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DRAFT

BASIC ASSESSMENT REPORT

FOR THE

THE PROPOSED UPGRADE OF THE MOORDKUIL RAW WATER PUMP STATION ON PORTIONS 15, 24 AND 25 OF THE FARM KLIPHEUVEL NO. 143, KLEINBRAK RIVIER, MOSSEL BAY MUNICIPALITY, WESTERN CAPE.

Compiled in terms of Appendix 1 of the Environmental Impact Assessment Regulations of 2014, as amended (GNR 326 of 2017; GNR517 of 2021), as promulgated in terms of the National Environmental Management Act of 1998 (Act No 107 of 1998).

PREPARED FOR:	Department of Water and Sanitation
DFFE REF:	TBC
SES REF NO:	UMPS/DBAR/DWS/06/26
DATE:	26 June 2026

PROJECT INFORMATION

Project Title:	THE PROPOSED UPGRADE OF THE MOORDKUIL RAW WATER PUMP STATION ON PORTIONS 15, 24 AND 25 OF THE FARM KLIPHEUVEL NO. 143, KLEINBRAK RIVIER, MOSSEL BAY MUNICIPALITY, WESTERN CAPE.
Applicant:	DEPARTMENT OF WATER AND SANITATION
Contact Details:	Department of Water and Sanitation Mr. Glenn Daniell Email: DaniellG@dws.gov.za
Property information:	Portion 25 of the Farm Klipheuvel No. 143 Portion 24 of the Farm Klipheuvel No. 143 Portion 25 of the Farm Klipheuvel No. 143
Details of the Environmental Assessment Practitioner (EAP):	Sharples Environmental Services CC Responsible EAP: Michael Bennett (EAPASA Reg. 2021/3163) Candidate EAP: Christiaan Smit (EAPASA Reg: 2024/8297)
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SES Report Reference:	UMPS/FK/MBM/12/25
Report Status:	Draft Basic Assessment Report
DFFE Reference Number:	TBC
Date of Report:	26 June 2026

COMPLIANCE OF THIS BASIC ASSESSMENT REPORT WITH APPENDIX 1 OF THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS OF 2014, AS AMENDED.

Appendix 1 of the Environmental Impact Assessment Regulations of 2014, as amended (Government Notice Regulation (GNR) 326 of 2017; GNR 517 of 2021) promulgated in terms of the National Environmental Management Act No.107 of 1998 (NEMA), states the requirements for the content of a Basic Assessment Report to be as follows:

"*A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–* "

The Table below lists the content requirements of a BA Report and where in this BAR one can find the required content.

REQUIREMENT	SECTION IN REPORT
(a) details of – (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae	Section 1.2
(b) the location of the activity, including: (i) the 21-Digit Surveyor General Code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties	Section 4.1
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructures at an appropriate scale; Or, it it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Section 4.1
(d) a description of the scope of the proposed activity, including – (i) all listed and specified activities triggered and being applied for; and (ii) a description of the activities to be undertaken including associated structures and infrastructure;	Section 2.5 Section 4
(e) a description of the policy and legislative context within which the development is proposed including – (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 2
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred locations	Section 7
(g) a motivation for the preferred site, activity and technology alternative;	Section 6
(h) a full description of the process followed to reach the proposed preferred alternative within the site, including-	
(i) details of all the alternatives considered;	Section 6
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 8
(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	N/A
(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspect;	Section 9

REQUIREMENT	SECTION IN REPORT
(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated	Section 10
(vi) the methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks associated with the alternative;	Section 10.2
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 10
(viii) the possible mitigation measures that could be applied and level of residual risks;	Section 1011.2
(ix) the outcome of the site selection matrix;	Section 6
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Section 6
(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 1111.2
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including – (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 10.2 Section 10.1 Section 10.3
(j) an assessment of each identified potentially significant impact and risk, including – (i) cumulative impacts; (ii) the nature, significance and consequence of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated.	Section 10
(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 of to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 9 Section 10
(l) an environmental impact statement which contains – (i) a summary of the key findings of the environmental impact assessment; (ii) map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (ii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 11
(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	Section 10
(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Section 11.2
(o) a description of any assumptions, uncertainties, and gaps in knowledge by which relate to the assessment and mitigation measures proposed;	Section 3
(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect to that authorisation;	Section 11.2

REQUIREMENT	SECTION IN REPORT
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	Section 11.2
(r) an undertaking under oath or affirmation by the EAP in relation to – (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&Aps; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Appendix J
(s) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(t) any specific information that may be required by the competent authority; and	N/A
(u) any other matters required in terms of Section 24(4)(a)(b)	N/A

GLOSSARY OF TERMS

Activity: An activity or operation carried out as part of the construction or operation of the pump station upgrades and associated infrastructure.

Alternatives: In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to –

i. The property on which or location where it is proposed to undertake the activity;
ii. The type of activity to be undertaken;
iii. The design or layout of the activity;
iv. The technology to be used in the activity, and;
v. The operational aspects of the activity.

Anthropogenic impacts: Impacts originating in human activity, e.g. pollution, mining, destruction of vegetation etc.

Biodiversity: The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity.

Community: Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area.

Competent Authority The decision-making authority responsible for evaluating the viability of the proposal and issuing the appropriate Authorisation. Also see Department of Forestry, Fisheries and Environment.

Consultation: A process for the exchange of views, concerns and proposals about a proposed project through meaningful discussions and the open sharing of information.

Construction Phase: The stage of project development comprising site preparation as well as all construction activities associated with the development.

Cumulative Impact: The impact of an activity that by itself may not be significant but combined with other existing and potential future impacts may be significant.

Department of Forestry, Fisheries and Environment: This Department is responsible for evaluating the viability of the development proposal and issuing the appropriate Authorisation.

Ecology: The study of the interrelationships of organisms with and within their environment.

Ecosystem: The interconnected assemblage of all species populations that occupy a given area and the physical environment with which they interact.

Endemic / Endemism: Found only within the study area / tendency of being found only in the study area.

Environment: The surroundings within which humans exist and that are made up of

i. The land, water and atmosphere of the earth;
ii. Microorganisms, plant and animal life;
iii. Any Part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Authorisation: The authorisation by a competent authority of a listed activity.

Environmental Assessment Practitioner (EAP): The person responsible for planning, management and co-ordination of environmental impact assessment, strategic environmental assessments, environmental management plans or any other appropriate environmental instrument introduced through regulations.

Environmental Impact Assessment (EIA): In relation to an application to which scoping must be applied, means the process of collecting, organizing, analysing, interpreting and communicating information that is relevant to the consideration of that application. This process necessitates the compilation of an Environmental Impact Report, which describes the process of examining the environmental effects of a proposed development, the anticipated impacts and proposed mitigatory measures.

Environmental Management Programme (EMPr) A management programme designed specifically to introduce the mitigation measures proposed in the Reports and contained in the Conditions of Approval in the Authorisation.

Fauna: The collective animals of a region.

Flora: The collective plants growing in a geographic area.

Heritage resources: A building, area, a ritual, etc. that forms part of a community's cultural legacy or tradition and is passed down from preceding generations.

Hydrological: (The study of) surface water flow.

Impact:	A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Integrated Environmental Management	The practice of incorporating environmental management into all stages of a project's life cycle, namely planning, design, implementation, management and review.
Integrated and Affected Party (I&AP)	Any individual, group, organization or associations which are interested in or affected by an activity as well as any organ of state that may have jurisdiction over any aspect of the activity.
Mitigation Measures	Design or management measures that are intended to avoid and/or minimise or enhance an impact, depending on the desired effect. These measures are ideally incorporated into a design at an early stage.
NEMA EIA Regulations:	The EIA Regulations means the regulations made under section 24(5) of the National Environmental Management Act (Act 107 of 1998) (Government Notice No. R 324, R 325, R 326 and R 327 in the Government Gazette of 7th April 2017 refer).
No-go alternative:	The option of not proceeding with the activity, implying a continuation of the current situation / status quo.
Operational Phase:	The stage of the works following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.
Public Participation Process (PPP)	A process in which potential Interested and Affected Parties are given an opportunity to comment on, or raise issues relevant to, specific matters.
Red Data List:	Species of plants and animals that because of their rarity and/or level of endemism are included on a Red Data List (usually compiled by the International Union for Conservation of Nature (IUCN)) which provides an indication of their threat of extinction and recommendations for their protection.
Registered Interested and Affected Party:	All persons who, as a consequence of the Public Participation Process conducted in respect of an application, have submitted written comments or attended meeting with the applicant or environmental assessment practitioner (EAP); all persons who have requested the applicant or the EAP in writing, for their names to be placed on the register and all organs of state which have jurisdiction in respect of the activity to which the application relates.
Species of Conservation Concern	Species of Conservation Concern (SCC) that have either been highlighted as species of concern through the National Web-Based Environmental Screening Tool, or a species that has been identified as being recognised as in danger and in need of protection in terms of the IUCN (International Union for Conservation) Red List.
Site Ecological Importance	Site Ecological Importance (SEI) is a function of the Biodiversity Importance of the sensitive receptors within a proposed development site and its resilience to anticipated impacts.
Significant impact:	Means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.
Spatial Development Framework (SDF):	A document required by legislation and essential in providing conservation and development guidelines for an urban area, which is situated in an environmentally sensitive area and for which major expansion is expected in the foreseeable future.
Specialist Study	A study into a particular aspect of the environment, undertaken by an expert in that discipline.
Stakeholders:	All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.
Sustainable Development:	Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

ABBREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority
CBA	Critical Biodiversity Area
CR	Critically Endangered
DFFE	Department of Forestry, Fisheries and Environment
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
EN	Endangered
ESA	Ecological Support Area
HWC	Heritage Western Cape
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEM:BA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NWA	National Water Act (Act No. 36 of 1998)
PPP	Public Participation Process
SA	South Africa
SDF	Spatial Development Framework
SES	Sharples Environmental Services cc
VU	Vulnerable
WCPSDF	Western Cape Provincial Spatial Development Framework

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Appendices in *Green* will be included in the Final Basic Assessment Report

1. SUMMARY AND BACKGROUND

1.1 Background to the Proposed Upgrade of the Moordkuil Pump Station

Sharples Environmental Services cc was appointed by *Neil Lyners and Associates (Pty) Ltd*, on behalf of the *Department of Water and Sanitation*, as the Independent Environmental Assessment Practitioner to conduct the Basic Assessment Report for the Upgrading of the Moordkuil Raw Water Pump Station (Moordkuil Pump Station).

The existing raw water abstraction works (constructed in 1980) was designed to abstract 800 litres per second of water from the Moordkuil river and to pump the water to the Klipheuwel Dam for storage. The Klipheuwel Dam is one of four reservoirs from which Mossel Bay residents receive their water. Only one of the existing two axial pumps is currently operational, which means that the facility is operating at half its original intended design capacity. The existing axial pump station design is outdated and it is not able to be maintained / repaired due to the unavailability of parts and other maintenance restrictions (unable to remove parts easily, axial pumps are not protected from silt and are subject to repeated wear and tear). It is therefore required to upgrade the existing raw water abstraction works and pump station with more modern technology that will be low maintenance, cost effective and efficient (able to abstract water at the full original intended design capacity of 800 litres per second and low maintenance). Please refer to Figure 1, 2 and 3 below for the locality of the Moordkuil Pump Station.

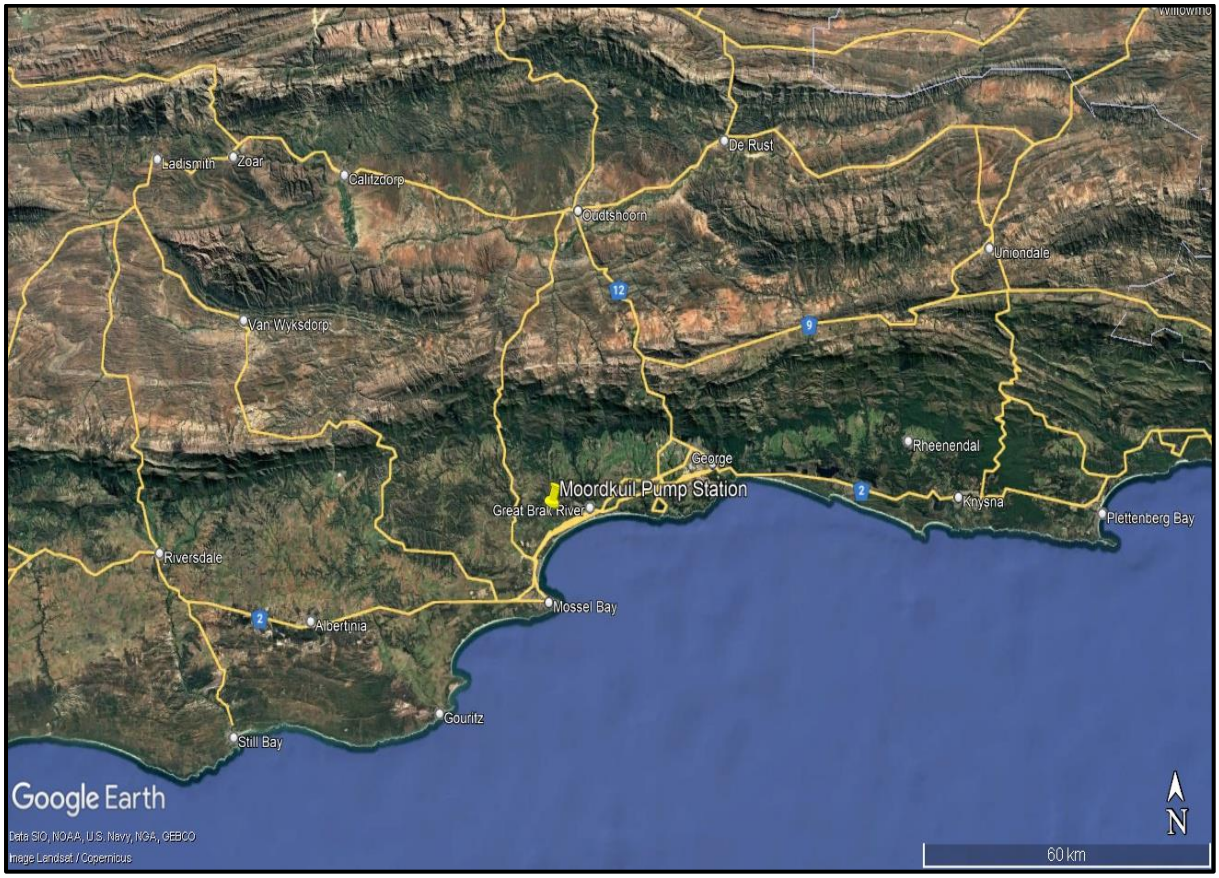

Figure 1: Topographical map of the geographical areas in relation to the Moordkuil Pump Station

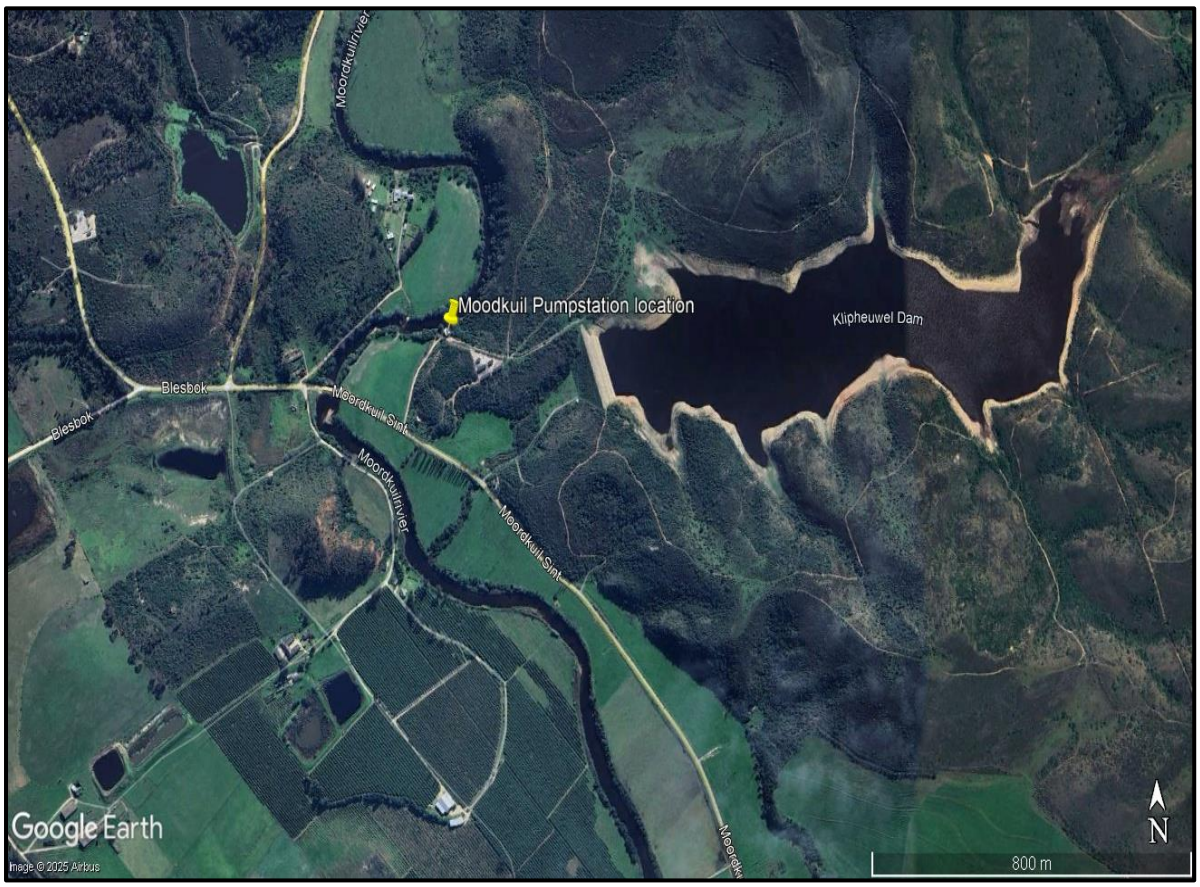

Figure 2: Location of the Moordkuil Pump Station.

Figure 3: Close-up Locality of the Moordkuil Pump Station.

The proposal to upgrade the Moordkuil Pump Station had commenced in 2014, whereby *Sharples Environmental Services cc* obtained an Environmental Authorisation for the proposed upgrades on the 4th of June 2018 (EA Ref: 14/12/16/3/3/1/1840). However, the project was paused and the EA subsequently lapsed. The project has since resumed in September 2024, and therefore a new application and BAR will be done to obtain Environmental Authorisation for the proposed upgrades.

1.2 Details of the Environmental Assessment Practitioner

Sharples Environmental Services cc is an independent environmental consultancy and has been actively engaged in the fields of environmental planning, assessment and management since 1998. We advise private, corporate and public enterprises on a variety of differing land use applications ranging from large-scale energy facilities, residential estates, resorts and golf courses to service infrastructure installations and the planning of major arterials. SES has offices in George and in Cape Town.

Author of Report: Michael Bennett (Director and Principle Environmental Assessment Practitioner) – Michael studied at the University of Cape Town completing a Bachelor of Science degree majoring in Environmental and Geographic Sciences and Ocean and Atmospheric Science. Michael joined SES in 2014 and has 10+ years' experience in the environmental field, he has proven competency in the compilation of environmental assessments, , legal compliance, on-site monitoring, and rehabilitation reporting. To date he has completed numerous environmental assessments, management plans, licencing applications, and audits within the private and governmental spheres. Michael is registered with EAPASA as a certified Environmental Practitioner (EAPASA 2021/3163).

Assistant Author: Christiaan Smit (Candidate Environmental Assessment Practitioner) - Christiaan graduated from the University of Stellenbosch completing his Masters on the Ocean Economy and also holds a BSc in Biodiversity and Ecology with a Post Graduate Diploma in Environmental Management. Christiaan is registered with EAPASA as a Candidate Environmental Assessment Practitioner (EAPASA 2024/8297).

The Curriculum Vitae and Declaration of Independence of the Environmental Assessment Practitioner (EAP) and all specialists have been included as Annexure J of this BAR.

Table 1 below provides a list of the independent specialists appointed to determine the sensitivity of the Area of Investigation and to evaluate the anticipated impacts of the proposed Moordkuil Pump Station upgrades project on the surrounding environment.

Table 1: Independent specialists appointed to evaluate the anticipated impacts of the proposed project on the receiving environment.

Environmental Theme	Specialist Company Name	Specialist Name	Registration Nr.
Aquatic Biodiversity	Upstream Consulting	Colin Fordham	SACNASP: 400166/14
Terrestrial Biodiversity	Blue Skies Research	Dr. Jacobus Visser	SACNASP: 128018
Animal Species			
Plant Species	Mark Berry	Dr. Mark Berry	SACNASP: 40073/98
Agriculture	Soil ZA	Johann Lanz	SACNASP: 400268/12
Cultural Heritage and Archaeological Theme	Jonathan Kaplan and Marion Bramford	Jonathan Kaplan (NID) Prof. Marion Bramford (Palaeontological Sensitivity Statement)	ASAPA CRM Membership No. 64 in Good Standing. PSSA, SASQUA. INQUA, IOP, FRSSAI MASSAf
Palaeontological			

2. LEGISLATION AND POLICY PERTAINING TO THE APPLICATION

2.1 The Basic Assessment Process

Due to the extent and the nature of the proposed upgrades to the Moordkuil Pump Station, a number of "Listed Activities" in terms of the Environmental Impact Assessment (EIA) Regulations of 2014, as amended (Government Notice Regulations (GNR) 326 of 2017; GNR 517 of 2021), have been triggered. As "Listed Activities" in terms of Listing Notice 1, as amended and Listing Notice 3, as amended will be trigged as a result of the proposed activities, a Basic Assessment of the proposed activities is required. Please refer to Subregulation 3(2) of Listing Notice 1 and 3, as amended (GNR 327 and GNR 324 of 2017; GNR 517 of 2021):

"The investigation, assessment and communication of potential impact of activities must follow the procedure as prescribed in regulations 19 and 20 of the Environmental Impact Assessment Regulations[, 2014] published in terms of section 24(5) of the Act." Regulations 19 and 20 of the EIA Regulations, as amended, pertains to the requirements of a Basic Assessment Report. Therefore, an Environmental Impact Assessment in the form of a Basic Assessment is required for the proposed Moordkuil Pump Station upgrades project.

The Department of Forestry, Fisheries and Environment (DFFE) is the Competent Authority (CA) acting as the Decision-making authority for the proposed project. The Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) is a Commenting Authority for the proposed project.

The BA process is informed by the EIA Regulations of 2014, as amended (GNR 326 of 2017; GNR 517 of 2021) and typically follows two main phases, namely, an Application Phase and a Basic Assessment (BA) Phase (including its associated Public Participation Process) as illustrated in Figure 4 below.

As stated in Appendix 1 of the EIA Regulations of 2014, as amended, the objectives of a Basic Assessment Report include:

- Determining the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- Identifying the alternatives considered, including the activity, location, and technology alternatives;
- Provision of a description of the need and desirability of the proposed alternatives;
- Through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine—
    - (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
    - (ii) the degree to which these impacts can be reversed, may cause irreplaceable loss of resources; and can be avoided, managed or mitigated;
- Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
    - (i) identify and motivate a preferred site, activity and technology alternative;
    - (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and
    - (iii) identify residual risks that need to be managed and monitored.

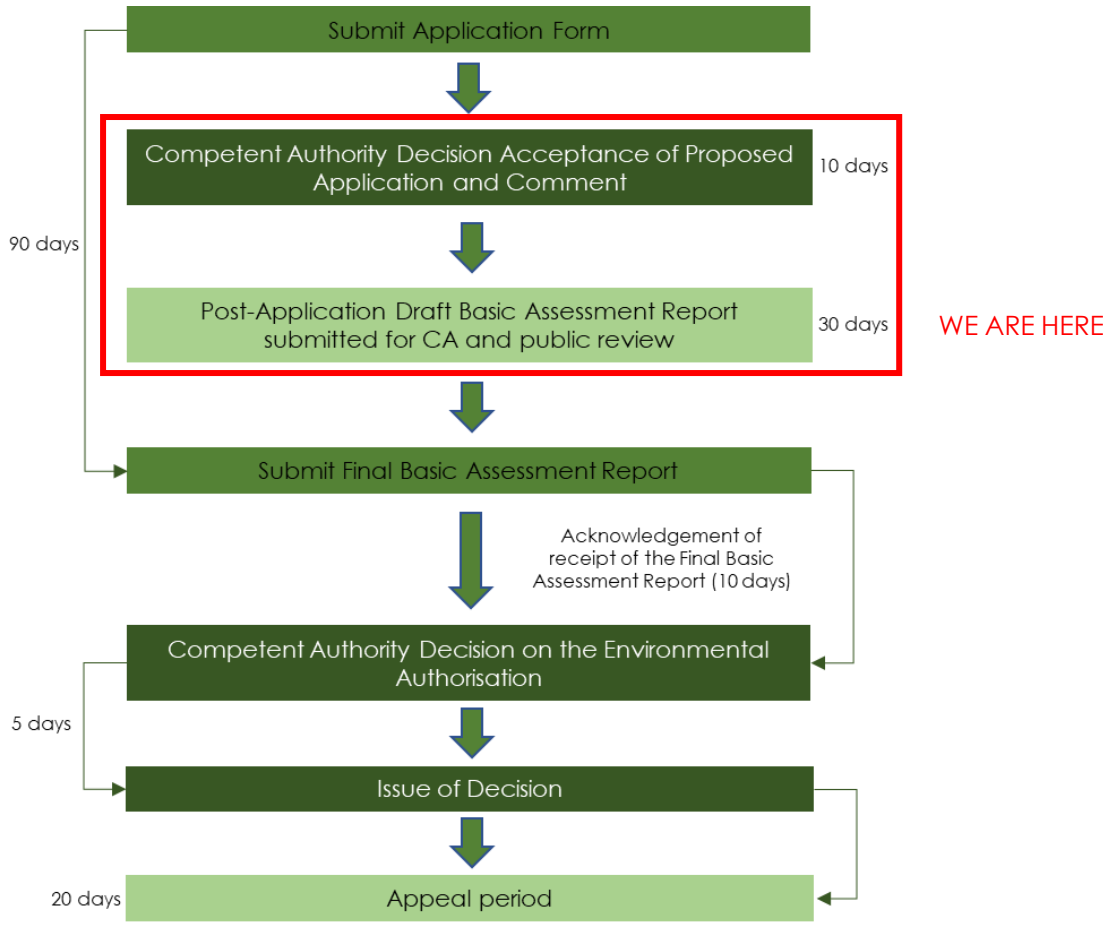

Figure 4: BA Process as stipulated in the EIA Regulations of 2014, as amended. The current phase of the project has been highlighted in red.

2.2 Summary of Regulations, Guidelines, Frameworks & Policies

The following Regulations (Acts) pertain to this development proposal and have been considered during the assessment process:

- The Constitution of South Africa (Act 108 of 1996);
- The National Environmental Management Act (NEMA), Act No 107 of 1998, as Amended
- The Environmental Impact Assessment Regulations, December 2014, as amended
- National Environmental Management Biodiversity Act (Act 10 of 2004);
- National Water Act (Act No. 36 of 1998)
- Spatial Planning and Land Use Management Act, No. 16 of 2013 (SPLUMA)
- Infrastructure Development Act, 2014 (Act No. 23 of 2014)
- The National Environmental Management Laws Amendment Act, 2022

The following guidelines pertain to this development proposal and have been considered during the assessment process:

- Guideline on Need and Desirability (2013/2017)
- Guideline on Environmental Management Plans (2005)
- Guideline for the Review of Specialist Input into the EIA Process (2005)

- Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)
- Guideline on Public Participation (2013)
- Guideline on Alternatives (2013)

National, Provincial & Municipal Development Planning Frameworks considered during the assessment process include:

- National Development Plan 2030 (2012);
- Western Cape Provincial Spatial Development Framework (PSDF) 2014;
- Integrated Development Plan (Draft 2025/2026): Mossel Bay Municipality
- Mossel Bay Municipality Spatial Development Framework (SDF);

The following specialist protocols held relevance to the proposed project:

- Site Sensitivity Verification Requirements where a specialist assessment is required, but no specific assessment protocol has been prescribed (March 2020).
- Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity (March 2020).
- Protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity (March 2020).
- Protocol for the specialist assessment and minimum report content requirements for environmental impacts on agricultural resources (March 2020).
- Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial plant species (October 2020).
- Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (October 2020).

2.3 Description of Key Legislation and Policies Listed Above and applicability to the proposed infrastructure upgrade project

2.3.1 The Constitution of South Africa (Act No. 108 of 1996)

The Constitution of South Africa is the supreme law of the country of South Africa. It provides the legal foundation for the existence of the republic, sets out the rights and duties of its citizens, and defines the structure of the government.

Section 24 of the Constitution states the following:

Everyone has the right –

- *To an environment that is not harmful to their health or well-being; and*
- *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-*
    - *Prevent pollution and ecological degradation;*
    - *Promote conservation; and*
    - *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*

2.3.2 The National Environmental Management Act (Act No. 107 of 1998)

The National Environmental Management Act (NEMA; No. 107 of 1998, as amended) gives effect to the Constitution of the Republic of South Africa by providing a framework for co-operative environmental governance and environmental principles that enable and facilitate decision-making on matters affecting the environment. NEMA requires that an Environmental Authorisation (EA) be issued by a competent authority (CA) before an activity listed in terms of Environmental Impact Assessment (EIA) Regulations Listing Notices Government Notice (GN) 324, 325, 326 & 327 published on the 7th April 2017 (as amended by GNR 517 of 2021) may commence.

Due to the fact that this development proposal constitutes an activity listed in the EIA Regulations of 2014, as amended (2014), a Basic Assessment Report must be submitted to the Department of Forestry, Fisheries & Environment (DFFE) before they issue the Department of Water and Sanitation with an Environmental Authorisation (either approval or rejection of the development proposal).

2.3.3 National Environmental Management: Biodiversity Act (Act. 10 of 2004)

This Act controls the management and conservation of South African biodiversity within the framework of NEMA. Amongst others, it deals with the protection of species and ecosystems that warrant national protection, as well as the sustainable use of indigenous biological resources. Sections 52 & 53 of this Act specifically make provision for the protection of critically endangered, endangered, vulnerable and protected ecosystems that have undergone, or have a risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention through threatening processes.

The following Notices pertains to the proposed project:

- ***Revised National List of Ecosystems that are Threatened and in Need of Protection (GN 2747 of 2022)***
  In November 2022, the DFFE released the revised National List of ecosystems that are threatened and in need of protection. These ecosystem categorisations served as an update to the 2011 NEMBA list of Threatened Ecosystems. As part of the revised ecosystem list, 120 species were identified, 55 of which are considered Critically Endangered (CR), 51 are Endangered (EN) and 14 ecosystems are Vulnerable (VU). The revised status was developed between 2016 and 2020 following issuing of the International Union for Conservation of Nature (IUCN) Red List of Ecosystems Framework.

  As per the Botanical Impact Assessment (Appendix G2), the study site is located in a renosterveld-thicket environment on the Southern Cape coastal plain. The indigenous species recorded on site are typical renosterveld and thicket species, such as *Elytropappus rhinocerotis, Eriocephalus africanus, Sideroxylon inerme, Mystroxylon aethiopicum* and *Azima tetracantha*. The 2018 SA Vegetation Map has incorrectly mapped the main vegetation type on site as Garden Route Granite Fynbos, with the pump station area encroaching on Groot Brak Dune Strandveld. Vlok has mapped it as Brandwag Fynbos-Renoster-Thicket (see CapeFarmMapper online data). The main vegetation type here should rather be mapped as Mossel Bay Shale Renosterveld, with strong elements (patches) of Albany thicket. This error is repeated in the 2024 beta version of the SA Vegetation Map. Mossel Bay Shale Renosterveld occurs on the undulating hills and valleys from the Kruisrivier near Riversdale to Botterberg, west of the Robinson Pass, centred on the Gouritz River. The renosterveld is described as a medium dense, medium tall cupressoid-leaved shrubland dominated by renosterbos. Thicket patches are common within the unit. Being part of the Fynbos Biome, Mossel Bay Shale Renosterveld is maintained by a regular fire regime. Unfortunately, landscape fragmentation is disrupting this 'maintenance' requirement, often leading to localised species loss and bush encroachment or alien infestation (pers. obs.). Due to its transformed state, Mossel Bay Shale Renosterveld is currently listed as Critically Endangered in the Revised National List of Threatened Ecosystems.

- **Alien and Invasive Species List (GN 1003 of 2020)**
  This Notice provides a list of 567 species considered as invasive species. These species have been categorized into four categories (Category 1a, 1b, 2 and 3), each bearing weight to different actions associated with them.

    - *Category 1a:* Species that must be combatted or eradicated and immediate actions towards management must be implemented. Authorised officials must be permitted to enter properties to monitor, assist with or implement the combating or eradication. Where an Invasive Species Management Programme has been developed, management (combat/eradication) must take place accordingly.

    - *Category 1b:* Species that must be controlled. Property owners and organs of state must control the listed invasive species within their properties. Where an Invasive Species Management Programme has been developed, management (combat/eradication) must take place accordingly. Any Category 2 listed species (where permits are applicable) which fall outside of containment and control, revert to Category 1b and must be controlled. Any Category 3 listed species which occur within a Protected Area or Riparian (wetland) revert to Category 1b and must be controlled.

    - *Category 2:* Requires a permit issued by the Department of Forestry, Fisheries and the Environment (DFFE) to carry out a restricted activity.

    - *Category 3:* Invasive species are subject to certain exemptions in terms of section 70 (1)(a) of the NEMBA Act, which applies to the listing of alien invasive species.

  Invasive aliens were recorded throughout the site especially along the access road and around the pump station, including Acacia mearnsii (black wattle, category 2), A. cyclops (rooikrans, 1b), Datura stramonium (common thorn apple, 1b), Opuntia ficus-indica (prickly pear, 1b), O. monacantha (prickly pear, 1b), Persicaria lapathifolia (spotted knotweed), Cestrum laevigatum (inkberry, 1b), Anredera cordifolia (Madeira vine, 1b), Erigeron bonariensis (flax-leaf fleabane), Nicotiana glauca (wild tobacco, 1b), Ricinus communis (castor-oil plant, 2), Solanum mauritianum (bugweed, 1b), Cirsium vulgare (spear thistle, 1b), Verbena bonariensis (purple top, 1b), Physalis peruviana (gooseberry), Xanthium spinosum (spiny cocklebur, 1b), Tagetes minuta (khaki weed), Cenchrus clandestinus (kikuyu, 1b in protected areas), Paspalum urvillei (giant paspalum) and Saccharum officinarum (sugarcane). over half are Category 1b and 2 invaders. In terms of the National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004) Alien and Invasive Species List (2016), category 1b invasive species require compulsory control as part of an invasive species control programme. Also, the harbouring of category 2 species, such as black wattle and castor-oil plant, is prohibited without a permit. Black wattle, which is indicative of past disturbances, is considered a serious threat to the environment and very difficult to control. The presence of the woody aliens also presents a fire risk. Please note a Site Specific Alien and Invasive Species Management Plan has been compiled and submitted to DFFE for approval. The Site Specific Alien and Invasive Species Management Plan is included as an Appendix to the EMPr.

2.3.4 Conservation of Agricultural Resources Act (Act No. 43 of 1983)

The Conservation of Agricultural Resources Act (CARA; Act No. 43 of 1983) provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. The Conservation of Agricultural Resources Act also defines different categories of alien plants.

The purpose of this act is to ensure the long term sustainable use and conservation of natural agricultural resources. The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA) has the objective to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants. It is the only legislation promoting the sustainable use of natural agricultural resources at farm level.

As per the findings of the Agricultural Compliance Statement undertaken by Johann Lanz, the proposed project will not lead to a loss of agricultural land and therefore there is no impact on the agricultural potential.

2.3.5 National Water Act (Act No. 36 of 1998)

The National Water Act, 1998 (NWA; Act No. 36 of 1998) provides the framework for the sustainable management of South Africa's water resources. It aims to protect, use, develop, conserve, manage and control water resources as a whole, promoting integrated water resource management that involves participation of all stakeholders. The NWA declares the national government to be the public trustee of the nation's water. The NWA is administered by the national Department of Water and Sanitation (DWS) via regional offices.

The following section 21 "water uses" require Water Use Authorisation (either in the form of a Water Use License (WULA) or a General Authorisation (GA) Water Use Registration:

c) impeding or diverting the flow of water in a watercourse;
i) altering the bed, banks, course or characteristics of a watercourse;

The proposed project requires water use authorisation in terms of Chapter 4 and Section 21 of the National Water Act No. 36 of 1998, prior to the commencement of activities.

2.3.6 National Heritage Resources Act (Act No. 25 of 1999)

The protection and management of South Africa's heritage resources is controlled by the National Heritage Resources Act (Act No. 25 of 1999) (NHRA). Heritage Western Cape (HWC) is the enforcing authority in the Western Cape and is a Stakeholder for this environmental process. An application will be lodged to HWC through the appropriate modes of communication. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process.

The NHRA requires relevant heritage authorities to be notified regarding this proposed project, as the following activities are relevant:

a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
c) any development or other activity which will change the character of a site—
i. exceeding 5 000 m^2 in extent; or

ii. *involving three or more existing erven or subdivisions thereof; or*
iii. *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
iv. *the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*

A Notice of Intent to Develop (NID) has been submitted to Heritage Western Cape (HWC), please refer to Appendix E1 for the ROD from HWC.

2.3.7 Provincial Spatial Development Framework (2014)

The Western Cape Provincial Spatial Development Framework (PSDF; 2014, as amended 2021) identifies the goals and vision of the province and has been developed in line with the Western Cape Land Use Planning Act, 2014 (LUPA; Act No. 3 of 2014) and the Spatial Planning Land Use Management Act, 2013 (SPLUMA; Act No. 16 of 2013).

The PSDF, as amended (2014) aims to be in line with the draft National Spatial Development Framework (NSDF, 2019), which gives effect to Chapter 8 of the National Development Plan 2030 (NDP), which sees it's strategies as follow:

- Integrating the NSDF into the various management systems and evaluating performance of fiscal instruments in relation to spatial transformation outcomes;
- Alignment of development sector planning, thereby bringing to light the sector expenditure breakdown within the Provincial and National Spheres, whilst adding a spatial component to key documents;
- Consideration of the National Treasury (NT) for NSDF alignment prior to the allocation of budgets.
- National spatial accountability system entailing co-ordination of reporting by various spheres of government.

The National Development Plan (NDP) (NPC, 2013) contains a plan aimed at eliminating poverty and reducing inequality by 2030. Chapter 4, Economy infrastructure – The foundation of social and economic development, is relevant to, and supports the establishment of this project. Provinces must specifically coordinate the alignment of sector and municipal plans and demonstrate their consistency to the NSDF.

The PSDF (2014) highlights that investment in infrastructure (including maintenance and upgrading of existing infrastructure) is needed to bring about the desired urban spatial transitions envisaged in the PSDF. The proposed refurbishment of the existing raw water abstraction works and pump station may indirectly support/ facilitate further development in the Mossel Bay area, as continued development is dependent on the availability of sufficient water resources. The proposed development is thus aligned with the 2014 PSDF.

2.3.8 Integrated Development Plan (Draft 2025/2026): Mossel Bay Municipality

The Mossel Bay Municipality is cognizant of the National and Provincial Policy development directives and has as such also aligned its development strategy to these while pursuing its constitutional mandates. The Municipal Key Performance Areas (KPA's) and Strategic Objectives set the strategic tone and pave the direction for future developments, investments and public/private partnership interventions. The Key Performance Areas and Strategic Objectives will guide service delivery and development over the next five years. The Municipality will endeavour to demonstrate alignment to these overarching objectives in all documentation such as Annual Budgets, the Service Delivery Budget and Implementation Plan

(SDBIP), Performance Agreements of Section 57 Managers as well as performance reporting. The latter is essential to ensure that every single investment in the outflow of projects and programmes are identified, planned and designed to contribute towards the realization of the Municipality's overarching developmental objectives.

One of the Key Performance Areas listed in the 2025/2026 IDP is "Basic Service Delivery and Infrastructure Development".

The associated Focus Areas include:

- Water Provision;
- Sewage and Sanitation Services;
- Household Electricity And Lighting;
- Housing and Serviced Site Opportunities;
- Provide Public Transport and Road Infrastructure;
- Solid Waste Management;
- Project Management and Technical Support Services.

The proposed development will result in more water being available from the Klipheuwel Dam for treatment which will reduce the risk of water restrictions and the risk of the municipality not being able to provide the basic service of water supply to the community.

2.3.9 ***Mossel Bay Municipality Spatial Development Framework (Draft 2022-2023)***

The Mossel Bay SDF (Draft 2022-2023) identifies "the provision and maintenance of adequate and sustainable infrastructure to support socio-economic growth" as a key spatial objective. The SDF highlights that continued residential, industrial and tourism expansion along the Mossel Bay – Hartenbos – Dana Bay corridor is placing increasing pressure on bulk water supply infrastructure. Upgrading the Moordkuil Pump Station directly supports this strategic goal by strengthening the regional bulk water system that supplies the main urban areas. Doubling the pumping capacity will ensure sufficient and reliable water delivery to meet the projected urban, industrial and tourism related growth identified in the SDF. This represents proactive infrastructure planning that aligns with the SDF's emphasis on "infrastructure led growth" instead of reactive service provision.

The SDF identifies water scarcity and climate variability as major risks to the municipality's long term resilience. One of its key environmental objectives is to strengthen infrastructure that enhances climate adaptation capacity, particularly in the face of recurring droughts and increasing water demand. The proposed upgrades directly advances this objective by increasing water transfer efficiency and redundancy in the bulk water supply network of the municipality. It reduces the municipality's vulnerability to supply interruptions and supports a more adaptive and resilient water management system. This aligns with the SDF's Sustainability Objective 3: "to build environmental and infrastructural resilience through responsible resource management".

The Environmental Management Framework Section of the SDF classifies the Moordkuil area as Low to Medium with regards to the Environmental Sensitivity Zone. Here infrastructure upgrades within existing footprints are considered desirable, provided that best practice environmental management measures are implemented. Because the proposed upgrade will occur within an existing disturbed footprint, it is consistent with the EMF's guideline that new bulk infrastructure should be located or expanded within already transformed areas and avoid

sensitive biodiversity corridors. The project therefore aligns with the spatial environmental directives of the SDF-EMF integration.

2.4 Approvals Required Pre-Construction and Planning Phase

The table below summarises the various environmental and planning approvals required from the various Authorities, before the construction of the development may take place.

Table 2: Summary Pre-Construction Environmental & Planning Approvals Required

Competent Authority	In terms of Legislation	Type of Approval / Licence / Required
National Department of Forestry, Fisheries & Environment (DFFE)	National Environmental Management Act (NEMA) and the 2014 EIA Regulations (April 2017)	**Environmental Authorisation** required in terms of the NEMA EIA Regulations (2014), as amended, for the activities listed in section 2.5 below.
Breede Olifants Catchment Management Agency (BOCMA)	The National Water Act (NWA)	Comments will be sought from the BOCMA regarding the impacts of the proposed project in relation to the water resources. BOCMA has confirmed that the intended water use of the proposal falls within the ambit of the General Authorisation. Please refer to Appendix I5 of the Draft BAR.
Heritage Western Cape (HWC)	National Heritage Resources Act (NHRA) – Section 38	Confirmation/ROD from Heritage Western Cape has been received required for the proposed project, see Appendix F1 of the Draft BAR.

2.5 Listed Activities Triggered in the NEMA EIA Regulations 2014, as amended

The following listed activities in terms of the various listing notices will be triggered by the proposed upgrades to the Moordkuil Pump Station project:

- Listing Notice 1 of 2014, as amended (GNR 327 of 2017; GNR 517 of 2021): 12, 19 and 45.
- Listing Notice 2 of 2014, as amended (GNR 325 of 2017; GNR 517 of 2021): None
- Listing Notice 3 of 2014, as amended (GNR 324 of 2017; GNR 517 of 2021): 4, 12 and 14.

Table 3: Listed activities in terms of the Listing Notice 1, 2 and 3, as amended, triggered by the proposed infrastructure upgrades project.

LISTING NOTICE 1 (GN No. R327 of 7th April 2017): Basic Assessment		
Activity #	**Description of Activity as per the relevant Notices**	**Reason for trigger**
LISTING NOTICE 1 (GN No. R327): Basic Assessment		
12	**The development of—** (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or **(ii) infrastructure or structures with a physical footprint of 100 square metres or more;** **where such development occurs—** **(a) within a watercourse;** (b) in front of a development setback; or **(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse**; — excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	The development of the intake structure, pumps, pipes, drywell, water meter chamber and cement access road all occur within 32 meters of the Moordkuil River and exceeds the 100 square meters threshold. **Therefore, this activity will be triggered.**
19	**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**; but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	The work in and along the river for the construction of the intake structure and coffer dam will require the removal of more than 10 cubic meters of soil from the Moordkuil River. **Therefore, this activity will be triggered**
45	**The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure—** **(i) has an internal diameter of 0,36 metres or more;** or	The current design throughput capacity of the Raw Water Abstraction Works is 800 litres per second. Only one of the two axial pumps is however operational so the facility has an

	(ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion— (aa) relates to transportation of water or storm water within a road reserve or railway line reserve; or (bb) will occur within an urban area	operational capacity of 400 litres per second. It is proposed that the facility will have a throughput capacity, the same as its current design capacity, of 800 litres per second so it is not proposed to increase the current design throughput capacity. The internal diameter of the existing pipeline infrastructure does exceed 360mm diameter and it is proposed to upgrade the existing axial pumps and water pipeline infrastructure **therefore this activity is triggered.**
LISTING NOTICE 3 (GN No. R324): Basic Assessment		
4	**The development of a road wider than 4 metres with a reserve less than 13,5 metres.** **i. Western Cape** i. Areas zoned for use as public open space or equivalent zoning; ii. Areas outside urban areas; **(aa) Areas containing indigenous vegetation;** (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or iii. Inside urban areas: (aa) Areas zoned for conservation use; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.	The proposed new cement access road ranges in width from 3m to 7.4m. The site is outside of an urban area, in an area containing indigenous vegetation. The proposed road reserve will be less than 13.5m as the road reserve in this case is the size of the road (3m to 7.4m in one section). This activity is **therefore triggered** because a portion of the road is wider then 4m with a reserve less than 13.5m, in the Western Cape, outside of an urban area and the site contains indigenous vegetation.
12	**The clearance of an area of 300 square metres or more of indigenous vegetation** except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. **i. Western Cape** **i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;** **ii. Within critical biodiversity areas identified in bioregional plans;** iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.	The proposed development will require the clearance of more than 300 square meters of indigenous vegetation. The Western Cape Biodiversity Spatial Plan of 2023 maps the proposed development as being located within CBA2: Terrestrial; CBA2: Earmarked; CBA2: Threatened Ecosystem; CBA2: Aquatic; CBA2: River; CBA2: Estuary; CBA: Terrestrial; CBA; Threatened Ecosystem; CBA: Aquatic; CBA: Estuary; CBA: River. The vegetation unit also has a threat status of critically endangered. **Therefore this activity will be triggered.**

14	**The development of—** (i) dams or weirs, where the dam or weir, including Infrastructure and water surface area exceeds 10 square metres; or **(ii) infrastructure or structures with a physical footprint of 10 square metres or more;** **where such development occurs—** **(a) within a watercourse;** (b) in front of a development setback; or **(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;** excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. **i. Western Cape** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas listed in terms of an international convention; **(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans**; (gg) Core areas in biosphere reserves; or (hh) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined.	The new intake structure and associated infrastructure will be constructed within the river, all other infrastructure (cement access road, water meter chamber, drywell, rising main) will be constructed within 32 meters of the Moordkuil River. The area is also mapped as an aquatic CBA, **therefore this activity will be triggered.**

3. ASSUMPTIONS AND LIMITATIONS

The findings of this report are subject to the following limitations:

- All information received from the sources contributing to this project is assumed to be correct, unbiased and has been conducted by independent specialists.

3.1 Terrestrial Biodiversity and Animal Species Specialist

- Optimal weather conditions during the surveying period along with an open and modified habitat structure were ideal for detecting a representative sample of the resident terrestrial faunal and avifaunal species diversity over the project footprint and alternative site camp locations. Even so, it is possible that not all species could be observed (especially cryptic species), and that the surveying period did not correspond to the activity period or activity season of some species. To allow for this, the thorough desktop assessment for the included faunal groups (mammals and avifauna; Appendices A and B) meant that all possibly occurring SCC were considered (Section 9) in the current assessment.

3.2 Plant Species Specialist

- Since fieldwork was carried out in autumn and late winter, flowering plants that only flower at other times of the year (e.g. late spring to summer), such as certain bulb species (notably from the Iridaceae and Orchidaceae families), may have been missed. The overall confidence in the completeness and accuracy of the botanical findings is however considered to be good.
- Notwithstanding the above limitation and the fact that the affected vegetation is degraded where most of the work will take place, the specialist is of the opinion that the survey and findings are adequate to aid decision making. However, a follow-up botanical survey later in spring should contribute towards the current species list.

3.3 Aquatic Biodiversity Specialist

- Aquatic ecosystems vary both temporally and spatially. Once-off surveys such as this can miss certain ecological information due to seasonality, thus limiting accuracy and confidence.
- The locations of the proposed activities were provided by the client. Due to the level of detail provided, it is recommended that the final layout design and method statement be approved by the aquatic specialist prior to implementation.
- While disturbance and transformation of habitats can lead to shifts in the type and extent of aquatic ecosystems, it is important to note that the current extent and classification is reported on here.
- All soil/vegetation/terrain sampling points were recorded using a Garmin Global Positioning System (GPS) and captured using Geographical Information Systems (GIS) for further processing.
- Infield soil and vegetation sampling was only undertaken within a specific focal area around the proposed activities, while the remaining watercourses were delineated at a desktop level with limited accuracy.
- No detailed assessment of aquatic fauna/biota (e.g. fish, invertebrates, microphytes, etc.) was undertaken, and not deemed necessary.

- The vegetation information provided is based on observation not formal vegetation plots. As such species documented in this report should be considered as a list of dominant and/or indicator wetland/riparian species.
- There were no seasonal limitations presented during assessment and the confidence level is high.
- The assessment of impacts and recommendation of mitigation measures was informed by the site-specific ecological concerns arising from the field survey and based on the assessor's working knowledge and experience with similar projects. The degree of confidence is considered high.

3.4 Agricultural Specialist

There are no specific assumptions, uncertainties or gaps in knowledge or data that affect the findings of this study.

3.5 Heritage Specialist

There were no limitations or constraints raised by the Archaeological Specialist.

3.6 Palaeontology Specialist

There were no limitations or constraints raised by the palaeontological Specialist.

4. DETAILED DESCRIPTION OF THE PROPOSED PROJECT

4.1 Site Location and Description of Property

4.1.1 Summary Table of Site and farm details

Please refer to the table below which is a summary of the site details associated with the Moordkuil Pump Station upgrades.

Table 4: Project Location - Summary details.

Province	Western Cape
District Municipality	Garden Route District Municipality
Local Municipality	Mossel Bay Municipality
Ward number(s)	Ward 4
Nearest town(s)	Mossel Bay
Portion name(s) and numbers	Farm Klipheuvel No. 143

List of Properties, Ownership & Extent of each Property Associated with Proposed Upgrades to the Moordkuil Pump Station:

Property	Size	Owner
Portion 25 of the Farm Klipheuvel No. 143	0.23Ha	Department of Public Works
Portion 15 of the Farm Klipheuvel No. 143	0.52Ha	
Portion 24 of the Farm Klipheuvel No. 143	0.21Ha	

Extent of Site (Development Footprint / Disturbed Area)	Total development footprint = 2488 m^2
SG Code	Portion 25: C05100000000014300025 Portion 24: C05100000000014300024 Portion 15: C05100000000014300015
Physical Address	Not Applicable
Co-ordinates of the centre point of site:	34^0 03' 11.62"S 22^0 08' 07.22"E

4.1.2 Location of the Moordkuil Pump Station.

The Moordkuil Pump Station is located on Portion 25, 24 and 15 of the Farm Klipheuvel No 143, Kleinbrak Rivier, Mossel Bay Municipality, Western Cape Province. An existing informal dirt road off Blesbok road provides access to the Moordkuil Pump Station site.

Figure 5: Locality of the Moordkuil Pump Station.

Figure 6: Close-up locality map of the Mordkuil Pump Station.

Table 5: Detailed project co-ordinate locations of the proposed sites and size of the properties.

Corner points of the proposed sites		
Site	**Latitude**	**Longitude**
Portion 25 of the Farm Klipheuvel No. 143	34° 03' 11.50"S	22° 08' 05.07"E
	34° 03' 13.04"S	22° 08' 05.49"E
	34° 03' 12.56"S	22° 08' 07.16"E
	34° 03' 11.08"S	22° 08' 06.90"E
Portion 15 of the Farm Klipheuvel No. 143	34° 03' 11.08"S	22° 08' 06.90"E
	34° 03' 11.61"S	22° 08' 07.01"E
	34° 03' 12.24"S	22° 08' 10.27"E
	34° 03' 10.89"S	22° 08' 11.47"E
	34° 03' 09.80"S	22° 08' 09.24"E
Portion 24 of the Farm Klipheuvel No. 143	34° 03' 11.61"S	22° 08' 07.01"E
	34° 03' 17.56"S	22° 08' 07.16"E
	34° 03' 13.10"S	22° 08' 09.59"E
	34° 03' 12.24"S	22° 08' 10.28"E
Property sizes of the proposed sites		
Site		**Size**
Portion 25 of the Farm Klipheuvel No. 143		0.23Ha
Portion 15 of the Farm Klipheuvel No. 143		0.52Ha
Portion 24 of the Farm Klipheuvel No. 143		0.21Ha

Table 6: Detailed project co-ordinate locations of the existing infrastructure.

Coordinates of the existing Pump Station (corner points)		
Infrastructure	**Latitude**	**Longitude**
Existing Pump Station	34° 03' 11.99"S	22° 08' 7.08"E
	34° 03 '11.80"S	22° 08 '7.59"E
	34° 03' 11.30"S	22° 08' 7.19"E
	34° 03' 11.42"S	22° 08 '6.76"E
Coordinates of the existing access road (start, center and end)		
Infrastructure	**Latitude**	**Longitude**
Existing Access Road	34° 03' 18.01"S	22° 08' 2.70"E
	34° 03' 14.01"S	22° 08' 4.34"E
	34° 03' 12.15"S	22° 08' 7.03"E

4.2 Detailed Description of the Scope of the Proposed Activity

4.2.1 Project Background and Need for the Upgrade.

Sharples Environmental Services cc was appointed by *Neil Lyners and Associates (Pty) Ltd*, on behalf of the *Department of Water and sanitation*, as the Independent Environmental Assessment Practitioner to conduct the Basic Assessment Report for the Upgrading of the Moordkuil Raw Water Pump Station (Moordkuil Pump Station).

The existing raw water abstraction works (constructed in 1980) was designed to abstract 800 litres per second of water from the Moordkuil river and to pump the water to the Klipheuwel Dam for storage. The Klipheuwel Dam is one of four reservoirs from which Mossel Bay residents receive their water. Only one of the existing two axial pumps is currently operational, which means that the facility is operating at half its original intended design capacity. The existing axial pump station design is outdated and it is not able to be maintained / repaired due to the unavailability of parts and other maintenance restrictions (unable to remove parts easily, axial pumps are not protected from silt and are subject to repeated wear and tear). It is therefore required to upgrade the existing raw water abstraction works and pump station with more modern technology that will be low maintenance, cost effective and efficient (able to abstract water at the full original intended design capacity of 800 litres per second and low maintenance).

The proposal to upgrade the Moordkuil Pump Station had commenced in 2014, whereby *Sharples Environmental Services cc* obtained an Environmental Authorisation for the proposed upgrades on the 4th of June 2018 (EA Ref: 14/12/16/3/3/1/1840). However, the project was paused and the EA subsequently lapsed. The project has since resumed in September 2024, and therefore a new application and BAR will be done to obtain Environmental Authorisation for the proposed upgrades.

4.2.2 Description of the Proposed Upgrades to the Moordkuil Pump Station.

The proposed development project entails the upgrade of the existing Raw Water Abstraction Works and Pump Station. In summary, the following is proposed to be constructed:

- The construction of a new reinforced concrete inlet hopper structure for the pump station;
- The construction of pipe protection ramp structure for the pipes into the existing pump station building.
- An existing informal dirt road off Blesbok Road, provides access to the site. It is proposed to reinstate the existing gravel road (180m long and 3.6m wide) within the same development footprint, which has become almost impassable due to water ingress into the existing layerworks (farmers leaking irrigation channel). The final road is proposed to be 3m wide. 300mm is proposed on each side for the bottom layerworks that have to be wider than the top layerworks to transfer vehicle loads to the soil. The proposed affected area will be 3.6m but the final road will be 3m wide with a stormwarter channel/ditch of about 1m width adjacent. The existing road is approximately 3m wide as well and we can safely assume that its layerworks would also have been similar to the proposed reinstatement design.
- A new concrete road (in an already disturbed area mostly). The new concrete road proposed is has a footprint of approximately 1100m2 and has a width of 3m with a stormwater channel/ditch of about 1m width adjacent.
- Installation of gabions between the cement access road edge and the river;
- Construction of an access ramp to the hopper;

- The construction of a new water meter chamber next to the pump station. The development footprint of the water meter chamber is approximately 20m^2;
- Replacing of three air-valves and construction of new chambers around the air-valves;
- Installation of new pipework, pumps and motor control centers;
- Installation of other mechanical items such as cover, trash-racks, etc.
- Upgrading of the electrical supply and breakers within the existing pump station building;
- Installation of a sediment barrier downstream of the crossing to curb sediment generation in the river;
- Final reinstatement of the river bed to the requirements of the CEMP;

The concrete inlet hopper structure is proposed to be anchored to the bedrock by means of piling foundations. In order to install the piles, a pile rig needs to obtain access in the correct position. It is for this reason that a temporary platform structure is required to be constructed within the Moordkuil River.

The area where the inlet hopper (and the associated pile foundations) is proposed to be constructed is below the 1:10 year floodline, within the river. It is therefore required to construct a coffer dam around the area where the inlet hopper structure is proposed to be built in order to have a dry area for construction and concrete setting.

All of the above, except for the proposed temporary platform, cement access road, new water meter chamber and sediment barrier, are proposed within the existing development footprint.

It is also proposed to demolish the existing underwater cement bag wall, existing above water concrete steps and the existing underwater concrete plinths for the existing pipes. Please refer to the proposed site layout plans below.

Upon recommencement of the project in late 2024, an underwater survey was undertaken to assess changes in the riverbed topography since 2014. ASP Tech, who undertook the initial sedimentation study, was subsequently appointed by Lyners to conduct a Verification Study to evaluate, among other factors, the appropriateness of the original intake structure in light of the updated bathymetry survey. The resulting report is provided as Appendix G6. During the verification study on the riverbed topography a significant rock outcrop upstream of the proposed intake structure was identified. As a result, it was determined that the outcrop would need to be removed, and the intake structure enlarged beyond the dimensions proposed in the 2014 – 2016 feasibility study to ensure effective operation.

An alternative solution involves relocating the intake structure directly onto the rock outcrop, which presents several technical and economic advantages:

- Improved Foundation Conditions: Relocating the intake would result in more favourable geotechnical conditions, potentially yielding a cost saving of approximately R1.7 million.
- Operational Continuity: By situating the intake upstream at the rock outcrop, it may be possible to maintain operation of the existing pump station throughout the construction period.
- Minimal Disruption to Adjacent Infrastructure: The nearby farmers' pump station, located just downstream of the existing station, would remain unaffected.

Should the existing pump station remain operational during construction, an estimated cost saving of approximately R24.5 million could be realized over the 18-month construction period by avoiding the need to purchase water from the Wolwedans Dam and the associated saving in chemicals at the water treatment works.

A new dry well pump station could be constructed at an estimated cost of approximately R2.4 million. This facility would enable continuous operation of the existing pump station with minimal interruption of the water abstraction during the construction phase. An additional benefit of constructing a permanent dry well is that it would allow the end-suction pumps to be installed at a lower elevation. This could possibly eliminate the requirement for immersible pumps within the intake structure in the future and enable the use of foot valves in combination with a priming system. A new dry well will also provide additional space for the installation of the proposed electrical equipment as the existing MCC room is very small.

Based on the abovementioned, Option 3 (wetwell on rock outcrop with drywell next to pump station, Concept Layout 2) is recommended for implementation for the Moordkuil Pump Station upgrade, as it offers the lowest capital and operational costs, best operational reliability, and acceptable environmental impact (Please refer to the Concept and Viability Design Report – Appendix G6).

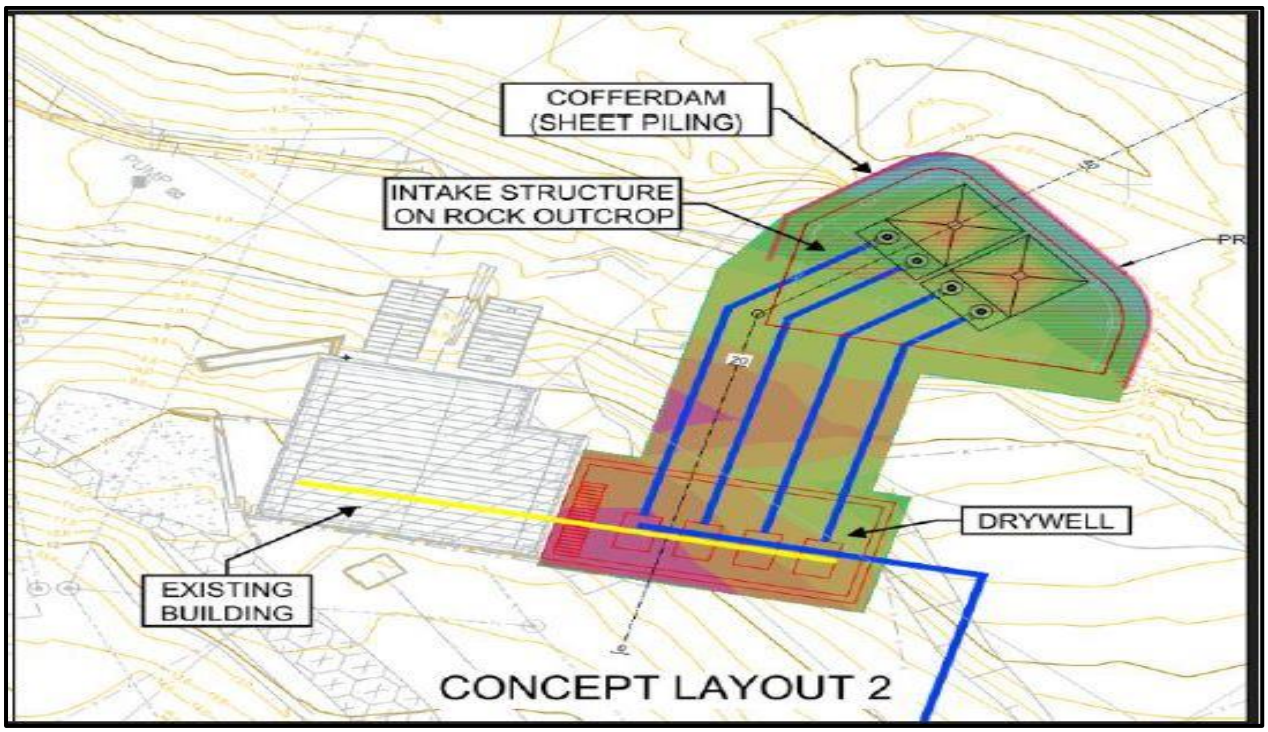

Figure 7: Option 3 - Concept Layout 2.

To maximise the value of existing assets, a phased approach should be adopted:

- Phase 1: Utilisation of existing immersible and end-suction pumps that was bought based on the previous (2014 – 2016) investigation.
- Phase 2: Replacement of the immersible pumps with foot valves and installing larger single stage end suction pumps in die drywell. The detailed considerations for this system, such as the operation of the foot valves and the suction pipework priming, will be included in the detailed design report.

The hydraulic design ensures the intake structure is self-scouring and resilient to sediment deposition. The civil design provides for robust, flood-resistant structures, with careful integration of new and existing facilities to maintain operational continuity during construction.

The mechanical design supports both current and future pump configurations, with appropriate safety margins for motor sizing and lifting equipment.

The electrical design requires upgrading of the transformer and cabling to accommodate increased power demand, with a focus on direct online (DOL) drives for reliability and ease of maintenance.

The control system will be kept as simple as possible, with automated protection, measurement, and reporting. Remote monitoring will be implemented for real-time status updates, but remote control will not be enabled, as per client requirements.

Three alternative site camp locations are also proposed, however based on the specialist assessments it was determined that site camp option 3 is the only feasible option. Please refer to the Figures below showing the proposed services layout, the working area and site camps, and Google Earth Imagery of the construction footprint.

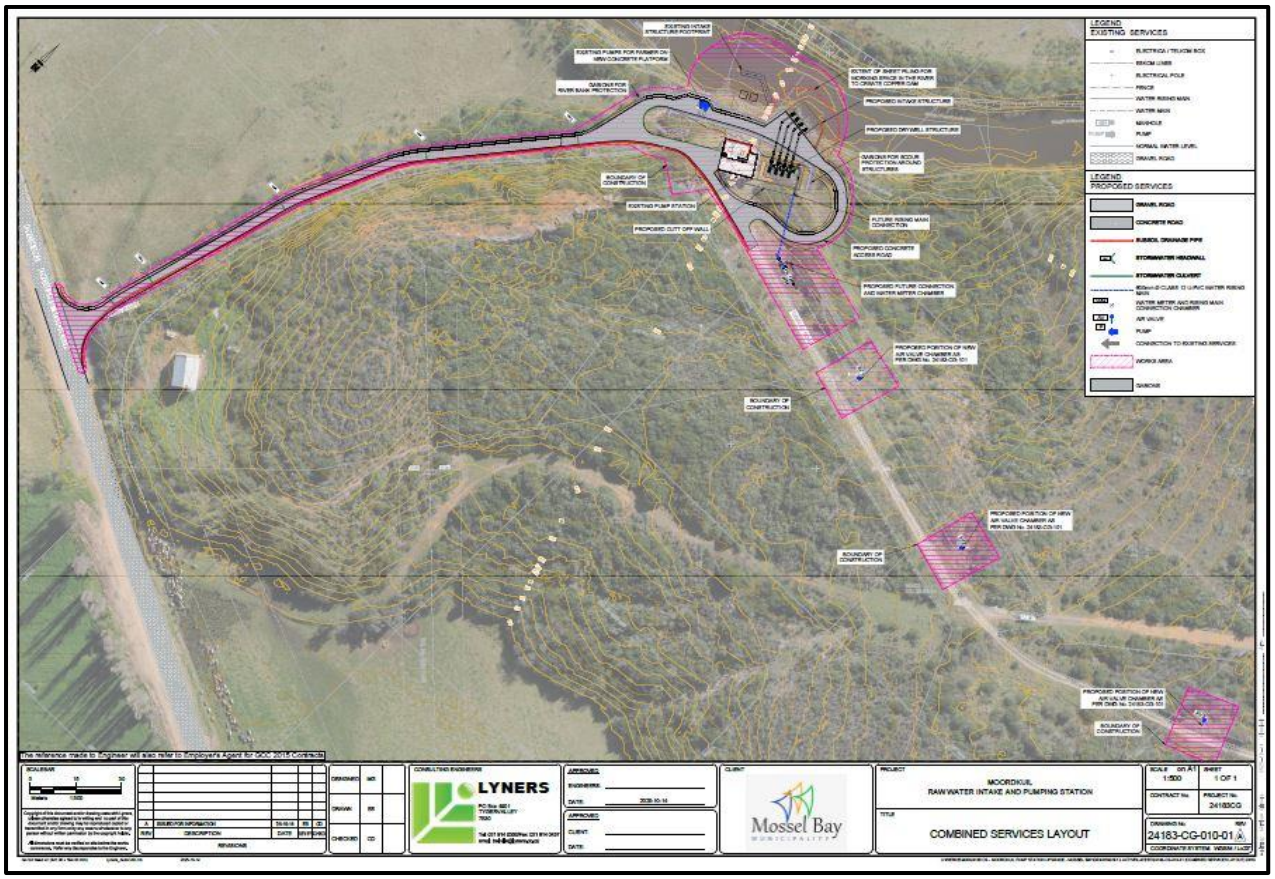

Figure 8: Proposed Services Layout.

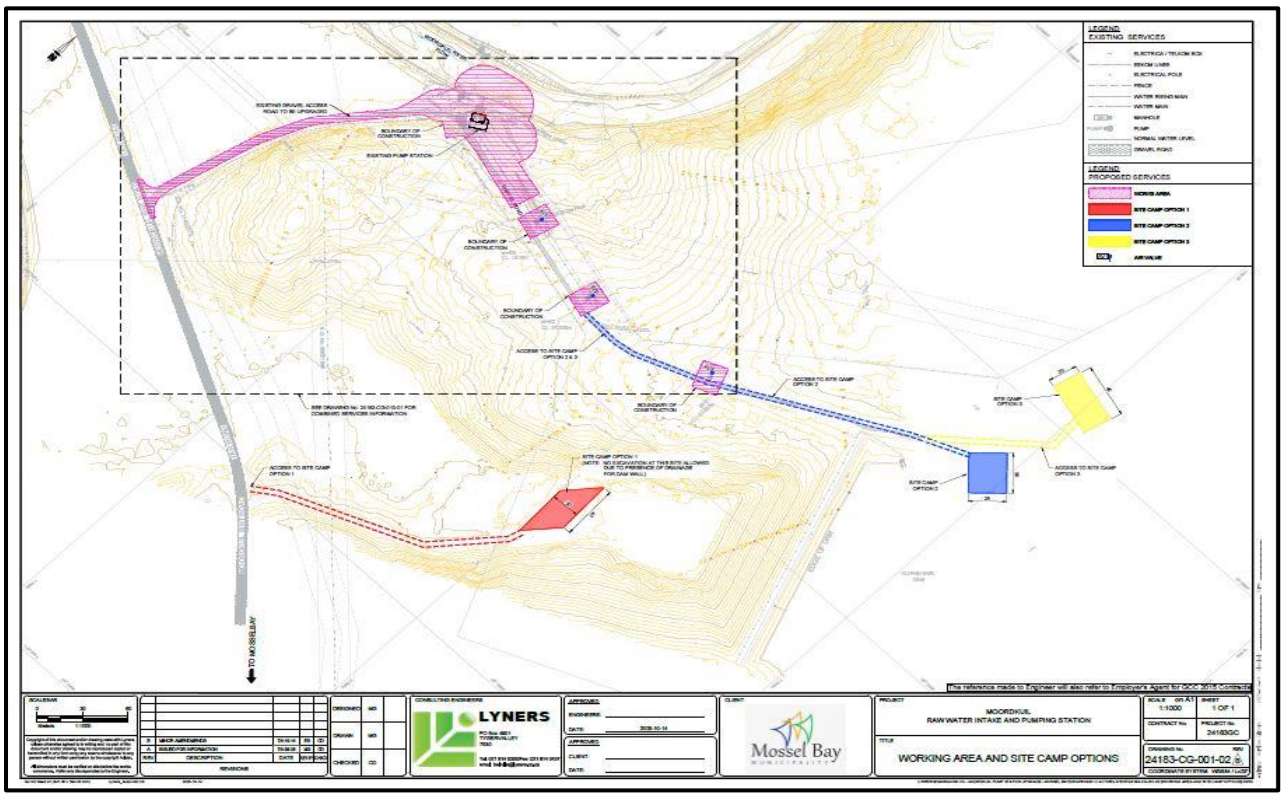

Figure 9: Working Area and Site Camp Locations Layout.

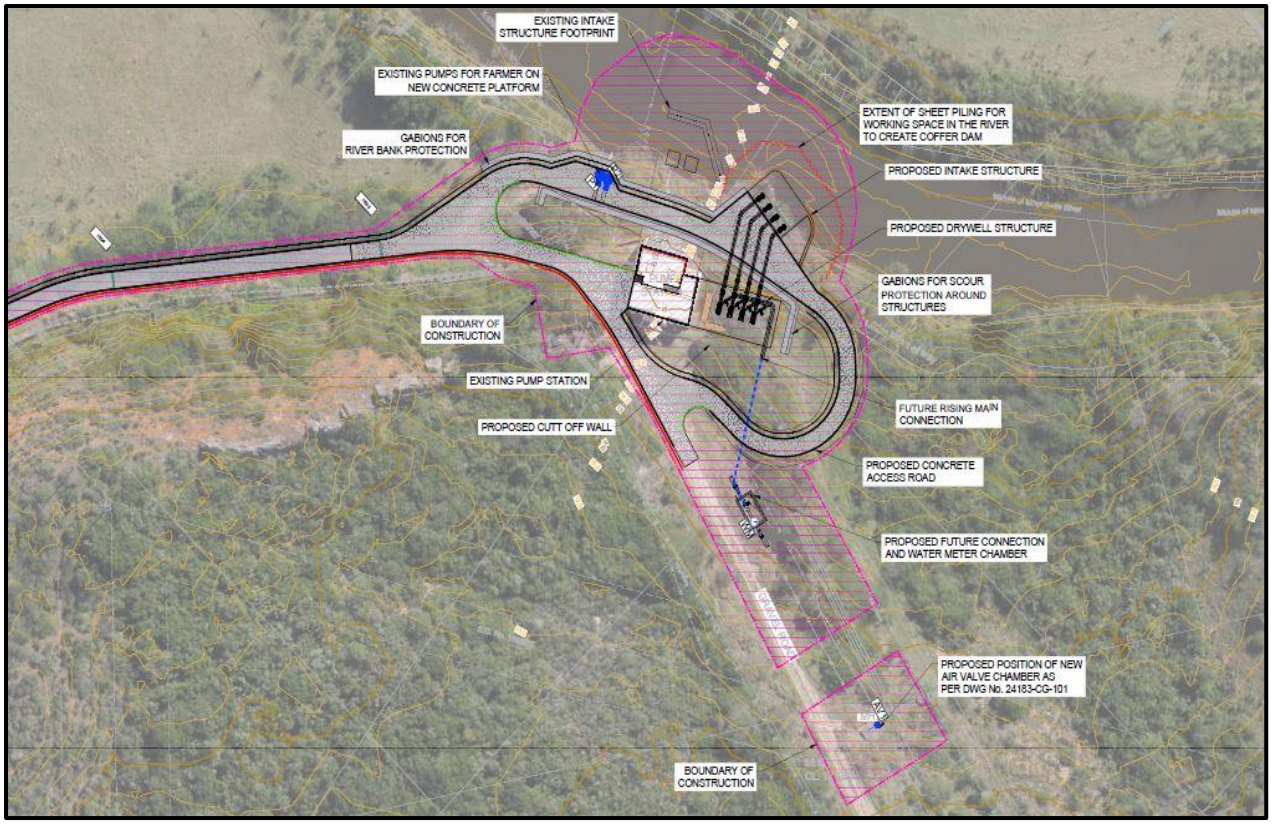

Figure 10: Proposed Upgrades to the Moordkuil Pump Station.

4.2.3 *Site Access.*

An existing informal dirt road off Blesbok Road, provides access to the site. It is proposed to reinstate the existing gravel road (180m long and 3.6m wide) within the same development footprint, which has become almost impassable due to water ingress into the existing layerworks (farmers leaking irrigation channel). The final road is proposed to be 3m wide. 300mm is proposed on each side for the bottom layerworks that have to be wider than the top layerworks to transfer vehicle loads to the soil. The proposed affected area will be 3.6m but the final road will be 3m wide with a stormwarter channel/ditch of about 1m width adjacent. The existing road is approximately 3m wide as well and we can safely assume that its layerworks would also have been similar to the proposed reinstatement design.

It is also proposed to construct a short concrete access road (in an already disturbed area mostly). The new concrete road proposed footprint is approximately 1100m^2 and has a width of 3m with a stormwater channel/ditch of about 1m width adjacent.

4.2.4 *Development Footprint and New Infrastructure Coordinates.*

Table 7: Development Footprint of the Proposed Development and Associated Infrastructure.

Infrastructure	Development Footprint
Proposed pump station footprint including proposed inlet hopper structure, pipes, and drywell (excl. pipes under road)	249 m^2
New concrete access road (incl. cut / fill slopes)	1100 m^2
Gabions	150 m^2
Reinstatement of gravel road (incl. cut / fill slopes)	810 m^2
Water meter chamber	20 m^2
Rising main	11 m^2
Subsoil drainage pipe	123 m^2
Air valve chambers (3 No.)	25 m^2
TOTAL DEVELOPMENT FOOTPRINT	**2488 m^2**

Table 8: New Infrastructure Coordinates.

Orientation	Latitude	Longitude
Proposed pump station footprint including proposed inlet hopper structure, pipes, and drywell		
Corner Point	34° 03' 11.85"S	22° 08' 7.48"E
Corner Point	34° 03' 11.57"S	22° 08' 8.06"E
Corner Point	34° 03' 10.82"S	22° 08' 7.20"E
Croner Point	34° 03' 10.98"S	22° 08' 7.83"E
New concrete access road (incl. cut / fill slopes)		
Start Point	34° 03' 12.78"S	22° 08' 5.55"E
100m Point	34° 03' 11.94"S	22° 08' 8.41"E
End Point	34° 03' 12.28"S	22° 08' 5.92"E
Gabions		
Start Point	34° 03' 11.51"S	22° 08' 8.27"E
Centre Point	34° 03' 11.29"S	22° 08' 7.61"E
Centre Point	34° 03' 11.43"S	22° 08' 6.92"E
End Point	34° 03' 11.80"S	22° 08' 6.27"E
Reinstatement of gravel road (incl. cut / fill slopes)		

Orientation	Latitude	Longitude
Start Point	34° 03' 18.07"S	22° 08' 2.62"E
Centre Point	34° 03 '14.87"S	22° 08' 3.87"E
End Point	34° 03' 12.80"S	22° 08' 5.55"E
Water meter chamber		
Corner Point	34° 03' 12.26"S	22° 08' 8.73"E
Corner Point	34° 03' 12.35"S	22° 08' 8.70"E
Corner Point	34° 03' 12.15"S	22° 08' 8.27"E
Corner Point	34° 03' 12.26"S	22° 08' 8.21"E
Rising Main		
Start Point	34° 03' 11.35"S	22° 08' 7.97"E
Centre Point	34° 03' 11.80"S	22° 08' 8.27"E
End Point	34° 03' 12.18"S	22° 08' 8.22"E
Subsoil drainage pipe		
Start Point	34° 03' 17.97"S	22° 08' 2.90"E
100m Point	34° 03' 14.92"S	22° 08' 4.04"E
100m Point	34° 03' 12.20"S	22° 08' 6.93"E
End Point	34° 03' 12.37"S	22° 08' 8.04"E
Air valve chambers (3 No.)		
Air valve chamber 1	34° 03' 12.54"S	22° 08' 10.29"E
Air valve chamber 2	34° 03' 13.17"S	22° 08' 12.82"E
Air valve chamber 3	34° 03' 12.65"S	22° 08' 16.60"E

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 Existing impacts of the Moordkuil Pump Station

The existing Moordkuil Raw Water Pump Station contributes a long-term disturbed footprint within the riparian corridor, with ongoing operational impacts including localised flow/habitat modification at the abstraction point, potential entrainment/impingement at the intake, and intermittent turbidity during debris clearing and maintenance. The facility and access route maintain edge effects such as vegetation disturbance, soil compaction, erosion susceptibility and the establishment/spread of invasive alien plants. Routine operations also generate low-level noise, possible light spill (where security lighting is installed), and create an ongoing risk of accidental contamination from fuels/oils and maintenance wastes entering stormwater pathways and the river if housekeeping controls are inadequate.

5.2 Biophysical Environment (Desktop evaluation)

5.2.1 Location, topography and land use

The study site is located on the edge of the Moordkuil River floodplain, 3 km north of Klein Brak River. The surrounding landscape to the north and east is hilly. The hillslopes north of the Klipheuwel Dam rise to 168 m above sea level, while the landscape flattens out downstream towards the south and the confluence with the Brandwag River. The site is covered by tracts of degraded thicket and also renosterveld on the slopes above the site. Two of the proposed site camp options are located inside pastures on the floodplain. Dairy farms have transformed much of the surrounding landscape north of the N2, with only the hilly areas and steeper slopes remaining untransformed. Botlierskop Private Game Reserve is located just over a kilometre away to the north.

5.2.2 Climate

The mean annual rainfall for the site, which is located on the Garden Route coastal plain, is 444 mm (as per CapeFarmMapper climatic data for 1950 to 2000). The peak rainfall periods are the months of March and October-November (i.e. bimodal rainfall regime), while the driest periods are the summer and winter months. The study area lies in a transitional area between the winter and summer rainfall regions. Mean daily maximum and minimum temperatures are 23.4°C and 10.2°C for February and July, respectively (as per CapeFarmMapper climatic data).

5.2.3 Hydrology

According to CapeFarmMapper, the pump station is located on the edge of a NFEPA estuarine wetland associated with the Moordkuil River (Figures 14 & 15). The National Freshwater Ecosystem Priority Areas (NFEPA) project provides strategic spatial priorities for conserving South Africa's freshwater ecosystems and supports sustainable use of water resources. These priority areas are commonly referred to as NFEPA's. One of the site camp options is also located next to a non-perennial watercourse coming from the Klipheuwel Dam. The above wetland and watercourse have been included in the Western Cape biodiversity network.

Figure 11: Combined topography and hydrology map.

Figure 12: Moordkuil River with one of the water abstraction pipes.

5.2.4 Geology

According to the 3422 AA Mossel Bay 1:50 000 geological map, the site lies on the boundary between alluvium and Enon Formation (conglomerate, breccia & sandstone) (Figure 13). The latter belongs to the Uitenhage Group (Jurassic to Cretaceous age) of sediments. The cobblestones found in the Enon conglomerate originate from the Table Mountain Group sandstones (Viljoen, 1993). Enon conglomerate is an important source of stone aggregate,

which is mined at several quarries found in the area (Viljoen, 1993). The latter typically supports Albany thicket and renosterveld in the Mossel Bay area.

Figure 13: Exposed Enon conglomerate on a 'koppie' north of the site.

5.2.5 Freshwater Resources

The proposal is to be undertaken within and near the Moordkuil River, therefore Colin Fordham of Upstream Consulting was appointed to conduct and Aquatic Impact Assessment to assess the impacts of the proposed development on the surrounding aquatic environment. According to the Aquatic Impact Assessment Report (Appendix G1), the study area lies within the Southern Coastal Belt DWA Level 1 Ecoregion and DWS quaternary catchment K10F of the Gouritz Catchment Management Area. The Moordkuil River, a tributary of the Klein Brak River, is the largest river in this catchment. There are many unnamed perennial and non-perennial tributaries and dams in this catchment, with much abstraction occurring for agricultural practices. The Moordkuil River is categorised as being in moderate health, having a Present Ecological State (PES) score of C, which is Moderately modified.

The site sits at an elevation of between 1 and 15 m.a.s.l. on a moderately steep bank of the riparian section adjacent to the river. According to the latest national desktop river and wetland inventories, the Moordkuil River is incorrectly classified as an estuary at this location (Figure 14). The DC 4 road bridge prevents any saltwater ingress from the estuary. There are NFEPA or National Wetland Map 5 wetlands in the study area that will not be impacted by the proposed development. According to national river map all these systems eventually drain into the Moordkuil River. Within the larger 500m buffer area there is an additional three non-perennial systems.

The study area is outside of any within the desktop mapped Strategic Water Source Areas (Figure 15). However, according to the Western Cape Biodiversity Spatial Plan (WCBSP) (CapeNature, 2023) the biodiversity priority areas mapped by the WCBSP relative to the study area are shown in Figure 16. It indicates that the drainage lines support CBA 1 River, CBA 2 Estuary and CBA 2 Terrestrial. The WCBSP identifies biodiversity priority areas, Critical Biodiversity Areas, Ecological Support Areas (ESAs) and Other Natural Areas (ONA), which, together with Protected Areas (PA), are important for the persistence of a viable representative sample of all ecosystem types and species, as well as the long-term ecological functioning of the landscape. The primary purpose of a map of CBAs and ESAs is to guide decision-making about where best to locate development. Only low-impact, biodiversity- sensitive land-uses are appropriate within CBA. No rare or endangered aquatic biota were identified on site.

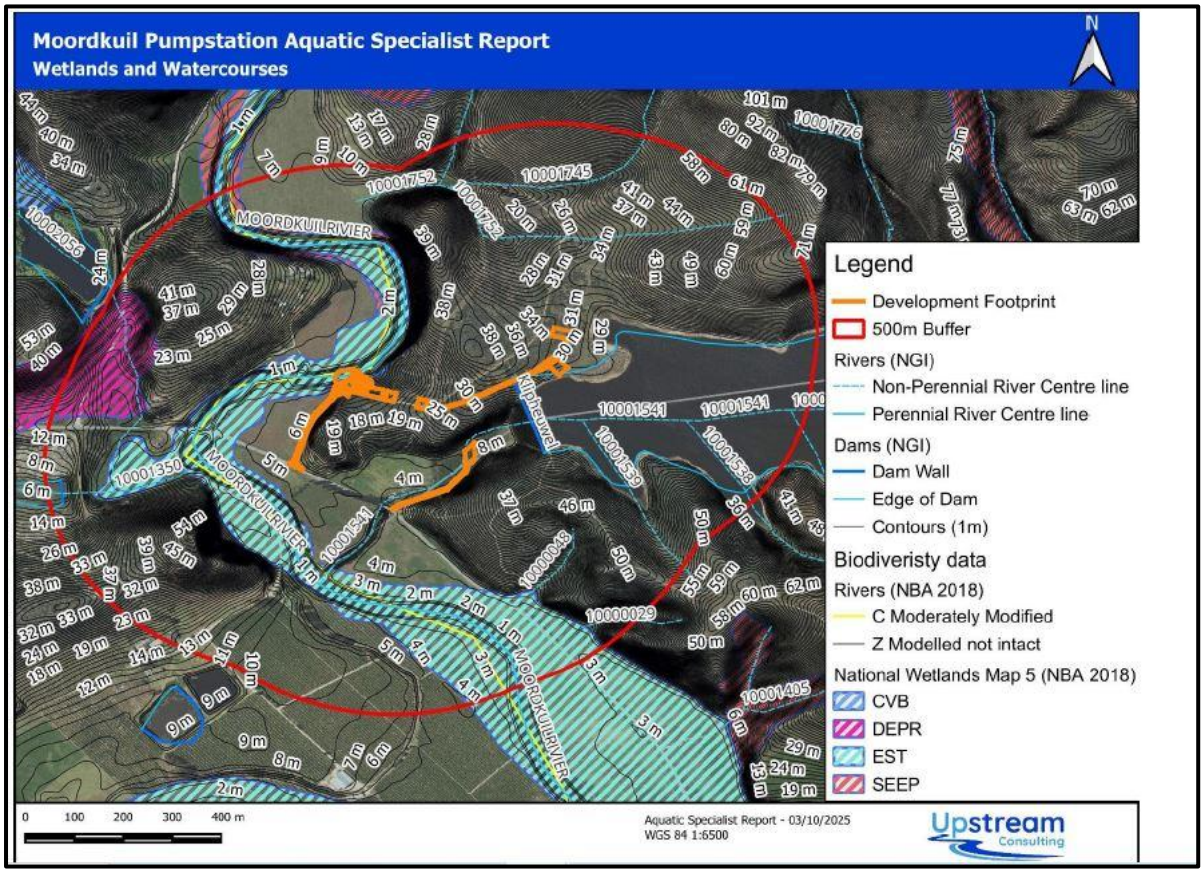

Figure 14: The site in relation to the national wetland and river desktop data inventories.

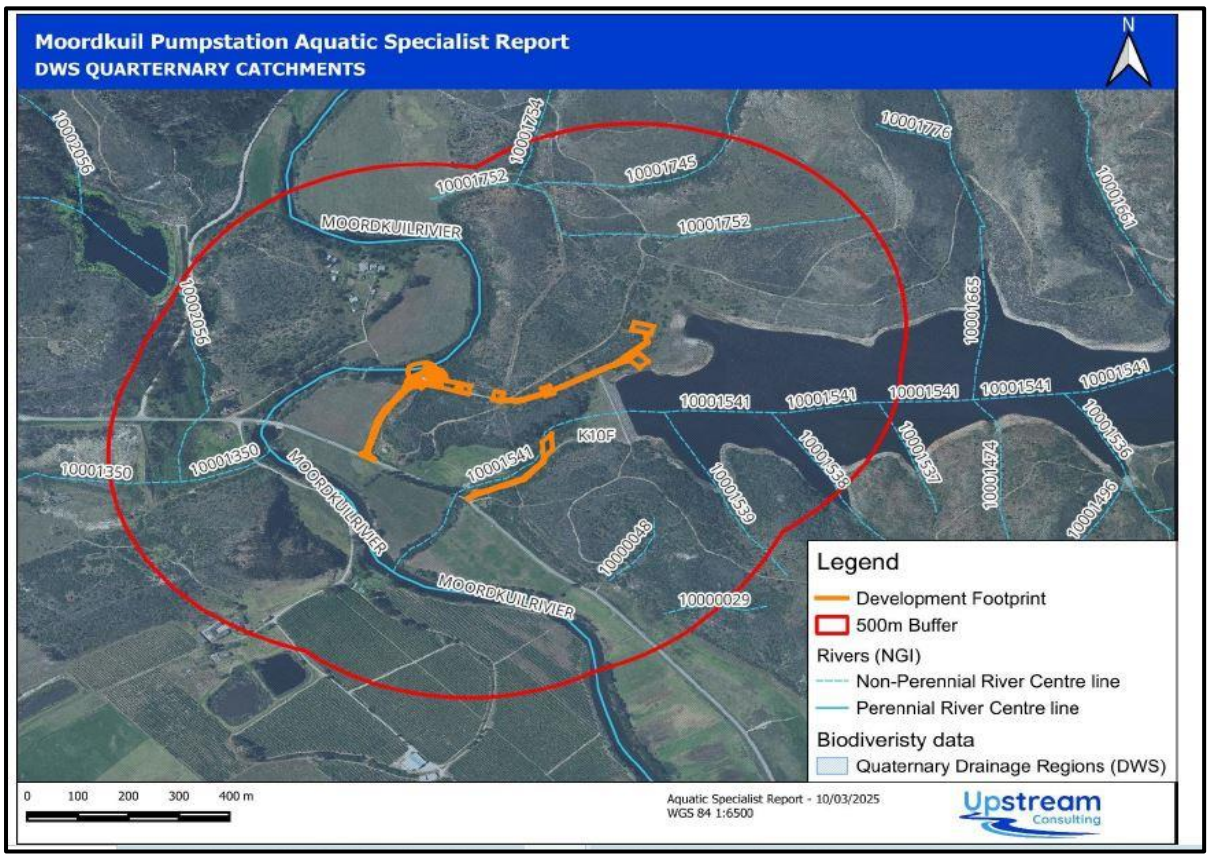

Figure 15: Map of the site in relation to the SWSAs and quaternary catchments.

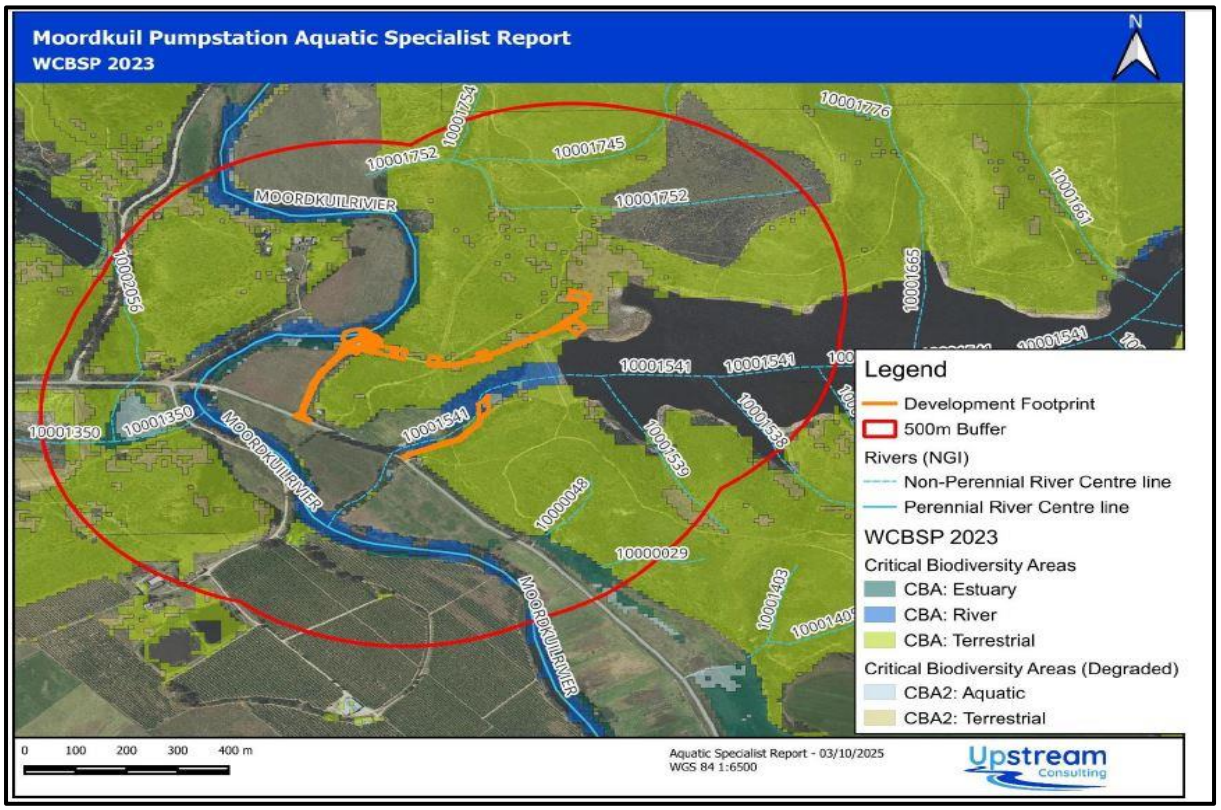

Figure 16: Map of the site in relation to the WCSBP conservation priority areas.

5.2.6 ***Vegetation (Botanical Impact Assessment compiled by MB Botanical Surveys – Appendix G2)***

The study site is located in a renosterveld-thicket environment on the Southern Cape coastal plain. The indigenous species recorded on site are typical renosterveld and thicket species, such as Elytropappus rhinocerotis, Eriocephalus africanus, Sideroxylon inerme, Mystroxylon aethiopicum and Azima tetracantha. The 2018 SA Vegetation Map has incorrectly mapped the main vegetation type on site as Garden Route Granite Fynbos, with the pump station area encroaching on Groot Brak Dune Strandveld (Figure 17). Vlok has mapped it as Brandwag Fynbos-Renoster-Thicket (see CapeFarmMapper online data). The main vegetation type here should rather be mapped as Mossel Bay Shale Renosterveld, with strong elements of Albany Thicket. This error is repeated in the 2024 beta version of the SA Vegetation Map. Mossel Bay Shale Renosterveld occurs on the undulating hills and valleys from the Kruisrivier near Riversdale to Botterberg, west of the Robinson Pass, centred on the Gouritz River (Mucina, 2006). The renosterveld is described as a medium dense, medium tall cupressoid-leaved shrubland dominated by renosterbos (Mucina, 2006). Thicket patches are common within the unit.

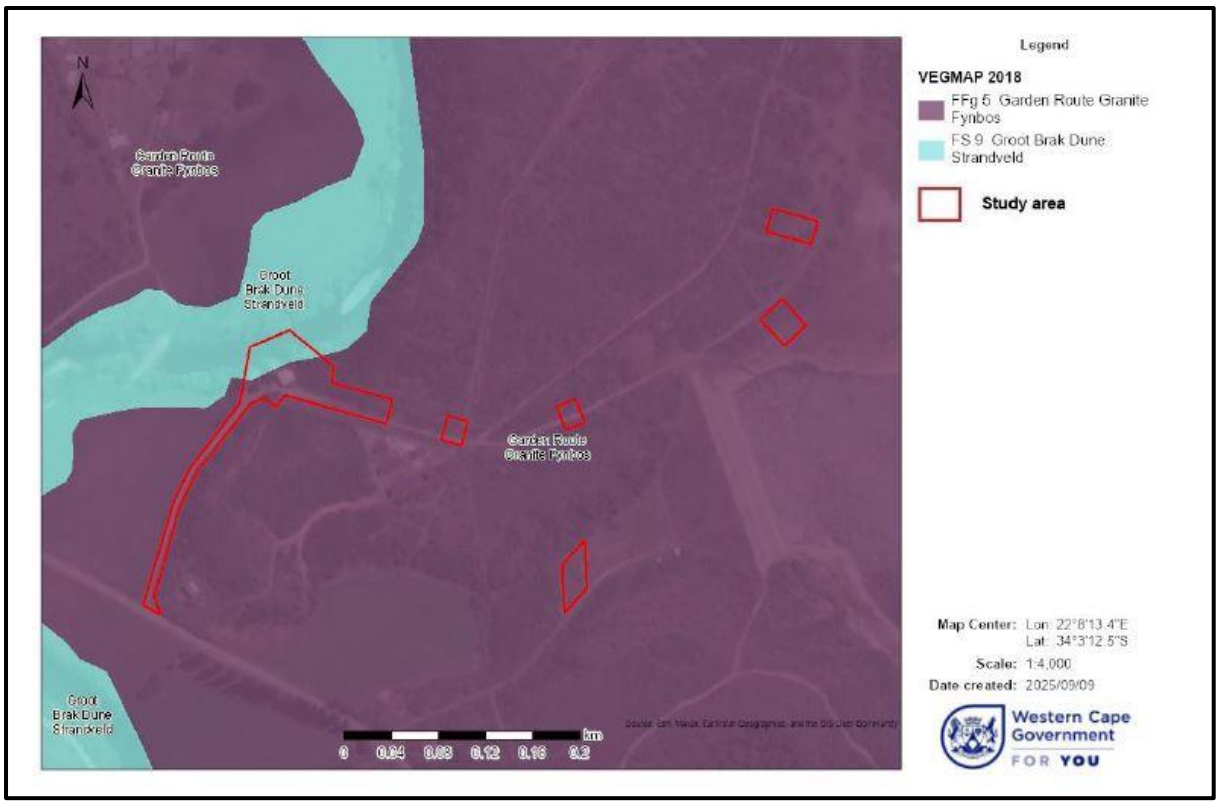

Figure 17: Extract of the 2018 SA Vegetation Map.

Being part of the Fynbos Biome, Mossel Bay Shale Renosterveld is maintained by a regular fire regime. Unfortunately, landscape fragmentation is disrupting this 'maintenance' requirement, often leading to localised species loss and bush encroachment or alien infestation (pers. obs.). Due to its transformed state, Mossel Bay Shale Renosterveld is currently listed as Critically Endangered in the Revised National List of Threatened Ecosystems (DEA, 2022). Only about 38% of Mossel Bay Shale Renosterveld is still left, while 0.2% is currently protected. A large percentage of it has been transformed in the past for pastures and croplands (Mucina, 2006). The ecosystem is also degraded by erosion and overgrazing (Mucina, 2006). The unit is narrowly distributed with high rates of habitat loss in the past 30 years, placing it at risk of collapse.

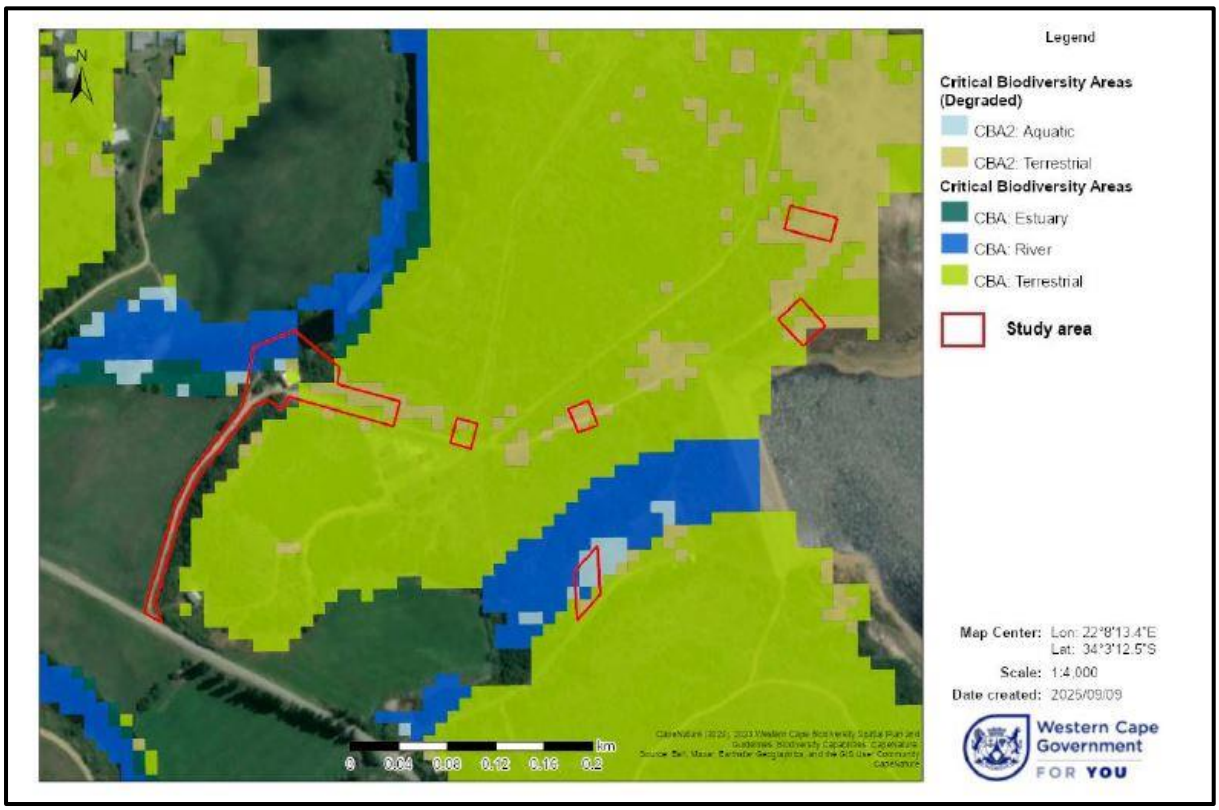

Figure 18: Extract of the Western Cape Biodiversity Network Map.

Biodiversity Planning: The 2023 Western Cape Biodiversity Spatial Plan (CapeNature, 2023) GIS (Geographical Information System) shapefiles were used for determining the conservation importance of the designated habitat. The entire project area falls inside the Western Cape biodiversity network, with most of the site and surrounding area mapped as a terrestrial critical biodiversity area (CBA) or degraded critical biodiversity area (CBA2). Small areas that encroach on the watercourses have been mapped as aquatic CBA's. Reasons for the mapped units include the presence of a climate adaption corridor, ecological processes (FEPA river corridor), threatened vegetation type (albeit the wrong type), threatened vertebrate habitat (bontebok), estuary (Klein Brak Estuary), river types (ephemeral upper foothill river & permanent lower foothill river), wetland types (channelled & unchannelled valley bottom wetlands) and water resource protection (Southern Coastal Belt).

5.2.7 Fauna (Terresrial Biodiversity, Terrestrial Faunal and Avifaunal Compliance Statement Report compiled by Blueskies Research – Appendix G3)

The distributions of 65 mammal species overlap with the study area landscape (Appendix A of Appendix G3). Among these, 59 species are currently listed as "Least Concern" by the IUCN (IUCN, 2021), with the remaining six species representing mammal SCC. These mammal SCC include the following:

1. The Duthie's Golden Mole (Chlorotalpa duthieae) classified as "Vulnerable",
2. Fynbos Golden Mole (Amblysomus corriae) classified as "Near-Threatened",
3. Leopard (Panthera pardus) classified as "Vulnerable",
4. African Clawless Otter (Aonyx capensis) classified as "Near-Threatened",
5. Long-tailed Forest Shrew (Myosorex longicaudatus) classified as "Endangered", and
6. White-tailed Rat (Mystromys albicaudatus) classified as "Vulnerable" by the IUCN.

From the observational records available on the iNaturalist (www.iNaturalist.org) platform, 14 mammal species have been confirmed in the study area landscape (Please refer to Appendix

G3), with 12 of these species currently listed as "Least Concern" by the IUCN, and with two mammal SCC confirmed within the study area landscape. These SCC pertain to the:

1. Leopard (Panthera pardus) observed to the north-west of the site on September 2024, and the
2. African Clawless Otter (Aonyx capensis) observed to the north-east of the site on May 2020.

5.2.8 ***Avifauna(Terresrial Biodiversity, Terrestrial Faunal and Avifaunal Compliance Statement Report compiled by Blueskies Research – Appendix G3)***

According to the SABAP2 records, 258 bird species have been recorded from the pentad overlapping the study area with 240 species classified as "Least Concern" by the IUCN, and 18 species which constitute avifaunal SCC (Appendix B of Appendix G3). These avifaunal SCC includes the:

1. Forest Buzzard (Buteo trizonatus) classified as "Near-Threatened",
2. Black Harrier (Circus maurus) classified as "Endangered",
3. African Marsh Harrier (Circus ranivorus) classified as "Least Concern",
4. Martial Eagle (Polemaetus bellicosus) classified as "Endangered",
5. Crowned Eagle (Stephanoaetus coronatus) classified as "Near-Threatened",
6. Bateleur (Terathopius ecaudatus) classified as "Endangered",
7. Secretarybird (Sagittarius serpentarius) classified as "Endangered",
8. Maccoa Duck (Oxyura maccoa) classified as "Endangered",
9. Curlew Sandpiper (Calidris ferruginea) classified as "Near-Threatened",
10. Caspian Tern (Hydroprogne caspia) classified as "Least Concern",
11. Lanner Falcon (Falco biarmicus) classified as "Least Concern",
12. Blue Crane (Anthropoides paradiseus) classified as "Vulnerable",
13. Denham's Bustard (Neotis denhami) classified as "Near-Threatened",
14. Knysna Warbler (Bradypterus sylvaticus) classified as "Vulnerable",
15. Lesser Flamingo (Phoeniconaias minor) classified as "Near-Threatened",
16. Knysna Woodpecker (Campethera notate) classified as "Near-Threatened",
17. Cape Cormorant (Phalacrocorax capensis) classified as "Endangered", and
18. Cape Gannet (Morus capensis) classified as "Endangered" by the IUCN.

5.2.9 ***Heritage Resources, Historical and Cultural Aspects***

Prof. Marion Bramford confirmed that the palaeosensitivity listed in the DFFE Screening Tool Reports are contested and that since here is no chance of fossils of any importance occurring in the project footprint, she requested exemption from any further palaeontological impact assessment. As far as the palaeontology is concerned there is no preferred site for the site camp. (Please refer to Appendix G5 for the Palaeosensitivity Statement).

A Notice of Intent to Develop was submitted to Heritage Western Cape, the matter was discussed at the Heritage Officers Meeting held on 2 June 2025 and it was determined that there is no reason to believe that the proposed upgrade of the raw abstraction works and pumpstation on Farm 143 Portions 15; 24; 25, Klipheuvel, Moordkuil Raw Water Extraction Works and Pump Station, Klein Brak River will impact on heritage resources, and no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required.

However, should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities above, all works must be stopped immediately, and Heritage Western Cape must be notified without delay.

5.3 Socio-Economic Environment

5.3.1 ***Existing Social and Economic Characteristics of the Community in the Vicinity of the Proposed Site***

In the context of the Census 2022 findings, Mossel Bay Municipality's population amounted to 140 075 individuals in 2022, positioning it as the second largest population in the Garden Route after George (294 929). Projections indicate that this number is expected to grow to 147 220 people by 2027, reflecting an average annual growth rate of 1.0 percent during this timeframe.

The available data suggests that in the Mossel Bay municipal area, there is a lower representation of males compared to females, with a distribution of 48.3 percent for males and 51.7 percent for females. The sex ratio in Mossel Bay has exhibited a gradual downward trend in the years leading up to 2022, according to census 2022 results. This phenomenon may be attributed to diverse factors, including a demographic changes, health and environmental factors, etc.

In terms of age representation, the largest share of the population, consist of the working age population (15 - 64 years) at 66.7 per cent, followed by the young children (0-14 years) aged cohort at 17.9 per cent and the elderly 15.4 per cent. The significant working-age population can contribute to higher economic productivity are more engaged in the labour force, leading to increased output and economic growth.

Within the Mossel Bay municipal area encompassing 52 985 households, 92.5 percent had access to formal housing, surpassing the Garden Route District's mean of 89 percent. Mossel Bay exhibited a diminished share of informal dwellings, constituting 5.8 percent, in contrast to the district-wide average of 9.6 percent for informal housing. This discrepancy in housing types implies distinct socio-economic dynamics within Mossel Bay, potentially influencing various economic and social indicators in comparison to the broader Garden Route District.

Service access levels within the Mossel Bay municipal area exceeded the access to formal housing in certain cases. Approximately 90.2 per cent of households had access to piped water either inside the dwelling/yard or through communal/neighbour's taps. 97.1 per cent had access to flush toilets or chemical toilets, and 98.2 per cent had access to electricity (including generators) for lighting. Additionally, local authorities removed refuse at least weekly for 92.5 per cent of households in the area. These disparities in housing and service access have socio-economic implications, impacting the living conditions and quality of life for the local population.

Mossel Bay is the second-largest economy in the GRD, contributing R8.1 billion to GDPR in 2023, which accounts for 17.5 per cent of the region's total economic output. The town also plays a key role in employment, providing 15.9 per cent of the District's jobs, amounting to 35 974 positions. The employment profile in Mossel Bay is notable for its higher share of skilled and semi-skilled workers, with 36.0 per cent of jobs classified as skilled, 40.0 per cent semi-skilled, and 24.0 per cent low-skilled. The economy of Mossel Bay is diverse and well-balanced, with substantial contributions from both the tertiary and secondary sectors. The largest contributor to the local GDPR is the finance, insurance, real estate, and business services sector, which accounts for 38.6 per cent. This is followed by wholesale and retail trade, catering, and accommodation (13.3 per cent), and transport, storage, and communication (9.9 per cent). Together, these sectors form the core of Mossel Bay's service economy. The secondary sector, though smaller, still plays a critical role, with manufacturing contributing 12.7 per cent and construction adding another 2.9 per cent to the local GDPR. The primary sector, including agriculture, forestry, and fishing, accounts for 4.8 per cent of the economy, though it remains an important part of the region, particularly in rural areas. Mossel Bay's evolving economy is increasingly characterised

by a shift toward skilled employment, particularly in sectors such as finance, public administration, and natural gas extraction. This transition reflects the town's growing importance as a hub for business services and industrial activity in the GRD, marking its position as a vital economic centre in the region.

The proposed development will result in more water being available from the Klipheuwel dam for treatment which will reduce the risk of water restrictions and the risk of the municipality not being able to provide the basic service of water supply to the community. The project will also contribute a total amount of R48,986,952, of which a percentage will be allocated to SMME's and local labour will be utilised. This percentage will be aligned with current policies.

It is not expected that the proposed upgrades will have any significant negative impacts on people's health and well-being in terms of noise, or odours. The visual character and sense of place will not be impacted on as the pump station has been at this site since 1980. The proposed upgrades will therefore not change the current character of the site.

5.3.2 Socio-Economic Value/Contribution of the Proposed Development

The proposed development will result in more water being available from the Klipheuwel dam for treatment which will reduce the risk of water restrictions and the risk of the municipality not being able to provide the basic service of water supply to the community.

5.3.3 Social Initiatives that will be Implemented by the Applicant to Address the Needs of the Community and to Uplift the Area

The proposal is to increase the pumping capacity of the Moordkuil Raw Water Pump Station to pump more water to the Klipheuvel dam which will result in more water being available from the Klipheuwel dam for treatment which will reduce the risk of water restrictions and the risk of the municipality not being able to provide the basic service of water supply to the community. The project will also contribute a total amount of R48,986,952, of which a percentage will be allocated to SMME's and local labour will be utilised. This percentage will be aligned with current policies.

5.3.4 Impacts of the Proposed Development on People's Health and Wellbeing

It is not expected that the proposed upgrades will have any significant negative impacts on people's health and well-being in terms of noise, or odours. The visual character and sense of place will not be impacted on as the pump station has been at this site since 1980. The proposed upgrades will therefore not change the current character of the site.

6. ALTERNATIVES

This section of the Basic Assessment Report (BAR) aims to provide an overview of the alternatives considered for the proposed upgrading of the Moordkuil Pump Station project, and where no alternatives have been considered, to provide a reasoning for not providing such alternatives. The following documents have been used in order to identify and further evaluate the feasibility of the various potential alternatives:

- EIA Guideline and Information Document Series: Guideline on Alternatives (DEA&DP, 2013) - Guideline considered when identifying and evaluating possible alternatives for the proposed development; and
- Integrated Environmental Management Information Series 11: Criteria for determining alternatives (DEA, 2004).

"Alternatives", in relation to a proposed activity, denotes different means of meeting the general purposes and requirements of the activity, which may include alternatives to –

a) the property on which, or location where, it is proposed to undertake the activity;
b) the type of activity to be undertaken;
c) the design or layout of the activity;
d) the technology to be used in the activity;
e) the operational aspects of the activity; and
f) the option of not implementing the activity.

6.1 Description of the Preferred Proposed Project Alternative

The preferred alternative entails the upgrade of the existing Raw Water Abstraction Works and Pump Station. In summary, the following is proposed to be constructed:

- The construction of a new reinforced concrete inlet hopper structure for the pump station;
- The construction of pipe protection ramp structure for the pipes into the existing pump station building.
- An existing informal dirt road off Blesbok Road, provides access to the site. It is proposed to reinstate the existing gravel road (180m long and 3.6m wide) within the same development footprint, which has become almost impassable due to water ingress into the existing layerworks (farmers leaking irrigation channel). The final road is proposed to be 3m wide. 300mm is proposed on each side for the bottom layerworks that have to be wider than the top layerworks to transfer vehicle loads to the soil. The proposed affected area will be 3.6m but the final road will be 3m wide with a stormwarter channel/ditch of about 1m width adjacent. The existing road is approximately 3m wide as well and we can safely assume that its layerworks would also have been similar to the proposed reinstatement design.
- A new concrete road (in an already disturbed area mostly). The new concrete road proposed is has a footprint of approximately 1100m2 and has a width of 3m with a stormwater channel/ditch of about 1m width adjacent.
- Installation of gabions between the cement access road edge and the river;
- Construction of an access ramp to the hopper;
- The construction of a new water meter chamber next to the pump station. The development footprint of the water meter chamber is approximately 20m2;
- Replacing of three air-valves and construction of new chambers around the air-valves;
- Installation of new pipework, pumps and motor control centers;

- Installation of other mechanical items such as cover, trash-racks, etc.
- Upgrading of the electrical supply and breakers within the existing pump station building;
- Installation of a sediment barrier downstream of the crossing to curb sediment generation in the river;
- Final reinstatement of the river bed to the requirements of the CEMP;

The concrete inlet hopper structure is proposed to be anchored to the bedrock by means of piling foundations. In order to install the piles, a pile rig needs to obtain access in the correct position. It is for this reason that a temporary platform structure is required to be constructed within the Moordkuil River.

The area where the inlet hopper (and the associated pile foundations) is proposed to be constructed is below the 1:10 year floodline, within the river. It is therefore required to construct a coffer dam around the area where the inlet hopper structure is proposed to be built in order to have a dry area for construction and concrete setting.

All of the above, except for the proposed temporary platform, cement access road, new water meter chamber and sediment barrier, are proposed within the existing development footprint.

It is also proposed to demolish the existing underwater cement bag wall, existing above water concrete steps and the existing underwater concrete plinths for the existing pipes.

Upon recommencement of the project in late 2024, an underwater survey was undertaken to assess changes in the riverbed topography since 2014. ASP Tech, who undertook the initial sedimentation study, was subsequently appointed by Lyners to conduct a Verification Study to evaluate, among other factors, the appropriateness of the original intake structure in light of the updated bathymetry survey. The resulting report is provided as Appendix G6. During the verification study on the riverbed topography a significant rock outcrop upstream of the proposed intake structure was identified. As a result, it was determined that the outcrop would need to be removed, and the intake structure enlarged beyond the dimensions proposed in the 2014 – 2016 feasibility study to ensure effective operation.

An alternative solution involves relocating the intake structure directly onto the rock outcrop, which presents several technical and economic advantages:

- Improved Foundation Conditions: Relocating the intake would result in more favourable geotechnical conditions, potentially yielding a cost saving of approximately R1.7 million.
- Operational Continuity: By situating the intake upstream at the rock outcrop, it may be possible to maintain operation of the existing pump station throughout the construction period.
- Minimal Disruption to Adjacent Infrastructure: The nearby farmers' pump station, located just downstream of the existing station, would remain unaffected.

Should the existing pump station remain operational during construction, an estimated cost saving of approximately R24.5 million could be realized over the 18-month construction period by avoiding the need to purchase water from the Wolwedans Dam and the associated saving in chemicals at the water treatment works.

A new dry well pump station could be constructed at an estimated cost of approximately R2.4 million. This facility would enable continuous operation of the existing pump station with minimal interruption of the water abstraction during the construction phase. An additional benefit of constructing a permanent dry well is that it would allow the end-suction pumps to be installed at a lower elevation. This could possibly eliminate the requirement for immersible pumps within the intake structure in the future and enable the use of foot valves in combination with a priming system. A new dry well will also provide additional space for the installation of the proposed electrical equipment as the existing MCC room is very small.

Based on the abovementioned, Option 3 (wetwell on rock outcrop with drywell next to pump station, Concept Layout 2) is recommended for implementation for the Moordkuil Pump Station upgrade, as it offers the lowest capital and operational costs, best operational reliability, and acceptable environmental impact (Please refer to the Concept and Viability Design Report – Appendix G6).

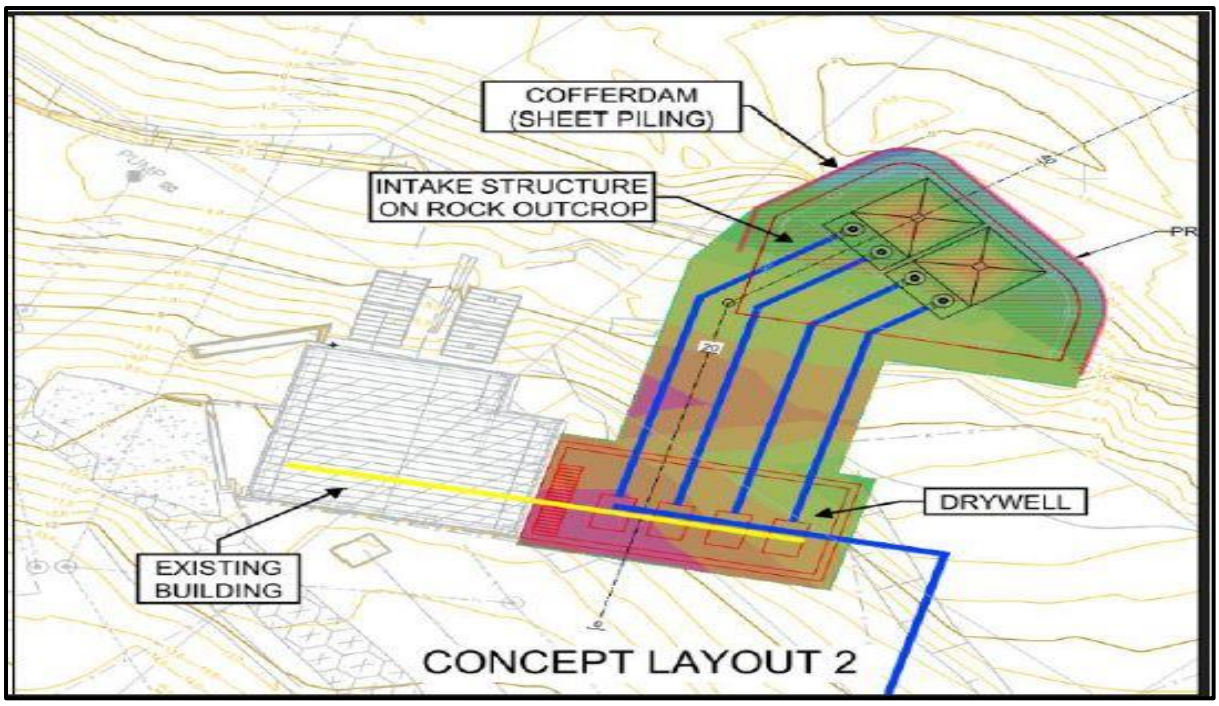

Figure 19: Option 3 - Concept Layout 2.

To maximise the value of existing assets, a phased approach should be adopted:

- Phase 1: Utilisation of existing immersible and end-suction pumps that was bought based on the previous (2014 – 2016) investigation.
- Phase 2: Replacement of the immersible pumps with foot valves and installing larger single stage end suction pumps in die drywell. The detailed considerations for this system, such as the operation of the foot valves and the suction pipework priming, will be included in the detailed design report.

The hydraulic design ensures the intake structure is self-scouring and resilient to sediment deposition. The civil design provides for robust, flood-resistant structures, with careful integration of new and existing facilities to maintain operational continuity during construction.

The mechanical design supports both current and future pump configurations, with appropriate safety margins for motor sizing and lifting equipment.

The electrical design requires upgrading of the transformer and cabling to accommodate increased power demand, with a focus on direct online (DOL) drives for reliability and ease of maintenance.

The control system will be kept as simple as possible, with automated protection, measurement, and reporting. Remote monitoring will be implemented for real-time status updates, but remote control will not be enabled, as per client requirements.

Three alternative site camp locations are also proposed, however based on the specialist assessments it was determined that site camp option 3 is the only feasible option.

6.2 Determination of the Preferred Proposed Project Alternative

6.2.1 ***Preferred Property and Site Alternative***

The site spans across three properties: Portion 25 of the Farm Klipheuvel No. 143, Portion 15 of the Farm Klipheuvel No. 143 and Portion 24 of the Farm Klipheuvel No. 143. The properties are situated approximately 3km north of the coastal towns Kleinbrak and Rheebok, on the Moordkuil River bank located in the Mossel Bay Municipality in the Western Cape.

As the proposal is for the upgrade of the existing Moordkuil raw water abstraction works, no property or site alternatives exist. The pump station has been at this site for more than 40 years. It will not make sense to move the whole site somewhere else. This pump station serves the residential area around it and there is no other property or site suitable for it.

6.2.2 ***Motivation for No Property or Site Alternatives Considered***

No site alternatives have been assessed because it makes logical sense in terms of cost and environmental impact not to consider location alternatives but to rather refurbish the existing raw water abstraction works, pump station and associated access road, mostly within the existing development footprint. The Moordkuil raw water abstraction works has been at the site since 1980, and therefore it will not make sense to reconstruct the pump station at another site along the Moordkuil River. Most of the upgrades will occur within the existing footprint, which is already established, therefore choosing to construct the pump station at a different site along the Moordkuil river will cause a much more significant disturbance and incur significant additional costs.

The overarching objective of the development proposal is to increase the quantity of water abstraction back to the originally designed capacity by decommissioning the pumping infrastructure that is outdated and no longer functional.

6.2.3 ***Preferred Activity Alternative and Motivation for No Activity Alternatives***

The overarching objective of the development proposal is to increase the quantity of water abstraction back to the originally designed capacity by decommissioning the pumping infrastructure that is outdated and no longer functional. It is proposed to build a pump station that will not require continued maintenance and security of water supply – no other activities would yield the desired outcome.

6.2.4 Preferred Design or Layout Alternative

Please refer to the Concept and Viability Design Report – Appendix G6.

Three different options were explored regarding design of the upgrade of the Moordkuil Pump Station.

Preferred Alternative (Alternative A):
The preferred alternative entails relocating the intake structure directly onto the rock outcrop. This presents significant technical and economic advantages which include:

- Improved Foundation Conditions: Relocating the intake would result in more favourable geotechnical conditions, potentially yielding a cost saving of approximately R1.7 million.
- Operational Continuity: By situating the intake upstream at the rock outcrop, it may be possible to maintain operation of the existing pump station throughout the construction period.
- Minimal Disruption to Adjacent Infrastructure: The nearby farmers' pump station, located just downstream of the existing station, would remain unaffected.

Should the existing pump station remain operational during construction, an estimated cost saving of approximately R24.5 million could be realized over the 18-month construction period by avoiding the need to purchase water from the Wolwedans Dam and the associated saving in chemicals at the water treatment works.

A new dry well pump station could be constructed at an estimated cost of approximately R2.4 million. This facility would enable continuous operation of the existing pump station with minimal interruption of the water abstraction during the construction phase. An additional benefit of constructing a permanent dry well is that it would allow the end-suction pumps to be installed at a lower elevation. This could possibly eliminate the requirement for immersible pumps within the intake structure in the future and enable the use of foot valves in combination with a priming system. A new dry well will also provide additional space for the installation of the proposed electrical equipment as the existing MCC room is very small.

Based on the abovementioned, Option 3 from the Concept and Viability Design Report (wetwell on rock outcrop with drywell next to pump station, Concept Layout 2) is recommended for implementation for the Moordkuil Pump Station upgrade, as it offers the lowest capital and operational costs, best operational reliability, and acceptable environmental impact (Please refer to the Concept and Viability Design Report – Appendix G6).

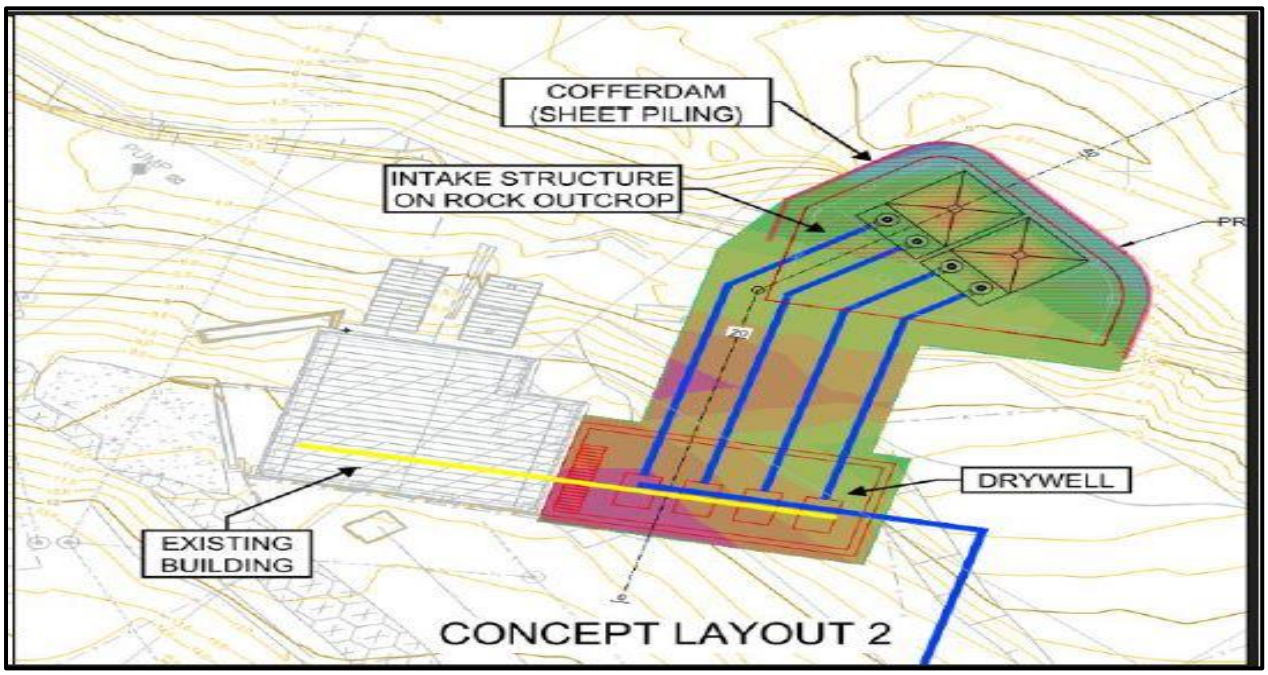

Figure 20: Option 3 - Concept Layout 2.

6.2.5 Design or Layout Alternative Investigated

Alternative B

Alternative B entails having the intake structure across the existing pump station, the rock outcrop identified will have to be removed. It will require pile foundations for the intake structure and restricted construction for the drywell between the existing pump station and the river. The existing pump station will also be taken out of operation for the entire construction period. Relocation of the farmers pumps downstream of the intake structure will be required to prevent the intakes from silting up.

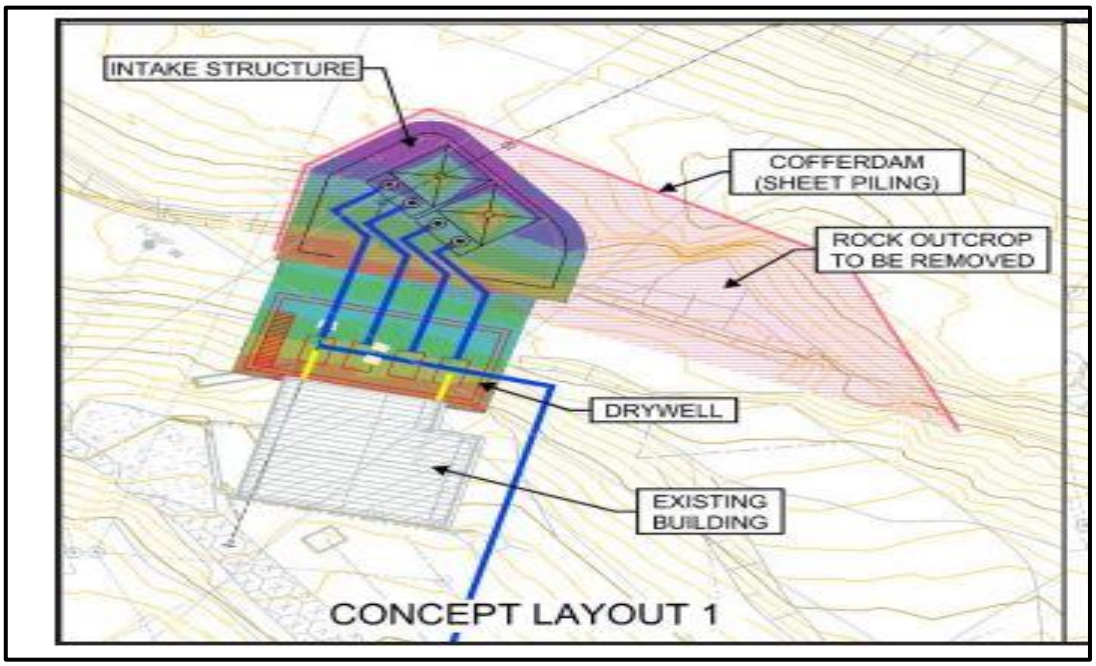

Figure 21: Concept Layout 1.

6.2.6 *Motivation for the Preferred Design or Layout Alternative*

The Preferred Alternative (Alternative A) presents several technical and economic advantages:

- Improved Foundation Conditions: Relocating the intake would result in more favourable geotechnical conditions, potentially yielding a cost saving of approximately R1.7 million.
- Operational Continuity: By situating the intake upstream at the rock outcrop, it may be possible to maintain operation of the existing pump station throughout the construction period.
- Minimal Disruption to Adjacent Infrastructure: The nearby farmers' pump station, located just downstream of the existing station, would remain unaffected.
- Intake structure location on the rock outcrop minimises the narrowing and potential impact on river dynamics,

Should the existing pump station remain operational during construction, an estimated cost saving of approximately R24.5 million could be realized over the 18-month construction period by avoiding the need to purchase water from the Wolwedans Dam and the associated saving in chemicals at the water treatment works.

6.2.7 *Positive and Negative Impacts that the Design or Layout Alternatives will have on the Environment*

Table 9: Advantages and Disadvantages of Preferred Alternative A.

Advantages	Disadvantages
Preferred Alternative A	
Minimises narrowing of river and potential impact on river dynamics	Larger construction footprint
Less disturbance in the river if rock outcrop is not removed.	
Smaller coffer dam required	

Table 10: Advantages and Disadvantages of Alternative B.

Advantages	Disadvantages
Alternative B	
Smaller construction footprint	Larger degree of disturbance in the river to remove the rock outcrop – could require blasting
	Requires pile foundations in the river for intake structure to be constructed.
	Intake structure narrows the existing river and can potentially negatively impact on river dynamics
	Larger coffer dam required

6.2.8 *Technology Alternatives and Operational Alternatives*

Not applicable to this proposal as no technology or operational alternatives exist.

6.2.9 *Explanation as to Why the No-Go Option is Not Preferred*

The status quo remains that the pump station only abstract 400 litres per second because parts to fix the broken axial pumps are unobtainable. The pump station infrastructure could be washed away in the next flood and then no water can be abstracted from the river.

6.3 Concluding Statement Regarding Alternatives

Taking the finding of the specialists into account, the impacts associated with Alternatives A and B are very similar, however Alternative B will require a larger degree of disturbance in the river due to the removal of the rock outcrop (which could possibly require blasting to remove it) and larger coffer dam.

According to the Concept and Viability report the relocation of the intake structure onto the rock outcrop (Option 3 Concept and Viability Report) will present several technical and economic advantages such as Improved Foundation Conditions: Relocating the intake would result in more favourable geotechnical conditions, potentially yielding a cost saving of approximately R1.7 million; Operational Continuity: By situating the intake upstream at the rock outcrop, it may be possible to maintain operation of the existing pump station throughout the construction period; Minimal Disruption to Adjacent Infrastructure: The nearby farmers' pump station, located just downstream of the existing station, would remain unaffected. This alternative is also significantly cheaper to construct as opposed to Alternative B.

Should the existing pump station remain operational during construction, an estimated cost saving of approximately R24.5 million could be realized over the 18-month construction period by avoiding the need to purchase water from the Wolwedans Dam and the associated saving in chemicals at the water treatment works.

Therefore Option 3 from the Concept and Viability Report is the Preferred Alternative.

For the purpose of evaluating the anticipated impact of the proposed development on the environment, the preferred proposed development alternative has been evaluated against Alternative B and the No-Go Alternative.

Please see Section 10 for the impact assessment undertaken for the proposed development.

7. PLANNING CONTEXT AND PROJECT NEED AND DESIRABILITY

7.1.1 Alignment with Existing Land Use Rights

The proposed development entails the upgrading of the existing Moordkuil Pump Station, which has been operating for more than 40 years. The proposed development is therefore in line with the existing land use rights of the property.

7.1.2 How Potential Conflicts with Existing Approvals for the Proposed Site Have Been Resolved

The previous Environmental Authorisation has lapsed; it was confirmed by DFFE that a new application and BAR must be conducted to obtain Environmental Authorisation for the proposed upgrades.

7.1.3 Comments from Authorities or Specialists with Respect to Biodiversity that have Influenced the Proposed Development

Three site camp locations were proposed for the construction process, however upon investigation the specialists determined that only site camp option 3 would be feasible. Site camp option 2 harbours sensitive botanical elements and sits within an aquatic buffer zone, and site camp option 1 sits in a unchanneled valley bottom wetland.

7.1.4 Influence of the Western Cape Biodiversity Spatial Plan (Including the Guidelines in the Handbook) on the Proposed Development

Figure 22: Extract of the Western Cape Biodiversity Network Map.

A large part of the project area falls inside the Western Cape biodiversity network. The pipeline route and two of the camp site options fall inside a terrestrial critical biodiversity area (CBA) and degraded critical biodiversity areas (CBA2). The pumpstation itself and camp site option below the dam wall encroach on aquatic (river) CBA's and degraded aquatic CBA's. Reasons for the mapped units include the presence of a climate adaption corridor, ecological processes (FEPA river corridor), threatened vegetation type (albeit the wrong type), threatened vertebrate habitat (bontebok), estuary (Klein Brak Estuary), river types (ephemeral upper foothill river & permanent lower foothill river), wetland types (channelled & unchannelled valley bottom wetlands) and water resource protection (Southern Coastal Belt). It was previously noted that most of the intact vegetation in the Mossel Bay interior is found on the steeper hill slopes. These areas are thus considered of great value in the biodiversity network. The CBA2's correspond with transformed areas, such as pastures and roads. The Moordkuil River has been mapped as an aquatic CBA. The closest protected area to the site is the Doring River Wilderness Area, located 15 km away to the north.

CBA's are defined as areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure (Pool-Stanvliet, 2017). These

sites are selected for meeting national targets for species, habitats and ecological processes (Pool-Stanvliet, 2017). Many of these areas support known occurrences of threatened plant species, and/or may be essential elements of designated ecological corridors. Loss of designated CBA's is therefore not recommended. ESA's, on the other hand, are supporting zones required to prevent the degradation of CBA's and Protected Areas.

7.1.5 Optimisation and Use of Existing Resources and Infrastructure

The proposal is to upgrade the existing Moordkuil Pump Station, majority of the upgrades will tie into existing infrastructure.

7.1.6 Need and Desirability

The Need and Desirability Guideline of 2017 (DEA) explains that the needs and desirability is determined by considering the broader community's needs and interests as reflected in a credible IDP, SDF and EMF for the area, and as determined by the EIA. It is further also highlighted that society in general should improve the efficiency and responsibility with which we use resources, and improve on the level of integration of social, economic, ecological and governance systems. The need and desirability therefore need to illustrate how a development integrates the socio-economic, ecological and political aspect in a beneficial manner.

Need and Desirability relates to the nature, scale and location of the proposal where the need can be translated to time (in other words would the time of this proposal be considered the right time to commence with said proposal), and the desirability can be translated to the place (is the proposal located in the correct place for the proposed activities) (DEA&DP, 2013; DEA, 2017). Through these considerations, it can be determined whether a proposal would be considered to be in alignment with the sustainability principles as well as the National Development Plan 2030 (NDP 2030)'s principles toward the transitioning to an environmentally sustainable, low-carbon economy. This BAR strives to answer the questions on Need and Desirability as posed in the relevant guidelines for the purpose of due consideration of both the biophysical and the socio-economic environments.

In order to properly interpret the EIA Regulations' requirement to consider "need and desirability", it is necessary to turn to the principles contained in NEMA, which serve as a guide for the interpretation, administration and implementation of NEMA and the EIA Regulations. With regard to the issue of "need", it is important to note that this "need" is not the same as the "general purpose and requirements" of the activity. While the "general purpose and requirements" of the activity might to some extent relate to the specific requirements, intentions and reasons that the applicant has for proposing the specific activity, the "need" relates to the interests and needs of the broader public. In this regard the NEMA principles specifically inter alia require that environmental management must:

- "place people and their needs at the forefront of its concern" and equitably serve their interests;
- "be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option;
- pursue environmental justice "so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person";

ensure that decisions take "into account the interests, needs and values of all interested and affected parties"; and

ensure that the environment is "held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage".

Community wellbeing – Increasing Water Demand:
The Moordkuil Pump Station is a critical component of the regional bulk water supply network serving the Mossel Bay Local Municipality and its residents. The proposed upgrade will double its current capacity from 400 l/s to 800 l/s and this will help to address the growing domestic, commercial and industrial water demands within the municipal area.

Water Security:
South Africa is currently experiencing a water crisis with dam levels exceedingly low. The Garden Route Region is particularly water stressed and there is increasing pressure on water resources. By increasing the current abstraction volume from 400 to 800 litres per second, as per the facilities intended original design, it will contribute significantly to increasing the volume of water stored in the Klipheuwel Dam, one of the main water sources of the Mossel Bay Municipality.

System Efficiency and Reliability:
The current system operates under high strain and the pipes are at risk of being washed away by flooding events. This increases the risk of mechanical failure, upgrading the facility will improve operational redundancy, reduce energy strain, and allow for maintenance without disrupting water delivery.

8. PUBLIC PARTICIPATION PROCESS

8.1 Public Participation: Opportunity to Register and Review of the Draft Basic Assessment Report

According to the Regulation 19(1) of the EIA Regulations of 2014, as amended, promulgated in terms of the National Environmental Management Act (NEMA), once an application is submitted to obtain an Environmental Authorisation in terms of the NEMA EIA Regulations, the Basic Assessment Report must be subjected to at least 30 days public participation. During this period potential or registered Interested and / or Affected Parties (interested in the project or affected by the thereby) are provided with an opportunity to lay comment on the proposal. These comments are taken into account, responded to, and where required changes are incorporated into the report as part of the submission of the Final Basic Assessment Report submitted to the Competent Authority for Decision Making purposes.

The **Draft Basic Assessment Report** is now available to Interested & Affected Parties for a period of **30+ days (6 July 2026 – 4 August 2026),** and is available for free download and review directly from our website (www.sescc.net) under the Public Documents tab.

Please note that all comments submitted to SES in writing on the Draft Basic Assessment Report will be responded to in the Comments & Response Table which will be included in the Final BAR. All those that submit comments will be automatically registered on the database and will be notified for the remainder of the EIA process of all reports available for review and comment. All personal information and comments received will be handled in accordance with the Protection of Personal Information Act.

8.1.1 Register of Interested & Affected Parties

As per to Regulation 41(2)(b) of the EIA Regulations of 2014, as amended, all occupiers of property, surrounding landowners, local government and any other entity with a potential vested interest must be notified of a project.

Accordingly, a desktop assessment was undertaken in order to ascertain the erven and farm numbers of the adjacent affected landowners & occupiers. Stakeholders (such as the applicable Government Departments and entities with a vested interest in the proposed project) have been identified and placed on the database. The surrounding landowners and occupants have been included in the public notification process. Where contact information was available to the EAP at the time of Public Participation, this was included into Appendix E1 of this BAR (in its redacted form for the purpose of the public review process).

Please refer to Appendix E1 for the I&AP Register.

8.1.2 Landowner Consent

According to Regulation 39(1) of the EIA Regulations of 2014, as amended, where the Applicant is not the landowner, or the person in control of the land, Landowner consent is required to be obtained. The Applicant (the Department of Water and Sanitation) is the "person in control of the land" and therefore landowner consent is not required.

8.1.3 Site Notice

A site notice in the appropriate size, as per the requirements of Regulations 41(2)(a) and 41(4) of the EIA Regulations of 2014, as amended, in accordance to the specifications of Regulation 41(3) of the EIA Regulations of 2014, as amended, will be erected on site in order to notify potential I&APs of the availability of the Draft BAR and inviting them to register and provide comments on the proposed project. Proof will be included in the Final BAR submission to DFFE.

8.1.4 Newspaper Advertisements

A newspaper advertisement, as is required in terms of Regulation 41(2)(c), will be placed in the Local Newspaper, the Mossel Bay Advertiser, notifying potential I&APs of the availability of the Draft BAR and inviting them to register and provide comments on the proposed project. Proof will be included in the Final BAR submission to DFFE.

8.1.5 Additional PPP procedures

As per Regulation 41(2)(e) of the EIA Regulations of 2014, as amended, alternative reasonable measures of notification and distribution may also be used to notify the public and make the

documents available to the public. For the purposes of the proposed project, the following measures were used:

- An email notification will be distributed to all the adjacent landowners, informing them of the project, the availability of the Draft BAR, and the commenting period. Proof will be included in the Final BAR submission to DFFE.

8.1.6 Comments and responses

A comments and responses report (CRR) in the form of a table will be compiled for the PPP associated with the current Application for Environmental Authorisation. All received comments will be captured and addressed accordingly. Proof will be included in the Final BAR submission to DFFE.

8.1.7 Summary of Comments Received

A summary of comments received will be included in the Final BAR submission to DFFE. Please also refer to Appendix E5 for the comments and response report from the previous application recently undertaken.

9. SUMMARY OF THE SPECIALIST ASSESSMENTS UNDERTAKEN

9.1 Screening Tool Results

The Department of Forestry, Fisheries & Environment (DFFE) has developed a screening tool informing the site sensitivity. This Environmental Screening Tool is a tool used toward identifying potential environmental sensitivities on a proposed site. The Environmental Screening Tool Reports have been included in Appendix H2 of this Report. The table below provides the sensitivities identified by the tool:

Table 11: Environmental Screening Tool Results (as extracted 27 March 2025).

THEME	VERY HIGH	HIGH	MEDIUM	LOW
Agricultural	X			
Animal Species Theme		X		
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme				X
Civil Aviation Theme		X		
Defence Theme				X
Palaeontology Theme	X			
Plant Species Theme		X		
Terrestrial Biodiversity Theme	X			

Based on the results indicated above, a number of specialist assessments were recommended by the Environmental Screening Tool. Table **Error! Reference source not found.**12 below provides the specialist assessments recommended as well as the reasoning provided for omission of the studies not undertaken as part of this impact assessment. A site sensitivity verification report (SSVR) has been included as Appendix H6 of the BAR.

Table 12: Specialist Assessments as recommended by the Environmental Screening tool (Please see Appendix G8 for the SSVR).

No	Specialist Assessment	Screening Tool Sensitivity	Sensitive features identified in the Environmental Screening Tool Report	Motivation for inclusion or omission of report
1	**Landscape / Visual Impact Assessment**	-	-	We disagree with the Screening Tool's indication that a Visual/ Landscape Assessment is required. The proposed activities comprise the upgrading of an existing pump station, with the majority of the upgrades occurring within the current facilities footprint. No new above-ground structures of visual significance will be introduced, and the project will not alter the existing landscape character, which is already defined by the existing pump station and other infrastructure. As such, the proposed development will not result in any change to the visual integrity, sense of place, or landscape quality of the area. A Visual Impact Assessment is therefore not warranted.
2	**Archaeological and Cultural Impact Assessment**	**Low**	**Low**: Low Sensitivity	A Notice of Intent to Develop (NID) was compiled and submitted to Heritage Western Cape, Heritage Western Cape (HWC) has confirmed "there is no reason to believe that the proposed upgrade of the raw abstraction works and pumpstation on Farm 143 Portions 15; 24; 25, Klipheuvel, Moordkuil Raw Water Extraction Works and Pump Station, Klein Brak River will impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required.". Please refer to Appendix G7 of the Draft BAR for the NID and Appendix F1 of the Draft BAR for the Record of Decision from HWC.
3	**Palaeontology Impact Assessment**	**Very High**	**Very High:** • Features with a Very High paleontological sensitivity	The palaeontology theme was rated as Very High by the screening tool report since the site has mapped palaeontology features. A specialist was appointed and verified the true paleosensitvity of the site to be **Low**. Please refer to Appendix G4 of the Draft BAR for the Palaeontological Impact Assessment Exemption Letter.
4	**Terrestrial Biodiversity Impact Assessment**	**Very High**	**Very High:** • ESA 2: Restore from other land use • CBA2: Terrestrial • CBA 1: Terrestrial • CR_Garden Route Granite Fynbos o CR_Groot Brak Dune Strandveld	The screening tool rated this sensitivity as Very High due to the ecological threat status and the vegetation types in which the site is located. The site is mapped as Garden Route Granite Fynbos which has an Ecological Threat Status of Critically Endangered; and Grootbrak Dune Strandveld which also has an Ecological Threat Status of Critically Endangered. A specialist was appointed to compile a report, and verified the site sensitivity to be **Low**. Please refer to Appendix G3 of the Draft BAR for the Terrestrial Biodiversity, Terrestrial Faunal and Avifaunal Compliance Statement Report.
5	**Aquatic Biodiversity Assessment**	**Very High**	**Very High:** • CBA 1: Aquatic • Estuary_Klein Brak • Wetlands_(Estuary)	The aquatic biodiversity theme was rated as Very High by the screening tool report since the property has mapped aquatic features. A specialist was appointed to compile a report, and verified the site as sensitive and therefore required a full Aquatic

No	Specialist Assessment	Screening Tool Sensitivity	Sensitive features identified in the Environmental Screening Tool Report	Motivation for inclusion or omission of report
				Impact Assessment. Please refer to Appendix G1 of the Draft BAR for the Aquatic Impact Assessment.
6	**Socio-Economic Assessment**	**-**	-	We disagree that a Socio-Economic Impact Assessment is required. The proposed upgrades to the Moordkuil Pump Station will not alter land use, restrict access, displace communities, or affect livelihoods. Construction is short-term and small in scale, and socio-economic conditions will remain unchanged. No specialist socio-economic study is warranted.
7	**Hydrology Assessment**	**-**	-	The screening tool report recommended that a Hydrology Assessment be conducted. We do not believe that it is required or that it will add any value to the Basic Assessment Report due to the hydrological and hydraulic considerations associated with the proposed development that were assessed through the detailed engineering design process. A specialist hydraulic engineering study titled 'Review of the Proposed Hydraulic Design of the Intake Works with 2D Hydrodynamic Modelling of Scour/Deposition and 3D CFD Modelling of Hydraulic Forces' was undertaken and is included in the Draft BAR in Appendix G6 of the Draft BAR (Concept and Viability Design Report). This study assessed flow dynamics, hydraulic forces, scour potential, sediment transport processes and the interaction between the proposed infrastructure and the river system. The findings of this study informed the final engineering design of the proposed abstraction works. In addition an Aquatic Impact Assessment was undertaken and is included in the Draft BAR (Appendix G1 – Aquatic Impact Assessment), therefore the hydrological, hydraulic and aquatic environmental considerations were already assessed through the engineering design investigations and specialist assessments and a new Hydrology Impact Assessment is not warranted.
8	**Plant Species Assessment**	**High**	**<u>High:</u>** • Polygala pubiflora	The plant species theme has a High sensitivity rating for the site. A specialist was appointed to compile a report, and determined one can argue that the ratings should be lower for certain areas of the site. Given the transformed or degraded state of the vegetation, the impact on terrestrial biodiversity and plant species is of **Medium-Low** significance, prior to mitigation. With mitigation, this impact can be lowered further. It is therefore recommended that the proposed project be considered for approval, but subject to the proposed mitigation measures listed in the specialists' report. Please refer to Appendix G2 of the Draft BAR for the Botanical Impact Assessment.
9	**Animal Species Assessment**	**High**	**<u>High</u>** • *Aves-Hydroprogne caspia* • *Aves-Bradypterus sylvaticus* • *Aves-Polemaetus bellicosus*	The animal species theme has a High sensitivity rating for the site. A specialist was appointed to compile a report, and verified the site as **Low** sensitivity for this theme. Please refer to Appendix G3 of the Draft

No	Specialist Assessment	Screening Tool Sensitivity	Sensitive features identified in the Environmental Screening Tool Report	Motivation for inclusion or omission of report
			• *Aves-Circus ranivorus* • *Aves-Neotis denhami* • *Aves-Pelecanus onocrotalus*	BAR for the Terrestrial Biodiversity, Terrestrial Faunal and Avifaunal Compliance Statement Report.

9.2 Summary of the Findings of the Site Sensitivity Verification Report (Appendix G6)

A summary of the Site Sensitivity Verification Report findings were prepared to confirm baseline sensitivities and regulatory compliance.

9.2.1 Agricultural Theme

The agricultural theme was rated as **Very High** by the screening tool report since the site has mapped agricultural features. An agricultural specialist was appointed to compile a report and the agricultural specialist has verified the actual sensitivity of the site as being of **Low** to **Medium** agricultural sensitivity. Please refer to Appendix G5 of the Draft BAR for the Site Sensitivity Verification and Agricultural Compliance Statement.

9.2.2 Animal Species Theme

The animal species theme has a **High** sensitivity rating for the site. A specialist was appointed to compile a report, and verified the site as **Low** sensitivity for this theme. Please refer to Appendix G3 of the Draft BAR for the Terrestrial Biodiversity, Terrestrial Faunal and Avifaunal Compliance Statement Report.

9.2.3 Aquatic Biodiversity Theme

The aquatic biodiversity theme was rated as **Very High** by the screening tool report since the property has mapped aquatic features. A specialist was appointed to compile a report, and verified the site as sensitive and therefore required a full Aquatic Impact Assessment. Please refer to Appendix G1 of the Draft BAR for the Aquatic Impact Assessment.

9.2.4 Archaeological and Cultural Heritage Theme

A Notice of Intent to Develop (NID) was compiled and submitted to Heritage Western Cape, Heritage Western Cape (HWC) has confirmed "there is no reason to believe that the proposed upgrade of the raw abstraction works and pumpstation on Farm 143 Portions 15; 24; 25, Klipheuvel, Moordkuil Raw Water Extraction Works and Pump Station, Klein Brak River will impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required.". Please refer to Appendix G7 of the Draft BAR for the NID and Appendix E1 of the Draft BAR for the Record of Decision from HWC.

9.2.5 Civil Aviation Theme

The screening tool report indicated a **High** sensitivity rating for this theme. However, the proposed works involve upgrades to an existing pump station. No tall structures, masts, cranes, or aviation-obstructive infrastructure will be introduced. Therefore, no civil aviation impacts are expected and the EAP (Mr Michael Bennett) verifies the site as being of **Low** sensitivity for this theme. In accordance with the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Civil Aviation Installations published under Government Notice No. 320 of 20 March 2020, "1.1.2. on a site where the information gathered from the site sensitivity verification differs from the designation of "very high", "high" or "medium" sensitivity on the screening tool and it is found to be of a "low" sensitivity, no further assessment requirements are identified". The SACAA Authority was informed of the project during the previous application process, and it was determined that the SACAA has no comments on the proposed upgrading of the Moordkuil Pump Station. SACAA will be included

in the I&AP Register during the Draft BAR Public Participation Process and confirmation of their previous comments will be obtained.

9.2.6 Defence Theme

The Screening Tool Sensitivity for this theme was **Low** and therefore no further investigation is required.

9.2.7 Palaeontology Theme

The palaeontology theme was rated as **Very High** by the screening tool report since the site has mapped palaeontology features. A specialist was appointed and verified the true paleosensitvity of the site to be **Low**. Please refer to Appendix G4 of the Draft BAR for the Palaeontological Impact Assessment Exemption Letter.

9.2.8 Plant Species Theme

The plant species theme has a **High** sensitivity rating for the site. A specialist was appointed to compile a report, and determined one can argue that the ratings should be lower for certain areas of the site. Given the transformed or degraded state of the vegetation, the impact on terrestrial biodiversity and plant species is of **Medium-Low** significance, prior to mitigation. With mitigation, this impact can be lowered further. It is therefore recommended that the proposed project be considered for approval, but subject to the proposed mitigation measures listed in the specialists' report. Please refer to Appendix G2 of the Draft BAR for the Botanical Impact Assessment.

9.2.9 Terrestrial Biodiversity Theme

The screening tool rated this sensitivity as **Very High** due to the ecological threat status and the vegetation types in which the site is located. The site is mapped as Garden Route Granite Fynbos which has an Ecological Threat Status of Critically Endangered; and Grootbrak Dune Strandveld which also has an Ecological Threat Status of Critically Endangered. A specialist was appointed to compile a report, and verified the site sensitivity to be **Low**. Please refer to Appendix G3 of the Draft BAR for the Terrestrial Biodiversity, Terrestrial Faunal and Avifaunal Compliance Statement Report.

9.2.10 Landscape / Visual Impact

We disagree with the Screening Tool's indication that a Visual/ Landscape Assessment is required. The proposed activities comprise the upgrading of an existing pump station, with the majority of the upgrades occurring within the current facilities footprint.

No new above-ground structures of visual significance will be introduced, and the project will not alter the existing landscape character, which is already defined by the existing pump station and other infrastructure. As such, the proposed development will not result in any change to the visual integrity, sense of place, or landscape quality of the area. A Visual Impact Assessment is therefore not warranted.

9.2.11 Hydrology Assessment

The screening tool report recommended that a Hydrology Assessment be conducted. We do not believe that it is required or that it will add any value to the Basic Assessment Report due to the hydrological and hydraulic considerations associated with the proposed development that were assessed through the detailed engineering design process. A specialist hydraulic

engineering study titled 'Review of the Proposed Hydraulic Design of the Intake Works with 2D Hydrodynamic Modelling of Scour/Deposition and 3D CFD Modelling of Hydraulic Forces' was undertaken and is included in the Draft BAR in Appendix G6 of the Draft BAR (Concept and Viability Design Report). This study assessed flow dynamics, hydraulic forces, scour potential, sediment transport processes and the interaction between the proposed infrastructure and the river system. The findings of this study informed the final engineering design of the proposed abstraction works. In addition an Aquatic Impact Assessment was undertaken and is included in the Draft BAR (Appendix G1 – Aquatic Impact Assessment), therefore the hydrological, hydraulic and aquatic environmental considerations were already assessed through the engineering design investigations and specialist assessments and a new Hydrology Impact Assessment is not warranted.

9.2.12 Socio-Economic Assessment

We disagree that a Socio-Economic Impact Assessment is required. The proposed upgrades to the Moordkuil Pump Station will not alter land use, restrict access, displace communities, or affect livelihoods. Construction is short-term and small in scale, and socio-economic conditions will remain unchanged. No specialist socio-economic study is warranted.

Table 13: Summary of Site Sensitivity Verification According to Screening Tool Theme Sensitivity Scores:

Theme	Screening Tool Sensitivity	Actual Sensitivity	Verification
Agriculture	**Very High**	**Low-Medium**	According to the Site Sensitivity Verification and Compliance Statement compiled by SoilZA, the actual sensitivity of the site is verified as being **Low-Medium** (refer to Appendix G5 of the Draft BAR)
Animal Species	**High**	**Low**	According to the Terrestrial Biodiversity, Terrestrial Faunal and Avifaunal Species Compliance Statement Report compiled by Blue Skies Research, the actual sensitivity of the site is verified as being **Low** (Refer to Appendix G3 of the Draftl BAR).
Aquatic Biodiversity	**Very High**	**Very High**	According to the aquatic specialist from Upstream Consulting the site is regarded as sensitive and therefore required a full Aquatic Impact Assessment. Please refer to Appendix G1 of the Draft BAR for the Aquatic Impact Assessment.
Archaeological, Cultural Heritage	**Low**	**Low**	A Notice of Intent to Develop (NID) was compiled and submitted to Heritage Western

			Cape, Heritage Western Cape (HWC) has confirmed "there is no reason to believe that the proposed upgrade of the raw abstraction works and pumpstation on Farm 143 Portions 15; 24; 25, Klipheuvel, Moordkuil Raw Water Extraction Works and Pump Station, Klein Brak River will impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required.". Please refer to Appendix G7 of the Draft BAR for the NID and Appendix F1 of the Draft BAR for the Record of Decision from HWC.
Civil Aviation	**High**	**Low**	the proposed works involve upgrades to an existing pump station. No tall structures, masts, cranes, or aviation-obstructive infrastructure will be introduced. Therefore, no civil aviation impacts are expected and the EAP (Mr Michael Bennett) verifies the site as being of **Low** sensitivity for this theme. In accordance with the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Civil Aviation Installations published under Government Notice No. 320 of 20 March 2020, "1.1.2. on a site where the information gathered from the site sensitivity verification differs from the designation of "very high", "high" or "medium" sensitivity on the screening tool and it is found to be of a "low" sensitivity, no further assessment requirements are identified". The SACAA Authority was informed of the project during the previous application process, and it was determined that the SACAA has no comments on the proposed upgrading of the Moordkuil Pump Station. SACAA will be included in the I&AP Register

			during the Draft BAR Public Participation Process and confirmation of their previous comments will be obtained.
Defence	**Low**	**Low**	No further action required.
Palaeontology	**Very High**	**Low**	A Notice of Intent to Develop (NID) was compiled and submitted to Heritage Western Cape, Heritage Western Cape (HWC) has confirmed "there is no reason to believe that the proposed upgrade of the raw abstraction works and pumpstation on Farm 143 Portions 15; 24; 25, Klipheuvel, Moordkuil Raw Water Extraction Works and Pump Station, Klein Brak River will impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required.". Please refer to Appendix G7 of the Draft BAR for the NID and Appendix E1 of the Draft BAR for the Record of Decision from HWC. In addition, a specialist was appointed and verified the true paleosensitvity of the site to be **Low**. Please refer to Appendix G4 of the Draft BAR for the Palaeontological Impact Assessment Exemption Letter.
Plant Species	**High**	**High – Medium to Low (Site Sensitivity varies across the site as per the specialist's report)**	MB Botanical Surveys was appointed to compile a report, and determined one can argue that the ratings should be lower for certain areas of the site. Given the transformed or degraded state of the vegetation, the impact on terrestrial biodiversity and plant species is of **medium-low** significance, prior to mitigation. With mitigation, this impact can be lowered further. It is therefore recommended that the proposed project be considered for approval, but subject to the proposed mitigation measures listed in the specialists' report. Please refer to

			Appendix G2 of the Draft BAR for the Botanical Impact Assessment.
Terrestrial Biodiversity	**Very High**	**Low**	Blue Skies Research was appointed to compile a report, and verified the site sensitivity to be **Low**. Please refer to Appendix G3 of the Draft BAR for the Terrestrial Biodiversity, Terrestrial Faunal and Avifaunal Compliance Statement Report.

9.3 Summary of Key Findings & Recommendations of Potential Impacts

The following specialist assessments have been undertaken for the purpose of providing additional insights into the potential impacts of the proposed upgrades to the Moordkuil Pump Station on the receiving environment and to identify all licences and permits required:

- Aquatic Biodiversity Impact Assessment;
- Botanical Impact Assessment
- Terrestrial Biodiversity, Terrestrial Faunal and Avifaunal Compliance Statement Report;
- Agricultural Compliance Statement;
- Palaeontology Exemption Letter.

9.3.1 Aquatic Biodiversity Impact Assessment (Appendix G1):

The proposal is to be undertaken within and near the Moordkuil River, therefore Colin Fordham of Upstream Consulting was appointed to conduct and Aquatic Impact Assessment to assess the impacts of the proposed development on the surrounding aquatic environment. According to the Aquatic Impact Assessment Report (Appendix G1), the study area lies within the Southern Coastal Belt DWA Level 1 Ecoregion and DWS quaternary catchment K10F of the Gouritz Catchment Management Area. The Moordkuil River, a tributary of the Klein Brak River, is the largest river in this catchment. There are many unnamed perennial and non-perennial tributaries and dams in this catchment, with much abstraction occurring for agricultural practices. The Moordkuil River is categorised as being in moderate health, having a Present Ecological State (PES) score of C, which is Moderately modified.

The site sits at an elevation of between 1 and 15 m.a.s.l. on a moderately steep bank of the riparian section adjacent to the river. According to the latest national desktop river and wetland inventories, the Moordkuil River is incorrectly classified as an estuary at this location (Figure 23). The DC 4 road bridge prevents any saltwater ingress from the estuary. There are NFEPA or National Wetland Map 5 wetlands in the study area that will not be impacted by the proposed development. According to national river map all these systems eventually drain into the Moordkuil River. Within the larger 500m buffer area there is an additional three non-perennial systems.

The study area is outside of any within the desktop mapped Strategic Water Source Areas (Figure 24). However, according to the Western Cape Biodiversity Spatial Plan (WCBSP) (CapeNature, 2023) the biodiversity priority areas mapped by the WCBSP relative to the study

area are shown in Figure 25. It indicates that the drainage lines support CBA 1 River, CBA 2 Estuary and CBA 2 Terrestrial. The WCBSP identifies biodiversity priority areas, Critical Biodiversity Areas, Ecological Support Areas (ESAs) and Other Natural Areas (ONA), which, together with Protected Areas (PA), are important for the persistence of a viable representative sample of all ecosystem types and species, as well as the long-term ecological functioning of the landscape. The primary purpose of a map of CBAs and ESAs is to guide decision-making about where best to locate development. Only low-impact, biodiversity- sensitive land-uses are appropriate within CBA. No rare or endangered aquatic biota were identified on site.

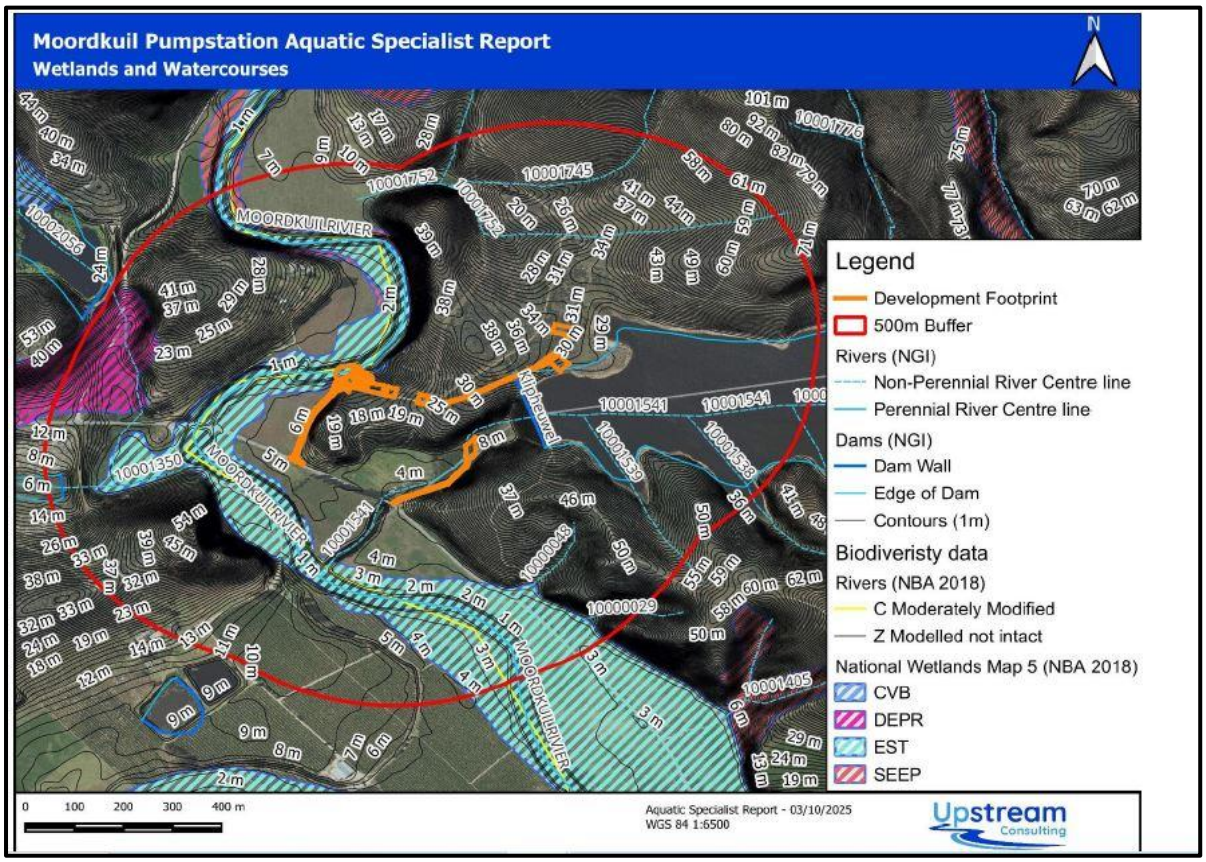

Figure 23: The site in relation to the national wetland and river desktop data inventories.

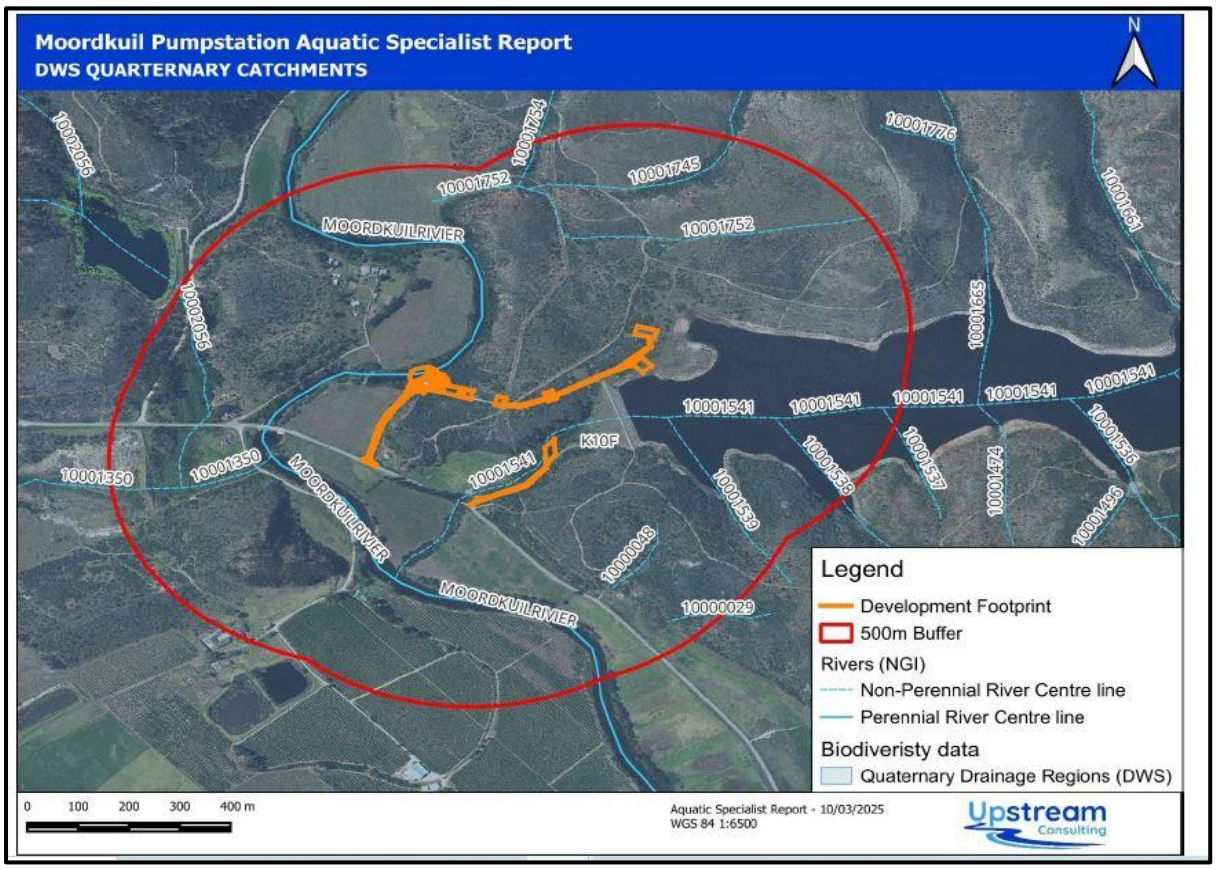

Figure 24: Map of the site in relation to SWSAs and quaternary catchments.

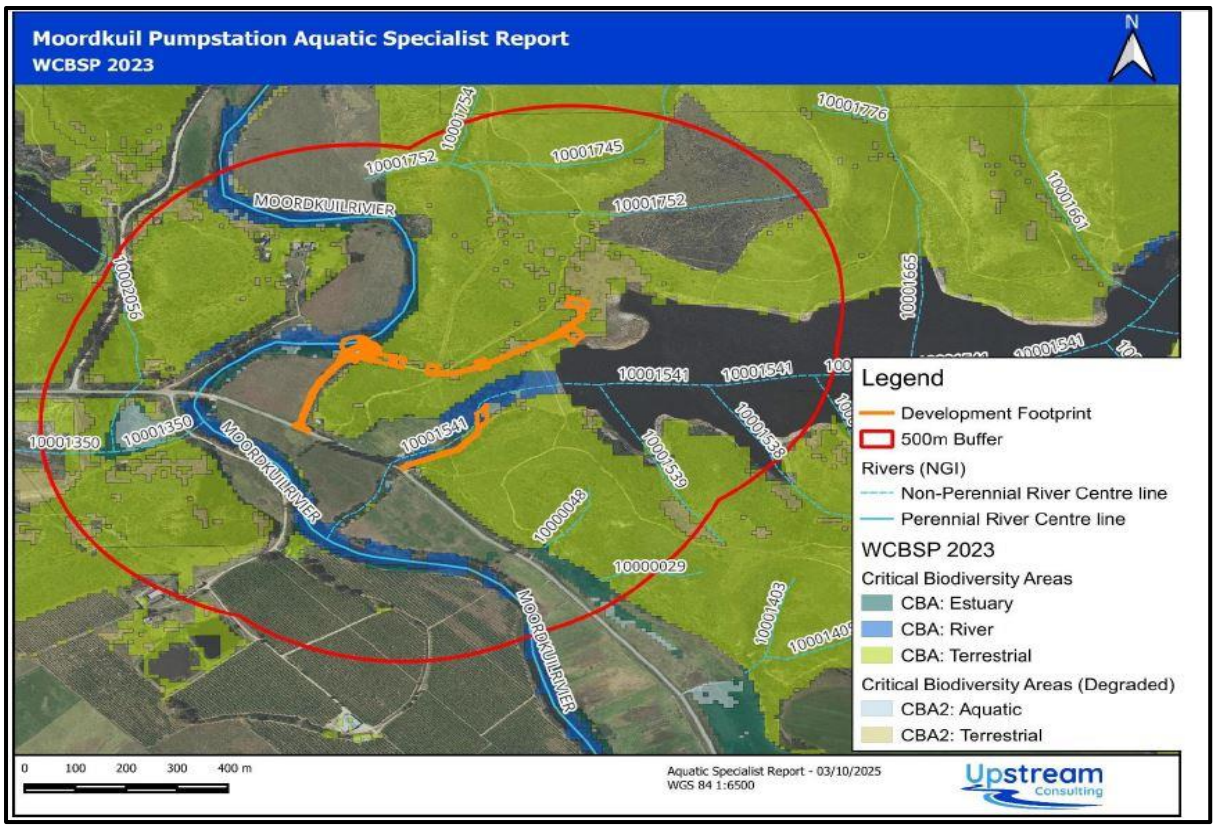

Figure 25: Map of the site in relation to the WCSBP conservation priority areas.

Aquatic Assessment:

Following the contextualisation of the study area with the available desktop data, a site visit was conducted to groundtruth the findings and delineate the aquatic habitat within study area. The Moordkuil Perennial River (PR) Hydrogeomorphic (HGM) unit 1 is the system within which the abstraction point for the pumpstation is located and the only system that will be impacted by the construction of the facilities, HGM 3 will be impacted by the establishment of construction of site camp 2. In total there are ten different HGM units identified and mapped within the 500m study area. The additional information collected in the field allowed for the development of an improved baseline river and wetland delineation map (Figure 26 and 27).

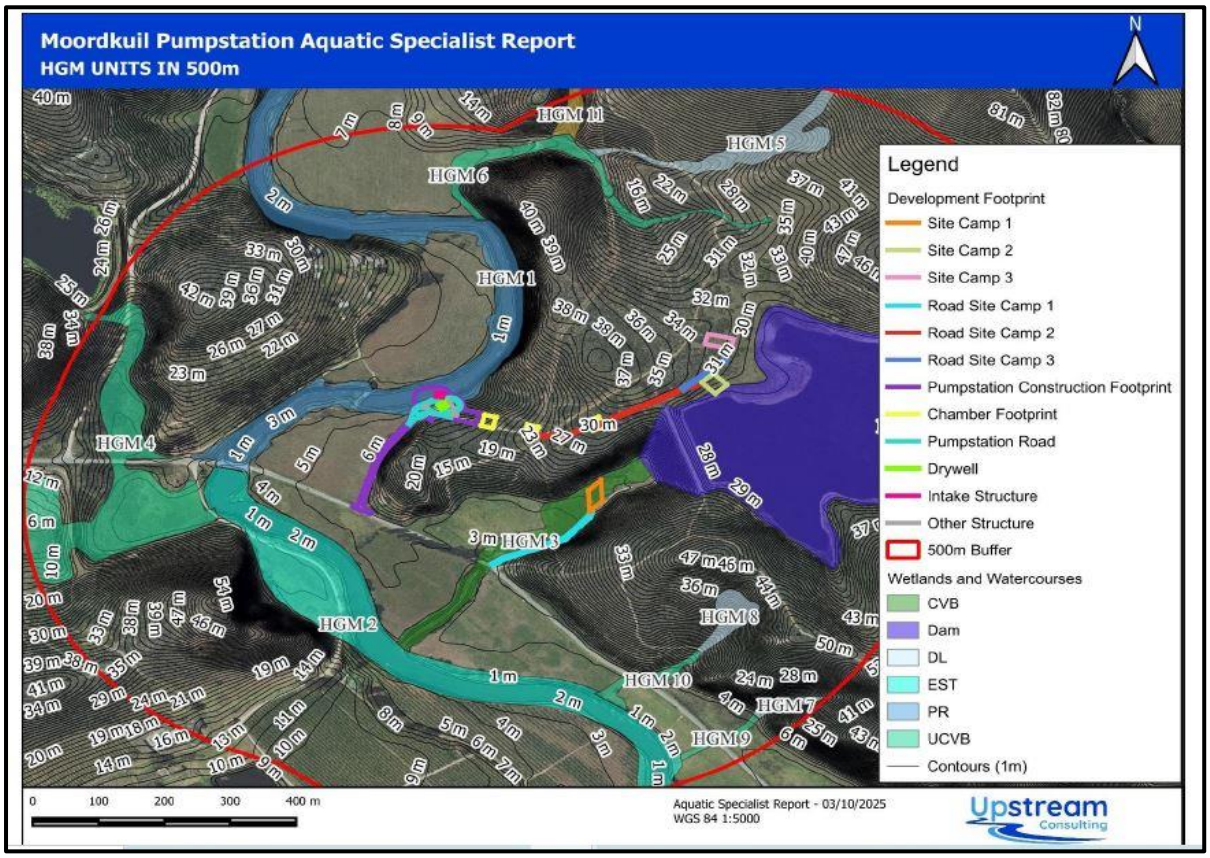

Figure 26: Map of delineated aquatic habitat within the study area following site verification.

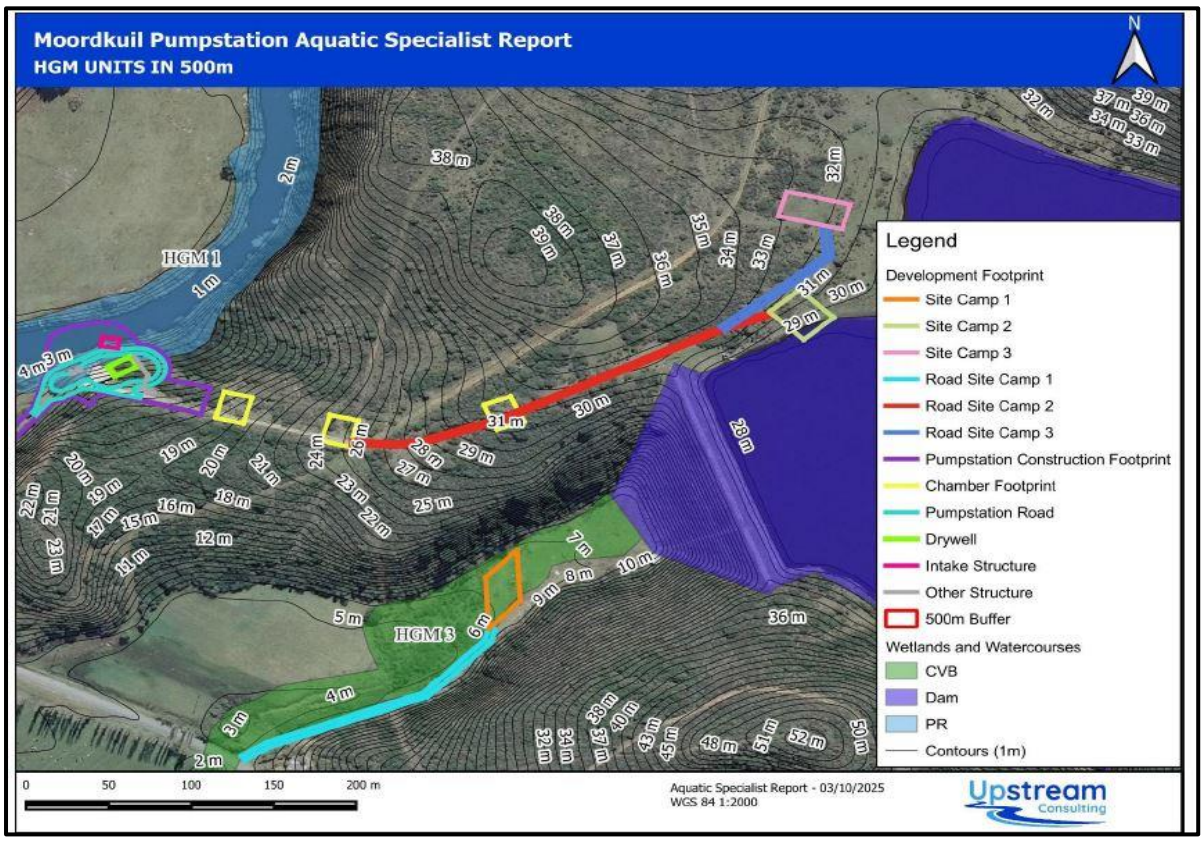

Figure 27: A map of the delineated aquatic habitat relative to the development footprint at a larger scale to illustrate scope of works relative to the aquatic habitat.

Present Ecological State: The Present Ecological State (PES) of a river or wetland represents the extent to which it has changed from the reference or near pristine condition (Category A) towards an impacted system which can be critically modified at Category F. The PES of the four impacted systems for this project were determined. The three wetland systems were classified according to the WET Health V2 tool (Macfarlane et al., 2020) and the two River systems were classified according to the rapid Index of Habitat Integrity (IHI) tool (Kleynhans, 1996).

Riparian PES:

Table 14: HGM units 1 Present Ecological State:

Resource	IHI Score (Average % Intact)	Class	Rationale
HGM 1	60,00	C	The system has been largely impacted by flow, and bank condition modifications. The majority of the system has being impacted through water abstraction and agricultural activities. The riparian zone has been subjected to habitat loss due to clearance and a high level of alien plant infestation. A large loss of natural habitat, biota and basic ecosystem functions has occurred.

Wetland PES:

Table 15: HGM 3 Present Ecological State:

	Wetland PES Summary			
Wetland name	HGM 3			
Assessment Unit	Channelled VB wetland			
Areal extent (Ha)	48,5 Ha			
PES Assessment	**Hydrology**	**Geomorphology**	**Water Quality**	**Vegetation**
Impact Score	6,1	5,1	4,2	5,5
PES Score (%)	39%	49%	58%	45%
Ecological Category	E	D	D	D
Trajectory of change	→	→	→	→
Combined Impact Score	5,5			
Combined PES Score (%)	45%			
Combined Ecological Category	D			

Ecosystem Services and EIS: Wetlands are globally threatened ecosystems and are well-recognized for the ecosystem services which they supply. Furthermore, these ecosystems make potentially important ecosystem services contributions to several broad-scale imperatives of government, including water resource management; biodiversity conservation; human safety and disaster resilience; socio-economic development and poverty elimination; and climate change mitigation and adaptation. Individual wetland/riparian areas differ according to their characteristics, contexts and the suite of ecosystem services which they supply to society (Kotze et al. 2020). Thus, there is a need to assess and compare wetland areas in terms of ecosystem services delivery.

A WET-Ecoservices (Version 2) (Kotze et al., 2020) is a field-based assessment was undertaken to assess the ecosystem services supplied by the different wetland and riparian systems. The assessment technique has recently been revised and now distinguishes clearly both ecosystem services' supply and the demand for all ecosystem services. This helps determine the potential of the wetland for delivering ecosystem services, by understanding its capacity to produce a service while also considering the societal demand for that service.

The Ecological Importance and Sensitivity (EIS) assessment method, as outlined by Rountree and Kotze (2013), provides a structured, scientifically grounded approach for evaluating the capacity of a wetland to support biodiversity, maintain ecological processes, and sustain ecosystem resilience. EIS determines the significance of a watercourse in terms of conservation priority and its sensitivity to disturbances or changes in land use. The EIS score guides decision-making during environmental assessments by identifying wetlands that warrant higher protection, even if they are degraded, due to their irreplaceable ecological functions. It ensures that development planning aligns with ecosystem sustainability principles as outlined in the National Water Act and NEMA.

HGM 3 system

Table 16: Summary of Ecosystem Services Assessment for the HGM 3 wetland:

		Present State			
	ECOSYSTEM SERVICE	Supply	Demand	Importance Score	Importance
REGULATING AND SUPPORTING SERVICES	Flood attenuation	1.3	0.2	0,0	Very Low
	Stream flow regulation	0.0	4.0	1,2	Low
	Sediment trapping	2.3	0.0	0,8	Very Low
	Erosion control	0.8	4.0	1,3	Low
	Phosphate assimilation	2.3	0.0	0,8	Very Low
	Nitrate assimilation	2.3	0.0	0,8	Low
	Toxicant assimilation	3.8	0.0	2,3	Moderately High
	Carbon storage	1.9	2.7	1,7	Moderate
	Biodiversity maintenance	1.9	4.0	2,4	Moderately High
PROVISIONING SERVICES	Water for human use	4.0	4.0	4,0	Very High
	Harvestable resources	3.0	0.3	1,7	Moderately Low
	Food for livestock	1.5	1.3	0,7	Very Low
	Cultivated foods	1.8	4.0	3,0	High
CULTURAL SERVICES	Tourism and Recreation	3.5	0.3	2,2	Moderate
	Education and Research	1.8	0.3	0,4	Very Low
	Cultural and Spiritual	3.0	0.0	1,5	Moderately Low

Table 17: Summary of EIS score for the HGM 3 wetland system:

SUMMARY	HGM 3	
	Score (out of 4)	Rating
BIODIVERSITY IMPORTANCE	2,33	Moderate
FUNCTIONAL/HYDROLOGICAL IMPORTANCE	1,84	Low-Moderate
DIRECT BENEFITS TO SOCIETY	2,85	Moderate
Ecological Importance and Sensitivity (EIS)	**2,34**	**Moderate**

EIS – HGM 1

Table 18: Summary of Ecosystem Service Assessment for the HGM 1 Moordkuil River:

RIPARIAN SYSTEM	ECOLOGICAL IMPORTANCE AND SENSITIVITY CATEGORY (EIS)	RATIONALE
HGM 1 – Moordkuil River	HIGH EC=B	*There are rare and endangered fish species, but minimal diversity of habitat types, no sensitivity to water quality changes, medium species richness. Remaining patches of indigenous riparian vegetation provide refuge for animals and a short corridor between the valley bottom and hilltops. The site is also classified as CBA.*

Aquatic Buffer Zones: An aquatic buffer zones are defined as a zone of vegetated land designed and managed so that sediment and pollutant transport carried from source areas via diffuse surface runoff is reduced to acceptable levels (Macfarlane and Bredin 2016). A buffer area between activities and watercourses can assist with managing a variety of potential impacts and protecting the system from PES and EIS deterioration.

Currently there are no formalised riverine or wetland buffer distances provided by the provincial authorities and as such the buffer model as described Macfarlane and Bredin (2017) for wetlands, rivers and estuaries was used. Using the buffer tool, it was determined that a 28m buffer zone should be adopted around the HGM 3 system for Site Camps 2 and 3. Site Camp 1 and the pumpstation are already located within the extent of the HGM 1 and HGM 3 respectively and no further encroachment outside of the construction footprint should be permitted.

Adopting aquatic buffer zones between development activities and watercourses can significantly reduce potential impacts. Therefore, the buffer zones (28m in width) shown in Figure 28 are recommended for this project.

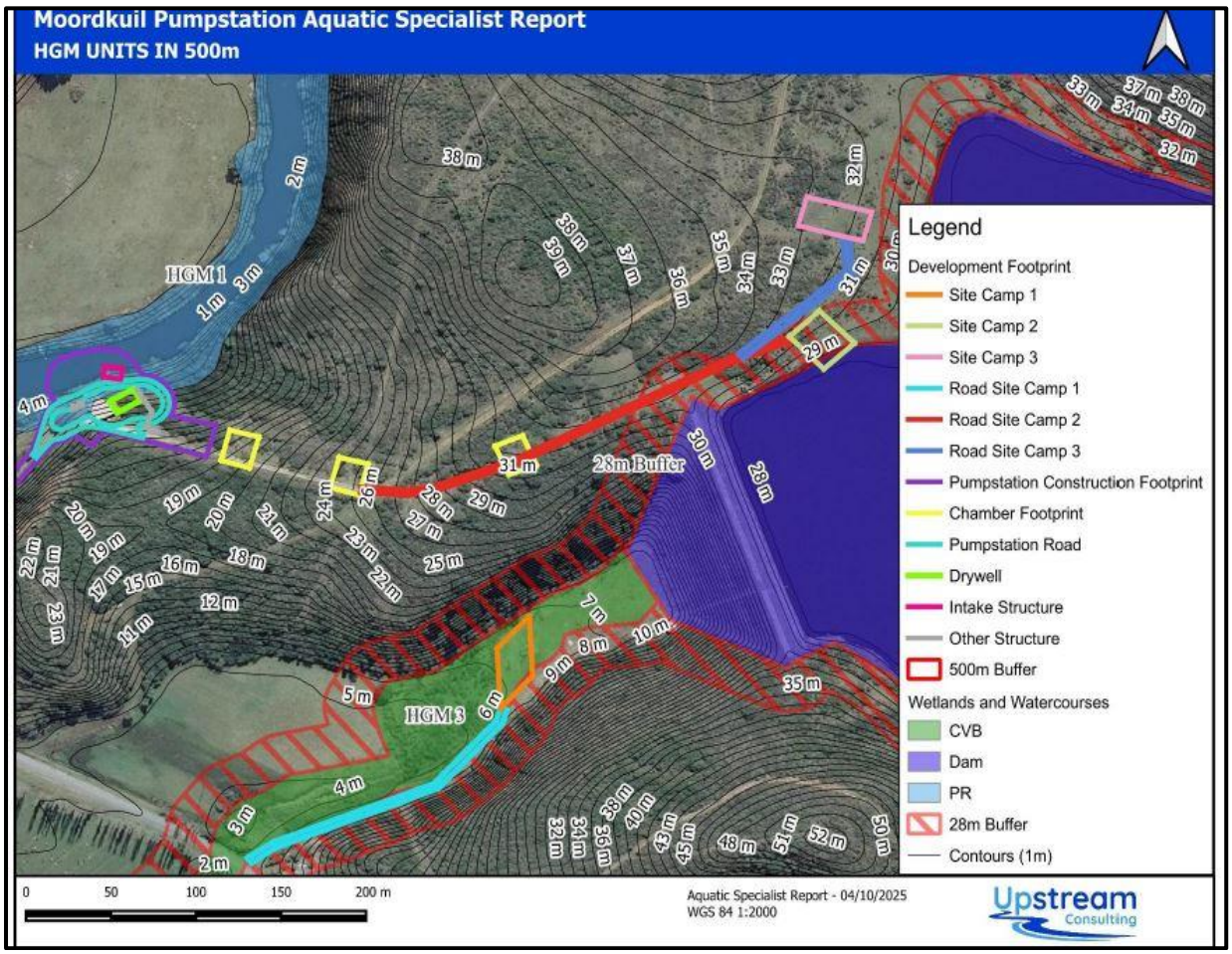

Figure 28: Recommended aquatic buffer zones.

Recommendations and Mitigations Measures:

Given the proposed scope of works for the three site camps, only Site Camp 3 is deemed feasible. Both Site Camps 1 and 2 are within the extent of HGM 3 and would require significant additional implementation of mitigation hierarchy, beyond standard mitigation measures as these camps would result in the net loss of wetland habitat. Site Camp 3 is acceptable, provided all the mitigation measures are strictly implemented and monitored. Therefore, Site Camp 3 will be used during the construction phase.

Due to the potential impacts of the proposed upgrades, the aquatic specialist has included the following mitigation measures:

Impact 1 – Disturbance/ loss of aquatic biota:
Design Phase:

- A construction method statement must be compiled and available on site. It must consider the no go area and include methods to avoid unnecessary disturbance.

Construction Phase:

- Any contractor found working within No-Go areas must be fined as per fining schedule/system setup for the project.
- It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. A list of these species needs to be added with photos into the EMPr. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas. Any use of herbicides in removing alien plant species is required to be investigated by the ECO before use.

- Where vegetation has been cleared in the riparian area it is recommended that cover components be reinstated appropriately. Only indigenous species are to be considered.
- Monitoring by an independent ECO during construction in all phases.
- The construction of both interim and permanent structures within the river channel should be minimized wherever possible, ensuring minimal disruption to flow patterns. In particular, the implementation of erosion control measures on the opposite bank should be avoided.

Operational Phase:

- In the long term, the maintenance and management of the infrastructure should follow an approved Environmental Management Plan for the Operational Phase, which must include the removal of invasive alien vegetation in the riparian zone adjacent to the pump station and access road.

Impact 2 – changes to the hydrological regime

Design Phase Considerations:

- Optimized Placement & Orientation – Where possible position the cofferdam to minimize disruption to the main flow path and align it with the natural flow direction to reduce turbulence.
- Permeability Considerations – If necessary, utilise a slotted or porous section to allow controlled water passage and reduce sudden pressure changes.
- Energy Dissipation Structures – Where necessary consider including stepped weirs, baffles, or flow deflectors to prevent excessive velocity increases and turbulence.
- Scour and Erosion Protection – Where necessary design reinforced edges with riprap, gabions, or concrete aprons to prevent localized scour.
- Sediment Transport Management – Where necessary ensure the structure allows for natural sediment movement to prevent excessive upstream deposition or downstream erosion.

Site Preparation Phase:

- Establish Controlled Access Routes: Limit disturbance to water flow and minimize construction related runoff.
- Flow Diversion & Bypass Measures: If possible install a controlled bypass system (e.g., pipes or channels) to maintain continuous downstream flow. Ensure the bypass capacity matches or exceeds expected base flow conditions.
- Contaminant Spill prevention measures: Store fuels, cement and chemicals away from the river and have containment measures in place.

Construction Phase:

- Control Water Flow During Construction: Carefully manage the rate and timing of water released during construction to avoid surges and ensure consistent downstream flow.
- Regular ECO Water Quality Monitoring: Conduct monitoring of water quality to track turbidity and contamination levels.
- Limit Water Diversion Duration: Minimize the time the flow is disrupted by construction activities to reduce impact on aquatic ecosystems.
- Controlled Dewatering: If contaminated, remove contaminated water onto shore and treat accordingly. Do not discharge untreated contaminated water back into the system.
- Efficient Temporary River Channel Construction: If required, implement bypasses and pumps with minimal disruption to the river's natural hydrology.

Operational Phase:

- Flood Control Measures: Regularly assess river levels and implement flood mitigation measures as required.
- Maintenance work: Any work associated with the maintenance of the water column infrastructure should be minimized in both spatial extent and duration. Preferably such work should take place during the drier months (December to April) to reduce hydrological impacts.

- Emergency infrastructure repair: Any flood damaged infrastructure should be repaired as soon as it is safe, and possible, to do so, to prevent further degradation and hydrological impacts.

Impact 3 – Geomorphological changes from erosion and sedimentation

Design phase considerations:

- Optimized Placement & Orientation – Where possible position the cofferdam to minimize disruption to the main flow path and align it with the natural flow direction to reduce turbulence.
- Permeability Considerations – If necessary, utilise a slotted or porous section to allow controlled water passage and reduce sudden pressure changes.
- Energy Dissipation Structures – Where necessary consider including stepped weirs, baffles, or flow deflectors to prevent excessive velocity increases and turbulence.
- Scour and Erosion Protection – Where necessary design reinforced edges with riprap, gabions, or concrete aprons to prevent localized scour.
- Sediment Transport Management – Where necessary ensure the structure allows for natural sediment movement to prevent excessive upstream deposition or downstream erosion.

Site Preparation Phase:

- Establish sediment control barriers: Install sediment fences, silt curtains, or berms around construction zones to contain sediment and prevent it from reaching water bodies.
- Stabilise disturbed areas: Apply erosion control techniques such as mulching, vegetation, or geotextiles to stabilize disturbed soils and reduce sediment runoff.

Construction Phase:

- Sediment trapping measures: Install sediment traps or basins at strategic points along construction sites to capture and manage sediment and minimise downstream contamination.
- Minimize disturbed areas: Limit the footprint of the construction zone and avoid unnecessary soil disturbance to reduce the potential for sediment mobilization.
- Monitor sedimentation: ECO monitor turbidity levels upstream and downstream of construction site to confirm the efficiency of mitigation measures and make adjustments as needed.
- Water diversion techniques: Divert clean water away from construction areas using berms or temporary channels to prevent sediment-laden water from entering watercourses.
- Control stormwater runoff: Use temporary sediment control measures, such as erosion mats or check dams, to control runoff and prevent excessive sedimentation during heavy rainfall events.

Operational Phase:

- Maintain natural water column sediment levels: Regularly clean and maintain coffer dam, and filtration systems to ensure they continue functioning effectively in capturing sediment and returning captured sediment back to the water column.
- Vegetative stabilization: Promote the growth of native vegetation in areas susceptible to erosion to stabilize soil and reduce sediment generation over time.
- Revegetation of exposed soils: In any areas that have been disturbed, replant vegetation and apply soil stabilisation techniques to prevent erosion and further sediment loss.
- Flood Control Measures: Regularly assess river levels and implement flood mitigation measures as required.
- Maintenance work: Any work associated with the maintenance of the water column infrastructure should be minimized in both spatial extent and duration. Preferably such work should take place during the drier months (December to April) to reduce hydrological impacts.
- Emergency infrastructure repair: Any flood damaged infrastructure should be repaired as soon as it is safe, and possible, to do so, to prevent further degradation and hydrological impacts.

Impact 4 – Water quality deterioration

Site Preparation & Construction Phase:

- Pollution Prevention:
  - Establish designated fuelling and maintenance areas away from the watercourse to prevent fuel and oil spills.
  - Store hazardous materials (e.g., cement, fuels, chemicals) in bunded areas away from the river.
  - Implement spill response procedures and have spill kits on-site.
  - Ensure proper waste disposal, including construction debris and domestic waste, to prevent contamination.
- Stormwater Management:
  - Design temporary stormwater control measures to prevent runoff from carrying pollutants into the river.
  - Use infiltration trenches or constructed wetlands to filter runoff before it enters the watercourse.

Operational Phase:

- Monitoring & Maintenance:
  - Regularly monitor water quality parameters (e.g., turbidity, dissolved oxygen, nutrients, heavy metals) to detect any degradation.
  - Implement adaptive management strategies if water quality deteriorates over time.
- Vegetative Buffer Zones:
  - Maintain or restore riparian vegetation to filter runoff, stabilize banks, and improve water quality.
  - Prevent livestock access to the river and site camps near infrastructure to reduce nutrient loading and bank erosion.
- Long-Term Pollution Control:
  - Establish protocols for handling accidental spills or contamination events.
  - Ensure all waste is deposed of at a registered waste disposal site.

The aquatic habitats within 500m of the project footprint were identified and mapped on a desktop level using available data. Following this, a site assessment was conducted to confirm desktop findings, gather additional information, and define the boundaries of the aquatic habitat. The groundtruthed findings are largely in alignment with the information of the desktop databases.

Risk assessment determined that there are two potentially impacted HGM units, namely the riparian system of the Moordkuil River, which is a perennial system, and HGM unit 3 which is a channelled valley bottom system. The Moordkuil River is the existing abstraction point and is already subjected to impacts from abstraction activities and is the location where both alternatives. However, the remaining habitat still provides important ecosystem services. It was recommended that no further deterioration of the habitat must be allowed outside of the designated construction footprint.

Impact assessment determined that after mitigation, Alternatives 1 and 2 both have similarly low impacts (after mitigation). The lowest impacts were from the No-Go Alternative. Mitigation should focus on minimising construction footprint and reduction of impacts on the hydrological and geomorphological characteristics of the watercourse. A robust monitoring programme should be developed and audited annually by a SACNASP registered ecologist.

In conclusion, there are fatal flaws associated with the proposed establishment of Site Camp 1 and 2 as the principals of impact avoidance (if possible), should have been implemented. The No-Go Alternative has the lowest impacts and therefore is the preferred alternative (from a freshwater perspective), but Site Camp 3 is acceptable, provided all the mitigation measures are strictly implemented and monitored. The proposed project requires water use authorisation

in terms of Chapter 4 and Section 21 of the National Water Act No. 36 of 1998, prior to the commencement of activities.

9.3.2 ***Botanical Impact Assessment (Appendix G2):***

Site Ecological Importance: In order to demonstrate the biodiversity sensitivity of the project area, a site ecological importance (SEI) map was prepared. This map considers the biodiversity importance of the receptor area and its resilience to impacts. The receptor area is described as the affected habitats (i.e. transformed/degraded areas, Moordkuil River & thicket/renosterveld). Most of the project footprint scored a Very Low value, while the thicket/renosterveld and riverine areas scored High and Medium values, respectively. These values were influenced by the size of areas in question, threat status and condition of the vegetation, potential presence of SCC, and connectivity with the biodiversity network. The results of the SEI analysis are presented in Table 19.

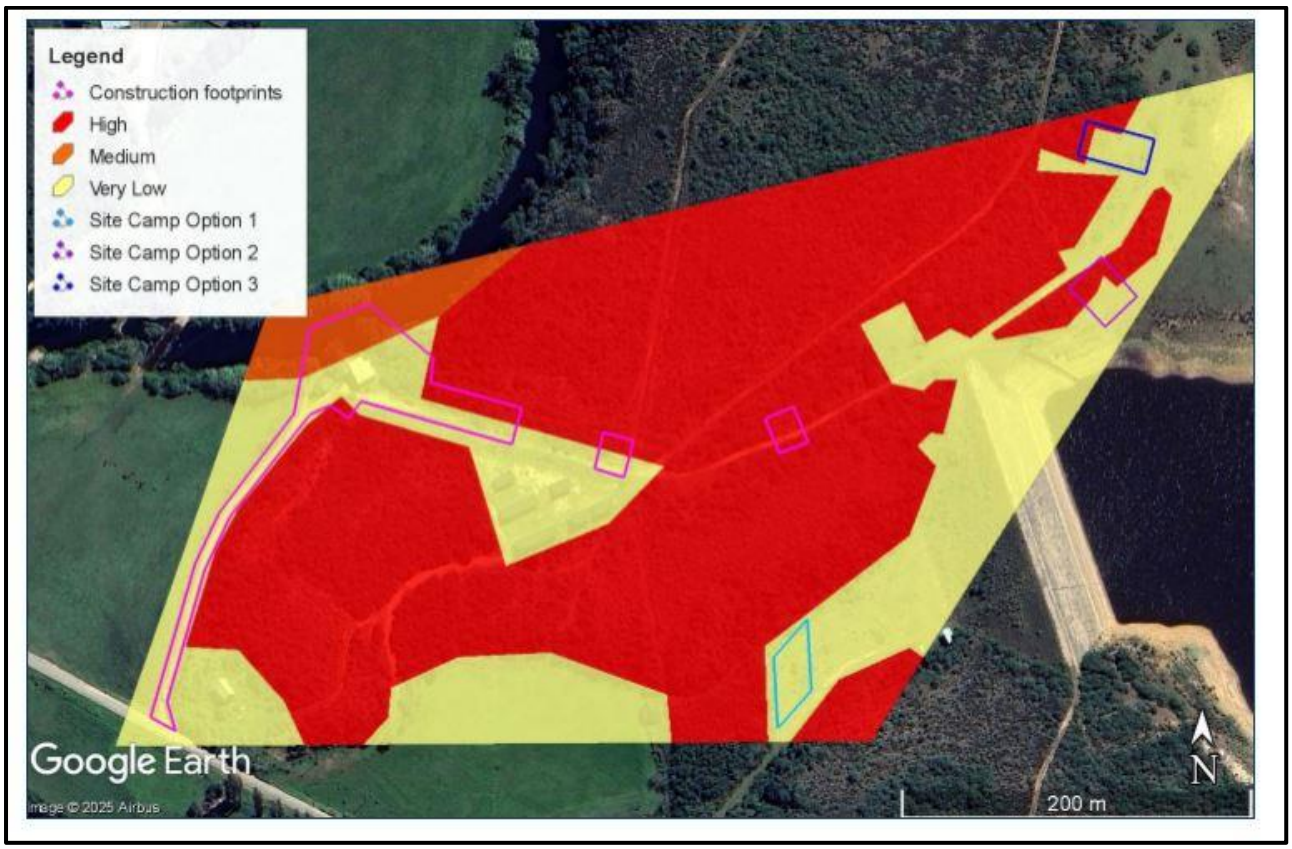

Figure 29: Site ecological importance map of the project area.

Table 19: SEI Analysis:

	CI	FI	BI	RR	SEI
Medium to good quality thicket/renosterveld	High	High	High	Medium	High
Moordkuil River corridor	High	High	High	High	Medium
Transformed or highly degraded areas	Low	Low	Low	Very High	Very Low

Terrestrial Biodiversity (vegetation):
With the information in hand, it is impossible to determine how much natural vegetation will be affected by the project. However, encroachments of thicket/renosterveld and riverine vegetation is expected. Fortunately, most of these encroachments will occur in degraded or regrowth vegetation next to existing infrastructure and farm roads. Post construction recovery is also expected to be quick if allowance is made for rehabilitation and alien control. Pioneer tree and shrub species, such as Vachellia karroo, Searsia spp, Dicerothamnus rhinocerotis, Eriocephalus africanus and Athanasia trifurcata, will populate the disturbed areas again within a couple of years. The affected vegetation is also well represented on the surrounding hills. With regards to the design alternatives for the pump station, the current preferred alternative will not result in a significantly greater impact than the previous alternative (Alternative B).

With regards to the site camp options, options 1 and 3 are more degraded or disturbed, and mainly covered by grasses and scattered pioneer shrubs/trees. Site option 2 contains considerably more vegetation and plant species. It is therefore recommended that site options 1 and/or 3 be considered for the site camp. Proper fencing will be needed around the site camp to prevent damage to the adjacent vegetation. In the case of option 1 below the dam wall, consideration must be given to an adjacent watercourse/wetland. During the construction phase care must be exercised to avoid the unnecessary disturbance of the adjacent vegetation. Proper fencing will be needed in this regard. As an indirect impact, earthworks will provide ideal conditions for the establishment of invasive alien species. The presence of aliens, such as black wattle, wild tobacco and a plethora of herbaceous species, will exacerbate this impact.

The project area is located partly inside a CBA corridor that runs along the foothills of theMossel Bay interior and connects with Outeniquas (Doringrivier Wilderness Area & Ruitersbos Nature Reserve) to the north. Apart from providing a backbone to the local biodiversity network, the corridor serves as an important passage along which fauna can migrate between the mountain and the foothills and along the foothills itself. With the project located close to the southern edge of the corridor one can expect a temporary impact on its functionality. The only mitigation measures would be to rehabilitate the disturbed areas post construction, encourage the re-establishment of indigenous vegetation on the disturbed surfaces (where practical), and implement alien control.

Plant Species:
The impact on plant species, including potential SCC and protected tree species, is also expected to be of low significance, with mitigation. This is due to the presence of mostly widespread and common thicket/renosterveld species. Two SCC were recorded on site, namely Hermannia lavandulifolia (VU) and Freesia cf fergusoniae (VU). Both observed occurrences can be avoided. Polygala pubiflora (VU) and Trichodiadema burgeri (VU) were also recorded by the author on an adjacent farm. Fortunately, all of them are still frequently encountered in suitable habitats in the Mossel Bay area. Given their habitat preferences and known iNaturalist records, the probability of SCC listed in the Screening Report to occur on site is indicated in Annexure 1 of Appendix G2. Seven species, including four sensitive species which names are withheld, have a medium to high probability to occur on the site or

surrounding area. The probability that any of these species will be impacted by the project will be less due to the degraded state of the project footprint. To mitigate the impact, topsoil from the construction areas should be protected and replaced after construction as part of the rehabilitation process. As a duty of care measure, consideration could also be given to search and rescue (S&R) of suitable species (e.g. bulbs and succulents). Of course, any replanting of rescued plant material must be done in matching habitats from which the plants originate. Two protected tree species will probably be affected, namely Sideroxylon inerme and Pittosporum viridiflorum. A permit will be needed for their removal.

The cumulative botanical impact of the project is expected to be equivalent to the impact on terrestrial biodiversity and plant species described above, i.e. the continued erosion of Albany thicket and/or Mossel Bay Shale Renosterveld, the biodiversity network, as well as the loss of plant species. In this instance, the slight loss of biodiversity and resultant cumulative impact will be acceptable (with mitigation), due to the transformed or degraded state of the affected vegetation and the nature of the project. A large part of the site can be rehabilitated and some of the vegetation restored.

The botanical specialist has recommended the following mitigation measures:

Construction Phase Mitigation Measures:

Impact on terrestrial biodiversity:

- Fence off the construction areas. The thicket/renosterveld outside the construction areas must not be disturbed in any way.
- With regards to the site camp options, preference should be given to options 1 and 3. Site option 2, which contains considerably more vegetation and plant species, should not be selected. In the case of site camp option 1 (below the dam wall), a buffer of sufficient width must be maintained between the camp and nearby watercourse.
- To mitigate the impact of vegetation clearing, topsoil and seedbearing plant material from the construction areas must be protected and replaced after construction as part of the rehabilitation process. As a duty of care measure, consideration should also be given to S&R of suitable species (e.g. bulbs & succulents). Of course, any replanting of rescued plant material must be done in matching habitats from which the plants originate. Bulbs should be removed along with some soil, placed in gel, bagged and then taken to a nursery for temporary storage or transplanted directly in the receiving area. S&R should be done at an appropriate time of the year, preferably when the soil is wet during the raining season. Ideally, bulbs should be salvaged during leaf fall, but before or after flowering. Please note that a CapeNature permit is needed for the relocation of indigenous plant species.
- Allow at least 24 months for the monitoring of rehabilitation success and alien infestation post construction. Keep the project footprint as well as an additional strip of 10-15 m wide clear of invasive aliens.

Impact on flora, SCC and protected tree species

- Fence off the construction areas. The thicket/renosterveld outside the construction areas must not be disturbed in any way.
- With regards to the site camp options, preference should be given to options 1 and 3. Site option 2, which contains considerably more vegetation and plant species, should not be selected. In the case of site camp option 1 (below the dam wall), a buffer of sufficient width must be maintained between the camp and nearby watercourse.
- To mitigate the impact of vegetation clearing, topsoil and seedbearing plant material from the construction areas must be protected and replaced after construction as part of the rehabilitation process. As a duty of care measure, consideration should also be

given to S&R of suitable species (e.g. bulbs & succulents). Of course, any replanting of rescued plant material must be done in matching habitats from which the plants originate. Bulbs should be removed along with some soil, placed in gel, bagged and then taken to a nursery for temporary storage or transplanted directly in the receiving area. S&R should be done at an appropriate time of the year, preferably when the soil is wet during the raining season. Ideally, bulbs should be salvaged during leaf fall, but before or after flowering. Please note that a CapeNature permit is needed for the relocation of indigenous plant species.

- Allow at least 24 months for the monitoring of rehabilitation success and alien infestation post construction. Keep the project footprint as well as an additional strip of 10-15 m wide clear of invasive aliens.

Operational Phase Mitigation Measures:
Impact on terrestrial biodiversity and Impact on flora, SCC and protected tree species:

- Monitor the construction footprint and all areas disturbed during construction for rehabilitation success and erosion. Where needed, rehabilitate/revegetate disturbed surfaces expediently. Erosion prevention measures may be needed on steep slopes, such as silt fences, logs or netting, to slow down runoff and potential erosion. Mulching and seeding with indigenous thicket/renosterveld seed may also be needed.
- As a long-term maintenance requirement, continue with alien clearing on and around the project footprint, focussing on invasive species such as black wattle, rooikrans, common thorn apple, prickly pear, wild tobacco, castor-oil plant, bugweed and spear thistle. These species are category 1b and 2 invaders that require compulsory control as part of an invasive species control programme. Please note that it is a legal requirement for landowners to clear alien vegetation on their land.

The site proposed for the project lies inside transformed or degraded Albany thicket and Mossel Bay Shale Renosterveld. The latter is currently listed as Critically Endangered. The site is also partly located inside the Western Cape biodiversity network, with most of it mapped as terrestrial and aquatic critical biodiversity areas (CBA) or degraded critical biodiversity areas (CBA2). Two SCC were recorded on site, namely Hermannia lavandulifolia (VU) and Freesia cf fergusoniae (VU). Both observed occurrences can be avoided. Two protected tree species (Sideroxylon inerme & Pittosporum viridiflorum) are also present on the site.

With regards to the Screening Reports, I do not disagree with the general ratings of High for plant species and Very High for terrestrial biodiversity. However, these ratings do not always take localised disturbances (transformations) on the ground into account, such as farm roads, cleared/degraded areas or incorrectly mapped vegetation types. For example, Garden Route Granite Fynbos and Groot Brak Dune Strandveld do not occur here. One can therefore argue that the ratings should be lower for certain areas of the site. Given the transformed or degraded state of the vegetation, the impact on terrestrial biodiversity and plant species is of medium-low significance, prior to mitigation. With mitigation, this impact can be lowered further.

It is therefore recommended that the proposed project be considered for approval, but subject to the proposed mitigation measures listed above.

9.3.3 Agricultural Compliance Statement (Appendix G5):

The overall conclusion of this assessment is that the proposed development is acceptable because it leads to no loss of future agricultural production potential.

This assessment disputes the high and very high sensitivity classification of the site by the screening tool and verifies the entire site as being of low to medium agricultural sensitivity because of its assessed cropping potential.

Although the climate, terrain, and soil suitability may allow for viable crop production, other factors constrain the potential of the site to practically deliver agricultural produce and therefore limit its agricultural production potential.

This is primarily because the location and use of the site will serve the purpose of upgrading the existing raw bulk water abstraction works. For this reason, the site is highly unlikely to ever be viably utilised for agricultural production, and its potential is therefore assessed here as very low

An agricultural impact must by definition cause a change to the future agricultural production potential of land. If there is no change, there is no impact. In this case, the entire development footprint is considered to be below the threshold for needing to be conserved as agricultural production land because of the limitations that make it unsuitable as viable cropland. The proposed development on this land will result in no loss of future agricultural production potential in terms of national food security.

Due to the facts that the proposed development will not occupy scarce, viable cropland, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed here as being of low significance and as acceptable.

From an agricultural impact point of view, it is recommended that the proposed development be approved. The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.

9.3.4 Palaeontology Exemption Letter (Appendix G4):

The Moordkuil River Pumpstation project lies entirely on the Quaternary sands and alluvium along the river valley that is indicated as moderately sensitive. The area is highly disturbed from agriculture and present thick vegetation so it is very unlikely that any transported Quaternary fossils occur there. In addition, any fossil material would be fragmented and unidentifiable, plus it would be out of primary context. The true palaeosensitivity should be low.

Proposed sites for the camp site are on the Enon Formation and indicated as very highly sensitive. This palaeosensitivity is also contested because the Enon Formation is a conglomerate with boulders, pebbles and sands and is a "dump" for such sediments that were deposited from the Cretaceous to the Tertiary which means there are no fossils that could assist with the dating. Furthermore, both sites are also highly disturbed from previous agriculture and clearing.

Since there is no chance of fossils of any importance occurring in the project footprint, we request exemption from any further palaeontological impact assessment. As far as the palaeontology is concerned there is no preferred site for the camp site.

9.3.5 Terrestrial Biodiversity, Terrestrial Faunal and Avifaunal Species Compliance Statement Report (Appendix G3):

Faunal Habitat Types Within the Study Area:
The study area is largely comprised of open and modified habitats with no remaining natural vegetation. These parts correspond to existing roads, firebreaks, buildings and infrastructure of the existing Moordkuil Pump Station. Similarly, the three alternative site camp locations are located in open areas with no remaining natural vegetation. The part of the project footprint

closest to the Moordkuil River harbours a small number of large (mostly invasive) trees, also intersecting the part of the river where the existing axial pump is located. Overall, the project footprint (including the alternative site camp locations) are spatially limited (>1 hectare) with an extra-limital placement with regards to surrounding natural areas. Taken together therefore, these small and modified areas offer little in the way of ecological functionality in the surrounding landscape.

The distributions of 65 mammal species overlap with the study area landscape (Appendix A of Appendix G3). Among these, 59 species are currently listed as "Least Concern" by the IUCN (IUCN, 2021), with the remaining six species representing mammal SCC. These mammal SCC include the following:

1. The Duthie's Golden Mole (Chlorotalpa duthieae) classified as "Vulnerable",
2. Fynbos Golden Mole (Amblysomus corriae) classified as "Near-Threatened",
3. Leopard (Panthera pardus) classified as "Vulnerable",
4. African Clawless Otter (Aonyx capensis) classified as "Near-Threatened",
5. Long-tailed Forest Shrew (Myosorex longicaudatus) classified as "Endangered", and
6. White-tailed Rat (Mystromys albicaudatus) classified as "Vulnerable" by the IUCN.

From the observational records available on the iNaturalist (www.iNaturalist.org) platform, 14 mammal species have been confirmed in the study area landscape (Appendix A of Appendix G3), with 12 of these species currently listed as "Least Concern" by the IUCN, and with two mammal SCC confirmed within the study area landscape. These SCC pertain to the:

1. Leopard (Panthera pardus) observed to the north-west of the site on September 2024, and the
2. African Clawless Otter (Aonyx capensis) observed to the north-east of the site on May 2020.

Field Survey

Evidence of eight mammal species were recovered within the study area, seven of which are currently classified as "Least concern" and one, the Duthie's Golden Mole (Chlorotalpa duthieae) classified as "Vulnerable" by the IUCN (Appendix C of Appendix G3). A single individual of this species was recorded just outside the western part of the project footprint underneath the trees adjacent to the Moordkuil River. Population sizes in this part of the landscape are likely limited, and will follow trees adjacent to the river channel, or within small adjacent "kloof" areas where thicket vegetation is located.

Other mammal species recorded include antelope such as the introduced Impala (Aepyceros melampus) in the game farm to the east of the site, as well as the naturally occurring Cape Gysbok (Raphicerus melanotis), Common Duiker (Sylvicapra grimmia) and Southern Bushbuck (Tragelaphus scriptus) which traverse the site from the adjacent natural areas. Tracks of the Cape Porcupine (Hystrix africaeaustralis) and a physical observation of one Vervet Monkey (Chlorocebus pygerythrus) were also noted. Finally, given an abundance of avifaunal prey species, one mammal predator, the Caracal (Caracal caracal), was also observed hunting Cape Spurfowl (Pternistis capensis) in the natural parts adjacent to the site. Taken together, mammal diversity in the natural areas adjacent to the study area appears relatively high, but with these species only ephemerally traversing the site on occasion.

Avifauna

Desktop Assessment

According to the SABAP2 records, 258 bird species have been recorded from the pentad overlapping the study area with 240 species classified as "Least Concern" by the IUCN, and 18 species which constitute avifaunal SCC (Appendix B of Appendix G3). These avifaunal SCC includes the:

1. Forest Buzzard (Buteo trizonatus) classified as "Near-Threatened",
2. Black Harrier (Circus maurus) classified as "Endangered",
3. African Marsh Harrier (Circus ranivorus) classified as "Least Concern",
4. Martial Eagle (Polemaetus bellicosus) classified as "Endangered",
5. Crowned Eagle (Stephanoaetus coronatus) classified as "Near-Threatened",
6. Bateleur (Terathopius ecaudatus) classified as "Endangered",
7. Secretarybird (Sagittarius serpentarius) classified as "Endangered",
8. Maccoa Duck (Oxyura maccoa) classified as "Endangered",
9. Curlew Sandpiper (Calidris ferruginea) classified as "Near-Threatened",
10. Caspian Tern (Hydroprogne caspia) classified as "Least Concern",
11. Lanner Falcon (Falco biarmicus) classified as "Least Concern",
12. Blue Crane (Anthropoides paradiseus) classified as "Vulnerable",
13. Denham's Bustard (Neotis denhami) classified as "Near-Threatened",
14. Knysna Warbler (Bradypterus sylvaticus) classified as "Vulnerable",
15. Lesser Flamingo (Phoeniconaias minor) classified as "Near-Threatened",
16. Knysna Woodpecker (Campethera notate) classified as "Near-Threatened",
17. Cape Cormorant (Phalacrocorax capensis) classified as "Endangered", and
18. Cape Gannet (Morus capensis) classified as "Endangered" by the IUCN.

Field Survey

In total, 43 bird species were recorded within the study area landscape with 42 species currently classified as "Least concern" (Appendix C of Appendix G3) and one, the Knysna Woodpecker (Campethera notata), classified as "Near- Threatened" by the IUCN. A single individual of this species was observed vocalising in the thicket vegetation in the "kloof" to the north of the site. To this end, the natural vegetation in the surrounding landscape along with the trees along the Moordkuil River drainage channel offer suitable habitat for this species.

Also notable is the presence of two raptor species, the Jackal Buzzard (Buteo rufofuscus) and Black-winged Kite (Elanus caeruleus), indicating the presence of a suitable terrestrial prey base over the natural parts of the landscape. In addition, the presence of the Pied Kingfisher (Ceryle rudis) and Brown-hooded Kingfisher (Halcyon albiventris) is linked to the abundance of fish species in the Moordkuil River drainage channel.

Other avifauna comprise vegetation associated species which are common in the surrounding landscape. Even so, the avifaunal species assemblage appears relatively species rich, indicating the ecological intactness of natural habitats adjacent to the site.

Butterflies

Twelve butterfly species were recorded in the study area landscape, all of which are currently classified as "Least Concern" by the IUCN (Appendix C of Appendix G3). The landscape harbours a high butterfly species richness, albeit comprising species which are common for the area. This high butterfly diversity indicates the ecological intactness of the natural areas surrounding the site which harbours an abundance of flowering plants

Faunal and avifaunal diversity within the study area

Faunal habitats in the study area landscape harbour a diverse mammal, avifaunal and butterfly species profile with both rare (SCC) and common species of "Least Concern" (IUCN, 2021) being present. In addition, predator-prey dynamics (as is evidenced by the presence of mammal and avifaunal predators) appear intact over the natural part of the landscape, also indicating intact and functional ecosystem dynamics.

In contrast, the project footprint and alternative site camp locations are limited to small and already cleared and modified areas with an extra-limital placement relative to the surrounding natural landscape. To this end, faunal and avifaunal movement over these parts is highly ephemeral with these parts supporting no permanent faunal subpopulations. From a terrestrial faunal and avifaunal perspective therefore, the project footprint and alternative site camp locations is of a "Low" sensitivity.

Species of Conservation Concern

Along with the six (one mammal, four avifaunal and one invertebrate) SCC listed in the DFFE Screening Tool (Table 1 in Appendix G3), the potential occurrence of 20 other (six mammal and 14 avifaunal) SCC within the study area was assessed, given their recovery in the desktop assessment (see Section 8 of Appendix G3). The probability of occurrence of each specific SCC within the study area landscape was assessed based on the following criteria:

Confirmed - The species was confirmed as present within or near the study area during the field survey.

High - The species was not confirmed as present within or near the study area during the field survey but has been recorded study area landscape in the case of mammals. In the case of avifauna, the species has been recorded in the overlapped SABAP2 pentad recently (less than 2 years ago) and in high number (>10 times) and is also likely to occur in the study area, given suitable habitat characteristics.

Medium - The species was not confirmed as present within or near the study area during the field survey and has not been recorded in the study area landscape in the case of mammals. In the case of avifauna, the species has been recorded a number of times (<10 times) in the overlapped SABAP2 pentad recently (less than 2 years ago). Suitable habitat for the species is also present in the study area landscape.

Low - No suitable habitat for the species is present in the study area. Furthermore, in the case of avifauna, the species has been recorded a low number of times (<3 times) or more than five years ago in the overlapped SABAP2 pentad.

Among the SCC considered, the presence of the Duthie's Golden Mole (Chlorotalpa duthieae) and Knysna Woodpecker (Campethera notata) was confirmed within the study area landscape during the field survey, with the Leopard (Panthera pardus) African Clawless Otter (Aonyx capensis), Forest Buzzard (Buteo trizonatus), Martial Eagle (Polemaetus bellicosus), Lanner Falcon (Falco biarmicus), Blue Crane (Anthropoides paradiseus), Denham's Bustard (Neotis denhami) and Knysna Warbler (Bradypterus sylvaticus) also likely to occur within the surrounding landscape given suitable habitat characteristics and previous observations of these species.

The study area landscape therefore harbours confirmed or likely subpopulations of at least three mammal and seven avifaunal SCC. Importantly, the project footprint and alternative site camp locations are spatially limited (<1 hectare) and extra-limital to the natural habitats where these species occur. To this end, the presence of these SCC over the receiving environment is likely to be highly ephemeral, with the proposed project unlikely to impact on their subpopulations (Section 11 of Appendix G3)

All other SCC considered have either a "Low" or "Medium" likelihood of occurring in the study area landscape, either given their scarcity in confirmed sightings or a lack of suitable habitat for these species. These SCC are not further considered during this assessment.

Terrestrial and Aquatic Biodiversity Features:
The larger part of the project footprint currently overlaps with areas regarded as degraded terrestrial and aquatic CBA2 owing to the open and transformed nature of these parts. Only a small section of the northern access road is mapped as a terrestrial CBA1, owing to the previous presence of Garden Route Granite Fynbos which has subsequently been cleared to form a fire break.

As noted from the ground-truthing phase, the project footprint and alternative site camp locations fail to meet the criteria of degraded terrestrial and aquatic CBA2 defined as "Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure." This follows from their already cleared and modified nature, retrieval as"Very low" SEI, small spatial extent of less than 1 hectare and an extra-limital placement relative to the surrounding natural landscape. Furthermore, these parts also harbour no permanent subpopulations of terrestrial faunal or avifaunal species, with only a highly ephemeral movement of species. In combination therefore, the project footprint and alternative site camp rather exist in an "Irreversibly modified" condition and offer little in the wat of supporting bioidversity features, ecosystems or ecological processes in the local landscape. The loss of these parts to development is unlikely to impact on ecosystem integrity at either local or regional scales.

Conclusion

While the proposed project is unlikely to have any major impacts on terrestrial biodiversity and terrestrial faunal and avifaunal species, the a temporary platform will be constructed through soil infill material behind the sheet piling accommodate a temporary platform for the piling rig in order to construct the concrete inlet hopper within the Moordkuil River. Because this temporary platform will intersect a sensitive freshwater environment, any such scope of works should follow recommendations from the freshwater specialist.

Aside from overlap with the freshwater ecosystem of the Moordkuil River, all other project footprints and site camp locations under both Preferred Alternative layout A and Alternative layout B are located in less sensitive areas from terrestrial biodiversity and terrestrial faunal and avifaunal perspectives and are unlikely to impact on ecological processes or biodiversity patterns at either local or regional scales. Both these development layouts and associated activities are therefore supported from terrestrial biodiversity and terrestrial faunal and avifaunal biodiversity perspectives.

10. ENVIRONMENTAL IMPACT ASSESSMENT AND METHODOLOGY

10.1 Potential Environmental Impacts Identified

The following potential environmental impacts have been identified by the EAP. These impacts have been substantiated by input from the various specialists and confirmed that these impacts would have the potential to occur during the construction and post-construction / Rehabilitation phases of the proposed upgrades to the Moordkuil Pump Station. These impacts would be required to be avoided, and if unavoidable, mitigated to an acceptable level of impact significance.

10.1.1 Construction Phase

- **Aquatic Assessment Impact 1 – Disturbance or loss of aquatic habitat –** The disturbance or loss of aquatic fauna and flora from direct physical destruction or disturbance which can result in further deterioration of aquatic habitat integrity, habitat fragmentation, and a reduction in the supply of ecosystem services.
- **Aquatic Assessment Impact 4 – Water quality deterioration –** Changes to the natural water quality parameters resulting in reduced ecosystem integrity and decreased biodiversity
- **Botanical Assessment Impact 1 – Impact on terrestrial biodiversity -** Clearing of mostly degraded thicket/renosterveld, temporary impact on the functionality of the biodiversity network, increased opportunity for alien infestation, and pollution of aquatic systems. During site clearing and vegetation clearing activities as well as construction activities.
- **Botanical Assessment Impact 2 – Impact of the project on flora, SCC and protected tree species –** loss of indigenous flora, potential SCC and protected tree species due to clearance activities associated with construction.
- **Socio-Economic Impact 1 – Job creation -** Estimated 10 employment opportunities will be created during the construction of the proposed facilities. Approximately 100% of these opportunities will accrue to historically disadvantaged individuals from the surrounding communities.

10.1.2 Construction and Operational Phase

- **Aquatic Assessment Impact 2 – Changes to the hydrological regime –** Changes to the natural movement of water flow through the Moordkuil River, by construction of infrastructure within the water column and riparian habitat. These changes can result in altered flow patterns, sediment transport, and erosion. Localized scour, sediment deposition upstream, and increased downstream velocity is possible to occur around water column infrastructure. There are risks of improperly designed infrastructure causing water column turbulence and vortex formation.
- **Aquatic Assessment Impact 3 – Geomorphological changes from erosion and sedimentation –** Changes to the form and geomorphological processes from clearing riparian vegetation and construction within the watercourse due to potential erosion and sedimentation from hydrological changes and increased sediment inputs.

10.1.3 Operational Phase

- **Botanical Assessment Impact 1 – Impact on terrestrial biodiversity -** Increased alien infestation and erosion due to poor rehabilitation efforts.
- **Botanical Assessment Impact 2 – Impact of the project on flora, SCC and protected tree species –** loss of indigenous flora, potential SCC and protected tree species due to poor rehabilitation efforts.

- **Socio-Economic Impact 2 – Security of availability of water supply -** The proposed development, if authorised, will have a positive cumulative socio-economic impact in terms of securing water storage and supply capacity, especially in times of drought. The benefits of security of water supply are far reaching for all. The additional water supply capacity could support further urban (and economic) development in Mossel Bay. The additional water supply capacity could support further urban (and economic) development in Mossel Bay. Further development may be associated with positive socio-economic benefits and growth for the surrounding community.

10.2 Methodology Used in Determination of the Significance of Potential Impacts

The assessment criteria utilised in this environmental impact assessment is based on, and adapted from, the Guideline on Impact Significance, Integrated Environmental Management Information Series 5 (Department of Environmental Affairs and Tourism (DEAT), 2002) and the Guideline 5: Assessment of Alternatives and Impacts in Support of the Environmental Impact Assessment Regulations (DEAT, 2006).

The impacts have henceforth been determined through the following parameters:

- The **extent** of the anticipated impact.
- The **duration** for which the impact will be exercised.
- The **probability** of occurrence of the anticipated impact.
- The **significance** of the anticipated impact.
- How **reversible** the anticipated impact would be.
- How **mitigable** the anticipated impact would be.
- The **degree of loss** of the resources.
- The **cumulative impact** of the anticipated aspect.
- The significance of the **consequence** of the aspect.

Table 20: Methodology for determining the Impacts of the proposed project.

Determination of the Extent (Scale)	
Site specific	On site or within 100m of the site boundary, but not beyond the property boundary
Local	The impacted area includes the whole or a measurable portion of the site and property, but could affect the area surrounding the development, including the neighbouring properties and wider municipal area.
Regional	The impact would affect the broader region (e.g. neighbouring towns) beyond the boundaries of the adjacent properties.
National	The impact would affect the whole country (if applicable)

Determination of Duration	
Temporary	The impact will be limited to the construction phase
Short term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than 8 months after the completion of the construction phase.
Medium term	The impact will last up to the end of the construction phase, where after it will be entirely negated in a period shorter than 3 years after the completion of construction activities.
Long term	The impact will continue for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.
Permanent	This is the only class of impact that will be non-transitory. Such impacts are regarded to be irreversible, irrespective of what mitigation is applied.

Determination of Probability	
Improbable	The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
Probable	There is a possibility that the impact will occur to the extent that provisions must therefore be made.
Highly probable	It is most likely that the impact will occur at some stage of the development. Plans must be drawn up to mitigate the activity before the activity commences.
Definite	The impact will take place regardless of any prevention plans

Determination of Significance (without mitigation)	
No significance	The impact is not substantial and does not require any mitigation action.
Low	The impact is of little importance but may require limited mitigation.

Medium	The impact is of sufficient importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impact to acceptable levels.
Medium-High	The impact is of high importance and is therefore considered to have a negative impact. Mitigation is required to manage the negative impacts to acceptable levels.
High	The impact is of great importance. Failure to mitigate with the objective of reducing the impact to acceptable levels could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.
Very High	The impact is critical. Mitigation measures cannot reduce the impact to acceptable levels. As such the impact renders the proposal unacceptable.

Determination of Significance (with mitigation)	
No significance	The impact will be mitigated to the point where it is regarded to be insubstantial
Low	The impact will be mitigated to the point where it is of limited importance.
Medium	Notwithstanding the successful implementation of the mitigation measures, the impact will remain of significance. However, taken within the overall context of the project, such a persistent impact does not constitute a fatal flaw.
High	Mitigation of the impact is not possible on a cost-effective basis. The impact continues to be of great importance and taken with the overall context of the project, is considered to be a fatal flow in the project proposal.

Determination of Reversibility	
Completely Reversible	The impact is reversible with implementation of minor mitigation measures
Partly Reversible	The impact is partly reversible but more intensive mitigation measures
Barely Reversible	The impact is unlikely to be reversed even with intense mitigation measures
Irreversible	The impact is irreversible, and no mitigation measures exist.

Determination of Degree to which an impact can be Mitigated	
Can be mitigated	The impact is reversible with implementation of minor mitigation measures
Can be partly mitigated	The impact is partly reversible but more intense mitigation measures
Can be barely mitigated	The impact is unlikely to be reversed even with intense mitigation measures
Not able to mitigate	The impact is irreversible, and no mitigation measures exist.

Determination of Loss of Resources	
No loss of resource	The impact will not result in the loss of any resources.
Marginal loss of resource	The impact will result in marginal loss of resources.
Significant loss of resources	The impact will result in significant loss of resources.
Complete loss of resources	The impact will result in a complete loss of all resources.

Determination of Cumulative Impact	
Negligible	The impact would result in negligible to no cumulative effects.
Low	The impact would result in insignificant cumulative effects.
Medium	The impact would result in minor cumulative effects.
High	The impact would result in significant cumulative effects.

Determination of Consequence significance	
Negligible	The impact would result in negligible to no consequences.
Low	The impact would result in insignificant consequences.
Medium	The impact would result in minor consequences.
High	The impact would result in significant consequences.

10.3 Description and Assessment of the Significance of Impacts Prior and After Mitigation

Based on the sections above, the potential impacts have been evaluated and have been described in the sections below:

10.3.1 Development/Construction Phase Impacts:

Alternative:	Preferred Alternative A	Alternative B	No-Go Alternative
PLANNING, DESIGN AND DEVELOPMENT PHASE			
SOCIO-ECONOMIC IMPACT 1			
Potential impact and risk:	**JOB CREATION:** • **Estimated 10 employment opportunities will be created during the construction of the proposed facilities.** • **Approximately 100% of these opportunities will accrue to historically disadvantaged individuals from the surrounding communities.**		
Nature of impact:	**Positive**	**Positive**	**NO IMPACT**
Extent and duration of impact:	**Local – short term**	**Local – short term**	
Consequence of impact or risk:	**N/A**	**N/A**	
Probability of occurrence:	**Definite**	**Definite**	
Degree to which the impact may cause irreplaceable loss of resources:	**No loss**	**No loss**	
Degree to which the impact can be reversed:	**N/A**	**N/A**	
Indirect impacts:	**N/A**	**N/A**	
Cumulative impact prior to mitigation:	**Low (+)**	**Low (+)**	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low (+)**	**Low (+)**	
Degree to which the impact can be avoided:	**N/A**	**N/A**	
Degree to which the impact can be managed:	**N/A**	**N/A**	
Degree to which the impact can be mitigated:	**N/A**	**N/A**	
Proposed mitigation:	**SEE BELOW**		
Residual impacts:	**Negligible**	**Negligible**	
Cumulative impact post mitigation:	**Low (+)**		
Significance rating of impact after mitigation	**Low (+)**	**Low (+)**	**NO IMPACT**

(e.g. Low, Medium, Medium-High, High, or Very-High)			

Mitigation Measures:

No mitigation required for this positive benefit. However, preference should be given to previously disadvantaged individuals from the local community when appointing contractors/ workers. All construction employees/ contractors must be appointed according to the relevant BBBEE and employment equity requirements of the Applicant.

Alternative:	**Preferred Alternative A**	**Alternative B**	**No-Go Alternative**
PLANNING, DESIGN AND DEVELOPMENT PHASE			
BOTANICAL ASSESSMENT IMPACT 1			
Potential impact and risk:	**IMPACT ON TERRESTRIAL BIODIVERSITY:** • **Clearing of mostly degraded thicket/renosterveld.** • **Temporary impact on the functionality of biodiversity network.** • **Increased opportunity for alien infestation.** • **Pollution of aquatic systems.**		
Nature of impact:	Negative	Negative	**NO IMPACT**
Extent and duration of impact:	Site Specific - Medium	Site Specific - Medium	
Probability of occurrence:	High	High	
Degree to which the impact may cause irreplaceable loss of resources:	Medium	Medium	
Degree to which the impact can be reversed:	Medium	Medium	
Indirect impacts:	None identified.	None identified.	
Cumulative impact prior to mitigation:	Medium-Low	Medium-Low	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Medium-Low (-)**	**Medium-Low (-)**	
Proposed mitigation:	**SEE BELOW**		
Cumulative impact post mitigation:	Low	Low	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low (-)**	**Low (-)**	**NO IMPACT**

Mitigation Measures:

- Fence off the construction areas. The thicket/renosterveld outside the construction areas must not be disturbed in any way.
- With regards to the site camp options, preference should be given to options 1 and 3. Site option 2, which contains considerably more vegetation and plant species, should not be selected. In the case of site camp option 1 (below the dam wall), a buffer of sufficient width must be maintained between the camp and nearby watercourse.
- To mitigate the impact of vegetation clearing, topsoil and seedbearing plant material from the construction areas must be protected and replaced after construction as part of the rehabilitation process. As a duty of care measure, consideration should also be given to S&R of suitable species (e.g. bulbs & succulents). Of course, any replanting of rescued plant material must be done in matching habitats from which the plants originate. Bulbs should be removed along with some soil, placed in gel, bagged and then taken to a nursery for temporary storage or transplanted directly in the receiving area. S&R should be done at an appropriate time of the year, preferably when the soil is wet during the raining season. Ideally, bulbs should be salvaged during leaf fall, but before or after flowering. Please note that a CapeNature permit is needed for the relocation of indigenous plant species.
- Allow at least 24 months for the monitoring of rehabilitation success and alien infestation post construction. Keep the project footprint as well as an additional strip of 10-15 m wide clear of invasive aliens.

Alternative:	**Preferred Alternative A**	**Alternative B**	**No-Go Alternative**
PLANNING, DESIGN AND DEVELOPMENT PHASE			
BOTANICAL ASSESSMENT IMPACT 2			
Potential impact and risk:	**IMPACT OF THE PROJECT ON FLORA, SCC & PROTECTED TREE SPECIES:** • **Loss of indigenous flora, potential SCC and protected tree species.**		
Nature of impact:	**Negative**	**Negative**	**NO IMPACT**
Extent and duration of impact:	**Site Specific - Medium**	**Site Specific - Medium**	
Probability of occurrence:	**High**	**High**	
Degree to which the impact may cause irreplaceable loss of resources:	**Medium**	**Medium**	
Degree to which the impact can be reversed:	**Medium**	**Medium**	
Indirect impacts:	**None identified.**	**None identified.**	
Cumulative impact prior to mitigation:	**Medium-Low**	**Medium-Low**	
Significance rating of impact prior to mitigation	**Medium-Low**	**Medium-Low**	

(e.g. Low, Medium, Medium-High, High, or Very-High)			
Cumulative impact post mitigation:	**Low**	**Low**	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low (-)**	**Low (-)**	**NO IMPACT**

Mitigation Measures:

- Fence off the construction areas. The thicket/renosterveld outside the construction areas must not be disturbed in any way.
- With regards to the site camp options, preference should be given to options 1 and 3. Site option 2, which contains considerably more vegetation and plant species, should not be selected. In the case of site camp option 1 (below the dam wall), a buffer of sufficient width must be maintained between the camp and nearby watercourse.
- To mitigate the impact of vegetation clearing, topsoil and seedbearing plant material from the construction areas must be protected and replaced after construction as part of the rehabilitation process. As a duty of care measure, consideration should also be given to S&R of suitable species (e.g. bulbs & succulents). Of course, any replanting of rescued plant material must be done in matching habitats from which the plants originate. Bulbs should be removed along with some soil, placed in gel, bagged and then taken to a nursery for temporary storage or transplanted directly in the receiving area. S&R should be done at an appropriate time of the year, preferably when the soil is wet during the raining season. Ideally, bulbs should be salvaged during leaf fall, but before or after flowering. Please note that a CapeNature permit is needed for the relocation of indigenous plant species.
- Allow at least 24 months for the monitoring of rehabilitation success and alien infestation post construction. Keep the project footprint as well as an additional strip of 10-15 m wide clear of invasive aliens.

Alternative:	**Preferred Alternative A**	**Alternative B**	**No-Go Alternative**
SITE PREPARATION AND CONSTRUCTION PHASE			
AQUATIC ASSESSMENT IMPACT 1			
Potential impact and risk:	**DISTURBANCE/LOSS OF AQUATIC BIOTA:** • **The disturbance or loss of aquatic fauna and flora from direct physical destruction or disturbance which can result in further deterioration of aquatic habitat integrity, habitat fragmentation, and a reduction in the supply of ecosystem services.**		
Nature of impact:	**Negative**	**Negative**	**NO IMPACT**
Extent and duration of impact:	**Local and long-term**	**Site Specific – Long term**	
Consequence of impact or risk:	**Moderate**	**Low**	
Probability of occurrence:	**Highly probable**	**Probable**	

Degree to which the impact may cause irreplaceable loss of resources:	**Low**	**Low**	
Degree to which the impact can be reversed:	**Recoverable**	**Recoverable**	
Indirect impacts:	**Probable**	**Probable**	
Cumulative impact prior to mitigation:	**Low**	**Low**	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Medium (-)**	**Low (-)**	
Degree to which the impact can be avoided:	**Barely**	**Partially**	
Degree to which the impact can be managed:	**High**	**High**	
Degree to which the impact can be mitigated:	**Can be mitigated**	**Can be mitigated**	
Proposed mitigation:	**SEE BELOW**		
Residual impacts:	**Low**	**Very Low**	
Cumulative impact post mitigation:	**Low**	**Low**	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low (-)**	**Very Low (-)**	**NO IMPACT**

Mitigation Measures:

Design Phase:

- A construction method statement must be compiled and available on site. It must consider the no go area and include methods to avoid unnecessary disturbance.

Construction Phase:

- Any contractor found working within No-Go areas must be fined as per fining schedule/system setup for the project.
- It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. A list of these species needs to be added with photos into the EMPr. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas. Any use of herbicides in removing alien plant species is required to be investigated by the ECO before use.
- Where vegetation has been cleared in the riparian area it is recommended that cover components be reinstated appropriately. Only indigenous species are to be considered.
- Monitoring by an independent ECO during construction in all phases.
- The construction of both interim and permanent structures within the river channel should be minimized wherever possible, ensuring minimal disruption to flow patterns. In particular, the implementation of erosion control measures on the opposite bank should be avoided.

Operational Phase:

- In the long term, the maintenance and management of the infrastructure should follow an approved Environmental Management Plan for the Operational Phase, which must include the removal of invasive alien vegetation in the riparian zone adjacent to the pump station and access road.

Alternative:	Preferred Alternative A	Alternative B	No-Go Alternative
SITE PREPARATION, CONSTRUCTION			
AQUATIC ASSESSMENT IMPACT 4			
Potential impact and risk:	**WATER QUALITY DETERIORATION:** • **Changes to the natural water quality parameters resulting in reduced ecosystem integrity and decreased biodiversity.**		
Nature of impact:	**Negative**	**Negative**	**NO IMPACT**
Extent and duration of impact:	**Local and short term**	**Local and medium term**	
Consequence of impact or risk:	**Medium**	**Medium**	
Probability of occurrence:	**Improbable**	**Probable**	
Degree to which the impact may cause irreplaceable loss of resources:	**Marginal loss**	**Marginal loss**	
Degree to which the impact can be reversed:	**Barely Reversible**	**Barely Reversible**	
Indirect impacts:	**Probable**	**Probable**	
Cumulative impact prior to mitigation:	**Low**	**Low**	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low (-)**	**Medium (-)**	
Degree to which the impact can be avoided:	**Partially**	**Barely**	
Degree to which the impact can be managed:	**Can be managed**	**Partially**	
Degree to which the impact can be mitigated:	**Can be barely mitigated**	**Can be mitigated**	
Proposed mitigation:	**SEE BELOW**		
Residual impacts:	**Low**	**Low**	
Cumulative impact post mitigation:	**Negligible**	**Low**	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low (-)**	**Low (-)**	**NO IMPACT**

Mitigation Measures:

Site Preparation & Construction Phase:

- **Pollution Prevention:**
  - Establish designated fuelling and maintenance areas away from the watercourse to prevent fuel and oil spills.
  - Store hazardous materials (e.g., cement, fuels, chemicals) in bunded areas away from the river.
  - Implement spill response procedures and have spill kits on-site.
  - Ensure proper waste disposal, including construction debris and domestic waste, to prevent contamination.
- **Stormwater Management:**
  - Design temporary stormwater control measures to prevent runoff from carrying pollutants into the river.
  - Use infiltration trenches or constructed wetlands to filter runoff before it enters the watercourse.

Operational Phase:

- **Monitoring & Maintenance:**
  - Regularly monitor water quality parameters (e.g., turbidity, dissolved oxygen, nutrients, heavy metals) to detect any degradation.
  - Implement adaptive management strategies if water quality deteriorates over time.
- **Vegetative Buffer Zones:**
  - Maintain or restore riparian vegetation to filter runoff, stabilize banks, and improve water quality.
  - Prevent livestock access to the river and site camps near infrastructure to reduce nutrient loading and bank erosion.
- **Long-Term Pollution Control:**
  - Establish protocols for handling accidental spills or contamination events.
  - Ensure all waste is deposed of at a registered waste disposal site.

Construction and Operational Phase Impacts:

Alternative:	**Preferred Alternative A**	**Alternative B**	**No-Go Alternative**
DESIGN PHASE, SITE PREPARATION, CONSTRUCTION AND OPERATIONAL PHASE			
AQUATIC ASSESSMENT IMPACT 2			
Potential impact and risk:	**CHANGES TO THE HYDROLOGICAL REGIME:** • **Changes to the natural movement of water flow through the Moordkuil River, by construction of infrastructure within the water column and riparian habitat. These changes can result in altered flow patterns, sediment transport, and erosion. Localized scour, sediment deposition upstream, and increased downstream velocity is possible to occur around water column infrastructure. There are risks of improperly**		

	designed infrastructure causing water column turbulence and vortex formation.		
Nature of impact:	**Negative**	**Negative**	**NO IMPACT**
Extent and duration of impact:	**Site Specific and permanent**	**Site and permanent**	
Consequence of impact or risk:	**Low**	**Low**	
Probability of occurrence:	**Highly probable**	**Definite**	
Degree to which the impact may cause irreplaceable loss of resources:	**Marginal loss**	**Marginal loss**	
Degree to which the impact can be reversed:	**Reversible**	**Barely reversible**	
Indirect impacts:	**Improbable**	**Highly probable**	
Cumulative impact prior to mitigation:	**Negligible**	**Low**	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low (-)**	**Low (-)**	
Degree to which the impact can be avoided:	**Barely**	**Cannot be avoided**	
Degree to which the impact can be managed:	**Can be managed**	**Partially**	
Degree to which the impact can be mitigated:	**Can be mitigated**	**Can be mitigated**	
Proposed mitigation:	**SEE BELOW**		
Residual impacts:	**Negligible**	**Low**	
Cumulative impact post mitigation:	**Negligible**	**Low**	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Very Low (-)**	**Low (-)**	**NO IMPACT**

Mitigation Measures:

Design phase considerations:

- **Optimized Placement & Orientation** – Where possible position the cofferdam to minimize disruption to the main flow path and align it with the natural flow direction to reduce turbulence.
- **Permeability Considerations** – If necessary, utilise a slotted or porous section to allow controlled water passage and reduce sudden pressure changes.
- **Energy Dissipation Structures** – Where necessary consider including stepped weirs, baffles, or flow deflectors to prevent excessive velocity increases and turbulence.
- **Scour and Erosion Protection** – Where necessary design reinforced edges with riprap, gabions, or concrete aprons to prevent localized scour.
- **Sediment Transport Management** – Where necessary ensure the structure allows for natural sediment movement to prevent excessive upstream deposition or downstream erosion.

Site Preparation Phase:

- **Establish Controlled Access Routes:** Limit disturbance to water flow and minimize construction-related runoff.
- **Flow Diversion & Bypass Measures:** If possible, install a controlled bypass system (e.g., pipes or channels) to maintain continuous downstream flow. Ensure the bypass capacity matches or exceeds expected base flow conditions.
- **Contaminant Spill prevention measures:** Store fuels, cement and chemicals away from the river and have containment measures in place.

Construction Phase:

- **Control Water Flow During Construction:** Carefully manage the rate and timing of water released during construction to avoid surges and ensure consistent downstream flow.
- **Regular ECO Water Quality Monitoring:** Conduct monitoring of water quality to track turbidity and contamination levels.
- **Limit Water Diversion Duration:** Minimize the time the flow is disrupted by construction activities to reduce impact on aquatic ecosystems.
- **Controlled Dewatering:** If contaminated, remove contaminated water onto shore and treat accordingly. Do not discharge untreated contaminated water back into the system
- **Efficient Temporary River Channel Construction:** If required, implement bypasses and pumps with minimal disruption to the river's natural hydrology.

Operational Phase:

- **Flood Control Measures:** Regularly assess river levels and implement flood mitigation measures as required.
- **Maintenance work**: Any work associated with the maintenance of the water column infrastructure should be minimized in both spatial extent and duration. Preferably such work should take place during the drier months (December to April) to reduce hydrological impacts.

Alternative:	Preferred Alternative	Alternative B	No-Go Alternative
DESIGN PHASE, SITE PREPARATION, CONSTRUCTION AND OPERATIONAL PHASE			
AQUATIC ASSESSMENT IMPACT 3			
Potential impact and risk:	**GEOMORPHOLOGICAL CHANGES FROM EROSION AND SEDIMENTATION:** • **Changes to the form and geomorphological processes from clearing riparian vegetation and construction within the watercourse due to potential erosion and sedimentation from hydrological changes and increased sediment inputs.**		
Nature of impact:	**Negative**	**Negative**	**NO IMPACT**
Extent and duration of impact:	**Site Specific and short term**	**Local and short term**	
Consequence of impact or risk:	**Low**	**Moderate**	

Probability of occurrence:	**Probable**	**Probable**	
Degree to which the impact may cause irreplaceable loss of resources:	**Marginal loss**	**Marginal loss**	
Degree to which the impact can be reversed:	**Partially reversible**	**Barely Reversible**	
Indirect impacts:	**Improbable**	**Highly Probable**	
Cumulative impact prior to mitigation:	**Low**	**Medium**	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low (-)**	**Moderate (-)**	
Degree to which the impact can be avoided:	**Medium**	**Low**	
Degree to which the impact can be managed:	**High**	**High**	
Degree to which the impact can be mitigated:	**Can be mitigated**	**Can be mitigated**	
Proposed mitigation:	**SEE BELOW**		
Residual impacts:	**Low**	**Medium**	
Cumulative impact post mitigation:	**Low**	**Low**	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Very Low (-)**	**Low(-)**	**NO IMPACT**

Mitigation Measures:

Design phase considerations

- **Optimized Placement & Orientation** – Where possible position the cofferdam to minimize disruption to the main flow path and align it with the natural flow direction to reduce turbulence.
- **Permeability Considerations** – If necessary, utilise a slotted or porous section to allow controlled water passage and reduce sudden pressure changes.
- **Energy Dissipation Structures** – Where necessary consider including stepped weirs, baffles, or flow deflectors to prevent excessive velocity increases and turbulence.
- **Scour and Erosion Protection** – Where necessary, design reinforced edges with riprap, gabions, or concrete aprons to prevent localized scour.
- **Sediment Transport Management** – Where necessary ensure the structure allows for natural sediment movement to prevent excessive upstream deposition or downstream erosion.

Site Preparation Phase:

- **Establish sediment control barriers:** Install sediment fences, silt curtains, or berms around construction zones to contain sediment and prevent it from reaching water bodies.
- **Stabilise disturbed areas:** Apply erosion control techniques such as mulching, vegetation, or geotextiles to stabilize disturbed soils and reduce sediment runoff.

Construction Phase:

- **Sediment trapping measures:** Install sediment traps or basins at strategic points along construction sites to capture and manage sediment and minimise downstream contamination.
- **Minimize disturbed areas:** Limit the footprint of the construction zone and avoid unnecessary soil disturbance to reduce the potential for sediment mobilization.
- **Monitor sedimentation:** ECO monitor turbidity levels upstream and downstream of construction site to confirm the efficiency of mitigation measures and make adjustments as needed.
- **Water diversion techniques:** Divert clean water away from construction areas using berms or temporary channels to prevent sediment-laden water from entering watercourses.
- **Control stormwater runoff:** Use temporary sediment control measures, such as erosion mats or check dams, to control runoff and prevent excessive sedimentation during heavy rainfall events.

Operational Phase:

- **Maintain natural water column sediment levels:** Regularly clean and maintain coffer dam, and filtration systems to ensure they continue functioning effectively in capturing sediment and returning captured sediment back to the water column.
- **Vegetative stabilization:** Promote the growth of native vegetation in areas susceptible to erosion to stabilize soil and reduce sediment generation over time.
- **Revegetation of exposed soils:** In any areas that have been disturbed, replant vegetation and apply soil stabilisation techniques to prevent erosion and further sediment loss.
- **Flood Control Measures:** Regularly assess river levels and implement flood mitigation measures as required.
- **Maintenance work:** Any work associated with the maintenance of the water column infrastructure should be minimized in both spatial extent and duration. Preferably such work should take place during the drier months (December to April) to reduce hydrological impacts.
- **Emergency infrastructure repair:** Any flood damaged infrastructure should be repaired as soon as it is safe, and possible, to do so, to prevent further degradation and hydrological impacts.

10.3.2 Operational Phase Impacts:

Alternative:	Preferred Alternative	Alternative B	No-Go Alternative
OPERATIONAL PHASE			
SOCIO-ECONOMIC IMPACT 2			
Potential impact and risk:	**SECURITY OF AVAILABILITY OF WATER SUPPLY:** • **The proposed development, if authorised, will have a positive cumulative socio-economic impact in terms of securing water storage and supply capacity, especially in times of drought.**		

	• **The benefits of security of water supply are far reaching for all. The additional water supply capacity could support further urban (and economic) development in Mossel Bay.** • **The additional water supply capacity could support further urban (and economic) development in Mossel Bay.** • **Further development may be associated with positive socio-economic benefits and growth for the surrounding community.**		
Nature of impact:	**Positive**	**Positive**	**Negative**
Extent and duration of impact:	**Local – short term**	**Local – short term**	**Local – short term**
Consequence of impact or risk:	**N/A**		
Probability of occurrence:	**Definite**	**Definite**	**Definite**
Degree to which the impact may cause irreplaceable loss of resources:	**No loss**	**No loss**	**No loss**
Degree to which the impact can be reversed:	**N/A**	**N/A**	**N/A**
Indirect impacts:	**N/A**	**N/A**	**N/A**
Cumulative impact prior to mitigation:	**Medium (+)**	**Medium (+)**	**Medium (-)**
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Medium (+)**	**Medium (+)**	**Medium (-)**
Degree to which the impact can be avoided:	**N/A**	**N/A**	**N/A**
Degree to which the impact can be managed:	**N/A**	**N/A**	**N/A**
Degree to which the impact can be mitigated:	**N/A**	**N/A**	**N/A**
Proposed mitigation:	**SEE BELOW**		
Residual impacts:	**Negligible**	**Negligible**	**Negligible**
Cumulative impact post mitigation:	**Medium (+)**	**Medium (+)**	**Medium (-)**
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Medium (+)**	**Medium (+)**	**Medium (-)**

Alternative:	**Preferred Alternative**	**Alternative B**	**No-Go Alternative**
OPERATIONAL PHASE			
BOTANICAL ASSESSMENT IMPACT 1			
Potential impact and risk:	**IMPACT ON TERRESTRIAL BIODIVERSITY:** • **Increased alien infestation.** • **Erosion due to poor rehabilitation efforts.**		
Nature of impact:	Negative	Negative	**NO IMPACT**
Extent and duration of impact:	Site Specific - Medium	Site Specific - Medium	
Probability of occurrence:	Medium	Medium	
Degree to which the impact may cause irreplaceable loss of resources:	Medium-Low	Medium-Low	
Degree to which the impact can be reversed:	High	High	
Indirect impacts:	None identified.	None identified.	
Cumulative impact prior to mitigation:	Low	Low	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low (-)**	**Low (-)**	
Proposed mitigation:	**SEE BELOW**		
Cumulative impact post mitigation:	Low	Low	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low (-)**	**Low (-)**	**NO IMPACT**

Mitigation Measures:

- Monitor the construction footprint and all areas disturbed during construction for rehabilitation success and erosion. Where needed, rehabilitate/revegetate disturbed surfaces expediently. Erosion prevention measures may be needed on steep slopes, such as silt fences, logs or netting, to slow down runoff and potential erosion. Mulching and seeding with indigenous thicket/renosterveld seed may also be needed.
- As a long-term maintenance requirement, continue with alien clearing on and around the project footprint, focussing on invasive species such as black wattle, rooikrans, common thorn apple, prickly pear, wild tobacco, castor-oil plant, bugweed and spear thistle. These species are category 1b and 2 invaders that require compulsory control as part of an invasive species control programme. Please note that it is a legal requirement for landowners to clear alien vegetation on their land.

Alternative:	**Preferred Alternative**	**Alternative B**	**No-Go Alternative**
OPERATIONAL PHASE			
BOTANICAL ASSESSMENT IMPACT 2			
Potential impact and risk:	**IMPACT OF THE PROJECT ON FLORA, SCC & PROTECTED TREE SPECIES:** • **Loss of indigenous flora, potential SCC and protected tree species.**		
Nature of impact:	**Negative**	**Negative**	**NO IMPACT**
Extent and duration of impact:	**Site Specific – Medium**	**Site Specific – Medium**	
Probability of occurrence:	**High**	**High**	
Degree to which the impact may cause irreplaceable loss of resources:	**Medium**	**Medium**	
Degree to which the impact can be reversed:	**Medium**	**Medium**	
Indirect impacts:	**None identified.**	**None identified.**	
Cumulative impact prior to mitigation:	**Medium-Low**	**Medium-Low**	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Medium-Low**	**Medium-Low**	
Cumulative impact post mitigation:	**Low**	**Low**	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	**Low (-)**	**Low (-)**	**NO IMPACT**

Mitigation Measures:

- Monitor the construction footprint and all areas disturbed during construction for rehabilitation success and erosion. Where needed, rehabilitate/revegetate disturbed surfaces expediently. Erosion prevention measures may be needed on steep slopes, such as silt fences, logs or netting, to slow down runoff and potential erosion. Mulching and seeding with indigenous thicket/renosterveld seed may also be needed.
- As a long-term maintenance requirement, continue with alien clearing on and around the project footprint, focussing on invasive species such as black wattle, 111ooikrans, common thorn apple, prickly pear, wild tobacco, castor-oil plant, bugweed and spear thistle. These species are category 1b and 2 invaders that require compulsory control as part of an invasive species control programme. Please note that it is a legal requirement for landowners to clear alien vegetation on their land.

10.4 Cumulative Impacts

Cumulative impacts in relation to an activity are defined in the EIA Regulations as meaning *"the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area".*

All specialist studies undertaken for the proposed activity considered potential cumulative impacts within their respective disciplines. Based on the findings of the specialists, cumulative impacts associated with the proposed development were consistently rated as low to negligible.

This is primarily due to the limited spatial footprint of the proposed activity, its temporary nature during construction, and the fact that the development will take place within an area that has been previously disturbed and is already characterised by existing infrastructure and land-use activities. The proposal does not introduce a new or intensified land use, nor does it result in permanent loss of natural habitat or significant changes to ecosystem functioning.

Furthermore, no other existing or reasonably foreseeable developments in the area were identified that, when combined with the proposed activity, would result in a meaningful amplification of environmental, social, or infrastructural impacts.

On this basis, it is concluded that the proposed upgrading of the Moordkuil Raw Water Pump Station is not expected to result in significant cumulative impacts, provided that the mitigation measures contained in this BAR and the associated EMPr are implemented.

10.5 Evaluation of the Mitigation Hierarchy in light of the proposed Moordkuil Pump Station project

The impact tables in the sections above indicate the potential environmental impacts and risks identified for the project, including the nature, significance, consequence, extent, duration and probability of impact, the degree of to which the impact can be reversed, and an indication as to whether to impact would cause irreplaceable loss of the resource or whether it would be able to be avoided, managed, or mitigated.

The image below provides a visual representation of the mitigation hierarchy. Whereas the table below provides a summary of the evaluation thereof in relation to the proposed upgrades to the Moordkuil Pump Station.

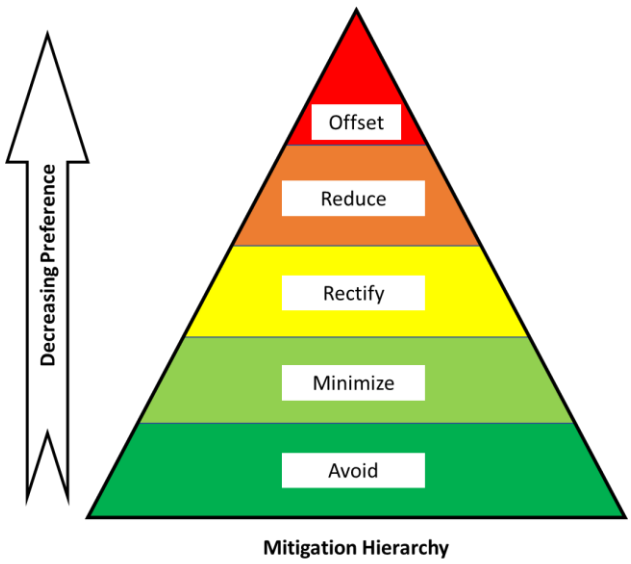

Figure 30: Mitigation Hierarchy.

Table 21: Mitigation hierarchy in relation to the upgrading of the Moordkuil Pump Station project.

Hierarchy level		Description in relation to the proposal
1	Avoid	The proposed upgrades are to an existing facility. According to the specialists, the anticipated impact of the project will be cumulatively low, as the sensitive features in the landscape would be avoided.
2	Minimise impacts	The recommended mitigation measures of the various specialists reports in addition to the mitigation measures provided in the EMPr will lead to the minimisation of the impacts of the construction phase.
3	Rectify	The rehabilitation measures in the EMPr are provided to return the impacted areas back to a functional state. The Applicant will be responsible for rectifying any non-compliances with the conditions of the EA and EMPr.
4	Reduce	All activities identified in the BAR will remain within the boundaries of the Moordkuil Pump Station and associated infrastructure footprint, where all areas beyond the construction footprint will be considered No-Go areas.
5	Offset	In June 2023, the Department of Forestry, Fisheries and Environment (DFFE) promulgated the National Biodiversity Offset Guidelines in terms of the National Environmental Management Act. 1998, as amended (Act No. 107 of 1992). Based on the National Biodiversity Offset Guidelines, 2023 (GN 3569 of 2023), an offset is required where the residual impacts are Medium or High. Based on the findings of the specialist assessments (specifically those relating to the ecosystems identified, as per the definition of the beforementioned guidelines), the following impact ratings were awarded, after the implementation of mitigation measures: • Botanical assessment: o Impact during construction phase: Low o Impact during post-construction / rehabilitation phase: Low • Aquatic assessment: o Cumulative impact during construction phase: Low o Cumulative impact during post-construction / operational phase: Low • Terrestrial faunal and avifaunal species compliance statement: o Impact during construction phase: low • Agricultural assessment: Insignificant • Palaeontology assessment: insignificant Therefore, based on the above, all impacts on the biodiversity component of the proposed infrastructure project can be mitigated to be lower than the threshold necessitating a biodiversity offset. Hence, no offset will be required for the proposed project.

11. ENVIRONMENTAL IMPACT STATEMENT

11.1 Summary of Key Findings of Impact Assessment

Table 22 below summarises the potential Impacts associated with the proposal. Please refer to the Section I (2) for the proposed mitigation measures to ensure the corresponding rating post mitigation. The findings of the Specialists have been taken into consideration in this BAR and the impact management measures identified by all the Specialists have been incorporated into the EMPr and will thus ensure that, through the implementation of the EMPr that the potential impacts are mitigated to the significance ratings as shown in Table 22 and that impacts to the environment for the proposal are minimised and that the proposal is undertaken in a sustainable manner.

Table 22: Summary of Impacts:

Impact	Applicable Listed Activity	Preferred Alternative A	Alternative B	No-Go Alternative
CONSTRUCTION PHASE				
JOB CREATION	-	Low (+)	Low (+)	No Impact
IMPACT ON TERRESTRIAL BIODIVERSITY	Listing Notice 3: 4, 12, 14	Low (-)	Low (-)	No Impact
IMPACT OF THE PROJECT ON FLORA, SCC & PROTECTED TREE SPECIES	Listing Notice 3: 4, 12, 14	Low (-)	Low (-)	No Impact
DISTURBANCE/LOSS OF AQUATIC BIOTA:	Listing Notice 1: 12, 19, 45 Listing Notice 3: 12, 14	Low (-)	Very Low (-)	No Impact
WATER QUALITY DETERIORATION	Listing Notice 1: 12, 19, 45 Listing Notice 3: 12, 14	Low (-)	Low (-)	No Impact
CONSTRUCTION AND OPERATIONAL PHASE				
CHANGES TO THE HYDROLOGICAL REGIME	Listing Notice 1: 12, 19, 45 Listing Notice 3: 12, 14	Very Low (-)	Low (-)	No Impact
GEOMORPHOLOGICAL CHANGES FROM EROSION AND SEDIMENTATION	Listing Notice 1: 12, 19, 45 Listing Notice 3: 12, 14	Very Low (-)	Low (-)	No Impact
OPERATIONAL PHASE				
SECURITY OF AVAILABILITY OF WATER SUPPLY:	-	Medium (+)	Medium (+)	Medium (-)
IMPACT ON TERRESTRIAL BIODIVERSITY	-	Low (-)	Low (-)	No Impact
IMPACT OF THE PROJECT ON FLORA, SCC & PROTECTED TREE SPECIES	-	Low (-)	Low (-)	No Impact

Specialists Reports Conclusions:

Aquatic Impact Assessment, Appendix G1 :

The aquatic habitats within 500m of the project footprint were identified and mapped on a desktop level using available data. Following this, a site assessment was conducted to confirm desktop findings, gather additional information, and define the boundaries of the aquatic habitat. The groundtruthed findings are largely in alignment with the information of the desktop databases.

Risk assessment determined that there are two potentially impacted HGM units, namely the riparian system of the Moordkuil River, which is a perennial system, and HGM unit 3 which is a channelled valley bottom system. The Moordkuil River is the existing abstraction point and is already subjected to impacts from abstraction activities and is the location where both alternatives. However, the remaining habitat still provides important ecosystem services. It was recommended that no further deterioration of the habitat must be allowed outside of the designated construction footprint.

Impact assessment determined that after mitigation, Alternatives 1 and 2 both have similarly low impacts (after mitigation). The lowest impacts were from the No-Go Alternative. Mitigation should focus on minimising construction footprint and reduction of impacts on the hydrological and geomorphological characteristics of the watercourse. A robust monitoring programme should be developed and audited annually by a SACNASP registered ecologist. Please note this will be done in accordance with the standard GA conditions.

In conclusion, there are fatal flaws associated with the proposed establishment of Site Camp 1 and 2 as the principals of impact avoidance (if possible), should have been implemented. The No-Go Alternative has the lowest impacts and therefore is the preferred alternative (from a freshwater perspective), but Site Camp 3 is acceptable, provided all the mitigation measures are strictly implemented and monitored. The proposed project requires water use authorisation in terms of Chapter 4 and Section 21 of the National Water Act No. 36 of 1998, prior to the commencement of activities.

Botanical Impact Assessment, Appendix G2 :

The site proposed for the project lies inside transformed or degraded Albany thicket and Mossel Bay Shale Renosterveld. The latter is currently listed as Critically Endangered. The site is also partly located inside the Western Cape biodiversity network, with most of it mapped as terrestrial and aquatic critical biodiversity areas (CBA) or degraded critical biodiversity areas (CBA2). Two SCC were recorded on site, namely Hermannia lavandulifolia (VU) and Freesia cf fergusoniae (VU). Both observed occurrences can be avoided. Two protected tree species (Sideroxylon inerme & Pittosporum viridiflorum) are also present on the site.

With regards to the Screening Reports, I do not disagree with the general ratings of High for plant species and Very High for terrestrial biodiversity. However, these ratings do not always take localised disturbances (transformations) on the ground into account, such as farm roads, cleared/degraded areas or incorrectly mapped vegetation types. For example, Garden Route Granite Fynbos and Groot Brak Dune Strandveld do not occur here. One can therefore argue that the ratings should be lower for certain areas of the site. Given the transformed or degraded state of the vegetation, the impact on terrestrial biodiversity and plant species is of medium-low significance, prior to mitigation. With mitigation, this impact can be lowered further.

It is therefore recommended that the proposed project be considered for approval, but subject to the proposed mitigation measures listed above.

Terrestrial Faunal and Avifaunal Species Compliance Statement Report, Appendix G3 :

While the proposed project is unlikely to have any major impacts on terrestrial biodiversity and terrestrial faunal and avifaunal species, the a temporary platform will be constructed through soil infill material behind the sheet piling accommodate a temporary platform for the piling rig in order to construct the concrete inlet hopper within the Moordkuil River. Because this temporary platform will intersect a sensitive freshwater environment, any such scope of works should follow recommendations from the freshwater specialist.
Aside from overlap with the freshwater ecosystem of the Moordkuil River, all other project footprints and site camp locations under both Preferred Alternative layout A and Alternative layout B are located in less sensitive areas from terrestrial biodiversity and terrestrial faunal and avifaunal perspectives and are unlikely to impact on ecological processes or biodiversity patterns at either local or regional scales. Both these development layouts and associated activities are therefore supported from terrestrial biodiversity and terrestrial faunal and avifaunal biodiversity perspectives.

Palaeontology Sensitivity Statement, Appendix G4 :

The Moordkuil River Pumpstation project lies entirely on the Quaternary sands and alluvium along the river valley that is indicated as moderately sensitive. The area is highly disturbed from agriculture and present thick vegetation so it is very unlikely that any transported Quaternary fossils occur there. In addition, any fossil material would be fragmented and unidentifiable, plus it would be out of primary context. The true palaeosensitivity should be low.

Both proposed sites for the camp site are on the Enon Formation and indicated as very highly sensitive. This palaeosensitivity is also contested because the Enon Formation is a conglomerate with boulders, pebbles and sands and is a "dump" for such sediments that were deposited from the Cretaceous to the Tertiary which means there are no fossils that could assist with the dating. Furthermore, both sites are also highly disturbed from previous agriculture and clearing.
Since there is no chance of fossils of any importance occurring in the project footprint, we request exemption from any further palaeontological impact assessment. As far as the palaeontology is concerned there is no preferred site for the camp site.

Agricultural Compliance Statement, Appendix G5 :

The overall conclusion of this assessment is that the proposed development is acceptable because it leads to no loss of future agricultural production potential.

This assessment disputes the high and very high sensitivity classification of the site by the screening tool and verifies the entire site as being of low to medium agricultural sensitivity because of its assessed cropping potential.

Although the climate, terrain, and soil suitability may allow for viable crop production, other factors constrain the potential of the site to practically deliver agricultural produce and therefore limit its agricultural production potential.

This is primarily because the location and use of the site will serve the purpose of upgrading the existing raw bulk water abstraction works. For this reason, the site is highly unlikely to ever be viably utilised for agricultural production, and its potential is therefore assessed here as very low

An agricultural impact must by definition cause a change to the future agricultural production potential of land. If there is no change, there is no impact. In this case, the entire development footprint is considered to be below the threshold for needing to be conserved as agricultural

production land because of the limitations that make it unsuitable as viable cropland. The proposed development on this land will result in no loss of future agricultural production potential in terms of national food security.

Due to the facts that the proposed development will not occupy scarce, viable cropland, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed here as being of low significance and as acceptable.

From an agricultural impact point of view, it is recommended that the proposed development be approved. The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.

11.1.1 Impact Management Measures Identified by the Specialists that will be Included in the EMPr

Aquatic Assessment Mitigation Measures:

Construction Phase:

Impact to mitigate	Mitigation
Disturbance/loss of aquatic biota	**Design Phase:** • A construction method statement must be compiled and available on site. It must consider the no go area and include methods to avoid unnecessary disturbance. **Construction Phase:** • Any contractor found working within No-Go areas must be fined as per fining schedule/system setup for the project. • It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. A list of these species needs to be added with photos into the EMPr. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas. Any use of herbicides in removing alien plant species is required to be investigated by the ECO before use. • Where vegetation has been cleared in the riparian area it is recommended

	that cover components be reinstated appropriately. Only indigenous species are to be considered. • Monitoring by an independent ECO during construction in all phases. • The construction of both interim and permanent structures within the river channel should be minimized wherever possible, ensuring minimal disruption to flow patterns. In particular, the implementation of erosion control measures on the opposite bank should be avoided. **Operational Phase:** • In the long term, the maintenance and management of the infrastructure should follow an approved Environmental Management Plan for the Operational Phase, which must include the removal of invasive alien vegetation in the riparian zone adjacent to the pump station and access road.
Water quality deterioration	**Site Preparation & Construction Phase:** • **Pollution Prevention:** o Establish designated fuelling and maintenance areas away from the watercourse to prevent fuel and oil spills. o Store hazardous materials (e.g., cement, fuels, chemicals) in bunded areas away from the river. o Implement spill response procedures and have spill kits on-site. o Ensure proper waste disposal, including construction debris and domestic waste, to prevent contamination. • **Stormwater Management:** o Design temporary stormwater control measures to prevent runoff from carrying pollutants into the river. o Use infiltration trenches or constructed wetlands to filter

	runoff before it enters the watercourse. **Operational Phase:** • **Monitoring & Maintenance:** o Regularly monitor water quality parameters (e.g., turbidity, dissolved oxygen, nutrients, heavy metals) to detect any degradation. o Implement adaptive management strategies if water quality deteriorates over time. • **Vegetative Buffer Zones:** o Maintain or restore riparian vegetation to filter runoff, stabilize banks, and improve water quality. o Prevent livestock access to the river and site camps near infrastructure to reduce nutrient loading and bank erosion. • **Long-Term Pollution Control:** o Establish protocols for handling accidental spills or contamination events. o Ensure all waste is deposed of at a registered waste disposal site.

Construction and Operational Phase:

Impact to mitigate	Mitigation
Changes to the hydrological regime	**Design phase considerations:** • **Optimized Placement & Orientation** – Where possible position the cofferdam to minimize disruption to the main flow path and align it with the natural flow direction to reduce turbulence. • **Permeability Considerations** – If necessary, utilise a slotted or porous section to allow controlled water passage and reduce sudden pressure changes. • **Energy Dissipation Structures** – Where necessary consider including stepped weirs, baffles, or flow deflectors to prevent excessive velocity increases and turbulence. • **Scour and Erosion Protection** – Where necessary design reinforced edges

	with riprap, gabions, or concrete aprons to prevent localized scour. • **Sediment Transport Management** – Where necessary ensure the structure allows for natural sediment movement to prevent excessive upstream deposition or downstream erosion. **Site Preparation Phase:** • **Establish Controlled Access Routes:** Limit disturbance to water flow and minimize construction-related runoff. • **Flow Diversion & Bypass Measures:** If possible, install a controlled bypass system (e.g., pipes or channels) to maintain continuous downstream flow. Ensure the bypass capacity matches or exceeds expected base flow conditions. • **Contaminant Spill prevention measures:** Store fuels, cement and chemicals away from the river and have containment measures in place. **Construction Phase:** • **Control Water Flow During Construction:** Carefully manage the rate and timing of water released during construction to avoid surges and ensure consistent downstream flow. • **Regular ECO Water Quality Monitoring:** Conduct monitoring of water quality to track turbidity and contamination levels. • **Limit Water Diversion Duration:** Minimize the time the flow is disrupted by construction activities to reduce impact on aquatic ecosystems. • **Controlled Dewatering:** If contaminated, remove contaminated water onto shore and treat accordingly. Do not discharge untreated contaminated water back into the system • **Efficient Temporary River Channel Construction:** If required, implement bypasses and pumps with minimal

	disruption to the river's natural hydrology. **Operational Phase:** • **Flood Control Measures:** Regularly assess river levels and implement flood mitigation measures as required. • **Maintenance work**: Any work associated with the maintenance of the water column infrastructure should be minimized in both spatial extent and duration. Preferably such work should take place during the drier months (December to April) to reduce hydrological impacts.
Geomorphological changes from erosion and sedimentation	**Design phase considerations** • **Optimized Placement & Orientation** – Where possible position the cofferdam to minimize disruption to the main flow path and align it with the natural flow direction to reduce turbulence. • **Permeability Considerations** – If necessary, utilise a slotted or porous section to allow controlled water passage and reduce sudden pressure changes. • **Energy Dissipation Structures** – Where necessary consider including stepped weirs, baffles, or flow deflectors to prevent excessive velocity increases and turbulence. • **Scour and Erosion Protection** – Where necessary, design reinforced edges with riprap, gabions, or concrete aprons to prevent localized scour. • **Sediment Transport Management** – Where necessary ensure the structure allows for natural sediment movement to prevent excessive upstream deposition or downstream erosion. **Site Preparation Phase:** • **Establish sediment control barriers:** Install sediment fences, silt curtains, or berms around construction zones to

	contain sediment and prevent it from reaching water bodies. • **Stabilise disturbed areas:** Apply erosion control techniques such as mulching, vegetation, or geotextiles to stabilize disturbed soils and reduce sediment runoff. **Construction Phase:** • **Sediment trapping measures:** Install sediment traps or basins at strategic points along construction sites to capture and manage sediment and minimise downstream contamination. • **Minimize disturbed areas:** Limit the footprint of the construction zone and avoid unnecessary soil disturbance to reduce the potential for sediment mobilization. • **Monitor sedimentation:** ECO monitor turbidity levels upstream and downstream of construction site to confirm the efficiency of mitigation measures and make adjustments as needed. • **Water diversion techniques:** Divert clean water away from construction areas using berms or temporary channels to prevent sediment-laden water from entering watercourses. • **Control stormwater runoff:** Use temporary sediment control measures, such as erosion mats or check dams, to control runoff and prevent excessive sedimentation during heavy rainfall events. **Operational Phase:** • **Maintain natural water column sediment levels:** Regularly clean and maintain coffer dam, and filtration systems to ensure they continue functioning effectively in capturing sediment and returning captured sediment back to the water column. • **Vegetative stabilization:** Promote the growth of native vegetation in areas susceptible to erosion to stabilize soil and reduce sediment generation over time.

	• **Revegetation of exposed soils:** In any areas that have been disturbed, replant vegetation and apply soil stabilisation techniques to prevent erosion and further sediment loss. • **Flood Control Measures:** Regularly assess river levels and implement flood mitigation measures as required. • **Maintenance work:** Any work associated with the maintenance of the water column infrastructure should be minimized in both spatial extent and duration. Preferably such work should take place during the drier months (December to April) to reduce hydrological impacts. • **Emergency infrastructure repair:** Any flood damaged infrastructure should be repaired as soon as it is safe, and possible, to do so, to prevent further degradation and hydrological impacts.

Botanical Assessment Mitigation Measures:

Construction Phase:

Impact to mitigate	Mitigation
Impact on terrestrial biodiversity	• Fence off the construction areas. The thicket/renosterveld outside the construction areas must not be disturbed in any way. • With regards to the site camp options, preference should be given to options 1 and 3. Site option 2, which contains considerably more vegetation and plant species, should not be selected. In the case of site camp option 1 (below the dam wall), a buffer of sufficient width must be maintained between the camp and nearby watercourse. • To mitigate the impact of vegetation clearing, topsoil and seedbearing plant material from the construction areas must be protected and replaced after construction as part of the rehabilitation process. As a duty of

	care measure, consideration should also be given to S&R of suitable species (e.g. bulbs & succulents). Of course, any replanting of rescued plant material must be done in matching habitats from which the plants originate. Bulbs should be removed along with some soil, placed in gel, bagged and then taken to a nursery for temporary storage or transplanted directly in the receiving area. S&R should be done at an appropriate time of the year, preferably when the soil is wet during the raining season. Ideally, bulbs should be salvaged during leaf fall, but before or after flowering. Please note that a CapeNature permit is needed for the relocation of indigenous plant species. • Allow at least 24 months for the monitoring of rehabilitation success and alien infestation post construction. Keep the project footprint as well as an additional strip of 10-15 m wide clear of invasive aliens.
Impact on flora, SCC and protected tree species	• Fence off the construction areas. The thicket/renosterveld outside the construction areas must not be disturbed in any way. • With regards to the site camp options, preference should be given to options 1 and 3. Site option 2, which contains considerably more vegetation and plant species, should not be selected. In the case of site camp option 1 (below the dam wall), a buffer of sufficient width must be maintained between the camp and nearby watercourse. • To mitigate the impact of vegetation clearing, topsoil and seedbearing plant material from the construction areas must be protected and replaced after construction as part of the rehabilitation process. As a duty of care measure, consideration should also be given to S&R of suitable

	species (e.g. bulbs & succulents). Of course, any replanting of rescued plant material must be done in matching habitats from which the plants originate. Bulbs should be removed along with some soil, placed in gel, bagged and then taken to a nursery for temporary storage or transplanted directly in the receiving area. S&R should be done at an appropriate time of the year, preferably when the soil is wet during the raining season. Ideally, bulbs should be salvaged during leaf fall, but before or after flowering. Please note that a CapeNature permit is needed for the relocation of indigenous plant species. • Allow at least 24 months for the monitoring of rehabilitation success and alien infestation post construction. Keep the project footprint as well as an additional strip of 10-15 m wide clear of invasive aliens.

Operational Phase:

Impact to mitigate	**Mitigation**
Impact on terrestrial biodiversity	• Monitor the construction footprint and all areas disturbed during construction for rehabilitation success and erosion. Where needed, rehabilitate/revegetate disturbed surfaces expediently. Erosion prevention measures may be needed on steep slopes, such as silt fences, logs or netting, to slow down runoff and potential erosion. Mulching and seeding with indigenous thicket/renosterveld seed may also be needed. • As a long-term maintenance requirement, continue with alien clearing on and around the project footprint, focussing on invasive species such as black wattle, rooikrans, common thorn apple, prickly pear, wild tobacco, castor-oil plant, bugweed and spear thistle. These species are category 1b and 2 invaders that require compulsory control as part of an invasive species

	control programme. Please note that it is a legal requirement for landowners to clear alien vegetation on their land.
Impact on flora, SCC and protected tree species	• Monitor the construction footprint and all areas disturbed during construction for rehabilitation success and erosion. Where needed, rehabilitate/revegetate disturbed surfaces expediently. Erosion prevention measures may be needed on steep slopes, such as silt fences, logs or netting, to slow down runoff and potential erosion. Mulching and seeding with indigenous thicket/renosterveld seed may also be needed. • As a long-term maintenance requirement, continue with alien clearing on and around the project footprint, focussing on invasive species such as black wattle, rooikrans, common thorn apple, prickly pear, wild tobacco, castor-oil plant, bugweed and spear thistle. These species are category 1b and 2 invaders that require compulsory control as part of an invasive species control programme. Please note that it is a legal requirement for landowners to clear alien vegetation on their land.

Terrestrial Faunal and Avifaunal Species Compliance Statement Mitigation Measures:

Construction Phase:

Impact to mitigate	**Mitigation**
Direct mortality of, or displacement of fauna	• The direct mortality of, or displacement of fauna is expected to be "Insignificant" to the receiving environment under both Preferred Alternative layout A and Alternative layout B. It is however advocated that every effort should be made to save and relocate any mammal, reptile, amphibian, bird, or invertebrate that cannot flee of its own accord, encountered during site preparation (i.e., to avoid and minimise the direct mortality of faunal species). These animals should be relocated to an area immediately outside of the

	project footprint, but under no circumstances any further away.
Contamination of ground water through chemical spills or leaching of chemicals	• Storage of fuel, chemicals and other hazardous substances should be done in suitable secure weatherproof containers with impermeable and bunded floors to limit pilferage or spillage into the environment. • Clean-up of any spillages (e.g. oil, fuel hazardous chemicals and cement) should proceed immediately and the contaminated soil should be removed and disposed of appropriately.

11.1.2 Summary of Construction Phase Impacts after Mitigation

The potential impacts identified during the construction of the proposed Moordkuil Pump Station project have been tabulated in Table 23. Through the implementation of the appropriate intervention measures, all potential negative impacts can be mitigated to a Low to Very Low significance.

Table 23: Summary of impacts during the Construction Phase of the Moordkuil Pump Station project.

Impact	Applicable Listed Activity	Nature	Significance Without Mitigation	Significance with mitigation	No-Go Alternative with mitigation
Construction Phase					
Socio-Economic Impact 1 – Job creation	-	Positive	**Low (+)**	**Low (+)**	**No impact**
Botanical Assessment Impact 1 – Impact on terrestrial biodiversity	Listing Notice 3: 4, 12, 14	Negative	**Medium-Low (-)**	**Low (-)**	
Botanical Assessment Impact 2 – Impact of the project on flora, SCC and protected tree species	Listing Notice 3: 4, 12, 14	Negative	**Medium-Low (-)**	**Low (-)**	
Aquatic Assessment Impact 1 – Disturbance/Loss of aquatic biota	Listing Notice 1: 12, 19, 45 Listing Notice 3: 12, 14	Negative	**Medium (-)**	**Low (-)**	
Aquatic Assessment Impact 4 – Water quality deterioration	Listing Notice 1: 12, 19, 45 Listing Notice 3: 12, 14	Negative	**Low (-)**	**Low (-)**	

11.1.3 Summary of Construction and Operational Phase impacts after Mitigation

Table 24: Summary of impacts during the Construction and Operational phase of the proposed Moordkuil Pump Station project

Impact	Listed Activities	Nature	Significance Without Mitigation	Significance with mitigation	No-Go Alternative with mitigation
Post-Construction Rehabilitation Phase					
Aquatic Assessment Impact 2 -Changes to the hydrological regime	Listing Notice 1: 12, 19, 45 Listing Notice 3: 12, 14	Negative	**Low (-)**	**Very Low (-)**	**No impact**

Impact	Listed Activities	Nature	Significance Without Mitigation	Significance with mitigation	No-Go Alternative with mitigation
Aquatic Assessment Impact 3 – Geomorphological changes from erosion and sedimentation	Listing Notice 1: 12, 19, 45 Listing Notice 3: 12, 14	Negative	**Low (-)**	**Very Low (-)**	**No impact**

11.1.4 Summary of Post-Construction Rehabilitation Phase after Mitigation

Table 25: Summary of impacts during the Post-Construction / Operational phase of the Moordkuil Pump Station project.

Impact	Listed Activities	Nature	Significance Without Mitigation	Significance with mitigation	No-Go Alternative with mitigation
Post-Construction Rehabilitation Phase					
Socio-Economic impact 2 – Security of availability of water supply	-	Positive	**Medium (+)**	**Medium (+)**	**Medium (-)**
Botanical Assessment Impact 2 – Impact of the project on flora, SCC and protected tree species	-	Negative	**Low (-)**	**Low (-)**	**No impact**
Botanical Assessment Impact 1 – Impact on terrestrial biodiversity	-	Positive	**Medium-Low (-)**	**Low (-)**	**No impact**

11.1.5 Summary of the positive and negative impacts and risks that the proposed activity or development and alternatives will have on the environment and community

Positive Impacts:

- Temporary job opportunities during the construction phase
- Increased pumping capacity for the pump station
- Increased water supply to Klipheuval Dam
- Capital expenditure in Mossel Bay

Negative Impacts:

- Temporary noise and construction related inconveniences.
- Temporary disturbance and impacts to the natural environment

11.2 Recommendations by the various professionals

11.2.1 Recommendations of the EAP

In order to obtain/reach the impact management objects the corresponding mitigation measures prescribed in the BAR and EMPr must be implemented.

The Impact monitoring will be undertaken by an appointed and independent ECO.

The impact management outcomes will be monitored by the appointed ECO, in addition to the implementation of mitigation measures during the duration of the development, if all management mitigation measures are implemented successfully the resulting impact management outcomes will mean that the develop was undertaken with no significant or avoidable impacts to the environment. Impact management objectives and impact management outcomes included in the EMPr

PRE-CONSTRUCTION PHASE	
IMPACT MANAGEMENT OBJECTIVES	**IMPACT MANAGEMENT OUTCOMES**
To appoint a suitably qualified and experienced Environmental Control Office	The conditions of Environmental Authorisation and the requirements of the EMPr are implemented and monitored during all phases of the development, which will promote sound environmental management on site.
To ensure the EMPr adheres to the requirements of the Environmental Authorisation and makes provision for the final detailed site layout	Good environmental management is promoted on site.
Identify and demarcate no-go areas, working areas and site facilities	Future construction activities will be restricted to within the designated areas & environmentally sensitive areas (no-go areas) will be protected from disturbance.
To set up and equip the site camp and associated site facilities in a manner that will promote good environmental management.	Site camp facilities do not impact significantly on environment. The equipment required to implement the provisions of the EMPr are provided on site.
Environmental Control Officer to conduct an inspection prior to the commencement of construction activities on site	Good environmental management is promoted and enforced by the ECO during the full pre-construction and construction phases. Site facilities are appropriately located on site. Construction workers receive environmental awareness training before commencing work on site
CONSTRUCTION PHASE	
To limit the impact on terrestrial biodiversity from the construction site.	Impact on terrestrial biodiversity is limited to the construction footprint and only to what is required to undertake the activities.
To limit the loss of indigenous flora and SCC during the construction process.	Only the approved footprint and a reasonable working corridor is disturbed by construction activities.
To prevent the direct mortality of, or displacement of fauna during the construction process.	Any animals encountered during construction are relocated to an area outside the construction footprint.
To prevent the contamination of ground water through chemical spills or leaching of chemicals during construction.	No ground water is contaminated through chemical spills or leaching of chemicals.
To prevent/limit the geomorphological changes from erosion and sedimentation during construction.	Sedimentation and erosion during construction is limited.
To prevent/limit changes to the hydrological regime of the Moordkuil River during construction.	Changes to the hydrological regime of the Moordkuil River is limited to the construction footprint.
To prevent/limit the disturbance of the aquatic habitat during construction.	Disturbance of the aquatic habitat is limited to the construction footprint.
To prevent/limit water quality deterioration during construction.	Water quality deterioration during construction is limited.

To create employment opportunities with potential for skills transfer, for members of the local community.	The local community benefits from the employment opportunities created during the construction phase.
POST CONSTRUCTION REHABILITATION PHASE	
To rehabilitate all areas disturbed by construction activities in an environmentally sensitive manner.	The site is neat and tidy and all exposed surfaces are suitably covered/ stabilised. There is no construction-related waste or pollution remaining on site.
To prevent the impact on terrestrial biodiversity during site closure and rehabilitation.	Impact on terrestrial biodiversity is prevented. Prevent erosion due to poor rehabilitation efforts.
To prevent the loss of indigenous flora and SCC during site closure and rehabilitation.	Alien infestation and resulting displacement of indigenous flora is prevented.
To prevent/limit changes to the hydrological regime of the Moordkuil River during site closure and rehabilitation.	Changes to the hydrological regime of the Moordkuil River is limited.
To prevent/limit the geomorphological changes from erosion and sedimentation during site closure and rehabilitation.	Sedimentation and erosion is limited.

11.2.2 Botanical Specialist Recommendations

- The botanical specialist concluded that it is therefore recommended that the proposed project be considered for approval, but subject to the proposed mitigation measures listed above.

11.2.3 Animal Species Specialist

- While the proposed project is unlikely to have any major impacts on terrestrial biodiversity and terrestrial faunal and avifaunal species, the a temporary platform will be constructed through soil infill material behind the sheet piling accommodate a temporary platform for the piling rig in order to construct the concrete inlet hopper within the Moordkuil River. Because this temporary platform will intersect a sensitive freshwater environment, any such scope of works should follow recommendations from the freshwater specialist.
- Aside from overlap with the freshwater ecosystem of the Moordkuil River, all other project footprints and site camp locations under both Preferred Alternative layout A and Alternative layout B are located in less sensitive areas from terrestrial biodiversity and terrestrial faunal and avifaunal perspectives and are unlikely to impact on ecological processes or biodiversity patterns at either local or regional scales. Both these development layouts and associated activities are therefore supported from terrestrial biodiversity and terrestrial faunal and avifaunal biodiversity perspectives.

11.2.4 Aquatic Specialist Recommendations

- Impact assessment determined that after mitigation, Alternatives 1 and 2 both have similarly low impacts (after mitigation). The lowest impacts were from the No-Go Alternative. Mitigation should focus on minimising construction footprint and reduction of impacts on the hydrological and geomorphological characteristics of the watercourse. A robust monitoring programme should be developed and audited annually by a SACNASP registered ecologist.
- In conclusion, there are fatal flaws associated with the proposed establishment of Site Camp 1 and 2 as the principals of impact avoidance (if possible), should have been implemented. The No-Go Alternative has the lowest impacts and therefore is the preferred alternative (from a freshwater perspective), but Site Camp 3 is acceptable, provided all the mitigation measures are strictly implemented and monitored. The

proposed project requires water use authorisation in terms of Chapter 4 and Section 21 of the National Water Act No. 36 of 1998, prior to the commencement of activities.

No specific recommendations were made by the Agricultural, Heritage and Palaeontological Specialists, respectively.

11.2.5 *Sensitive Areas, Sensitivity Map and a Map that that superimposes the preferred activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. (Attach map to this BAR as Appendix B2)*

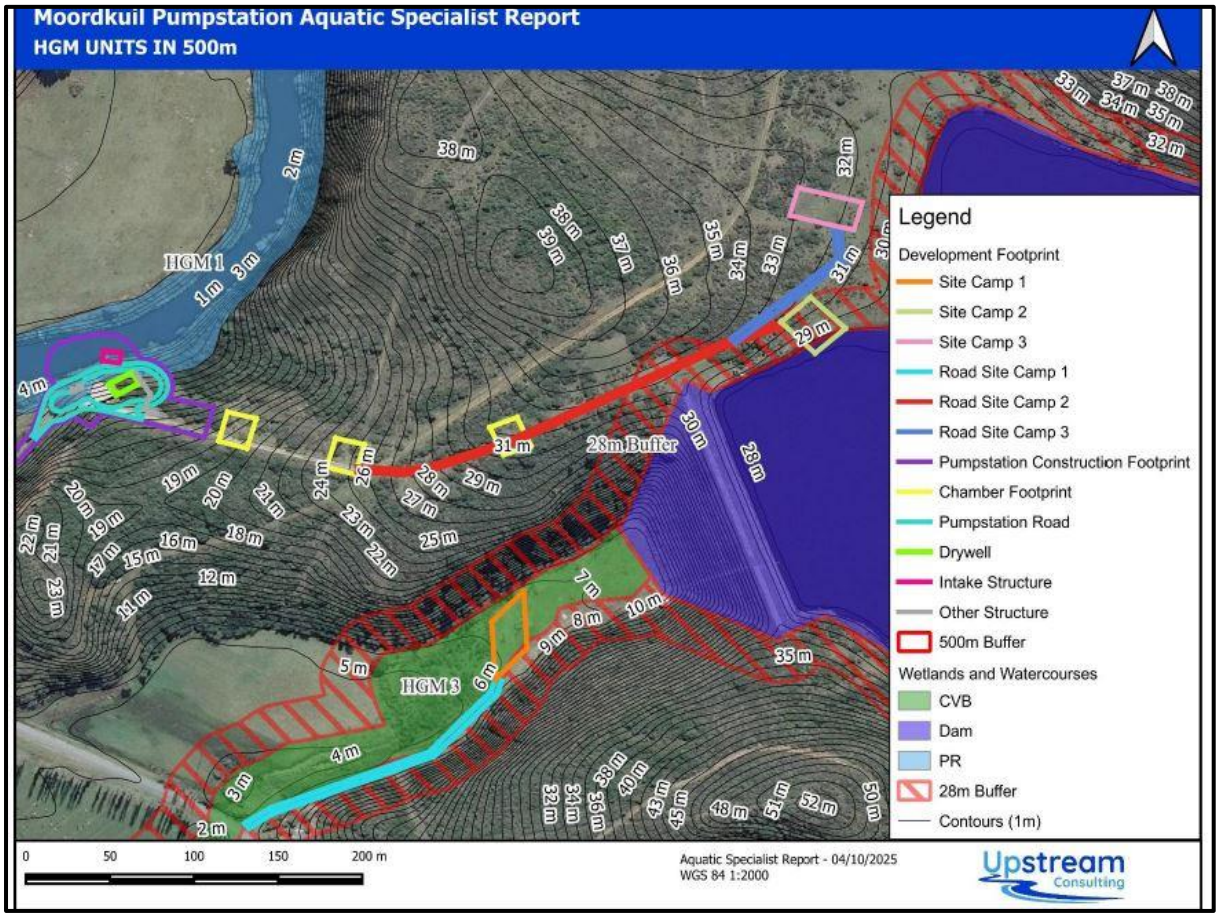

Figure 31: Aquatic Buffer Zones.

Figure 32: Extract of the Western Cape Biodiversity Network Map.

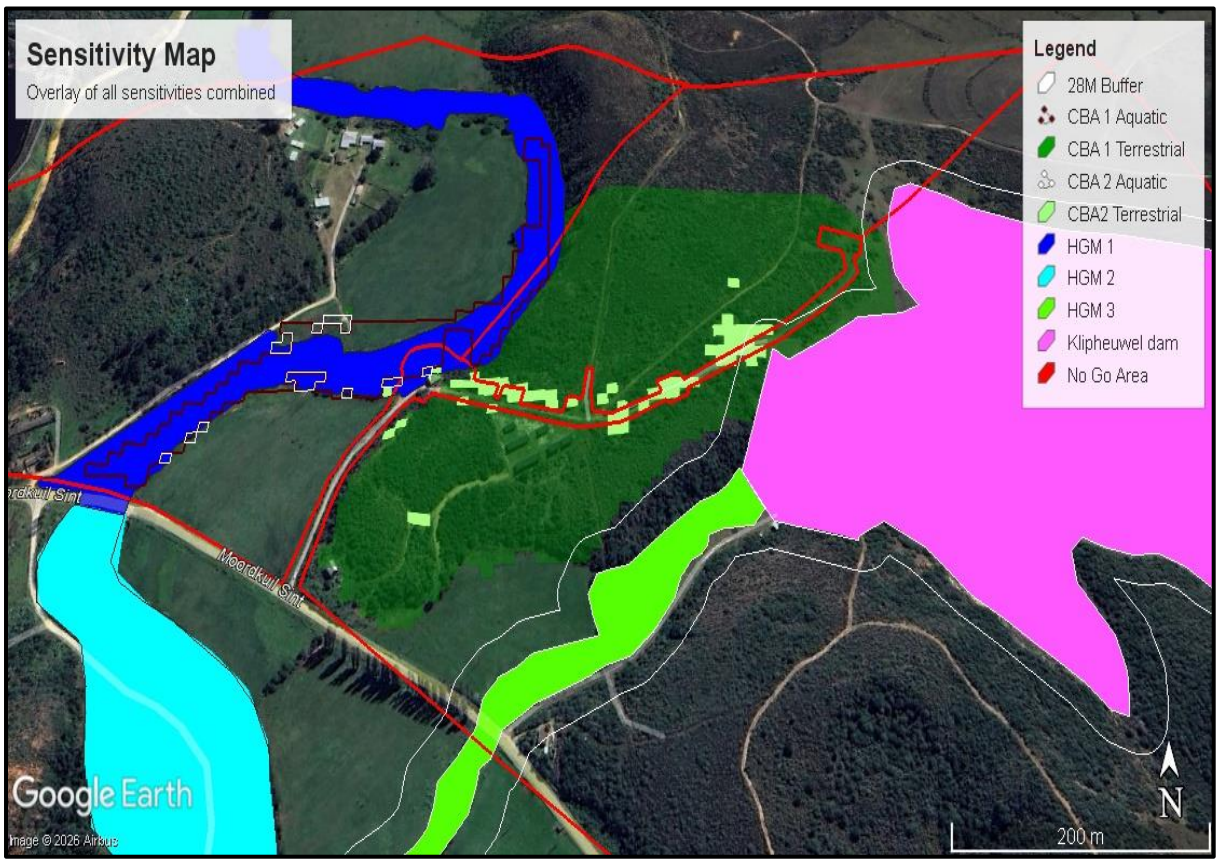

Figure 33: Sensitivity Map

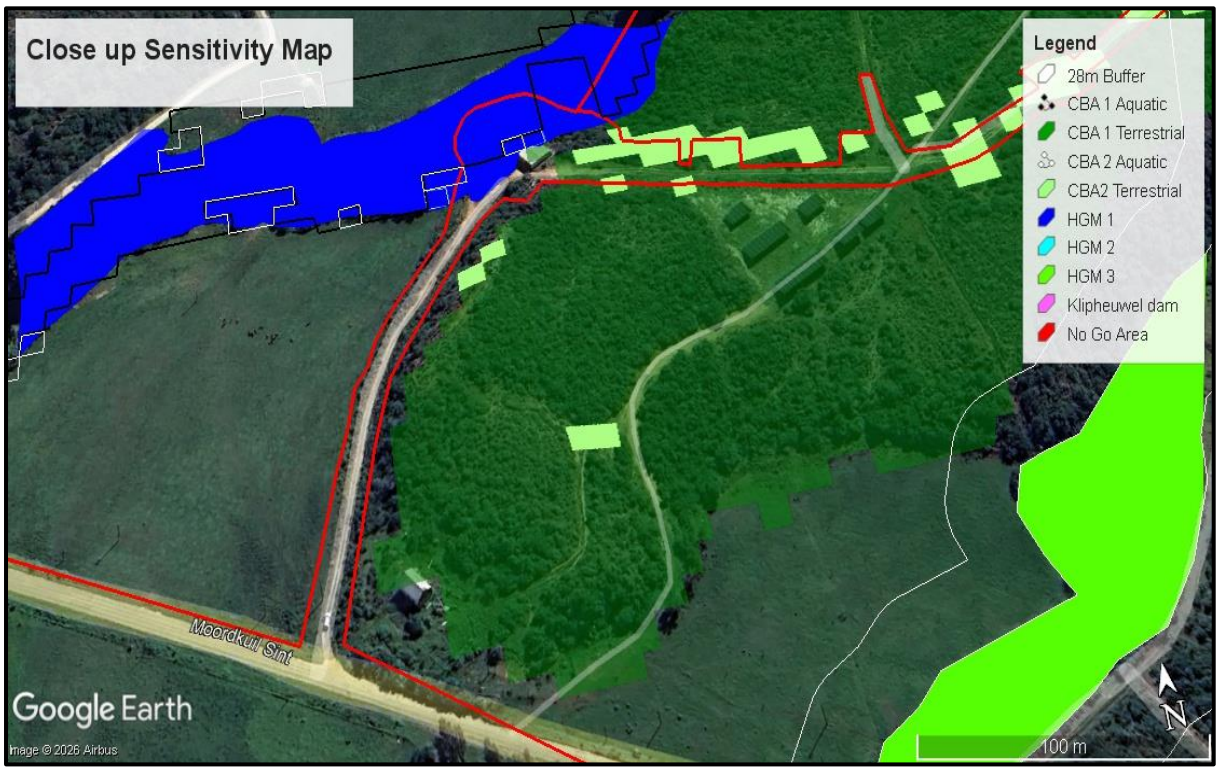

Figure 34: Close up of the sensitivity map.

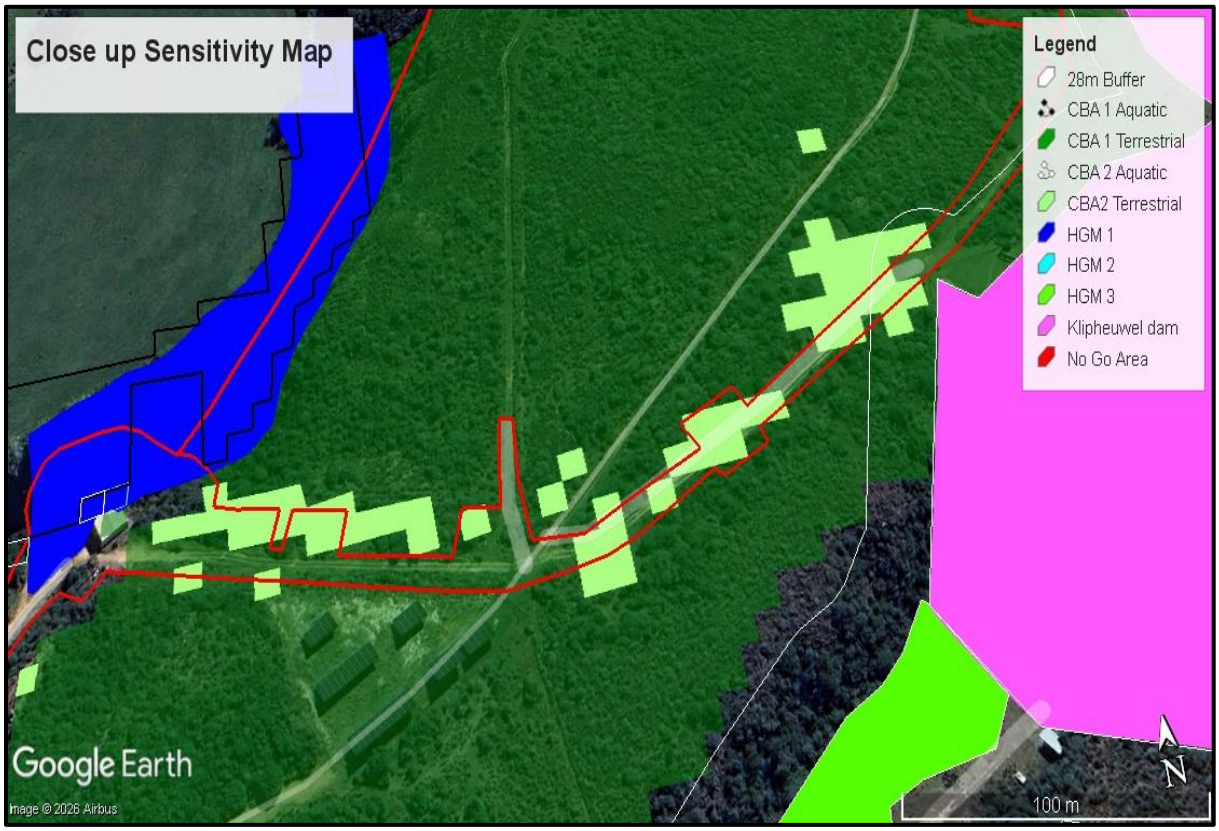

Figure 35: Close up of the sensitivity map.

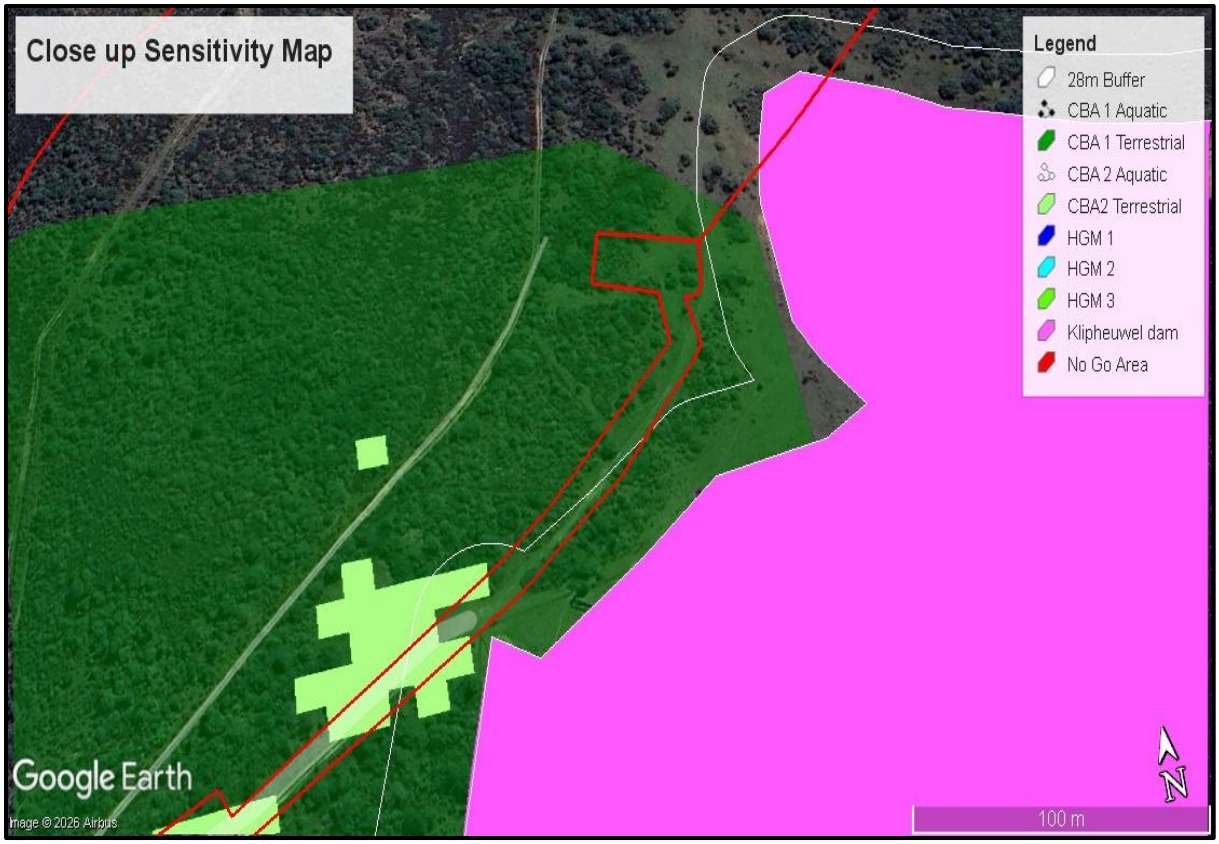

Figure 36: Close up of the sensitivity map.

11.3 EAP's Reasoned Opinion regarding the Environmental Impact of the Moordkuil Pump Station Project

11.3.1 Conditional Findings of the Assessment that must be Included as Conditions of the Authorisation:

The EMPr must be implemented, this is however a standard condition of Environmental Authorisation.

All mitigation measures from the specialists have been incorporated into the EMPr and as such are conditional to the environmental authorisation.

11.3.2 Conditional Findings of the Assessment that must be Included as Conditions of the Authorisation:

The preferred Alternative A should be authorised.

As seen in the body of this Basic Assessment Report, the negative impacts associated with the construction phase can be mitigated to that of a low significance. As the proposal is to upgrade a the existing Moordkuil pump station the negative impacts associated with the proposal are far outweighed by the positive impact of maintaining and upgrading existing water infrastructure.
Proposed Conditions of Authorisation:

- The EMPr must be implemented.
- An ECO must be appointed to monitor compliance with the EMPr

11.3.3 Description of any assumptions, uncertainties and gaps in knowledge that relate to the assessment and mitigation measures proposed:

It is assumed that the proposed mitigation measures as listed in this report and the EMPr (Appendix H1) will be implemented and adhered to as the significance of impacts ratings are conditional on implementation of the mitigation measures.

11.3.4 The period for which the EA is required, the date the activity will be concluded and when the post construction monitoring requirements should be finalised :

Time required to undertake the activities:

1 year for tendering purposes
2 years construction and rehabilitation phase
2 years for follow up alien clearing and rehabilitation monitoring

Total proposed validity period of EA: **5 years**

As no operational activities (in terms of the triggered activities listed in Section 2.5) will be applicable to the proposal, it is recommended that the validity period of the Environmental Authorisation, if granted, be twenty (20) years from the date of the authorisation. Therefore, making allowance for future works of a similar nature.