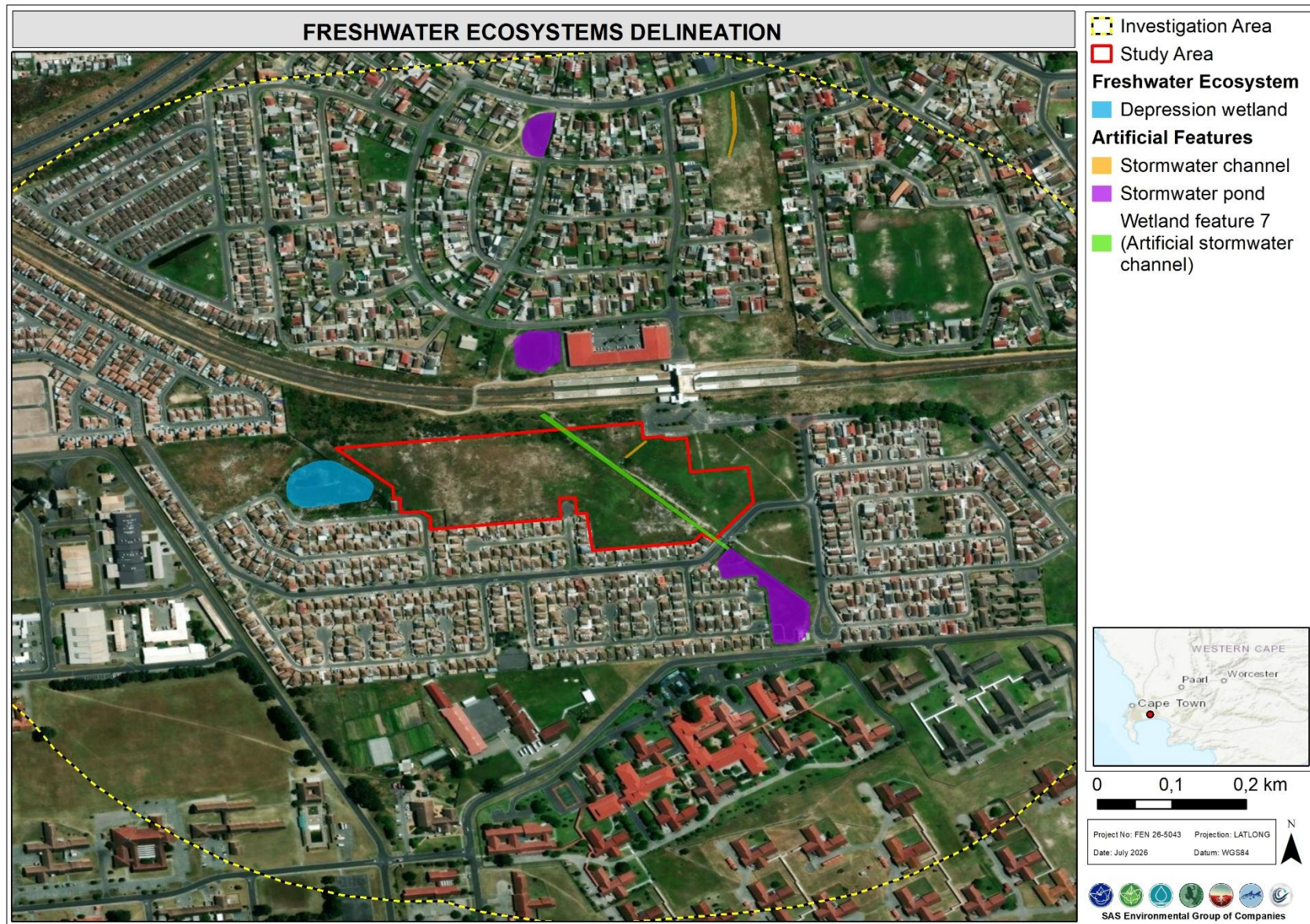


Figure 17: Field verified freshwater ecosystems and artificial features associated with the study area and associated investigation area.



5 PROJECT-SPECIFIC LEGISLATIVE REQUIREMENTS

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

- The Constitution of the Republic of South Africa, 1996⁴;
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) (as amended);
- The Environmental Impact assessment (EIA) Regulations as published under GN R982 in Government Gazette 38282 of 2014 as amended;
- The National Water Act, 1998 (Act No. 36 of 1998) (NWA) (as amended); and
 - Government Notice 4167 as published in the Government Gazette 49833 of 2023 as it relates to the NWA.

Regulated Area of a watercourse means -

- a) The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake, or dam;
- b) In the absence of a determined 1 in 100-year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or
- c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.

In terms of Section 21 of the National Water Act, 1998 (Act 36 of 1998) which provides the water uses that would trigger the need for a Water Use Authorisation (WUA), the following are applicable to the proposed development:

- **Section 21(c)** of the National Water Act, 1998 (Act No. 36 of 1998) – impeding or diverting the flow of water in a watercourse; and
- **Section 21(i)** of the National Water Act, 1998 (Act No. 36 of 1998) – altering the beds, banks, course, or characteristics of a watercourse.

5.1 Legislative Zones of Regulation

Certain articles of legislation related to the above Acts and legislation impose potential zones of regulation on freshwater ecosystems in both a national and provincial context. The Zones of Regulation (ZoR) are not necessarily development exclusion zones, rather areas in which EIA and WUA legislative tools have been introduced for the protection and sustainable use of freshwater resources by requiring that certain types of activities within a freshwater ecosystem, or within a certain distance of a freshwater ecosystem require authorisation. The definition and motivation for a regulated zone of activity for the protection of freshwater ecosystems can be summarised as per the Table 3 overleaf.

⁴ Since 1996, the Constitution has been amended by seventeen amendments acts. The Constitution is formally entitled the 'Constitution of the Republic of South Africa, 1996'. It was previously also numbered as if it were an Act of Parliament – Act No. 108 of 1996 – but since the passage of the Citation of Constitutional Laws Act, neither it nor the acts amending it are allocated act numbers.



Table 3: Articles of Legislation and the relevant zones of regulation applicable to each article.

Regulatory authorisation required	Zone of applicability
Water Use License Application for water uses as stipulated in Section 21(c) and (i) of the National Water Act, 1998 (Act No. 36 of 1998) (as amended). Department of Water and Sanitation (DWS)	GN 4167 outlines the parameters and process of a General Authorisation (GA), which replaces the need to apply for a licence in terms of Section 40 of the NWA, provided that the water use is within the limits and conditions of the GA. The notice replaces GN 509 of 2016. The GA sets out the need to determine the regulated area of a watercourse, as well as the degree of risk posed by an activity/ies related to a particular water use. In accordance with GN 4167 of December 2023, the regulated area of a watercourse for section 21 c and 21 i of the NWA, 1998 is defined as: ➤ the outer edge of the 1 in 100-year flood line or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake, or dam; ➤ in the absence of a determined 1 in 100-year flood line or riparian area the area within 100 m distance from the edge of a watercourse where the edge of the watercourse (excluding flood plains) is the first identifiable annual bank fill flood bench; and/or ➤ In respect of a wetland, a 500 m radius around the delineated boundary (extent) of any wetland, including pans.
Listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA Regulations (2014), as amended. Department of Forestry, Fisheries and the Environment (DFFE). <i>To be determined by the EAP in conjunction with the applicable regulating authority.</i>	Activities of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No.107 of 1998) EIA regulations, 2014 (as amended): Activity 12 of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No.107 of 1998) EIA regulations, 2014 (as amended in 2017) states that: <i>The development of—</i> (i) <i>dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</i> (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs—; a) within a watercourse; b) <i>in front of a development setback; or</i> c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. Excluding where such development occurs within an urban area. Activity 19 of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA regulations, 2014 (as amended) states: <i>“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.”</i>
City of Cape Town's (CoCT) Floodplain and River Corridor Management Policy (2009)	In accordance with the CoCT Floodplain and River corridor Management Policy, ecological buffers are recommended, varying in width between 10 m and 40 m for watercourses and up to 75 m recommended for wetlands, as determined by a suitably qualified specialist. A minimum buffer of 10 m is required for concrete canals. Refer to Section 5.2.

Based on the above, the relevant Zones of Regulation (ZoR) may be applicable to the identified depression wetland located outside the study area, and are conceptually indicated in the figures overleaf:

- NEMA 32 m ZoR (NEMA EIA Regulations) is applicable to all identified natural freshwater ecosystem(s); and
- GN 4167 500 m ZoR (NWA Regulations) is applicable to all identified wetland(s).



Under Section 28 of the NWA the water uses associated with the proposed development are required to be licenced, either in the form of a Water Use Licence (WUL), or via means of a General Authorisation (GA). GN 4167 of December 2023 details the requirements for the Section 21(c) and (i) water use GA.

The GA defines the regulated area of a freshwater ecosystem – i.e. the area in which a licence or GA in terms of Section 21 (c) and (i) would apply and provides the template for a risk assessment that must be undertaken when a development constitutes a Section 21 (c) and (i) water use within the regulated area of a freshwater ecosystem.

The legislative ZoRs are illustrated overleaf in conjunction with the delineated freshwater ecosystems and artificial features in Figures 18 and 19 overleaf.

Please note that these legislative zones of regulation only applies to the identified and delineated depression wetland located west of the study area, as this is the only natural freshwater system associated with the study and investigation areas.



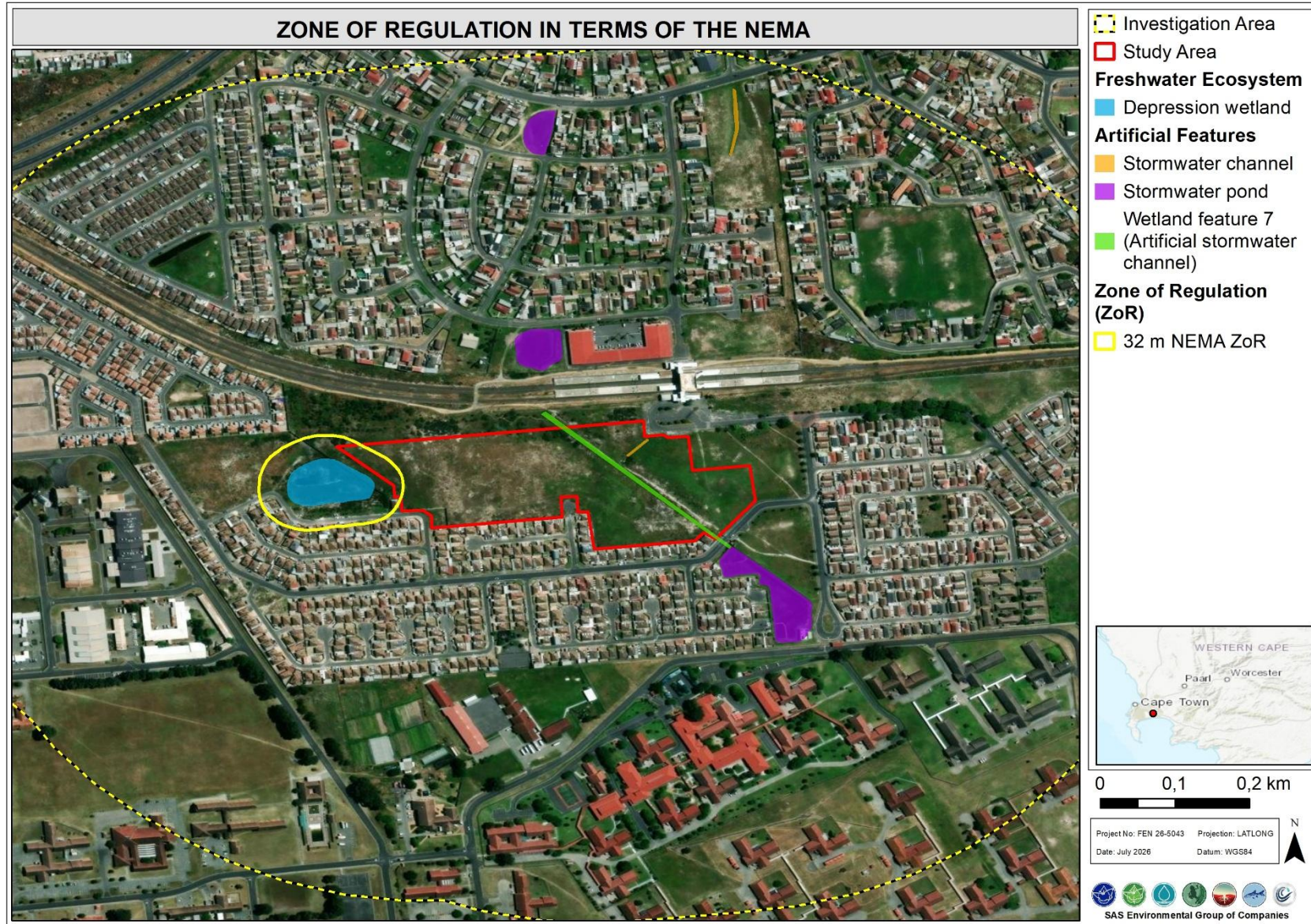


Figure 18: Conceptual representation of the Zones of Regulation in terms of NEMA associated with the study area.



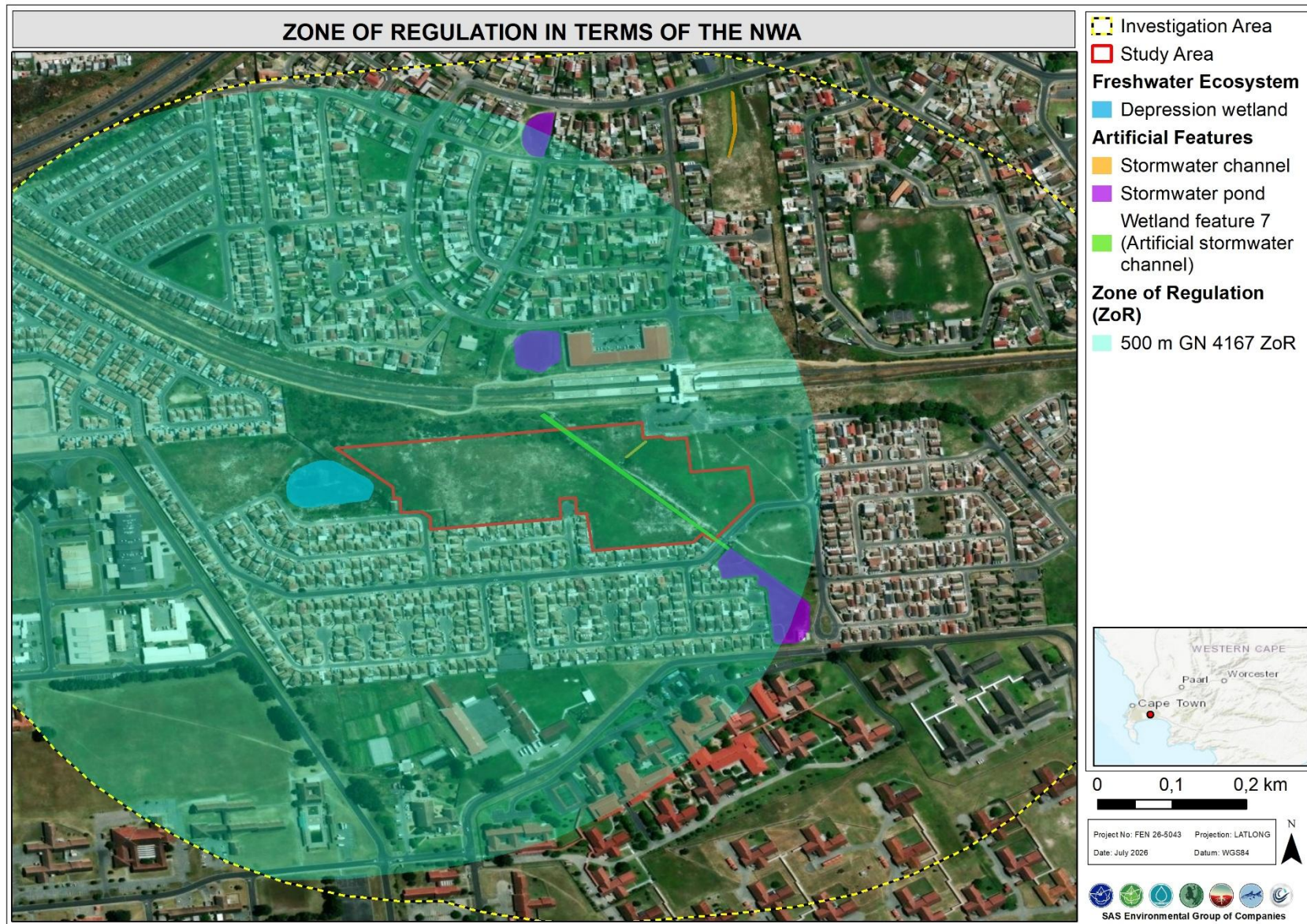


Figure 19: Conceptual representation of the GN 4167 zones of regulation in terms of the NWA associated with the study area.



5.2 Ecological Buffer Zones

To offer a measure of protection to the freshwater ecosystem in the investigation areas, non-developable buffer areas are necessary to be designated around all freshwater ecosystems. According to Macfarlane & Bredin (2017a), the definition of a buffer zone is variable, depending on the purpose of the buffer zone, however in summary, it is considered “a strip of land with a use, function or zoning specifically designed to protect one area of land against impacts from another”. Buffer zones are considered important to provide protection of basic ecosystem processes (in this case, the protection of wetland ecological services), reduce impacts on water resources arising from upstream activities (e.g. by removing or filtering sediment and pollutants), provision of habitat for aquatic and wetland species as well as for certain terrestrial species, and a range of ancillary societal benefits (Macfarlane & Bredin, 2017a). It should be noted however, that buffer zones are not considered to be effective mitigation against impacts such as hydrological changes arising from stream flow reduction, impoundments or abstraction, nor are they considered to be effective in the management of point-source discharges or contamination of groundwater, both of which require site-specific mitigation measures (Macfarlane & Bredin 2017a).

The Scientific Buffer Guideline Tool (Macfarlane & Bredin, 2017b) was applied to the freshwater ecosystem. The buffer guideline provides a Microsoft Excel™ based Buffer Zone Tool to determine suitable buffer zone requirements. The tool includes a rapid desktop tool for determining potential aquatic impact buffer zone requirements together with a site-based tool for determining buffer zone requirements for rivers, wetlands and estuaries. Central to the tool is a buffer model, which is populated automatically from the data inputted. This is based on best available science and is used to generate buffer zone recommendations as part of the assessment process. The Wetland Buffer Tool determined a 15 m construction and operational buffer for the freshwater ecosystem (depression wetland) located immediately west of the study area within the existing fully functional residential estate bordering the study area. This 15 m buffer will incorporate public open space both from the existing residential estate as well as the proposed new mixed-use development on Erven 3303 and 3304.

The ecological buffer area for the respective freshwater ecosystem is illustrated in Figure 20 overleaf. The final aquatic impact buffer requirement is based on the maximum of the recommended buffers for the construction and operational phases and taking practical considerations into account.



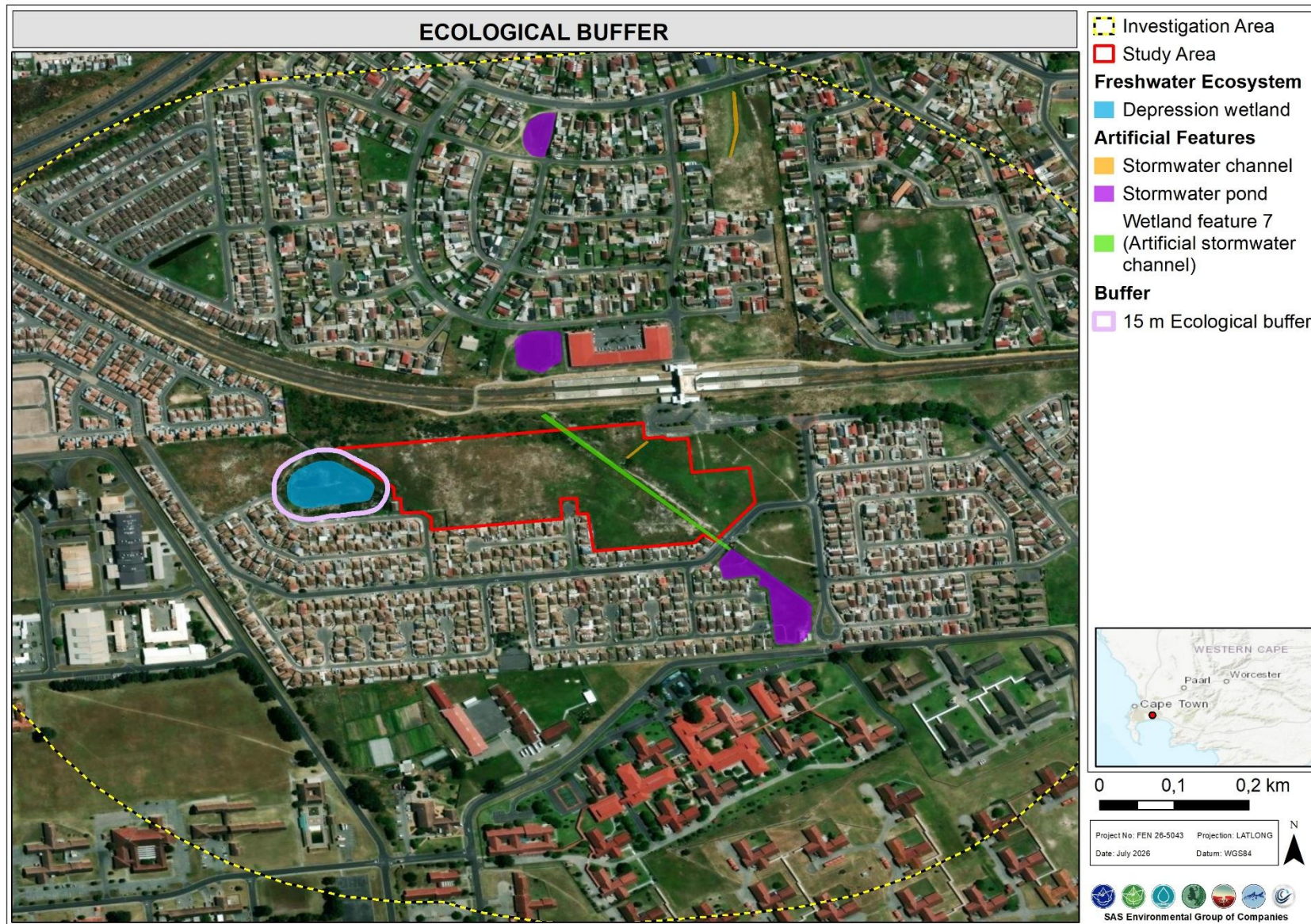


Figure 20: Conceptual representation of the ecological buffer associated with the study area.



6 IMPACT ASSESSMENT

The section presents the outcome of a pre-defined impact assessment undertaken in support of the NEMA Section 24G Rectification process for the piping of the stormwater channel ("Wetland 7") to allow for the densification of the proposed mixed-use housing development on consolidated Erven 3303 and 3304 in Mandalay.

The impact assessment concerning the impacts of the unlawful piping of the stormwater channel, hence serves the purpose of assessing the impacts to this water resource that already occurred as well as to inform the investigation of methods required to mitigate these impacts.

Additionally, these mitigation measures proposed are to be incorporated into a legally binding Maintenance Management Plan that is to be approved by the Competent Authority, prior to the commencement of any construction activities.

It is also recommended that the proposed mitigation measures be monitored and audited for compliance with the conditions laid out within the Maintenance Management Plan (once approved) by a suitably qualified Environmental Control Officer (ECO). This should be for the duration of the activities associated with the management procedures.

The colour scheme presented in Table 4 (below) was used to clarify the hierarchy of severity for the various activities and aspects. The more severe (orange to red) coloured cells were used to focus the overall consideration of risk and to focus the development of mitigatory recommendations to ensure that opportunities are presented to reduce the impacts as far as possible.

Table 4: Colour gradient used to visually quantify the severity of the impacts associated with the various activities.

Very Low	Low	Medium Low	Medium High	High	Very High
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A description of the phases presented in the impact assessment is as follows:

- **Unlawful activity commencement phase:** This phase relates to activities associated with the piping of the stormwater channel ("Wetland 7") including excavation, installation of the stormwater pipe and infilling that was facilitated sometime during 2017 to 2018. The focus of this phase is on the disturbances of soil during construction and potential alteration of the natural geomorphological and hydrological regime, as well as water quality and perceived impacts to aquatic biota; and
- **Rehabilitation (Offset) Phase:** This phase relates to the proposed mitigation activities that are aimed at mitigating the impacts as a result of the piping of the concerned stormwater channel ("Wetland 7"). The recommended mitigation activities include that the functional loss of aquatic habitat as a result of the proposed mixed-use housing development on Erven 3303 and 3304, which entailed the piping of the stormwater channel to facilitate the development, be consolidated into a single wetland offset area identified as the stormwater pond south of Stinkwood Road as described and identified in the Wetland Offset Report compiled by T. Belcher, dated March 2015. As such a Maintenance Management Plan (MMP) is to be compiled for this identified wetland offset area, which is to be approved by DEADP and legally binding. The MMP should



preferably incorporate the establishment of obligate and facultative hydrophytes within the stormwater pond area in order to increase the feature's assimilative capacity for nutrients and toxicants as well as to create additional freshwater habitat for aquatic biota, thereby enhancing the biodiversity value and ecoservice provisioning of this feature to the broader surrounding landscape. Additionally, the MMP should incorporate the removal of excess sediment, debris and litter from the offset area on a continual basis. While the long-term impacts of this phase are considered to be a net positive, the active works thereof may result in disturbances to soil resulting in compaction and erosion, and water quality impacts due to movement of machinery and personnel within the area, but only during the active rehabilitation phase.

6.1 *Modification to the freshwater resources' hydrological functioning and water quality*

The reduction in surface roughness as a result of vegetation removal during the unlawful piping of the stormwater channel ("Wetland 7") likely resulted in altered distribution, timing and pattern of flows through the channel. Earthworks associated with these activities potentially resulted in decreased water quality, altered flow regime and increased turbidity. Table 5 below summarises these activities and potential impacts caused during the commencement of the unlawful activities.

6.2 *Changes to the geomorphological processes (sediment balance, erosion and sedimentation)*

The unlawful piping of the stormwater channel ("Wetland 7") most probably resulted in the disturbance of geomorphological processes through the removal of hydrophytic vegetation and topsoil, and associated earth works, resulting in altered runoff patterns and increased erosion and sedimentation downstream towards the stormwater pond. Table 5 below summarises these activities and potential impacts caused.

6.3 *Altered aquatic habitat and impacts on biota*

Disturbances of soil and removal of vegetation during site preparation likely resulted in increased alien vegetation proliferation in the surrounding area. Physical transformation of the instream aquatic habitat to a terrestrial habitat via infilling of the stormwater channel ("Wetland 7"). Table 5 below summarises these activities and potential impacts caused.

6.4 *Altered Ecoservice Provisioning*

Disturbance and/or alteration to the ecoservice provision of the stormwater channel ("Wetland 7") as a result of the piping and infilling activities undertaken as well as the mitigation activities proposed.



Table 5: Impact assessment activities register

Unlawful Activity commencement phase	Rehabilitation (Offset) Phase
Site preparation prior to the commencement of the activities, which involved vehicular (transportation of materials) and associated disturbances to soils.	Site preparation including removal of alien invasive vegetation (manual labour and potential chemical control) and subsequent disturbance and compaction of soil during soil preparation for revegetation.
Earthworks involving the removal of topsoil and creation of stockpiles and berms associated with the installation of the stormwater pipeline.	Alien and invasive plant removal which may impact water quality as a result of the application of herbicides.
Groundbreaking including excavations and the stockpiling of spoil material.	Removal of accumulated vegetation matter and litter from the stormwater pond area during the rehabilitation phase.
Infilling of the stormwater channel following piping activities.	Potential reshaping of the bed and banks of the stormwater pond to mimic natural conditions indicative of natural depressional features and to follow the natural elevation profile.
Removal of instream vegetation from the stormwater channel potentially resulting in increased sediment loads, erosion and smothering of aquatic vegetation downstream within the stormwater pond.	Potential for soil compaction and trampling due to introduction of machinery and manual labour into the stormwater pond area as well as the introduction of contaminants from fertilisers to facilitate revegetation activities.
	Potential smothering of aquatic habitat including potential harm to biota (such as those occupying burrows/soil profile).

Table 6 (overleaf) summarises the outcome of the impact assessment indicating the significance of the impacts with and without any mitigation measures applied.



Table 6: Summary scores rated for unmitigated and mitigated phases

UNMANAGED								MANAGED							
Probability of Impact	Sensitivity of receiving environment	Severity	Spatial Scale	Duration of Impact	Likelihood	Consequence	Significance	Probability of Impact	Sensitivity of receiving environment	Severity	Spatial Scale	Duration of Impact	Likelihood	Consequence	Significance
UNLAWFUL ACTIVITIES COMMENCEMENT PHASE: Site preparation and commencement of the piping and infilling of the stormwater channel (“Wetland 7”).															
Impact on hydrological function and water quality															
5	1	2	2	3	6	7	42	N/A (offset relevant)							
							Low								
Impact on geomorphological processes (sediment balance, erosion and sedimentation)															
5	1	2	2	3	6	7	42	N/A (offset relevant)							
							Low								
Altered aquatic habitat and impacts on biota															
5	1	2	2	4	6	8	48	N/A (offset relevant)							
							Low								
Altered Goods & Ecoservice Provision															
5	1	2	2	4	6	8	48	N/A (offset relevant)							
							Low								
REHABILITATION PHASE: Rehabilitation of the Wetland Offset Area (Stormwater Pond) following the completion of the construction of the proposed development															
Impact on hydrological function and water quality															
5	1	1	2	2	6	5	30	3	1	1	2	2	4	5	20
							Low								Very low
Impact on geomorphological processes (sediment balance, erosion and sedimentation)															
5	1	2	2	2	6	6	36	3	1	1	2	2	4	5	20
							Low								Very low
Altered freshwater habitat and impacts on biota															
5	1	2	2	2	6	6	36	3	1	1	2	2	4	5	20
							Low								Very low

Based on the impact assessment tables above, the commencement of the piping and infilling of the stormwater channel ("Wetland 7") resulted in an overall **Low Negative Impact** on the hydrology of the study area. Additionally, the proposed rehabilitation and maintenance of the Wetland Offset Area as part of the development proposal to compensate for the loss of functional wetland habitat from the existing and currently proposed mixed-use development on Erven 3303 and 3304 in Mandalay was assessed to have a **Low Negative Impact** during active rehabilitation, whilst the post-rehabilitation is perceived to have an overall **Nett Positive Impact** on the ecological condition and ecoservice provisioning of this offset area (stormwater pond).



7 CUMULATIVE IMPACT STATEMENT

Cumulative impacts are activities and their associated impacts on the past, present and foreseeable future, both spatially and temporally, considered together with the impacts identified in Section 6.2 above.

Freshwater ecosystem areas within the region are under continued threat due to residential expansion and densification. Cumulative impacts stem from developmental activities that exacerbate existing impacts on the past, present and foreseeable future, state of these systems.

Typical cumulative impacts pertaining to the surrounding area comprise:

- Further disruption of the hydrological connectivity in the landscape;
- Further modification of the hydrological regime in terms of the magnitude, timing, duration and frequency of surface (overland) flows due to catchment hardening, reduced surface roughness and discharge of stormwater into freshwater ecosystems;
- Further erosion and sedimentation and eventual smothering of aquatic biota as well as changes to geomorphological processes; and
- Further establishment of alien and invasive species.

The proposed residential development on Erven 3303 and 3304 in Mandalay, is not expected to further disrupt the hydrological connectivity in the landscape, given that the hydrological connectivity of the wetland offset area (stormwater pond) with the catchment area to the north of the study area has been maintained via the piping of the stormwater channel ("Wetland 7") and hence not completely disrupted. Additionally, the stormwater runoff from the development proposal will be routed to the existing wetland offset area (stormwater pond).

The establishment of alien and invasive vegetation is deemed limited if the required Maintenance Management Plan is enforced and audited for compliance to manage for the establishment and/or encroachment during the construction phase. It is particularly important that disturbed soils and stockpiles be closely monitored during the construction phase, with established alien and invasive plants removed off site as soon as possible and disposed of at an appropriate disposal facility.

Provided that the MMP is strictly enforced once approved by DEADP, no other significant cumulative impacts are envisaged post the short-term construction and active rehabilitation phase impacts.



8 CONCLUSION

In October 2011, Communicare (Pty) Ltd, the then owner of Erf 776, Mandalay, was granted EA by DEADP to undertake listed activities in terms of NEMA and the EIA Regulations, 2014, for the establishment of a residential development. A Freshwater Ecological Assessment was conducted in 2008 by Environmental Monitoring Consulting (T. Belcher), to inform the EIA process. Additionally, a Wetland Offset Report was developed in the same year (Belcher, 2015) to compensate for the perceived loss of functional wetland habitat for the entire development area, with the wetland offset area identified as an existing stormwater pond located adjacent to the development area.

As per the then approved Spatial Development Plan (SDP), sections of a feature identified as a wetland ("Wetland 7"), designated as open space, were to be retained as open stormwater channels, while portions within the development footprint itself were approved for infilling and sub surfaced piping through an existing Water Use Licence (WUL). However, during the implementation of the EA, a non-compliance occurred in 2017/2018, whereby this feature ("Wetland 7") was piped beyond the approved piping extent.

PHS Consulting liaised with DEADP to facilitate a NEMA Section 24G Rectification Process for the sections of "Wetland 7" that was unlawfully piped during 2017 to 2018.

DEADP issued a Pre-Compliance Notice to the developer on 29 April 2026, identifying non-compliances associated with the piping of portions of "Wetland 7" beyond the extent authorised under the existing Environmental Authorisation and providing rehabilitation as an option to address the identified non-compliance. It is the opinion of the author that this rehabilitation requirement as specified by the Department is not feasible / reasonable, for the reasons outlined in Section 1.1.

Following the submission of the recommendations by the author to DEADP via PHS Consulting, DEADP subsequently advised that a Compliance Notice would be issued which would afford the applicant an opportunity to submit a voluntary Section 24G application to address the identified non-compliance. Additionally, FEN Consulting (Pty) Ltd. was approached by PHS Consulting, to undertake a Freshwater Impact Assessment for the piping of "Wetland 7" and proposed densification of the proposed mixed-use housing development on Erven 3303 and 3304 in Mandalay, to inform the S24G Rectification Process.

A field assessment was undertaken on the 10th of June 2026 (winter wet season), during which the presence of any natural freshwater ecosystem characteristics as defined by the DWAF (2008) and the NWA (1998) were noted (please refer to Section 4 of this report). The field assessment confirmed that no natural freshwater ecosystems were associated with the study area. Additionally, the feature identified and labelled as "Wetland 7" was erroneously identified as a wetland in the Freshwater Ecological Assessment compiled in 2008. This feature was clearly not a natural channel and at best could be classified as a water resource in the form of a stormwater channel. The site assessment further confirmed that the entire area associated with this stormwater channel ("Wetland 7"), including the alleged unlawfully piped areas, has been piped and infilled with these areas displaying no indications of hydromorphy, i.e., hydromorphic soil characteristics and/or hydrophytes (indicative of wetland conditions) were absent. Subsequently the entire area associated with this stormwater channel has reverted to a terrestrial nature which supports the opinion of the author that this area was most likely never



a true watercourse but that this stormwater channel functioned as a waterway and thus a water resource.

A Stormwater pond is located immediately south of the study area bordering Stinkwood Road, which is artificial in nature and forms part of the previously approved wetland offset area authorized by DWS in 2015. The wetland offset area was identified in a Wetland Offset Report compiled by Belcher in 2015 in order to compensate for the piping of perceived loss of functional wetland habitat for the entire development area together with the piping of the stormwater channel ("Wetland 7"). At the time those reports were written, the development area encompassed the study area and the established and functional residential estate to the immediate south.

The outcome of the pre-defined impact assessment undertaken as part of the NEMA S24G rectification process for the commencement of the piping and infilling of the stormwater channel ("Wetland 7") resulted in an overall *Low Negative Impact* on the hydrology of the study area. Additionally, the proposed rehabilitation and maintenance of the Wetland Offset Area as part of the development proposal to compensate for the loss of functional wetland habitat from the existing and currently proposed mixed-use development was also assessed to have a *Low Negative Impact* during active rehabilitation, whilst the post-rehabilitation is perceived to have an overall *Nett Positive Impact* on the ecological condition and ecoservice provisioning of this offset area (stormwater pond).

Hence, from a Water Resource Management perspective, the current status quo concerning the piping of "Wetland 7" (stormwater channel) should remain in place as per the legal, technical, environmental and safety reasoning mentioned in Section 1.1. Furthermore, it is the author's professional recommendation that the functional loss of wetland habitat as a result of the proposed mixed use housing development on Erven 3303 and 3304 in Mandalay, is to be consolidated into a single wetland offset area as described and identified in the Wetland Offset Report compiled by (Belcher, 2015). It is also the opinion of the author that the ecoservices provided by the then open stormwater channel in the form of stormwater polishing can and will be catered for in the proposed wetland offset area, given this offset area is adequately managed.

As such, it is strongly recommended that a Maintenance Management Plan (MMP) be compiled and approved by DEADP for the proposed development's open space areas as well as the wetland offset area, in order to ensure that these areas are managed and maintained in order to enhance the biodiversity value and ecoservice provisioning of these areas to the broader surrounding landscape.

Although it is the author's understanding that the development proposal obtained a WUL in 2015, the Department of Water and Sanitation (DWS), as custodians of the water resources in South Africa, should preferably be consulted to advise if any amendment(s) to the WUL are applicable, given the current proposed densification of the development proposal over and above the originally approved spatial layout.



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APPENDIX A – Terms of Use and Indemnity

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

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APPENDIX B – Legislative Requirements

LEGISLATIVE CONSIDERATIONS

The Constitution of the Republic of South Africa, 1996	The environment and the health and well-being of people are safeguarded under the Constitution of the Republic of South Africa, 1996 by way of section 24. Section 24(a) guarantees a right to an environment that is not harmful to human health or well-being and to environmental protection for the benefit of present and future generations. Section 24(b) directs the state to take reasonable legislative and other measures to prevent pollution, promote conservation, and secure the ecologically sustainable development and use of natural resources (including water and mineral resources) while promoting justifiable economic and social development. Section 27 guarantees every person the right of access to sufficient water, and the state is obliged to take reasonable legislative and other measures within its available resources to achieve the progressive normalization of this right. Section 27 is defined as a socio-economic right and not an environmental right. However, read with section 24 it requires of the state to ensure that water is conserved and protected and that sufficient access to the resource is provided. Water regulation in South Africa places a great emphasis on protecting the resource and on providing access to water for everyone.
National Environmental Management Act, 1998 (Act No. 107 of 1998)	The National Environmental Management Act, 1998 (Act No. 107 of 1998) and the associated Regulations as amended in 2021, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact. Provincial regulations must also be considered.
National Water Act , 1998 (Act No. 36 of 1998)	The National Water Act, 1998 (Act No. 36 of 1998) recognises that the entire ecosystem and not just the water itself in any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the Department of Water and Sanitation (DWS). Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) & (i). A watercourse is defined as: a) A river or spring; b) A natural channel in which water flows regularly or intermittently; c) A wetland, lake or dam into which, or from which water flows; and d) Any collection of water which the minister may, by notice in the Gazette, declare a watercourse.
Government Notice 4167 as published in the Government Gazette 49833 of 08 December 2023 as it relates to the NWA (Act 36 of 1998) as amended	GN 4167 outlines the parameters and process of a General Authorisation (GA), which replaces the need to apply for a licence in terms of Section 40 of the NWA, provided that the water use is within the limits and conditions of the GA. The notice replaces GN 509 of 2016. The GA sets out the need to determine the regulated area of a watercourse, as well as the degree of risk posed by an activity/ies related to a particular water use. In accordance with GN 4167 of December 2023, the regulated area of a watercourse for section 21c and 21i of the NWA, 1998 is defined as: a) the outer edge of the 1 in 100-year flood line or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake, or dam; b) in the absence of a determined 1 in 100-year flood line or riparian area the area within 100 m distance from the edge of a watercourse where the edge of the watercourse (excluding flood plains) is the first identifiable annual bank fill flood bench; or c) In respect of a wetland, a 500 m radius around the delineated boundary (extent) of any wetland, including pans. The GA only applies to the use of water in terms of Section 21(c) and (i) of the NWA where the risk class is LOW as determined through the application of the Risk Matrix as prescribed in the Notice. The GA also does not apply where other Section 21 water uses are triggered, does not apply for most sewage infrastructure and pipelines carrying hazardous materials, water uses associated with hazardous materials, water uses associated with water and wastewater treatment works, and for most mining-related water uses. The GA may be exercised as follows:



	i) Section 21(c) or (i) water use activities that are determined to pose a LOW Risk as determined through the application of the Risk Matrix as prescribed in the Notice can be undertaken subject to the general conditions of the GA; ii) Section 21(c) or (i) water use activities set out in Appendix D1 of the Notice can be undertaken without being subject to the requirement of a risk assessment and subject to the general conditions of the GA. Such water use activities in Appendix D1 include inter alia emergency river crossings, fence erection, solar renewable infrastructure that has no direct impact on watercourses and mini-scale hydropower developments; iii) Prescribed water use activities undertaken by certain State Owned Entities as detailed in Appendix D2 of the Notice can be undertaken without being subject to the requirement of a risk assessment and subject to the general conditions of the GA; iv) Maintenance work associated an existing lawful water use in terms of section 21(c) or (i) of the Act that has a LOW risk class as determined through the Risk Matrix can be undertaken ; v) River and stormwater management activities including maintenance of infrastructure as contained in a river management plan or similar management plan, may be conducted subject to the approval of such a plan by the relevant DWS regional office or catchment management agency; vi) Rehabilitation of wetlands or rivers where such rehabilitation activities has a LOW risk class as determined through the Risk Matrix can be conducted; and vii) Emergency work arising from an emergency situation and or incident associated with the persons' existing lawful water use entitlement can be undertaken, provided that all work is executed and reported in the manner prescribed in the Emergency protocol contained in Appendix C of the GA. A General Authorisation (GA) issued as per this notice will require the proponent to adhere with specific conditions, rehabilitation criteria and monitoring and reporting programme. Furthermore, the water user must ensure that there is a sufficient budget to complete, rehabilitate and maintain the water use as set out in this GA. Upon completion of the registration, the responsible authority will provide a certificate of registration to the water user within 30 working days of the submission. On written receipt of a registration certificate from the Department, the person will be regarded as a registered water user and can commence within the water use as contemplated in the GA.
Listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA Regulations (2014), as amended.	Activities of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No.107 of 1998) EIA regulations, 2014 (as amended): Activity 12 of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No.107 of 1998) EIA regulations, 2014 (as amended in 2017) states that: <i>The development of—</i> (i) <i>dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</i> (ii) <i>infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs—;</i> a) <i>within a watercourse;</i> b) <i>in front of a development setback; or</i> c) <i>if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. Excluding where such development occurs within an urban area.</i> Activity 19 of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA regulations, 2014 (as amended) states: <i>“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.”</i>



APPENDIX C – Freshwater Ecosystems Method of Assessment

All wetland or riparian features encountered within the investigation area was assessed using the Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland systems, hereafter referred to as the “Classification System” (Ollis *et al.*, 2013). A summary on Levels 1 to 4 of the classification system is presented in Table D-1 and Table D-2 below.

Table D-1: Classification System for Inland Systems, up to Level 3.

WETLAND / AQUATIC ECOSYSTEM CONTEXT		
LEVEL 1: SYSTEM	LEVEL 2: REGIONAL SETTING	LEVEL 3: LANDSCAPE UNIT
Inland Systems	DWA Level 1 Ecoregions	Valley Floor
	OR	Slope
	NFEPA WetVeg Groups	Plain
	OR	Bench (Hilltop / Saddle / Shelf)
	Other special framework	

Table D-2: Hydrogeomorphic (HGM) Units for the Inland System, showing the primary HGM Types at Level 4A and the subcategories at Level 4B to 4C.

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

Level 1: Inland systems



From the classification system, Inland Systems are defined as **aquatic ecosystems that have no existing connection to the ocean**⁷ (i.e. characterised by the complete absence of marine exchange and/or tidal influence) but **which are inundated or saturated with water, either permanently or periodically**. It is important to bear in mind, however, that certain Inland Systems may have had a historical connection to the ocean, which in some cases may have been relatively recent.

Level 2: Ecoregions & NFEPA Wetland Vegetation Groups

For Inland Systems, the regional spatial framework that has been included in Level 2 of the classification system is that of the DWA's Level 1 Ecoregions for aquatic ecosystems (Kleynhans *et al.*, 2005). There is a total of 31 Ecoregions across South Africa, including Lesotho and Swaziland. DWA Ecoregions have most commonly been used to categorise the regional setting for national and regional water resource management applications, especially in relation to rivers.

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

Level 3: Landscape Setting

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

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

Level 4: Hydrogeomorphic Units

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

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



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

1. Ecological Buffer Determination

In order to determine a relevant freshwater non-development buffer in the study area, relevant to the proposed development, the scientific buffer guideline tool was applied to the study area. The buffer guideline provides an Excel™ based buffer zone tool to determine suitable buffer zone requirements. The tool includes a rapid desktop tool for determining potential aquatic impact buffer zone requirements together with a site-based tool for determining buffer zone requirements for rivers, wetlands and estuaries. Central to the tool is a buffer model, which is populated automatically from the data inputted. Importantly, the type of development and sector into which a proposed development falls needs to be specified and has a bearing on the determination of the buffer width. The tool also considers the biodiversity-related sensitivity of the receiving freshwater ecosystems. The tool is based on best available science and is used to generate buffer zone recommendations as part of the assessment process. Figure D-1 below outlines an overview of the stepwise assessment process for buffer zone determination as applied through the tool. The buffer assessment is determined using site-based parameters using data collected for the (on-site) detailed assessment of freshwater ecosystems associated with the proposed development.

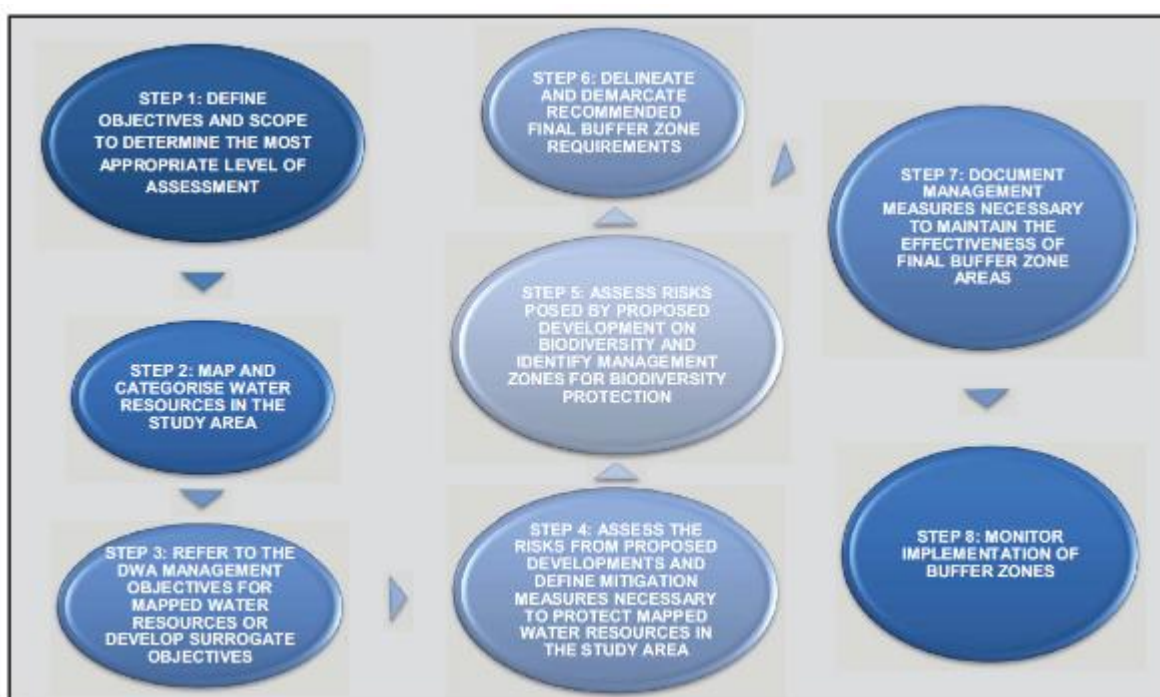


Figure D-1: Overview of the stepwise assessment process for buffer zone determination and applied through the buffer tool.



APPENDIX D –Impact Assessment Methodology

1. Ecological Impact Assessment Method of Assessment

The first stage of impact assessment is the identification of environmental activities, aspects and impacts. This is supported by the identification of receptors and resources, which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. The definitions used in the impact assessment are presented below.

- An **activity** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or infrastructure that is possessed by an organisation.
- An **environmental aspect** is an 'element of an organizations activities, products and services which can interact with the environment'⁵. The interaction of an aspect with the environment may result in an impact.
- **Environmental risks/impacts** are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. In the case where the impact is on human health or wellbeing, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is.
- **Receptors** can comprise but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as wetlands, flora and riverine systems.
- **Resources** include components of the biophysical environment.
- **Frequency of activity** refers to how often the proposed activity will take place.
- **Frequency of impact** refers to the frequency with which a stressor (aspect) will impact on the receptor.
- **Severity** refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent-setting; threat to environmental and health standards.
- **Spatial extent** refers to the geographical scale of the impact.
- **Duration** refers to the length of time over which the stressor will cause a change in the resource or receptor.

The significance of the impact is then assessed by rating each variable numerically according to the defined criteria. Refer to the Table E-7. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity, spatial scope and duration of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity and the frequency of the impact together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance-rating matrix and are used to determine whether mitigation is necessary⁶.

The assessment of significance is undertaken twice. Initial, significance is based on only natural and existing mitigation measures (including built-in engineering designs). The subsequent assessment takes into account the recommended management measures required to mitigate the impacts. Measures such as demolishing infrastructure, and reinstatement and rehabilitation of land, are considered post-mitigation.

The model outcome of the impacts was then assessed in terms of impact certainty and consideration of available information. The Precautionary Principle is applied in line with South Africa's National Environmental Management Act 1998 (Act No. 108 of 1998) in instances of uncertainty or lack of information, by increasing assigned ratings or adjusting final model outcomes. In certain instances where a variable or outcome requires rational adjustment due to model limitations, the model outcomes have been adjusted.

⁵ The definition has been aligned with that used in the ISO 14001 Standard.

⁶ Some risks/impacts that have low significance will however still require mitigation.



Table E-7: Criteria for assessing significance of impacts.**LIKELIHOOD DESCRIPTORS**

Probability of impact	RATING
Highly unlikely	1
Possible	2
Likely	3
Highly likely	4
Definite	5
Sensitivity of receiving environment	RATING
Ecology not sensitive/important	1
Ecology with limited sensitivity/importance	2
Ecology moderately sensitive/ /important	3
Ecology highly sensitive /important	4
Ecology critically sensitive /important	5

CONSEQUENCE DESCRIPTORS

Severity of impact	RATING
Insignificant / ecosystem structure and function unchanged	1
Small / ecosystem structure and function largely unchanged	2
Significant / ecosystem structure and function moderately altered	3
Great / harmful/ ecosystem structure and function largely altered	4
Disastrous / ecosystem structure and function seriously to critically altered	5
Spatial scope of impact	RATING
Activity specific/ < 5 ha impacted / Linear developments affected < 100 m	1
Development specific/ within the site boundary / < 100 ha impacted / Linear developments affected < 100 m	2
Local area/ within 1 km of the site boundary / < 5000 ha impacted / Linear developments affected < 1000 m	3
Regional within 5 km of the site boundary / < 2000 ha impacted / Linear developments affected < 3000 m	4
Entire habitat unit / Entire system/ > 2000 ha impacted / Linear developments affected > 3000 m	5
Duration of impact	RATING
One day to one month	1
One month to one year	2
One year to five years	3
Life of operation or less than 20 years	4
Permanent	5



Table E-8: Significance Rating Matrix.

LIKELIHOOD (Frequency of activity + Frequency of impact)	CONSEQUENCE (Severity + Spatial Scope + Duration)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table E-9: Positive/Negative Mitigation Ratings.

Significance Rating	Value	Negative Impact Management Recommendation	Positive Impact Management Recommendation
Very high	126-150	Critically consider the viability of proposed projects Improve current management of existing projects significantly and immediately	Maintain current management
High	101-125	Comprehensively consider the viability of proposed projects Improve current management of existing projects significantly	Maintain current management
Medium-high	76-100	Consider the viability of proposed projects Improve current management of existing projects	Maintain current management
Medium-low	51-75	Actively seek mechanisms to minimise impacts in line with the mitigation hierarchy	Maintain current management and/or proposed project criteria and strive for continuous improvement
Low	26-50	Where deemed necessary seek mechanisms to minimise impacts in line with the mitigation hierarchy	Maintain current management and/or proposed project criteria and strive for continuous improvement
Very low	1-25	Maintain current management and/or proposed project criteria and strive for continuous improvement	Maintain current management and/or proposed project criteria and strive for continuous improvement

The following points were considered when undertaking the assessment:

- Risks and impacts were analysed in the context of the *project's area of influence* encompassing:
 - Primary project site and related facilities that the client and its contractors develop or control;
 - Areas potentially impacted by cumulative impacts for any existing project or condition and other project-related developments; and
 - Areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location.
 - Risks/Impacts were assessed for all stages of the project cycle including:
 - Pre-construction;
 - Construction;
 - Operation; and
 - Rehabilitation.
- If applicable, transboundary, or global effects were assessed.
- Individuals or groups who may be differentially or disproportionately affected by the project because of their *disadvantaged* or *vulnerable* status were assessed.
- Particular attention was paid to describing any residual impacts that will occur after rehabilitation.

2. Assessment of Cumulative Impacts



A “Cumulative Impact”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities⁷.

The role of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact). This section should address whether the construction of the proposed development will result in:

- Unacceptable risk
- Unacceptable loss
- Complete or whole-scale changes to the environment or sense of place
- Unacceptable increase in impact

The specialist is required to conclude if the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area.

⁷ Unless otherwise stated, all definitions are from the 2014 EIA Regulations, GNR 982



APPENDIX E – Site Sensitivity Verification

FRESHWATER ECOSYSTEM SITE SENSITIVITY VERIFICATION REPORT AS PART OF THE S24G RECTIFICATION PROCESS CONCERNING THE PROPOSED MIXED-USE DEVELOPMENT ON ERVEN 3303 AND 3304 (SUBDIVIDED FROM ERF 776), MANDALAY, WESTERN CAPE PROVINCE.

Introduction

According to the “Protocols for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes (“the Protocols”) published in Government Gazette No. 43110 on 20 March 2020 and Government Gazette No. 43855 on 30 October 2020, the Environmental Assessment Practitioner (EAP) must verify the current use of the site in question and its environmental sensitivity as identified by the Screening Tool to determine the need for specialist inputs in relation to the themes included in the Protocols. The Protocols are allowed for in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended (“NEMA”). The Protocols must be complied with for every new application for Environmental Authorisation that is submitted after 9 May 2020.

This document serves as the Aquatic Biodiversity (Freshwater) Site Sensitivity Verification Report for the proposed mixed-use development on erven 3303 and 3304 (subdivided from erf 776), Mandalay, Western Cape Province.

Area of assessment

The proposed mixed-use housing development will be located on Erven 3303 and 3304 *subdivided from Erf 776) in Mandalay, Western Cape Province.

This Freshwater Ecosystem site sensitivity verification report relates to a Screening Tool Report (STR) completed for the site in August 2026.

Site Verification Methodology

A site assessment was conducted by the specialist to inform the specialist report required for the proposed project.

Aquatic Biodiversity Site Verification

The table below provides information regarding the outcome of the Screening Tool in terms of the aquatic biodiversity theme sensitivity associated with the proposed project as well as a brief summary of the outcome of the freshwater ecosystem specialist report in response.



Table G1: Aquatic Biodiversity Theme Sensitivity analysis for the proposed project.

Environmental Theme	Applicable Protocol	Response
Aquatic Biodiversity Sensitivity Rating: According to the screening tool, some areas within the study area and the associated investigation area are considered to be of Very High Aquatic Biodiversity Sensitivity, as these areas overlap with freshwater features indicated as depressions. Requiring a Freshwater Ecosystem Impact Assessment. Actual Sensitivity: The designation of very high sensitivity for freshwater features by the DFFE Screening Tool is disputed with a reduction to Low Sensitivity through the findings of the freshwater assessment, given that no natural freshwater features were identified within the study area. The low aquatic biodiversity sensitivity designation for the remainder of the study and investigation areas where no freshwater ecosystems have been delineated is not disputed by the site verification. In these areas, the designation of low sensitivity is confirmed.	Protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity (GN 320 of March 2020).	Due to the specific requirement to inform the S24G Rectification Process, a freshwater ecosystem impact assessment needs to be undertaken. During field verification it was determined that the areas associated with the proposed development are of low sensitivity.



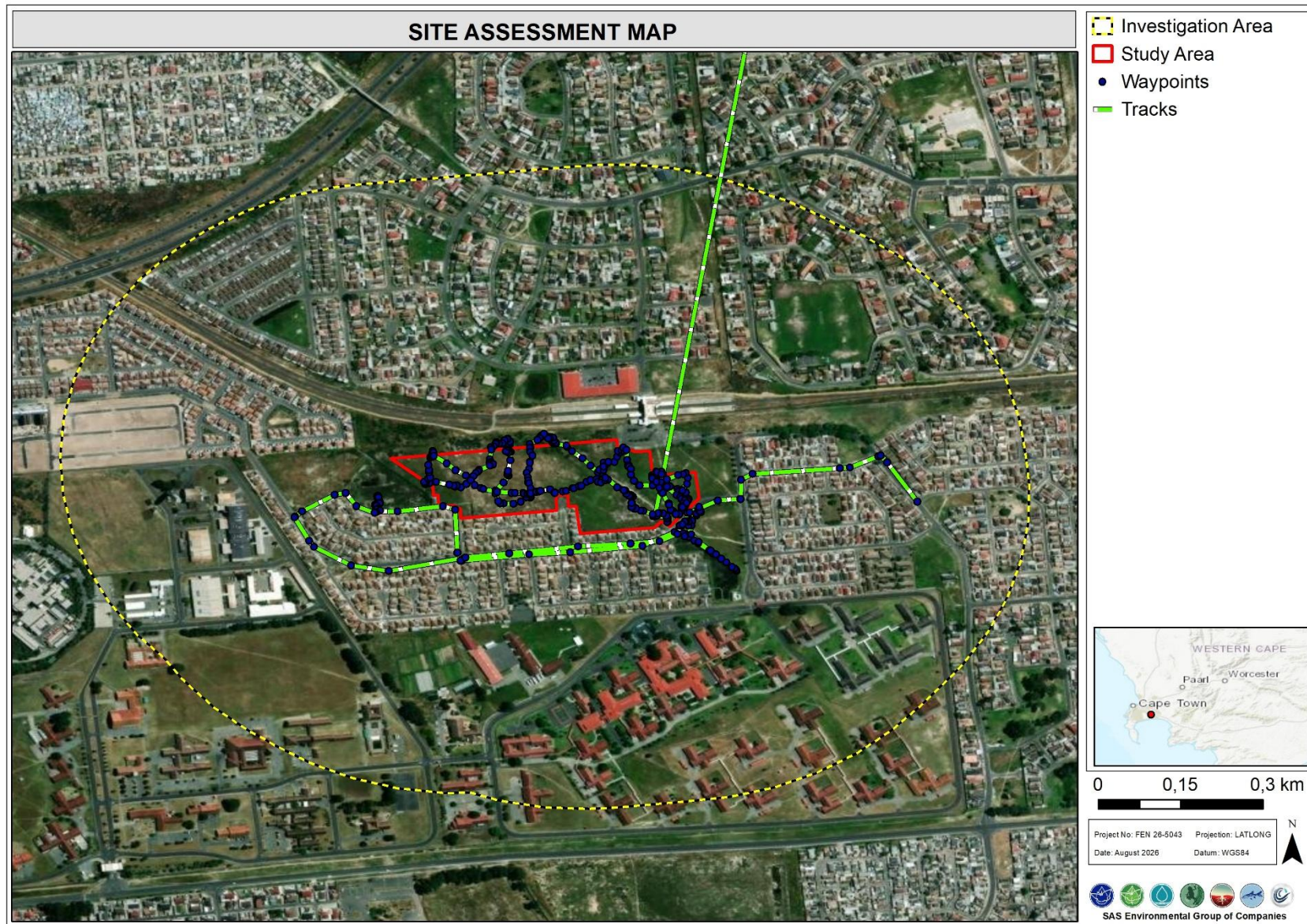


Figure 21: GPS Track and Coordinates taken during the site assessment.



APPENDIX F– General “Good Housekeeping” Mitigation Measures

General construction management and good housekeeping practices

Latent and general impacts which may affect the freshwater ecology and biodiversity, will include any activities which take place in close proximity to the proposed development that may impact on the receiving environment. Mitigation measures for these impacts are highlighted below and are relevant to the watercourse identified in this report:

Development footprint

- All development footprint areas must remain as small as possible and must not encroach into the freshwater areas unless absolutely essential and part of the proposed development. It must be ensured that the freshwater habitat is off-limits to construction vehicles and non-essential personnel;
- The boundaries of footprint areas, including contractor laydown areas, must be clearly defined and all activities must remain within defined footprint areas. Edge effects will need to be extremely carefully controlled;
- Planning of temporary roads and access routes must avoid freshwater ecosystems and be restricted to existing roads where possible;
- Appropriate sanitary facilities must be provided for the life of the construction phase and all waste removed to an appropriate waste facility;
- All hazardous chemicals as well as stockpiles must be stored on bunded surfaces and have facilities constructed to control runoff from these areas;
- All hazardous storage containers and storage areas must comply with the relevant SABS standards to prevent leakage;
- No fires must be permitted in or near the construction area; and
- Ensuring that an adequate number of waste and “spill” bins are provided will also prevent litter and ensure the proper disposal of waste and spills.

Vehicle access

- All vehicles must be regularly inspected for leaks. Re-fuelling must take place offsite on a sealed surface area to prevent ingress of hydrocarbons into the topsoil;
- In the event of a vehicle breakdown, maintenance of vehicles must take place with care and spillage must be prevented near the surface area to prevent ingress of hydrocarbons into topsoil and subsequent habitat loss; and
- All spills should they occur, should be immediately cleaned up and treated accordingly. Contaminated soil must be bagged and disposed of in hazardous waste receptacles.

Vegetation

- Removal of the alien and weed species encountered within the wetlands must take place in order to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998). Removal of species should take place throughout the construction, operational, and maintenance phases; and
- Species specific and area specific eradication recommendations:
 - Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used;
 - Footprint areas must be kept as small as possible when removing alien plant species; and



- No vehicles must be allowed to drive through designated sensitive watercourse areas during the eradication of alien and weed species.

Soil

- Sheet runoff from access roads and the walk ways must be slowed down by the strategic placement of berms;
- As far as possible, all construction activities must occur in the low flow season, during the drier winter months;
- As much vegetation growth as possible (of indigenous floral species) should be encouraged to protect soil;
- No stockpiling of topsoil must take place within close proximity to the watercourse, and all stockpiles must be protected with a suitable geotextile to prevent sedimentation of the watercourse;
- All soil compacted as a result of construction activities as well as ongoing operational activities falling outside of project footprint areas must be ripped and profiled; and
- A monitoring plan for the development and the immediate zone of influence must be implemented to prevent erosion and incision.

Rehabilitation

- Construction rubble must be collected and disposed of at a suitable landfill site;
- All alien vegetation in the footprint area as well as immediate vicinity of the proposed development must be removed. Alien vegetation control must take place for a minimum period of two growing seasons after rehabilitation is completed; and
- Side slope and embankment vegetation cover must be monitored to ensure that sufficient vegetation is present to bind the soil and prevent further erosion.



APPENDIX G – Specialist Information

DETAILS, EXPERTISE AND CURRICULUM VITAE OF SPECIALISTS

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

Dietmar de Klerk	BSc Conservation Ecology (Stellenbosch University)
Amanda Milesen	Postgraduate Diploma Nature Conservation (UNISA)
Dr. Wietsche Roets	PhD Ecohydrology (University of the Western Cape)

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

Company of Specialist:	FEN Consulting (Pty) Ltd		
Name / Contact person:	Dietmar de Klerk		
Postal address:	221 Riverside Lofts, Tygerfalls Boulevard, Bellville		
Postal code:	7539	Cell:	078 067 4777
Telephone:	011 616 7893 (head office)	Fax:	N/A
E-mail:	dietmar@sasenvgroup.co.za		
Qualifications	BSc Conservation Ecology (Stellenbosch University)		
Registration / Associations	SACNASP (Pri.Sci.Nat)		

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

I, **Dietmar de Klerk**, declare that -

- I act as the **independent specialist** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



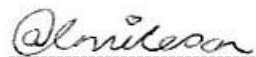
Signature of the Specialist



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

I, **Amanda Milesen**, declare that -

- I act as the **independent specialist** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



Signature of the Specialist

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

I, **Wietsche Roets**, declare that -

- I act as the **independent specialist** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



Signature of the Specialist





**SAS ENVIRONMENTAL GROUP OF COMPANIES –
SPECIALIST CONSULTANT INFORMATION
CURRICULUM VITAE OF **DIETMAR DE KLERK****

PERSONAL DETAILS

Position in Company	Senior Field Ecologist
Joined SAS Environmental Group of Companies	2024

MEMBERSHIPS

Registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioner Association of South Africa (EAPASA)
(EAPASA – Reg No. 2023/7731)
Registered Professional Natural Scientist with the South African Council for Natural Scientific Professions
(SACNASP – Reg No. 11973)

EDUCATION

Qualifications

BSc Hons Conservation Ecology (Stellenbosch University)	2010
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Short Courses

Tools for Wetland Assessment presented by Prof. F. Ellery and Rhodes University	2020
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AREAS OF WORK EXPERIENCE

South Africa –Western Cape

KEY SPECIALIST DISCIPLINES

Legislative Requirements, Processes and Assessments

- Facilitation of Environmental Impact Assessments (EIAs)
- Water Use License Applications (General Authorisations)
- Environmental and Water Use Audits
- Environmental Control Officer (ECO) work
- Environmental Management Programme (EMPr) compilation
- Rehabilitation Plan compilation

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Wetland Offset Reporting





**SAS ENVIRONMENTAL GROUP OF COMPANIES –
SPECIALIST CONSULTANT INFORMATION
CURRICULUM VITAE OF **AMANDA MILESON****

PERSONAL DETAILS

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

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Registered Professional Natural Scientist at South African Council for Natural Scientific Professions (SACNASP)

Member of the South African Wetland Society (SAWS)

Member of the International Society of Wetland Scientists

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

EDUCATION

Qualifications

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

Short Courses

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

AREAS OF WORK EXPERIENCE

South Africa – All Provinces

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

KEY SPECIALIST DISCIPLINES

Freshwater Assessments

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

Biodiversity Assessments

- Biodiversity Ecological Assessments
- Biodiversity Offset Plans





**SAS ENVIRONMENTAL GROUP OF COMPANIES –
SPECIALIST CONSULTANT INFORMATION
CURRICULUM VITAE OF DR. WIETSCHE ROETS**

PERSONAL DETAILS

Position in Company	Ecologist, Aquatic Ecologist
Joined SAS Environmental Group of Companies	2026

MEMBERSHIP IN PROFESSIONAL SOCIETIES

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

EDUCATION

Qualifications

PhD Ecohydrology (University of the Western Cape)	2008
MSc Aquaculture (University of the North)	1998
BSc (Hons) Zoology (Aquatic Ecology, Taxonomy, Parasitology and Physiology) (North-West University Potchefstroom)	1987
Higher Education Diploma (Post-grad)	1986
BSc (Zoology, Botany) (North-West University Potchefstroom)	1985

Short Courses

Certified course on Resource Identification and Utilisation - Soil classification in 1995 (Department of Agriculture, North-West Province).
Wilderness Management Course in the Baviaanskloof in 1997 (Wilderness Action Group - Paul Weingart and Greg Hansen from the USA)
"Hard Rock Aquifer" training course at the Groundwater Division of the University of the Western Cape (UWC) in November 2004.
International Wethydro Short Intensive Course on Wetland Management in Poland 19 - 26 July 2005 hosted by the Agricultural University of Warsaw, Poland.
Project Management course in 2007 (Insite Training - SETA accredited No. 0270)
BGIS course presented by the South African National Botanical Institute (SANBI) and the Department of Environmental Affairs and Development Planning (DEADP) Western Cape, 24 June 2009, Saasveld George.
Certified EIA administrators course (1-5 February 2010), University of Pretoria.
EIA administrators training on new NEMA regulations 2010, King George Hotel, George 19-20 July 2010.
Seminar/Workshop on "Development of Coastal Setback Lines", 21 & 22 October, University of Stellenbosch: Civil Engineering. 21 & 22 October 2010 (Continual Professional Development points 2).
National Storm Surge Workshop hosted by Department of Environmental Affairs "Oceans and Coast" Knysna 22 & 23 February 2011.
Sustainable Urban Drainage Systems Workshop (SuDS) - 16 May 2011. University of Cape Town: Engineering Department and the WRC. Pine Lodge, George (CPD 0.75).
Estuary Management Course 4-6 October 2011, NMMU George.
Fish Response Assessment Index (FRAI) training (in-house) DWA Bellville 27 February 2012.
Macro Invertebrate Response Assessment Index (MIRAI) training (in-house) DWA Bellville 18-20 June 2012.
Section 21 (c) and (i) water use training (in-house) DWA Pretoria Head Office December 2012.
Integrated Environmental Management (IEM) training (in-house) DWA Head Office Pretoria February 2013.
Present Ecological State (PES), Ecological Importance (EI) and Ecological Sensitivity (ES) model training (in-house) DWA Roodeplaat RQS, January 2014.



International Training Programme on Water Sensitive Urban Design and Planning at the Water Research Commission (WRC) in conjunction with University of Cape Town (UCT) and Centre of Science and Environment India, 13-15 September 2017.

AREAS OF WORK EXPERIENCE

South Africa – All Provinces

DEVELOPMENT SECTORS OF EXPERIENCE

1. Water Use Authorisation Reviews for Mining: Coal, chrome, Platinum Group Metals (PGMs), mineral sands, gold, phosphate, river sand, clay, fluorspar
2. Environmental Authorisation and Water Use Authorisation reviews for Linear developments (energy transmission, telecommunication, pipelines, roads)
3. Reference Group Member for various Water Research Commission Projects
4. Water Use Authorisation reviews for Renewable energy (Hydro, wind and solar)
5. Environmental Authorisation- and Water Use Authorisation reviews for Commercial development
6. Environmental Authorisation- and Water Use Authorisation reviews for Residential development
7. Environmental Authorisation- and Water Use Authorisation reviews for Agriculture developments
8. Environmental Authorisation- and Water Use Authorisation reviews for Industrial/chemical
9. Ecological Management of Provincial Game Reserves as Regional Ecologist
10. Aerial Game Census coordinator
11. Aquatic Scientist in the Western Cape with CapeNature
12. EIA reviewer with Department of Environmental Affairs Development Planning – Western Cape (DEADP)

KEY SPECIALIST DISCIPLINES

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Environmental and Water Use Audits
- Freshwater Resource Management and Monitoring as part of National Programs (REMP etc)

Freshwater Assessments

- Freshwater (wetland / riparian) Delineation and Assessment

Aquatic Ecological Assessment and Water Quality Studies

- Habitat Assessment Indices (IHAS, HRC, IHIA & RHAM)
- Aquatic Macro-Invertebrates (SASS5 & MIRAI)
- Fish Assemblage Integrity Index (FRAI)
- Riparian Vegetation Integrity (VEGRAI)
- Water quality Monitoring

Biodiversity Assessments

- Vegetation type mapping and descriptions for Nature Reserves
- Determination of carrying capacity for game on Nature Reserves
- Biomass determinations and burning programmes for Nature Reserves
- Game monitoring and distribution for Nature Reserves
- Aerial Game Census
- Grass monitoring
- Drafting of Ecological Management Plans for Nature Reserves
- Road and watering hole placements for Nature Reserves

Soil and Land Capability Assessment

- Completed Geology and Soil Identification course
- Reference Group Member for Hydropedological Assessment tools at the Water Research Commission

Training

- Presented various training courses on Water Use Authorisation mainly focusing on section 21 (c) and (i) water uses.
- Presented training courses on Aquatic Ecosystem Functioning in the Western Cape
- Presented training courses on groundwater surface water interactions.

