

THE SEWAGE TREATMENT PACKAGE PLANT FOR THE PROPOSED LUSAKA COMMUNITY HEALTHCARE FACILITY, PHUTHADITJHABA, THABO MOFUSANYANA DISTRICT, FREE STATE PROVINCE



May 2022

DRAFT BASIC ASSESSMENT REPORT

FOR

THE SEWAGE TREATMENT PACKAGE PLANT FOR THE PROPOSED LUSAKA COMMUNITY HEALTHCARE FACILITY, PHUTHADITJHABA, THABO MOFUSANYANA DISTRICT, FREE STATE PROVINCE

Prepared for:

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On behalf of:

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Submitted to:

Department of Forestry, Fisheries and the Environment (DFFE)

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May 2022

PROJECT INFORMATION

Title:	Draft Basic Assessment for the Sewage Treatment
	Package Plant (STP) for the Proposed Lusaka
	Community Healthcare Facility in Phuthaditjhaba,
	Thabo Mofutsanyana District Municipality, Free State
	Province
Competent Authority:	Department of Forestry, Fisheries and the
	Environment (DFFE)
Applicant:	COEGA Development Corporation (CDC)
Environmental Assessment Practitioner:	GA Environment (Pty) Ltd.
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Approver:	Nkhensani Khandlhela
Date:	13 May 2022

DOCUMENT HISTORY AND QUALITY CONTROL

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0	22/04/2022	Draft for internal review	Matshego Keikelame	Vukosi Mabunda
1	16/05/2022	Draft for public review	Matshego Keikelame	Nkhensani Khandlhela

SIGNING OF THE ORIGINAL DOCUMENT

Original	Prepared by	Reviewed by	Approved by
Date:	Name:	Name:	Name:
22 April 2022	Matshego	Vukosi Mabunda	Nkhensani
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LEGISLATIVE REQUIREMENTS FOR A BASIC ASSESSMENT REPORT

The table below provides the requirements for a Basic Assessment report in terms of the NEMA EIA Regulations (Appendix 1) with reference to the relevant sections of this report where these requirements are addressed.

Section	Content	Reference		
A Dasia Assassm	ant Depart (DAD) must contain the information that is necessary for the comp	tont		
authority to con	A Basic Assessment Report (BAR) must contain the information that is necessary for the competent			
, 3 (1) (a)	details of-	Section 1.10		
	(i) the EAP who prepared the report; and	Appendix H		
	(ii) the expertise of the EAP, including a curriculum vitae;			
3 (1) (b)	the location of the activity, including:	Section1.2		
	(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;			
3 (1) (c)	a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is-	Section1.2 and		
	(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	Appendix A		
	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;			
3 (1) (d)	a description of the scope of the proposed activity, including	Section 1.7		
	(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			
3 (1) (e)	a description of the policy and legislative context within which the development is proposed including-	Section 2		
	(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			
3 (1) (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 location	Section 1.6		
3 (1) (g)	a motivation for the preferred site, activity and technology alternative	Section 5		

2 (1) (b)	a full description of the process followed to reach the proposed proferred	Soction F
3 (1) (1)	alternative within the site, including:	Section 5
	(i) details of all the alternatives considered;	
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	
	(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;	
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	
	(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.	
	(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	
	(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;	
	(viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix;	
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity	
3 (1) (i)	(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-	Section 7
	(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	
3 (1) (j)	(j) an assessment of each identified potentially significant impact and risk, including-	Section 8

	(i) cumulative impacts;	
	(ii) the nature, significance and consequences 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	
3 (1) (k)	where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	Section 8 and Appendix F
3 (1) (I)	an environmental impact statement which contains-	Section 9.1
	(i) a summary of the key findings of the environmental impact assessment;	
	(ii) a 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	
	(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	
3 (1) (m)	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr	Appendix G
3 (1) (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 9.2
3 (1) (o)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 1.12
3 (1) (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 of that authorisation	Section 9
3 (1) (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 9
3 (1) (r)	an undertaking under oath or affirmation by the EAP in relation to: the correctness of the information provided in the reports;	Appendix H & Page 5
	(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. 	
3 (1) (s)	where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	Not Applicable
3 (1) (t)	any specific information that may be required by the competent authority	Not Applicable
3 (1) (u)	any other matters required in terms of section 24(4)(a) and (b) of the Act	Not Applicable

AFFIRMATION OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

This report was compiled and prepared by Matshego Keikelame under the guidance of Nkhensani Khandlhela. I <u>Matshego Keikelame</u>, an EAP employed by <u>GA Environment (Pty) Ltd</u> declare that the information provided in this report is correct and relevant to the activity/ project, that comments from Interested and Affected Parties have been incorporated into this report, that the report has included inputs from Specialists and that all relevant project information was made available to Interested and Affected Parties.

SIGNATURE OF EAP

DATE: 11 May 2022

EXECUTIVE SUMMARY

1. INTRODUCTION

COEGA Development Corporation (CDC) is proposing to develop a Sewage Treatment Package Plant (STP) in Lusaka, Phuthaditjhaba, Thabo Mofutsanyana District, Free State. The Sewage Treatment Plant will be required to cater for the sewage that will be generated in proposed Healthcare facility as there is a lack of adequate infrastructure in the area.

The area around the site for the proposed healthcare facility currently has 150mm diameter pipes installed, running east and north of the site to a sewer pump station. The pump station is however not in a working condition for a significant period of time. For this reason, a package plant is being proposed which will discharge treated wastewater into the nearest natural watercourse (Metsi Matsho Tributary).

The Information received from the design engineers regarding the package plant are as follows:

- Design flow: 18200 l/d
- Peak Flow: 0.6 l/s

The proposed Package Plant will comprise a number of a gravity trunk sewer main pipe, which feeds into the pre-digestion chamber before it enters the bioreactor. The following basic components are included in the plant:

- Pre-digestion Chamber;
- Balancing Chamber;
- Bioreactor Chamber;
- Clarifier;
- Two Disinfection Tanks;
- Power supply for the pumps;
- Air Blower Pump;
- Discharge Pump; and
- Transfer Pump.

In line with the requirements of the National Environmental Management Act (NEMA), Environmental Impact Assessment (EIA) Regulations, 2014 as amended, Ramgoolam Group (Pty) Ltd appointed GA Environment (Pty) Ltd on behalf of COEGA Development Corporation (CDC) as the Independent Environmental Consultants to undertake an Environmental Authorisation (EA) and Water Use Authorisation (WUA) Processes for the Sewage Treatment Package Plant (STP) for the proposed Lusaka Community Healthcare Facility.

The purpose of this report is to present the results of the environmental assessment undertaken for the STP. The report presents the following:

- Legislative framework governing the site;
- The status quo of the environmental conditions of the site as well as applicable environmental studies, licences and permits;
- Proposed designs and alternatives;
- Public participation process;
- Impact assessment methodology and impact assessment;
- Overall findings to indicate the sensitivity of the site, potential fatal flaws, and issues that require the attention of COEGA.

An Environmental Authorization through a Basic Assessment (BA) Process in terms of Section 24(5) of the NEMA, Act No. 107 of 1998 and a Water Use Authorization (WUA) as per the National Water Act (No. 36 of 1998) are required for the Sewage Treatment Package Plant.

2. LEGISLATIVE FRAMEWORKS

All legal provisions and the legal context for the proposed development presented in this document include a review of legislation, regulations, policies and guidelines, which are relevant to, or have implications, for the proposed project. The National, Provincial and Local Government legislation are presented in the report and include the following:

- Constitution of the Republic of South Africa, 1996 (Act No 108 of 1996);
- National Environmental Management Act, 1998 (Act 107 of 1998);
- NEMA EIA Regulations 2014 (as amended);
- National Environmental Management Waste Act, 2008 (Act 59 of 2008);
- National Environmental Management: Protected Areas Act (Act No. 57 of 2003);
- National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004);
- National Heritage Resources Act, 1999 (Act 25 of 1999);
- National Environmental Management Protected Areas Act, 2003 (Act 57 of 2003);
- National Forest Act, 1998 (Act 36 of 1998);
- The National Water Act (Act No. 36 of 1998)
- The National Water Services Act (Act No. 108 of 1997);

- Free State Nature Conservation Ordinance 8 of 1969
- Thabo Mofutsanyana District Environmental Management Framework
- Free State Provincial Spatial Development Framework (2013).

3. BASIC ASSESSMENT AND PUBLIC PARTICIPATION PROCESS

In terms of section 24(2) of NEMA, the Minister and or any MEC in concurrence with the Minister may identify activities which require authorisation as these activities may negatively affect the environment. Environmental Impact Assessment (EIA) Regulations were promulgated in December 2014 (as amended) in terms of Section 24(5) and Section 44 of the National Environmental Management Act (NEMA), Act 107 of 1998. In terms of the 2014, EIA Regulations the triggered listed activities fall under GNR 983 Listing Notices 1 and GNR 985 Listing Notices 3 which are further discussed as follows:

- GNR 983 Listing Notice 1 (Regulation 983) define activities which will trigger the need for a **Basic Assessment process;**
- GNR 984 Listing Notice 2 (Regulation 984) defines activities which trigger a Scoping and Environmental Impact Assessment (EIA) process. **This is not applicable to the current project**
- GNR 985 Listing Notice 3 (Regulations 985) refers to certain listed activities located in specifically defined geographical areas for which a **Basic Assessment process** would be required.

The listed activities that will be triggered for the project and a Basic Assessment process are as follows:

- *GNR 983 Listing Notice 1, Activity 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.
- *GNR 985 Listing Notice 3, Activity 12:* The clearance of an area of 300 square metres or more of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.
 - a. In Eastern Cape, Free State, Gauteng, Limpopo, North West and Western Cape provinces:

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.

GNR 985 Listing Notice 3, Activity 14: The development of –

xii) infrastructure or structures with a physical footprint of 10 square metres or more where such development occurs—

- a) within a watercourse; or
- c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse

a. Free State

ii) Outside urban areas:

(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.

A Public Participation Process (PPP) consistent with Chapter 6 of the NEMA EIA Regulations 2014, as amended (Government Notice R. 982 in Government Gazette No. 40772 of 07 April 2017) was followed for the project. In addition to Chapter 6 of the NEMA EIA Regulations, 2014 as amended, on the 5th of June 2020, the Minister of the Department of Forestry, Fisheries and the Environment, issued directions regarding the measures to address, prevent and combat the spread of the COVID-19 relating to the National Environmental Management Permits and Licences. A Public Participation Plan was submitted to the DFFE on the 27th of January 2022, the plan was approved on the 1st of February 2022. It must be noted that the abovementioned directions have since been withdrawn effective from 22 March 2022.

The Draft Basic Assessment Report was compiled and will be issued out for Public and Competent Authority (CA) review for the legislated period of at least 30 days. The comments raised by the CA as well as various Interested and Affected Parties (I&APs) will be recorded and addressed in the Final BAR. The PPP that commenced in January 2022 is summarised as follows:

- A newspaper advertisement was placed in the local newspaper (Eastern Free State Issue) on the 17th of February 2022, calling for I&AP registration with the project and comments. Proof of the newspaper advertisement is attached in **Appendix E1** of this report;
- Notification letters were compiled and distributed to all adjacent landowners on the 31st of January 2022. Proof of the of the distribution is attached in Appendix E2 and E8 of this report;
- Site notices were placed in various locations along and within proximity of the of the Sewage Treatment Package Plant location on the 31st of January 2022. Proof of the site notices placement is attached in Appendix E3;

- Electronic versions of the notification letters were distributed to I&APs and is currently ongoing;
- The Draft Basic Assessment report will be made available to the public electronically for a 30day review period. All comments made by the public and Commenting Authorities will be incorporated into the final report which will be submitted to DFFE for review and decisionmaking.
- The following commenting authorities will be provided with a copy of the report in electronic format and hardcopy (if requested):
 - Thabo Mofutsanyana District Municipality Departments;
 - Maluti-a-Phofung Local Municipality Departments;
 - Department of Small Business Development, Tourism and Environmental Affairs (DESTEA);
 - Free State Heritage Resources Agency;
 - South African Heritage Resource Agency.
 - Department of Water and Sanitation.

SMS, e-mail notifications and telephone calls will be utilised to notify all registered I&APs about the availability of the report. Public Participation will be undertaken as per the approved Public Participation Plan.

4. DESCRIPTIONS OF THE AFFECTED ENVIRONMENT

An understanding of the overall character and other sensitivities that were identified in the surrounding environment is pertinent to the project. The Biophysical aspects discussed are *Climate, Geology, Protected Areas, Regional Vegetation and Conservation Plan Area, Hydrological* and *Heritage features*. The Socio-Economic conditions, Demographics, employment levels and service delivery are also discussed in this report.

5. SPECIALIST STUDIES

In accordance with the requirements of Appendix 6 of the NEMA EIA Regulations, 2014 as amended, and a review of the DFFE Screening tool requirements, the following specialist studies were undertaken:

- Terrestrial Biodiversity Impact Assessment
- Aquatic Biodiversity Impact Assessment;
- Phase I Heritage Impact Assessment; and
- Palaeontological Impact Assessment;

The Ecological studies (flora, fauna and wetland) were undertaken under the recently published Government Notice 320 (dated 20 March 2020) and Government Notice 1150 (dated 30 October 2020) in terms of NEMA: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation".

According to the Terrestrial Biodiversity Assessment undertaken by The Biodiversity Company in February 2022, no significant patches of intact natural vegetation remain within the project areas or immediate surrounds which is evident in the disturbed and transformed habitats within and outside of the proposed sewage treatment plant development. The project area is of low botanical and faunal diversity as well as sensitivity and present no faunal or botanical constraints to the proposed development with no specific ecological mitigation required.

According to the Phase I Heritage Impact Assessment undertaken by Dr Johan Abraham van Schalkwyk, the cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a limited pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer and industrial) component. The second component, although much younger, is a semi-urban one, in which large numbers of people were forcibly resettled in the area. During the survey, no sites, features or objects of cultural significance were identified. Heritage resources are sparsely distributed on the wider landscape with highly significant (Grade 1) sites being rare. Because of the low likelihood of finding further significant heritage resources in the area of the proposed for development and the generally low density of sites in the wider landscape the overall impacts to heritage are expected to be of generally low significance.

The Palaeontological Impact Assessment undertaken by Banzai Environmental found that the proposed development is underlain by the Elliot Formation (Stormberg Group, Karoo Supergroup). According to the South African Heritage Resources Information System, the Palaeontological Sensitivity of the Elliot Formation is Very High. A 1-day site-specific field survey of the development footprint was therefore conducted on foot and by a motor vehicle on 8 March 2022. No fossiliferous outcrops were detected in the development footprint. An overall medium palaeontological sensitivity is allocated to the development footprint. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological reserves of the area and construction of the development may be authorised in its whole extent.

The Specialist reports are attached to **Appendix F** of this report. With regards to the Management Plans for the project, an Environmental Management Programme (EMPr), and Rehabilitation Plan

have been compiled to provide mitigation measures for all potential issues that are likely to emanate from the project.

6. ALTERNATIVES

In terms of Section 24 of NEMA, the proponent is required to demonstrate that alternatives have been investigated and described in sufficient detail during the BA process. These alternatives must be practical, feasible, reasonable and viable to cater for an unbiased approach to the project and in turn to ensure environmental protection. A total of three (3) alternatives types were assessed for the project, namely site location alternatives, routing alternatives, and operational alternatives in addition to the no-go alternative. The advantages and disadvantages of these alternatives as well as the reason for the preferred alternative are presented in this report. Section 5 of the report provides a detailed description and assessment of Alternatives. **Appendix B** shows the proposed route alternative that have been assessed as part of the Basic Assessment Process.

It is the recommendation of the EAP that specified preferred alternative be approved as it details the most effective way of meeting the need and purpose of the proposed activity whilst minimising its impact on the environment.

7. ENVIRONMENTAL IMPACTS

In accordance with Government Notice R. 982, promulgated in terms of Section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), the EAP is required to assess the significance of potential impacts in terms of the following criteria:

- Nature of the impact;
- Extent of the impact;
- Intensity of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Reversibility of impacts; and
- Impact on irreplaceable resources; and
- Cumulative impacts.

The potential impacts identified and discussed were divided into two themes which are as follows.

• Theme 1: Impacts on the Biophysical Environment - (impacts on surrounding indigenous plant species, fauna, soil and surface water); and

• Theme 2: Impacts on the Human Environment- (impacts on the surrounding residential area and business. These include traffic, dust and air quality, noise, visual, health and safety, and employment opportunities)

Cumulative impacts were also discussed in this report and the **Table 1** below indicates a summary of impacts identified.

Impact description	Type of	Project phase	Significance	Significance with
	impact		without	mitigation
			mitigation	
IMPACT 1: Loss of floral habitat and species	NEGATIVE	Construction	Low	Low
diversity	(- VE)	Operational	low	low
		operational		
IMPACT 2: Destruction, further loss and	NEGATIVE	Construction	Medium	Low
fragmentation of the vegetation community	(- VE)	Operational	Low	Low
IMPACT 3: Loss of fauna migration	NEGATIVE	Construction	Medium	Low
connectivity	(- VE)	Operational	Low	Low
		l		
IMPACT 4: Introduction and spread of alien	NEGATIVE	Construction	Medium	Low
vegetation	(- VE)	Operational	Low	Low
IMPACT 5: Changes in water quality due to foreign materials and increased nutrients	NEGATIVE	Construction	Medium	Low
Toreign materials and increased nutrients	(•=)	Operational	Medium	Low
watercourse, riparian, and instream habitat	(- VE)	Construction	Medium	LOW
-		Operational	Medium	Low
IMPACT 7: Soil and Natural Vegetation	NEGATIVE	Construction	Medium	Low
disturbance	(- VE)	Operational	Medium	Low
IMPACT 8: Changes in water flow regime	NEGATIVE	Construction	Medium	Low
	(- VE)	Operational	Low	Low
IMPACT 9: Impacts on contaminations of surface water due to hydrocarbons and	NEGATIVE (- VE)	Construction	Medium	Low
spillages.		Operational	Medium	Low
IMPACT 10 Loss of Topsoil and Soil	NEGATIVE	Construction	Medium	Low
	(- VE)	Operational	Low	Low
IMPACT 11: Impacts on waste generated		Construction	Low	Low

Table 1: Impact Assessment Summary Table

Impact description	Type of impact	Project phase	Significance without mitigation	Significance with mitigation
	NEGATIVE (- VE)	Operational	Low	Low
IMPACT 12: Traffic on local roads	NEGATIVE (- VE)	Construction	Medium	Low
	POSITIVE (+ VE)	Operational	Low	No significance
IMPACT 13: Dust and air quality	NEGATIVE (- VE)	Construction	Medium	Low
		Operational	Low	Low
IMPACT 14: Noise impacts	NEGATIVE	Construction	Medium	Low
	(- VE)	Operational	Low	Low
		Construction	1	Nie siewifieren en
INPACT 15: Hentage impacts	(- VE)		LOW	No significance
		Operational	LOW	No significance
IMPACT 16: Palaeontological impacts	NEGATIVE	Construction	Low	No significance
	(- VE)	Operational	No significance	No significance
IMPACT 17: Visual impacts	NEGATIVE	Construction	Medium	Low
	(- VE)	Operational	Low	Low
IMPACT 18: Health and safety impacts	NEGATIVE (- VE)	Construction	Medium	Low
	POSITIVE (+ VE)	Operational	Low	Low
IMPACT 19: Temporary employment opportunities	POSITIVE (+ VE)	Construction	Positive	Nō significance
		Operational	Positive	No significance

8. CONCLUSIONS AND RECOMMENDATIONS

This DBAR has provided a broader description of the biophysical, Infrastructural and socio-economic issues associated with the proposed development for the proposed sewage treatment package plant. A comprehensive public participation process was conducted and is also presented in this report.

The DBAR has presented an assessment of the impacts of each of the proposed activities as well as the potential cumulative impacts of the development in its entirety. Mitigation measures for each of the impacts are discussed to ensure that positive impacts can be optimised, and negative impacts minimised in order for the project to be integrated into the environment in a sustainable manner. It is the recommendation of the EAP that the **proposed design** is the most effective way of meeting the need and purpose of the proposed activity. Taking into consideration the findings of the environmental impact assessment, the project benefits outweigh the negative impacts identified, provided that mitigation measures are applied effectively. Impacts of high significance are not foreseen once proper mitigation measures have been implemented.

The EAP's key recommendations outlined in the report are as follows:

- An EMP shall be compiled to guide the construction activities of the Health Care Facility as this facility is linked to the proposed construction of the STP and associated sewer pipelines;
- An Independent Environmental Control Officer must be appointed to monitor all construction activities and ensure the demarcation of all applicable areas and approve the locations of all infrastructure;
- c. The Contractor shall inform all adjacent landowners of the commencement of construction activities at least 30 days before the commencement via adequate signage at strategic points on site
- Movement of faunal species through the study area must be catered for by the provision of the sewer discharge pipeline, in order to maintain regional metapopulation dynamics and to prevent local extinctions;
- e. No treated wastewater/effluent may be discharged directly into any watercourse without the appropriate Water Use Licence in place
- f. Topsoils should be excavated and stockpiled separately from the subsoils to be used during the rehabilitation of the pipeline area. Drip trays shall be provided in construction areas for stationary plant and for "parked" plant; Drip trays, sumps and bunds must be emptied regularly, especially before a known rain event and after a rain event, and the contents disposed of at a licensed disposal facility;
- g. Water quality monitoring and/or sampling should be undertaken upstream and downstream of the discharge point to ensure there are no significant water quality changes. The frequency of monitoring and/or sampling should be determined by a qualified aquatic ecologist;
- h. The Contractor must be trained to recognise any cultural heritage and palaeontological features. Should such features be discovered during the construction phase, a Chance Find Protocol must be implemented immediately, and a suitably qualified heritage specialist must be called to investigate through the ECO;

- i. Adhere to all conditions of the Environmental Authorisation issued by DFFE as well as any conditions of permits that may be required thereafter; and
- j. Adhere to all recommendations outlined in the specialist Reports (**Appendix F**), and the Environmental Management Programme in **Appendix G**.

DRAFT BASIC ASSESSMENT REPORT FOR THE SEWAGE TREATMENT PACKAGE PLANT FOR THE PROPOSED LUSAKA COMMUNITY HEALTHCARE FACILITY, PHUTHADITJHABA, THABO MOFUSANYANA DISTRICT, FREE STATE PROVINCE

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Appendix F4: Palaeontological Impact Assessment

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- **Appendix G:** Environmental Management Programme and Management Plans
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Appendix I1: Department of Forestry, Fisheries and Environment: Screening Tool

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LIST OF ABBREVIATIONS / ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority
CBA	Critical Biodiversity Area
DBAR	Draft Basic Assessment Report
DFFE	Department of Forestry, Fisheries and the Environment
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance & Sensitivity
EMPr	Environmental Management Programme
ESA	Ecological Support Areas
I&APs	Interested and Affected Parties
l/d	litres a day
l/s	litres per second
NEMA	National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998),
NEM:BA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEM: PAA	National Environmental Management: Protected Areas Act (Act 57 of 2003)
PES	Present Ecological State
RI&APs	Registered Interested and Affected Parties
SANBI	South African National Biodiversity Institute

GLOSSARY OF TERMS

This section provides a catalogue of terms and definitions, which may be used in this report and, or other documents drafted for the project.

Term	Definition
Clearing/Clearance	Clearing/Clearance refers to the removal of vegetation through permanent eradication and
	in turn no likelihood of regrowth. 'Burning of vegetation (e.g. fire- breaks), mowing grass or
	pruning does not constitute vegetation clearance, unless such burning, mowing or pruning
	would result in the vegetation being permanently eliminated, removed or eradicated'.
Competent	In respect of a listed activity or specified activity, means the organ of state charged by this
Authority	Act with evaluating the environmental impact of that activity and, where appropriate, with
	granting or refusing an environmental authorisation in respect of that activity.
Cultural significance	Aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological
	value or significance.
Critical Biodiversity	Areas that are deemed important to conserve ecosystems and species. For this reason,
Area	these areas require protection.
Development	The building, erection, construction or establishment of a facility, structure or
	infrastructure, including associated earthworks or borrow pits, that is necessary for the
	undertaking of a listed or specified activity, but excludes any modification, alteration or
	expansion of such a facility, structure or infrastructure, including associated earthworks or
	borrow pits, and excluding the redevelopment of the same facility in the same location, with
	the same capacity and footprint.
Duty of Care	Every person who causes, has caused or may cause significant pollution or degradation of
	the environment to take reasonable measures to prevent such pollution or degradation
	from occurring, continuing or recurring, or, in so far as such harm to the environmental is
	authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such
	pollution and degradation of the environment. "
Decommissioning	means to take out of active service permanently or dismantle partly or wholly, or closure of
	a facility to the extent that it cannot be readily recommissioned;
Environment	the surroundings within which humans exist and that are made up of —
	(i) the land, water and atmosphere of the earth;
	(ii) micro-organisms, 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 well-being.
Environmental	The individual responsible for the planning, management, coordination or review of
Assessment	environmental impact assessments, strategic environmental assessments, environmental
Practitioners	management programmers or any other appropriate environmental instruments
Factorial Convert	Introduced through regulations.
Ecological Support	Areas that support the ecological functioning of protected areas or CBAs or provide
Area	Important ecological infrastructure.
Indigenous	Refers to vegetation consisting of indigenous plant species occurring naturally in an area,
vegetation	regardless of the level of alien infestation and where the topsoil has not been lawfully
	disturbed during the preceding ten years.

Term	Definition
Interested and	a) any person, group of persons or organisation interested in or affected by such operation
Affected Parties	or activity; and
(IAPs)	(b) any organ of stale that may have jurisdiction over any aspect of the operation or activity.
Phased Activity	Means an activity that is developed in phases over time on
	the same or adjacent properties to create a single or linked entity, but excludes any activity
	for which an environmental authorisation has been obtained in terms of the Act or the
	Environment Conservation Act, 1989 (Act No. 73 of 1989);
Protected Area	A protected area is a clearly defined geographical space, recognised, dedicated and
	managed, through legal or other effective means, to achieve the long-term conservation of
	nature with associated ecosystem services and cultural values.
	These are areas aimed at the protection and conservation of areas which are ecologically
	viable and have high biodiversity. Example of Protected Areas include but are not limited to
	National Parks, Nature Reserves, world heritage sites and marine protected areas
Public Participation	In relation to the assessment of the environmental impact of any application for an
Process	environmental authorisation, means a process by which potential Interested and Affected
	Parties are given opportunity to comment on, or raise issues relevant to, the application.
Sewage Treatment	Sewage treatment is a type of wastewater treatment which aims to remove contaminants
Plant	from sewage to produce an effluent that is suitable for discharge to the surrounding
	environment or an intended reuse application, thereby preventing water pollution from raw
	sewage discharges
Species of	IUCN Red List definition: Threatened species, and other species of significant conservation
Conservation	importance: Extinct, Extinct in the Wild, Near Threatened, Data Deficient. In South Africa,
Concern	the following additional categories are added: Rare, Critically Rare.
Threatened or	These refers to other plants and animals that are at threat of extinction or are protected
protected species	due to their high conservation values and or national importance.

1 INTRODUCTION

1.2 Background

COEGA Development Corporation (CDC) is proposing to develop a Sewage Treatment Package Plant (STP) in Lusaka, Phuthaditjhaba, Thabo Mofutsanyana District, Free State. The STP will be required for the treatment of sewage that will be generated from the proposed Healthcare facility (Clinic). The area currently has inadequate sewage infrastructure to treat sewage that will be generated from the proposed Healthcare facility. Additional sewage pipelines will be required to discharge treated sewer into to nearest watercourse.

The site is located in close proximity to the proposed health care facility and currently has 150mm diameter pipes installed, running east and north of the site which connect to a sewer pump station. The sewer pump station has however, not been operational for a significant period of time. For this reason, a sewage package plant which will discharge treated wastewater into the nearest natural watercourse known as the Metsi Matsho Tributary, located approximately 200m north of the site is being proposed.

1.3 Locality Description and Surrounding Land-Uses

The project is located in Lusaka, Phuthaditjhaba, Free State. Access is readily available via Comet Road from Phuthaditjhaba. There are two access points located southeast of the site. Existing internal community gravel roads will also provide access to the property site. The roads around the site are deteriorated due to lack of maintenance from the Municipality. Visible landmarks around the site include the Tswelangpele Intermediate School which is located south of the proposed site and the Molapo Secondary school is located to the north of the site.

The site for the Sewage Treatment Package Plant is located in Ward 31 and it is approximately 6km southeast of the town of Phuthaditjaba. The site centre coordinates are **28°33'5.96"S** and **28°51'58.08"E** (Figure 1). The area in close proximity to the site where the Healthcare Facility is proposed currently has 150mm diameter pipes installed, running east and north of the site and connect to the existing sewer pump station. Existing storm water drainage systems along the roads also show signs of deterioration as they are covered by overgrown vegetation and not maintained by the Municipality.



Figure 1: Locality Map of the Lusaka Healthcare Facility Sewage Treatment Package plant.

The Maluti-A-Phofung mostly being a rural municipality, the municipality indirectly consists of a high rate of unemployment. Other factors contributing to the high employment rate is the shortage of skills and illiteracy rates. As it is generally applicable throughout the country, unemployment is at the heart of poverty within the municipality as observed by the EAP during the site environmental screening and public participation. Majority of households around the site use pit toilets while only a few have installed their own sewage septic tanks in their own yards. Subsistence farming was noted as one of the building blocks for economic development within the area as livestock grazing around the prosed site was noted.

1.4 Project Description

The purpose of this section is to provide a description of the proposed Sewage Treatment Package Plant and route of the main sewer pipeline that will discharge in the Metsi Mantsho Tributary. Please also refer to **Figures 1** for illustrative details. The design layout of the proposed STP and associated discharge pipeline is attached to **Appendix B.** The information provided in these sections are taken from the Preliminary Designs that have been provided the appointed Engineers. The site is located in close proximity to the proposed health care facility and currently has 150mm diameter pipes installed, running east and north of the site which connect to a sewer pump station. The sewer pump station has however, not been operational for a significant period of time. It is for such reasons that a sewage package plant which will discharge treated wastewater into the nearest natural watercourse known as the Metsi Matsho tributary is being proposed.

The STP Plant will have a Design flow capacity of 18 200 l/d with a peak flow of 0.6 l/s. The proposed STP will comprise a number of a gravity trunk sewer main pipe, which will feed into the pre-digestion chamber before it enters the bioreactor. The STP will consist of five main sections namely; Predigestion (septic tank), Balancing (equalisation), Bioreactor, Clarifier (Humus tank) and Disinfection tank (Chlorine contact tank).



Figure 2: Examples of STP plants that have been used in other facilities (Inchanga Hotel and Mona Primary school) in South Africa



Figure 3: Sewage Treatment Package Plant Process Description (taken from Lilliput Treatment Technologies Manual).

Figure 2 and 3 are examples of the schematic diagram indicative of the treatment process that will be considered for the treatment of the sewage that will be generated and treated through proposed STP.

1.4.1 Project Alternative

A total of three (3) alternatives types were assessed for the project, namely site location alternatives, routing alternatives and operational activities in addition to the no-go alternative. The location alternative is based on the proximity of the STP to the proposed Healthcare Facility and routing alternative is based on the alignment of the discharge pipeline to the to the Metsi Matsho Tributary along the tarred road. These alternatives are briefly discussed in this section and the detailed description and assessment of the alternatives **is presented in Section 5** of the report.

1.4.2 Construction Camp and Materials Storage Area

It is proposed that the construction camp and materials storage area be situated in the vicinity of the construction area. Landowner's permission and negotiations will be undertaken by the Applicant prior to establishment. The exact position of the camp will be negotiated with the Contractor. The

construction camp may not be situated within any of the sensitive areas identified by the specialists such as the wetland area/riparian area or its buffered zone. The construction camp will include the following amongst others:

- Site Office;
- Temporary refuelling area;
- Temporary ablution facilities;
- Hazardous materials storage area;
- Concrete batching area;
- Overnight parking area for all machinery and construction vehicles;
- Demarcated general waste and hazardous waste storage areas; and
- Demarcated area for the storage of construction road signs, surveyor pegs and all other construction materials.

1.4.3 Existing Services

The STP for the proposed Lusaka Healthcare facility is located within Phuthaditjhaba. As mentioned, the site can easily be accessed through a number of local roads. The Comet Road is one of the existing main roads from the town to the site. The site and its surroundings were observed to have poor drainage as storm water infrastructure around site along the road was noted to be in a dilapidated state indicative of poor maintenance (**Figure 4**). An existing 150mm diameter pipe connects to a sewer pump station and runs from east and north of the site. The pump station observed around site is not in a good working condition as it was observed to be seeping raw sewage directly into the Metsi Mantsho Tributary (**Figure 5**). Several manholes (**Figure 6**) and pipes located southeast of the site, were also observed to be seeping raw sewage directly into the tributary. It is for such reasons that the construction of a STP has been considered. It is proposed that the STP will only discharge treated wastewater into the nearest natural watercourse.

A number of electricity powerlines were noted around the site. These powerlines provide power to the local community (**Figure 7**). It was also observed that there is a container and standpipe next to the proposed STP which is used by trucks and local people as a source of portable water. Please refer to **Figure 8** for an indication of the services noted within the vicinity of the site.



Figure 4: Storm water infrastructure with poor drainage



Figure 5: Raw sewage seeping in the Metsi Matsho Tributary



Figure 6: Manholes seeping sewage directly into the tributary



Figure 7: Electricity powerlines noted within close proximity to the site.



Figure 8: Standpipe located within close proximity to site

1.4.4 Need and Desirability for the proposed project

In terms of 3(1)(f) of Appendix 1 of NEMA 2014 EIA Regulations, as amended, a Basic Assessment must include a discussion of the need and desirability for a proposed project. Needs and desirability support the Environmental rights as set out in Section 24 of the Constitution, as well the relevant municipal

plans such as Municipal Integrated Development Plans (IDP), Spatial Development Frameworks (SDF) and Environmental Management Frameworks (EMF). Needs and desirability supports Sustainable development by ensuring that the proposed activity is ecologically, economically and socially sustainable.

The site does not have adequate sewage infrastructure for the proposed Healthcare Facility. The available infrastructure around the site is inadequate and not maintained by the municipality. The available infrastructure (pump station and associated pipes) around site is put under relentless strain due to inadequate maintenance. It is therefore imperative that the CDC builds a new sewage treatment package plant to ensure that it does not deteriorate to a level that could potentially negatively impact on the environment.

Numerous complaints about the smell of the current wastewater from the leaking infrastructure were verbally raised by the local community during the site walk about during initial public participation process. The proposed system to be implemented is a civil based sewage treatment package plant, which will allow for a longer lifespan for the proposed Healthcare facility.

In addition, the proposed STP will treat wastewater before it is discharged in the Metsi Matsho Tributary. Since the STP will be constructed adjacent to the proposed Healthcare facility (about 300m from the watercourse), thereby reduce potential contamination risks to the Metsi Matsho Tributary should the STP malfunction for any reason.

1.5 Applicable NEMA Listed Activities

In terms of section 24(2) of NEMA, the Minister and or any MEC in concurrence with the Minister may identify activities which require authorisation as these activities may negatively affect the environment. Environmental Impact Assessment (EIA) Regulations were promulgated in December 2014 (as amended) in terms of Section 24(5) and Section 44 of the National Environmental Management Act (NEMA), Act 107 of 1998 and consist of the following:

- *Regulation 982* provide details on the processes and procedures to be followed when undertaking an Environmental Authorisation process;
- *Listing Notice 1* (Regulation 983) define activities which will trigger the need for a Basic Assessment process;
- *Listing Notice 2* (Regulation 984) define activities which trigger an Environmental Impact Assessment (EIA) process. If activities from both R 983 and R 984 are triggered, then an EIA process will be required.
- *Listing Notice 3* (Regulations 985) define certain additional listed activities for which a Basic Assessment process would be required within identified geographical areas.

The above regulations were reviewed to determine whether the proposed project will trigger any of the above listed activities, and if so, what Environmental Authorisation Process would be required. The triggered listed activities are presented in **Table 2** and the proposed Sewage Treatment Package Plant requires an authorisation in terms of GNR 983 Listing Notice 1 and GNR 985 Listing Notice 3 of the NEMA EIA Regulations (2014), as amended. A Basic Assessment process will be required to be undertaken in line with all the requirements of the NEMA EIA Regulations, 2014, as amended.

Government	Activity in writing as per Listing Notice 1 (GN No 983) & Listing Notices	Applicability
Notice & Activity No	3 (GN No 985)	
	NEMA EIA REGULATIONS, 2014 as amended	
	GNR 983 – Listing Notice 1	
Activity 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.	The proposed construction of the Sewage Treatment Package Plant, and the associated sewage pipelines and other infrastructure will result in construction activities such as dredging, excavation, infilling of material within or in close proximity to identified watercourses.
	GNR 985 – Listing Notice 3	
Activity 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. a. In Eastern Cape, Free State, Gauteng, Limpopo, North West and Western Cape provinces: 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	The clearing of indigenous vegetation will be required in some areas identified as endangered and/or important ecosystems and biodiversity areas (Ecological Support Areas). Indigenous vegetation located within the Metsi Matsho Tributary will be cleared to accommodate the pipeline infrastructure

Table 2: Listed Activities in terms of NEMA EIA Regulations, 2014 as amended

Government Notice & Activity No	Activity in writing as per Listing Notice 1 (GN No 983) & Listing Notices 3 (GN No 985)	Applicability
Activity 14	The development of - xii) infrastructure or structures with a physical footprint of 10 square metres or more where such development occurs— a) within a watercourse; or c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse a. Free State ii) Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans	The proposed Sewage Treatment Package Plant is proposed in areas identified as endangered and/or important ecosystems and biodiversity areas. (Ecological support areas) and construction activities will occur within 32 meters of watercourses.

1.6 The objectives of the Basic Assessment Process

The main objectives of the Basic Assessment, in terms of the regulatory requirements stipulated in *Appendix 1* of the 2014 NEMA EIA Regulations, are to:

(a) determine 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;

(b) identify the alternatives considered, including the activity, location, and technology alternatives;

(c) describe the need and desirability of the proposed alternatives;

(d) 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—

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be avoided, managed or mitigated; and

(e) 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.

1.7 Structure of the Basic Assessment Report

This report has also considered the requirements outlined in Appendix 1 of the NEMA EIA Regulations 2014, as amended regarding the content of the Basic Assessment Report (BAR hereafter). In addressing these requirements, this BAR is divided into **10 Chapters**, the contents of which will be presented as follows in this report:

- **Chapter 1** introduces the background to the development proposal and profiles its proponents. Furthermore, this chapter provides an indication of the BA process that will be followed as well as providing insights into the legislative requirements that have resulted in the need for this process;
- **Chapter 2** provides the legislative framework for the BA process and the context of the proposed development. The legislative framework includes national and provincial legislation as well as planning framework which will have to be considered in the BA process;
- **Chapter 3** is a detailed description of the adopted Basic Assessment Methodology for the project;
- Chapter 4 is a description of the receiving environment associated with the proposed activities;
- **Chapter 5** is a description and comparative assessment of the alternatives that were considered for the project;
- **Chapter 6** details the Public Participation Process undertaken for the project. It also summarises key outcomes of the process;
- Chapter 7 discusses the Impact Assessment Methodology;
- Chapter 8 is a description and assessment of environmental impacts; and
- **Chapter 9** provides the Environmental Impact Statement conclusion to the report as well as recommendations.
- **Chapter 10** presents a Bibliography for the report.

1.8 Project Team

This section of the BAR provides contact details, of the key stakeholders (Applicant's representative), Environmental Assessment Practitioner and the Project Reviewer. These details are outlined in **Table 3** below.

Applicant's repr	esentative	Environmental Impact	Project Reviewer		
		Practitioner			
Name: Richard Sm	ith	Name: Matshego Keikelame	Name: Nkhensani Khandlhela		
Designation:	Programme	Designation: Environmental Impact	Designation: Environmental		
Manager		Assessment Practitioner	Manager		
Tel: 041 403 0439		Tel: 051 430 0430/011 312 2537	Tel: 011 312 2537		
e-mail:		Fax: 011 805 1950	Fax: 011 805 1950		
e-inali.		e-mail:	e-mail:		
		environment@gaenvironment.com/	nkhensanik@gaenvironment.com		
		matshegok@gaenvironment.com			

Table 3: Application details

This BAR was compiled and prepared by Matshego Keikelame under the guidance of Vukosi Mabunda and Nkhensani Khandlhela. **Matshego Keikelame** is a current Environmental Assessment Practitioner with 7 years' working experience. He is a registered professional with SACNASP as a Candidate Environmental Scientist and a Registered Environmental Assessment Practitioner with EAPASA. Matshego has professional background in Environmental Management having academic qualifications which focused on this discipline as well as work experience gained from previous organizations. He has undertaken and managed numerous projects in his fields of expertise for public sector, and private sector and has developed a track record of professional excellence in the field. Matshego specialises in compiling Basic Assessment Reports (BARs), Scoping & Environmental Impact Assessments (EIAs), and Environmental Authorisation applications. His academic qualification with a BSc Degree in Geography and a Postgraduate diploma in Integrated Water Management has enhanced his technical understanding of Integrated Environmental Management.

1.9 Specialist studies

In accordance with the requirements of Appendix 6 of the NEMA EIA Regulations, 2014 as amended, the recently published Government Notice 320 (dated 20 March 2020), Government Notice 1150 (dated 30 October 2020) and in terms of the NEMA National web-based environmental screening tool the following specialist studies indicated in **Table 4** have been commissioned for the proposed development:

Specialist Study	Company Name	Contact Person	Contact Details		
Terrestrial and	The Biodiversity	Andrew Husted	081 319 1225		
Aquatic Impact	Company				
Assessment					
Palaeontological	Banzai Environmental	Elize Butler	084 447 8759		
Impact Assessment	(Pty) Ltd				
Heritage Phase I	Dr Johan Abraham van	Dr Johan Abraham van	082 373 8491		
Impact Assessment	Schalkwyk operates as a	Schalkwyk			
	sole proprietor				

Table 4: Specialist Studies and contact details

The specialist reports are attached as **Appendix F** of this report.

1.10 Assumptions, Gaps and Limitations

The following key gaps, assumptions and limitations were made when conducting the DBAR:

- The application is limited to the STP for the proposed Healthcare Facility and does not cover activities related to the construction of the clinic, as the construction of the clinic does not trigger any NEMA Listed activities. All the impacts associated with the construction of the clinic will be managed and monitored during the construction phase through the EMP that will be implemented for the project;
- The information obtained from the specialist studies undertaken for this project is considered accurate and objective and sufficient for the level of assessment required;
- The information provided by the applicant is considered accurate, adequate, and unbiased, and no information that could change the outcome of the BA process has been withheld;
- The study is limited to the public participation and input which was forthcoming. Whilst every effort was made to encourage and enable public consultation, the EAP can only include and address what is tabled and relevant to the study.
- The study is limited by the input, or lack thereof, of key stakeholders.
- Furthermore, as the Basic Assessment Process is a project specific tool, this BAR is pertinent the development of the Sewage Treatment Package Plant. Notwithstanding that the study holistically considers the environment in which the development proposed and also considers the socio-economic benefits and impacts, it remains a project specific study and hence cannot address all concerns of the public which are not relevant to the project.

Thus, it can be concluded that other than the gaps in knowledge, assumptions provided above, and the information presented in various sections of this report, the information used in this report was adequate for the purposes of the current impact assessment.

2 LEGISLATIVE FRAMEWORK

This section of the Draft Basic Assessment Report (DBAR) discusses applicable legal provisions and the legal context for the proposed STP development and the associated sewage pipeline infrastructure. It provides a review of legislation, regulations, policies and guidelines, which are applicable to, or have implications, for the proposed project. The contents of this report are based on a review of the information that was available at the time of the compilation of the report. The discussion in this chapter is by no means an exhaustive list of the legal obligations of the applicant in respect of environmental management for the proposed development. This DBAR specifically focused on key Environmental legislation or legislation that includes an environmental component. These are:

- Constitution of the Republic of South Africa, 1996 (Act No 108 of 1996);
- National Environmental Management Act, 1998 (Act 107 of 1998);
- NEMA EIA Regulations 2014 (as amended);
- National Environmental Management Waste Act, 2008 (Act 59 of 2008);
- National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004);
- National Heritage Resources Act, 1999 (Act 25 of 1999);
- National Environmental Management Protected Areas Act, 2003 (Act 57 of 2003);
- National Forest Act, 1998 (Act 36 of 1998);
- The South African National Roads Agency Limited and National Roads Act, 1998 (Act 7 of 1998);
- Free State Nature Conservation Ordinance 8 of 1969

2.2 National Legislation

2.2.1 Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)

The environmental right is mentioned in Section 24 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996). This states the following:

"...everyone has the right 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".

The State must therefore respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities. The Constitution therefore recognises that the environment is a functional area of concurrent national and provincial legislative

competence, and all spheres of government and all organs of state must cooperate with, consult and support one another if the State is to fulfil its constitutional mandate.

The issuing of an environmental authorisation or other permits or licence for any aspect of the proposed STP will ensure that the environmental right enshrined in the Constitution contributes to the protection of the biophysical and socio- economic environment. The abovementioned authorisations, permits, or licences will be largely based on the legislation outlined in this Chapter.

2.2.2 National Environmental Management Act, 1998 (Act No. 107 of 1998)

In order to bring section 24 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) into realisation, the National Environmental Management Act, 1998 (NEMA) (Act No. 107 of 1998) was promulgated to serve to 'provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and enforcement of other environmental management laws; and to provide for matters connected therewith'. NEMA is main Environmental Legislation in South Africa and other Specific Environmental Management Acts (SEMA's) support its objectives.

Examples of SEMA's include the following:

- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008);
- National Water Act, 1998 (Act No. 36 of 1998);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004); and
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)

Some specific Environmental Management Legislation is also discussed in **Sections 2.1.3 and 2.1.4**. The key principles of NEMA as outlined in Section 2 can be summarised as follows:

- sustainability must be pursued in all developments to ensure that biophysical and socio-economic aspects are protected or;
- there must be equal access to environmental resources, services and benefits for all citizens including the disadvantaged and the vulnerable. Adverse environmental impacts shall be distributed fairly among all citizens;
- environmental governance must include the participation of all Interested and Affected Parties who must be catered for to allow their effective participation;

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- The polluter pays principle must be applied in all cases where any person has caused pollution or undertaken any action that led to the degradation of the environment.
- a) National Environment Management Act, 1998

The National Environmental Management Act (Act No. 107 of 1998) has been amended numerous times to better meet its overall objective of the protection of the environment.

The amendments to NEMA include but are not limited to:

- National Environmental Management Act, (Act No. 56 of 2002);
- National Environmental Management Act (Act No. 8 of 2004);
- National Environmental Management Act (Act No. 46 of 2003);
- b) NEMA Environmental Impact Assessment Regulations

In terms of section 24(2) of NEMA, the Minister and or any MEC in concurrence with the Minister may identify activities which require authorisation as these activities may negatively affect the environment. The Act requires that in such cases the impacts must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorising, permitting, or otherwise allowing the implementation of an activity. The NEMA EIA Regulations guide the processes required for the assessment of impacts of Listed Activities.

The requirement for the undertaking of Environmental Impact Assessments and Basic Assessments began in 1997 with the promulgation of the EIA Regulations under the Environment Conservation Act, 1989 (ECA) (Act No. 73 of 1989). These were followed by the 2006, 2010 and 2014 regulations. **Table 5** is a summary of the progression of the EIA regulations to date.

EIA Regulations	Government Gazette
EIA Regulations promulgated in	GNR 1182 & 1183: Government Gazette No 18261, 5 September
terms of the ECA, Act No 73 of 1989	1997
Amendment of the ECA EIA	GNR 670 and GNR 672 of 10 May 2002, Government Gazette No
Regulations	23401

Table 5: Summary of the South African EIA regulations from inception to date

EIA Regulations	Government Gazette
2006 EIA Regulations promulgated in	GNR 385, 386 and 387 Government Gazette No 28753, Pretoria, 21
terms of the NEMA, Act No 107 of	April 2006
1998	
2010 EIA Regulations promulgated in	GNR 543, 544, 545 and 546 Government Gazette No 33306,
terms of the NEMA, Act No 107 of	Pretoria, 18 June 2010
1998	
2014 EIA Regulations promulgated in	GNR 982, 983, 984 and 985 Government Gazette No 38282,
terms of the NEMA, Act No 107 of	Pretoria, 04 December 2014
1998	
Current	GNR 982, 983, 984 and 985 Government Gazette No 40772,
Amendment of the 2014 EIA	Pretoria, 07 April 2017
Regulations promulgated in terms of	
the NEMA, Act No 107 of 1998	

The Basic Assessment process for the proposed Sewage Treatment Package Plant is undertaken in terms of the NEMA EIA Regulations, 2014, as amended. These came into effect on 04 December 2014 and amended on the 07th April 2017. The triggered activities in terms of these regulations have already been discussed in **Section 1.6.**

c) Department of Forestry, Fisheries and Environment Screening Tool

On 5 July 2019, The Department of Forestry, Fisheries and Environment gave Notice of the requirement to submit a report generated by the National Web-based Environmental Screening Tool in terms of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and regulation 16(1)(b)(v) of the EIA regulations, 2014, as amended. The submission of this report is compulsory when submitting an application for environmental authorisation in terms of Regulation 19 and Regulation 21 of the Environmental Impact Assessment Regulations, 2014 effective from 4 October 2019. The DFFE Screening Tool Report was generated on the 6th of December 2021. The Screening report is provided in **Appendix I** of this report. The main findings to be discussed from the screening report are listed below.

d) Proposed Development Area Sensitivity

The following summary of the study area's environmental sensitivities were identified in the Environmental Screening Report. The environmental sensitivities for the proposed development footprint are indicated on **Table 6**.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme			Х	
Animal Species Theme			Х	
Aquatic Biodiversity Theme				Х
Archaeological and Cultural				Х
Heritage Theme				
Civil Aviation Theme				Х
Defence Theme				Х
Palaeontology Theme	Х			
Plant Species Theme				Х
Terrestrial Biodiversity	Х			
Theme				

Table 6: Environmental Sensitivity of Project Area

e) Specialist Assessment Identified

Based on the environmental sensitivities of the proposed project area summarised in **Table 6**, the following list of specialist assessments were identified through the Environmental Screening Report. **Table 7** provides the Specialist studies identified in the Screening report. A motivation by the EAP has been provided where a study has not been undertaken.

No	Specialist Assessment	EAP Motivation
1.	Landscape/Visual Impact	The proposed project will be an STP that will be linked to the
	Assessment	healthcare facility. The character of the area will not be
		changed as the STP will blend in with the infrastructure of the
		healthcare facility. As such, a Landscape/Visual Impact
		Assessment will not be required for this development.
2.	Archaeological and Cultural	A Heritage Impact Assessment was undertaken. The report is
	Heritage Impact Assessment	attached to Appendix F2.
3.	Palaeontology Impact Assessment	A Palaeontology Impact Assessment was undertaken the
		report is provided in Appendix F4 .
4.	Terrestrial Biodiversity Impact	A Terrestrial Assessment (Fauna and Flora) was undertaken.
	Assessment	The report is provided in Appendix F3.
5.	Aquatic biodiversity Impact	An Aquatic Assessment was undertaken. The report is
	Assessment	provided in Appendix F1.
6.	Hydrology Assessment	This assessment was covered in the Aquatic Biodiversity
		Impact assessment. The report is provided in Appendix F1.
7.	Socio-Economic Assessment	The proposed development is a supporting infrastructure for
		the proposed Lusaka Clinic which is required in the rural area

Tahle	7. 0	Snecialist	Assessments	Identi	fied
rubic	/	pecianse	ASSESSMENTS	<i>iucii</i>	jicu

		and will provide primary healthcare to the community. There is a likelihood of temporary employment during the
		construction phase of the project. It is the opinion of the EAP
		that a Socio-Economic Assessment is not deemed necessary.
8.	Plant Species Assessment	This assessment was covered in the Terrestrial Biodiversity Impact Assessment that was undertaken. The report is
		provided in Appendix F3
9.	Animal Species Assessment	This assessment was covered by the Terrestrial Biodiversity
		Impact Assessment was undertaken. The report is provided in
		Appendix F3

2.2.3 National Environmental Management: Waste Act 59 of 2008 (Act No. 59 of 2008)

This Act aims to regulate waste management to protect human health and the environment by putting measures in place to prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources. The Applicant shall ensure compliance with this Act by implementing practical measures to avoid or reduce unnecessary generation of waste and where the waste is generated measures such as re-using, recycling and recovery of waste shall be encouraged. These general principles of responsible waste management are also incorporated in the EMPr to manage waste related activities during construction.

2.2.4 National Environmental Management: Biodiversity Act (Act 10 of 2004): National Threatened or Protected Species Regulations and Species Lists, 2015

The objective of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) is to provide for the management and conservation of South Africa's biodiversity within the framework of NEMA; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith. The objectives of NEM: BA are:

- Within the framework of the National Environmental Management Act, to provide for:
 - the management and conservation of biological diversity within the Republic and of the components of such biological diversity;
 - the use of indigenous biological resources in a sustainable manner; and
 - o the fair and equitable sharing among stakeholders of benefits arising from bio-prospecting

involving indigenous biological resources;

- To give effect to ratified international agreements relating to biodiversity which are binding on the Republic;
- To provide for co-operative governance in biodiversity management and conservation; and
- To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

Chapter 4, Part 2 of the National Environmental Management: Biodiversity Act (NEMBA; Act 10 of 2004) provides for the listing of Threatened or Protected Species (TOPS). Species listed as such, in terms of the TOPS Regulations (2015) and the TOPS Lists of Species (2015), are further classified as Threatened (Critically Endangered, Endangered and Vulnerable) or Protected. The Act defines these classes as follows:

- *Critically Endangered species*: any indigenous species facing an extremely high risk of extinction in the wild in the immediate future;
- Endangered species: any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species;
- *Vulnerable species:* any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species; and
- Protected species: any species which is of such high conservation value or national importance that it
 requires national protection. Species listed in this category include, among others, species listed in
 terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

The TOPS Regulations (2015) further regulate the permit system set out in NEMBA as it applies to restricted activities involving specimens of listed threatened or protected species, where restricted activities involve those activities that have a direct impact on listed species such as hunting, catching, collecting, picking, chopping off, damaging or destroying, importing and export from Republic, possessing, keeping or exercising physical control over, breeding or propagating, conveying or translocating, selling or buying, receiving or donating or any other prescribed activity involving a TOPS specimen.

2.2.5 National Heritage Resources Act, 1999 (Act No. 25 of 1999)

The objective of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) is to introduce an integrated system for the management of national heritage resources. The identification, evaluation and assessment of any cultural heritage site, artefact or find in South Africa is required by this Act. Section 38 of this Act pertains to Heritage resources management and Section 38(1) states the following

Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50 m in length;

(c) any development or other activity which will change the character of a site-

(i) exceeding 5 000 m² 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;

(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

According to the heritage specialist, the cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a limited pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer and industrial) component. The second component, although much younger, is a semi-urban one, in which large numbers of people were forcibly resettled in the area. No sites, features or objects of cultural significance were identified. The detailed findings of the heritage impact assessment are provided in **Section 4.1.5**. The report will be submitted to SAHRA and the provincial heritage agency.

2.2.6 National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)

The National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) provides for a range of protected areas: protected environments, special nature reserves and natures reserves. South Africa has much valuable biodiversity outside of protected areas, but this is disappearing at an alarming rate. It has been recognised that in order to effectively conserve South Africa's biodiversity, conservation efforts must focus outside of formerly protected reserves, considering 80% of the country's most scarce and threatened habitats are privately owned. It is clearly not possible for government to purchase all the land identified as high priority in terms of habitat or threatened ecosystems to add it to our system of state-owned protected areas.

This requires a new approach to conservation extension and a shift away from reactive extension (i.e. responding to problems and enforcing regulations and permitting procedures) to proactive extension (i.e. engaging with a landowner before a problem is created) where stewardship is encouraged. For these purposes, extension officers need to be better equipped with people skills relating to relationship building, conflict resolution, land negotiation, as well as hands-on knowledge, in the form of practical guidelines for managing natural ecosystems.

According to the Terrestrial Assessment undertaken the Biodiversity Company, no significant patches of intact natural vegetation remain within the project areas or immediate surrounds which is evident in the disturbed and transformed habitats within and outside of the proposed sewage treatment plant development. The project area is of low botanical and faunal diversity as well as sensitivity and present no faunal or botanical constraints to the proposed development and no specific ecological mitigation is thus required.

2.2.7 National Forests Act, 1998 (Act No. 84 of 1998): Protected Tree Species, 2017

In terms of the National Forests Act (Act No. 84 of 1998) certain tree species can be identified and declared as protected. According to this Act, protected tree species may not be cut, disturbed, damaged or destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold except under a licence granted by the Department of Forestry, Fisheries and Environment (DFFE) or a delegated authority. Applications for such activities should be made to the responsible official in each province. Each application is evaluated on merit (including site visits) before a decision is taken whether or not to issue a licence (with or without conditions). Such decisions must be in line with national policy and guidelines. An updated list of protected tree species was published under section 12(1) (d) of the National Forests Act (Act No 84 of 1998) on 8 September 2017.

According to the Terrestrial Assessment undertaken the Biodiversity Company, none of the species found to occur on the project areas is listed on NEM:BA and DAFF's protected tree list nor species listed as species of conservation concern nationally or under the NWBMA (2016) or globally.

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

The National Water Act, 1998 (Act No. 36 of 1998) aims to provide for management of the national water resources in order to achieve sustainable use of water for the benefit of all water users. This act requires that the quality of water resources is protected as well as the integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure

that the nation's water resources are protected, used, developed, conserved and managed in ways which take into account:

- Meeting basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitation social and economic development;
- Providing for the growing demand for water use;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting dam safety; and
- Managing floods and drought.

In pursuit of these objectives, Chapter 4 of the act regulates water use, while Section 21 lists eleven water use types that are regulated [Section 21 (a) - (k)]. Watercourses and wetlands are protected in terms of this section, as both are regarded as water resources. Due to the location of the site within the 500m radius from a wetland which is one of the DWS' regulated areas, a Water Use Authorisation may be required. The list of the regulated areas inclusive of the 500m distance, but specific to the delineated boundary are as follows:

- The outer edge of the 1:100 year flood line and /or delineated riparian habitat whichever is the greatest measured from the middle of a river, spring, natural channel, lake or dam;
- In the absence of a determined 1:100 year flood line or riparian area, the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act);
- 500m radius from the delineated boundary of any wetland or pan.

According to the wetland assessment undertaken by The Biodiversity Company (2022), the field survey yielded one wetland type, a channelled valley bottom wetland. The overall PES rating for the wetland was largely modified (class D). The overall levels of service for HGM 1 was rated as being Intermediate. The EIS for HGM 1 was calculated to be Moderate (class C) importance. The Hydrological Functionality of the wetland was rated as Moderate (class C) importance. The Direct Human Benefits were calculated to have a have a Low (class D) importance. If prescribed mitigation measures are implemented for the project, a 20 m buffer zone has been determined for the construction and operational phases. A Water Use Authorisation is therefore, required for the proposed project and is currently underway.

2.2.9 Other National Legislation concerning or related to the environment

Various other laws regarding the protection of the environment that are relevant to this BA include:

- Environment Conservation Act, 1989 (Act No. 73 of 1989) (as amended);
 - The development of the STP must ensure the protection of ecological processes, natural systems and the natural beauty as well as the preservation of biotic diversity in the natural environment.
- Hazardous Substances Act, 1973 (Act No. 15 of 1973);
 - The project team must ensure the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances, and the control of certain electronic products if applicable.
- Land Administration Act, 1995 (Act No. 2 of 1995);
 - Applicant must ensure the delegation, powers and the assignment of the administration of laws regarding land matters are officially obtained and reported to the provincial authority for the realignment area.
- Water Services Act, 1997 (Act No. 108 of 1997); and
 - The project should ensure it does not negatively affected the water sources in the area through severe water contamination emanating from the development of the STP. A Water Use Application is currently underway.
- Occupational Health and Safety Act, 1993 (Act 85 of 1993).
 - All personnel must undertake the necessary basic environmental, health and safety training and issued with adequate personal protection equipment before commencement of the project.

2.3 Provincial Legislation

This Chapter of the report presents provincial legislation applicable to the proposed development.

2.3.1 Thabo Mofutsanyana District Environmental Management Framework

The Thabo Mofutsanyane District Municipality (TMDM) IDP (TMDM 2014 – 2015) notes that following to be their developmental outcomes: Integrated cities, towns, rural areas and social cohesion; Local economic development; and Environmental sustainability. In order to achieve these, a number of priority issues, objectives, strategies and projects have been included in the IDP, the priority issues that are contained in the IDP are: water, sanitation, electricity, waste management, roads, storm water, housing, cemeteries, rural development, telecommunication, environmental management, health, education, safety and security,

transport, sports and recreation, industrial development and disaster management. The developmental strategies have been informed by local, provincial and national policy and strategy guidelines.

2.3.2 Free State Spatial Development Framework (2013)

The Free State Provincial Spatial Development Framework (PSDF) aims to align the province's strategies, proposals and guidelines for future spatial development with the Free State Development Strategy (FSGDS) 2005 – 2014 and the NDP (refer to Section 4.3.2). Like the NDP, the PSDF identifies key challenges to be addressed through plans and strategies. Four categories have been identified, each with its own challenges and plans and strategies to address the challenges. The four categories identified include:

- Context Lack of international and national cooperation as it relates to biodiversity conservation and efficient bioregional planning.
- The Place Addressing the space-related aspects that represent the environmental capital of the Free State.
- The People Towards enhancing of well-being of the people of the province as an imperative for sustainable development.
- The Economy Towards promoting the economy and ensuring efficient use of monetary and infrastructural capital for the benefit of all (Van der Merwe, 2013).

The fundamental principle of the PSDF is sustainability of the resource base and supporting environment which would enable long-term viability of economic activity.

2.3.3 Free State Biodiversity Plan

The project needs to comply with the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM: BA) in providing the cooperative governance in biodiversity management and conservation. NEM: BA provides for the Minister to publish a notice in the Government Gazette that issues norms and standards, and indicators for monitoring progress for the achievement of any of the objectives of the Act. The NEM: BA also provides for:

The National Biodiversity Framework;

- Bioregional Plans;
- Biodiversity Management Plans;
- Biodiversity Management Agreements;
- The identification, listing and promotion of threatened or protected ecosystems; and

• Alien invasive species control and enforcement

No specific guidelines are given for the Free State Province in terms of habitat sensitivity mapping. The 2015 Free State Biodiversity Plan however, provides a map of Critical Biodiversity Areas (CBA's) and Ecological Support Areas (ESA's), which has conservation guidelines of different land-use areas in the province in mind. Different management criteria and recommendations for CBA's and ESA's are still under development. It may, however be expected that these criteria and guidelines will be similar to that of other provinces where agriculture is one of the more important land uses.



Figure 9: Lusaka Sewage Treatment Package Plant C-Plan Map

Figure 9 presents the distribution of CBA's and ESA's in the study area according to the 2015 Free State Biodiversity Plan. According to the Free State Biodiversity Plan (FSBP), the study area is located within an ecological support area. These are areas that support the ecological functioning of protected areas or CBAs or provide important ecological infrastructure. Based on the site environmental screening undertaken by the EAP, the area has been significantly modified and the functionality of the ecosystem degraded. However, the development will require clearance of indigenous vegetation within an ESA, therefore triggering GNR 985 Listing Notice 3.

3 BASIC ASSESSMENT METHODOLOGY

The NEMA Regulations of 2014, as amended identify three separate administrative processes for EIAs, depending on the nature of the activity. A Basic Assessment (BA) process (Listing Notice 1) is identified for those activities that have less of a possible detrimental impact to the environment. A Scoping and EIA process (Listing Notice 2) is necessary for those activities, which are identified as having more of a possible detrimental impact on the environment, whereas Listing Notice 3 relates to identified activities that would require environmental authorisation through a BA prior to the commencement of those activities in specific identified geographical areas only. The methodology for undertaking of a Basic Assessment Process in line with the NEMA EIA Regulations, 2014 is provided below.

3.2 Pre-Consultation with the Competent Authority

Due to the known nature of the project being a development of a STP, the EAP determined that a preconsultation meeting with the Competent Authority (DFFE) was not necessary as indicated on the preapplication meeting form submitted together with the public participation plan. The public participation plan was approved by DFFE on the 1st of February 2022. The approval is attached in **Appendix D2** of this report.

3.3 Registration of the Application with the Competent Authorities

An Application Form for Environmental Authorisation was completed and will be submitted together with the DBAR to DFFE for review and consideration.

3.4 Public Participation Process

A Public Participation Process (PPP) consistent with Chapter 6 of the NEMA EIA Regulations 2014, as amended (Government Notice R. 982 in Government Gazette No. 40772 of 07 April 2017) was followed for the project. In addition to Chapter 6 of the NEMA EIA Regulations, 2014 as amended, on the 5th of June 2020, the Minister of Environment, Forestry and Fisheries issued directions regarding the measures to address, prevent and combat the spread of the COVID-19 relating to the National Environmental Management Permits and Licences. A Public Participation Plan was submitted to the DFFE on the 27th January 2022, the plan was approved on the 1st February 2022. The Public Participation Plan and correspondence with the DFFE is attached to **Appendix D2**. It must be noted that the abovementioned directions have since been withdrawn effective from 22 March 2022. The Public for the project included the following:

- the identification of Interested and Affected Parties;
- the ongoing compilation of an I&AP database;

- the placement of site notices at visible and accessible locations close to the site (undertaken in January 2022);
- the placement of a newspaper advertisement in a local newspaper (Eastern Free State Issue); and
- the distribution of hardcopies off the Notification Letters to adjacent land owners and other parties was undertaken on site on the 31st of January 2022 and on an on-going basis for the electronic copies since the notification period commenced in January 2022.

The details of the PPP undertaken to date is discussed in detail in **Chapter 6** of this report.

3.5 Draft Basic Assessment report

The Draft Basic Assessment Report has been compiled and will be issued out for Public and Authority review for the legislated period of at least 30 days. It is important to highlight that the review period was determined in line with the reckoning of days as defined in Regulation 3 of the NEMA EIA Regulations, 2014, as amended. The following commenting authorities will be provided with a copy of the report in both electronic as well as hardcopy format:

- Thabo Mofutsanyana District Municipality;
 - Health & Safety and Environment Department;
- Maluti-a-Phofung Local Municipality;
 - Maluti-a-Phofung Water (MAP Water)
 - Environmental Department;
 - Ward Councillors;
 - Mayor's office; and
 - o Infrastructure Development Department;
- Free State Provincial Government:
 - Department of Small Business Development, Tourism and Environmental Affairs (DESTEA); and
 - Free State Heritage Resources Agency
- South African Heritage Resources Agency (SAHRA);
- Free State Heritage Resources Authority (FSHRA); and
- Department of Water and Sanitation (DWS).

SMS, e-mail notifications and telephone calls will be utilised to notify all registered I&AP's about the availability of the report.

3.6 Other Supporting Documents to the Basic Assessment

As part of the Basic Assessment process, an Environmental Management Programme (EMPr, and Rehabilitation Plan have been compiled in line with Appendix 4 of the NEMA EIA Regulations, 2014, as amended. The EMPr provides guidelines to CDC as the Project Developers, the Contractor as well as various other members of the technical team on how best to implement the mitigation measures for the proposed activity the site in order to avoid adverse environmental impacts. Refer to **Appendix G** of this Basic Assessment Report for the EMPr.

3.7 Issuing of the Environmental Authorisation

Following the review of the Final Basic Assessment Report, DFFE will issue the applicant with their decision on the application, which could either be the rejection of the application or an approval for which an Environmental Authorisation (EA) will be issued in terms of Section 24 of NEMA. This Environmental Authorisation will be issued to COEGA Development Corporation as the applicant. It should be noted that the EA may state that the activity may not commence before certain conditions are complied with. The EA may also include any other conditions that DFFE considers necessary for the protection of the environment.

3.8 Appeal Period

After a decision has been reached by DFFE, Chapter 2 of the National Appeal Regulations 2014 makes provision for any affected person to appeal against the decision. Within 20 days of being notified of the decision by DFFE, the appellant must submit the appeal to the appeal administrator. An appeal panel may be appointed at the discretion of the delegated organ of state to handle the case. The appeal panel will then submit its recommendations to that organ of state for a final decision on the appeal to be reached. GA Environment will communicate the decision of the DFFE and the manner in which appeals should be submitted to the Minister and to all I&APs as soon as reasonably possible after the final decision has been received.

4 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This Chapter serves to describe the environmental setting of the area identified whilst the environmental issues that were identified to be of significance are discussed in **Chapter 8** of this report. The Chapter will also provide a description of the overall character and other sensitivities that were identified in the surrounding environment. It must be highlighted that only aspects that are relevant to the project in terms of the environmental setting as well as the nature of the proposed activities are discussed in this section of the report. This Chapter will present both the Biophysical and the Socio-Economic Conditions of the site and its geographical setting.

4.1 Biophysical aspects

4.1.1. Climate and Topography

Climate is an important element for the project due to the following key factors:

- To plan for the construction phase as climate (particularly rainfall) can impact on project progress as noted in sources such as Ballesteros-Pérez (2017) & Freeman (2017);
- To establish the viability of the proposed realignment areas for proposed agricultural activities and/or game farming.

According to Climate-Data Org (2021), The climate in Phuthaditjhaba is mild, and generally warm and temperate. In winter, there is much less rainfall than in summer. This climate is considered to be Cwb according to the Köppen-Geiger climate classification the temperature here averages 13.4 °C. Precipitation is about 1020mm per year. At an average temperature of 17.8 °C, January is the hottest month of the year. In July, the average temperature is 6.7 °C. It is the lowest average temperature of the whole year.

Between the driest and wettest months, the difference in precipitation is 172mm. The average temperatures vary during the year by 11.1 °C. The month with the highest relative humidity is January (73.48 %). The month with the lowest relative humidity is September (43.63 %). The month with the highest number of rainy days is January (19.10 days). The month with the lowest number of rainy days is June (1.93 days) (**Figure 10**). Climate is not anticipated to be problematic to the proposed development.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	17.8 °C	17.6 °C	16.3 °C	13.3 °C	10 °C	7 °C	6.7 °C	9.7 °C	13.3 °C	15.2 °C	16.4 °C	17.8 °C
	(64.1) °F	(63.7) °F	(61.3) °F	(55.9) °F	(50.1) °F	(44.6) °F	(44.1) °F	(49.4) °F	(58) °F	(59.4) °F	(61.4) °F	(63.6) °F
Min. Temperature °C (°F)	13 °C	12.9 °C	11.1 °C	7.8 °C	3.8 °C	0.6 °C	-0.1 °C	2.4 °C	5.9 °C	8.6 °C	10.2 °C	12.2 °C
	(55.4) °F	(55.2) °F	(52) °F	(46.1) °F	(38.8) °F	(33) °F	(31.9) °F	(36.4) °F	(42.7) °F	(47.5) °F	(50.4) °F	(53.9) °F
Max. Temperature °C	23.3 °C	23 °C	21.9 °C	19.3 °C	17.1 °C	14.5 °C	14.6 °C	17.5 °C	21 °C	22.3 °C	22.9 °C	23.5 °C
(*F)	(73.9) °F	(73.4) °F	(71.5) °F	(66.7) °F	(62.8) °F	(58.2) °F	(58.3) °F	(63.6) °F	(69.8) °F	(72.1) °F	(73.1) °F	(74.3) °F
Precipitation / Rainfall	184	141	107	55	26	14	12	31	33	109	135	173
mm (in)	(7.2)	(5.6)	(4.2)	(2.2)	(1)	(0.6)	(0.5)	(1.2)	(1.3)	(4.3)	(5.3)	(6.8)
Humidity(%)	73%	73%	71%	67%	59%	56%	51%	46%	44%	55%	62%	68%
Rainy days (d)	-14	12	10	6	3	1	2	3	3	9	10	14
avg. Sun hours (hours)	8.5	8.5	8.3	8.1	8.5	8.4	8.7	9.0	9.3	8.9	9.1	9.0

Figure 10: Phuthaditjhaba Weather Averages (<u>https://en.climate-data.org/africa/south-africa/free-state/phuthaditjhaba-55825/</u>).

Phuthaditjhaba is located in the southern hemisphere, and the months of summer are: December, January, February, and March.

4.1.2. Geology and soils

The proposed development of the STP in Lusaka, Phuthaditjhaba, Thabo Mofutsanyana District, Free State is depicted on the 1:250 000 Harrismith 2828 Geological Map (1998) (Council of Geosciences, Pretoria) (**Figures 11-13**). This map indicates that the proposed development is underlain by the Triassic Elliot Formation (Stormberg Group, Karoo Supergroup).

The Elliot formation is known as the red beds of South Africa and is Upper Triassic and Lower Jurassic in age. This succession comprises of immature, fine- to medium-grained sandstones, mudstone, and siltstone. The strong red-purple-maroon diagenetic colouration is primarily argillaceous lithologies and lacks extensive marker beds. The Elliot Formation is 460 to 480m thick in the south of the Basin thinning towards the Free State Drakensberg and KwaZulu-Natal where it varies between 28 and 150m. The formation was generally deposited in a fluviolacustrine environment that consists of two different types of sandstone (lower and upper part of the Formation). These different sandstones formed by different fluvial depositional styles.

The upper part of the Formation generally comprises of tabular, multi-storey sheet sandstones and associated facies caused by loessic, aeolian ephemeral, fluvial, and playa lake processes (Visser and Botha, 1980; Eriksson, 1984, 1985; Smith et al., 1993; Bordy et al., 2004b). In the lower part of the Formation the sandstones consist of multi-storey, asymmetrical channel fills. Scientists believe that these sediments were deposits in a perennial, moderately meandering fluvial systems (Botha, 1968; Visser and Botha, 1980; Smith et al., 1993;

Bordy et al., 2004b). In the distal Drakensberg regions, the lower part of the Formation diminished in thickness. This part of the Formation is dominated by an association of seasonal to ephemeral anastomosing rivers with loessic floodplain fines, and semi-arid sheetflood deposits (Eriksson, 1984, 1985). The differences in fluvial style were generated by changes in the tectonic setting (like tectonic pulses and associated subsidence) as well as climatic conditions.

The Elliot Formation is represented by two Assemblage Zones. The *Scalenodontoides* Assemblage Zone (SAZ) is present in the Lower Elliot Formation (Stormberg Group, Karoo Supergroup) (Viglietti et al 2020a) while the *Massospondylus* Assemblage Zone (MAZ) is present in the Upper Elliot Formation (Viglietti et al 2020b). The SAZ is known for the *traversodontid* cynodont *Scalenodontoides macrodontes*, as well as the sauropodomorphs *Blikanasaurus cromptoni* and *Melanorosaurus readi* (Viglietti et al 2020a). The MAZ is the youngest Assemblage Zone tetrapod biozone in the Karoo Basin (upper Stormberg Group, Karoo Supergroup). This AZ is dominated by dinosaurs present in southern Gondwana. The crocodylomorph *Protosuchus haughtoni*, ornithischian *Lesothosaurus diagnosticus* as well as the sauropodomorph *Massospondylus carinatus* (Viglietti et al 2020b).

It is not foreseen that the geology of the area will affect the proposed development as this is a civil based structure. It is expected that the construction of the sewer pipeline does not require stable foundations and the underground septic tank for the STP is concrete structure to be constructed 2m deep underground.



Figure 11: Extract of the 1:250 000 2828 Harrismith Geological map (1998) (Council of Geoscience, Pretoria) indicating the proposed development in blue and brown

Age	Gp			West of 24° E	East of 24° E		Free State / KwaZulu-Natal		Vertebrate Assemblage Zones	Vertebrate Subzones												
Sic																	Drakensberg Gp		Drakensberg Gp			
SASS	RASS			Clarens Fm			Clarens Fm															
J.	MBE					upper Elliot Fm upper Ellio		upper Elliot Fm	massosponayias													
	LOR LOR					lower Elliot Fm	\sim	ower Elliot Fm	Scalenodontoides													
	S				\sim	Molteno Fm	\sim	Molteno Fm														
O		a.			\sim	\sim	\sim	~~~~~		Cricodon-Ufudocyclops												
SSI		Bqr				Burgersdorp Fm		Driekoppen Fm	Cynognathus	Trirachodon-Kannemeyeria												
μ		d Si								Langbergia-Gargainia												
TR		Tarkasta			Katberg Fm		Verkykerskop Fm		Lystrosaurus declivis													
						Palingkloof M.																
						Elandsberg M.	_	Harrismith M.														
					E		em Fn	Schoondraai M.		Lystrosaurus maccaigi- Moschorhinus												
					four	Ripplemead M.	ande		Daptocephalus													
					Bal		omi	Rooinekke M.		Dicynodon-Theriognathus												
			E	Steenkempeulakte M		Daggaboersnek M.	Ž			Dicynodon-menoghainus												
	RT	lgdu	oof	Steenkampsviakte w.				Frankfort M.														
	UFC	de S	Teekl	Oukloof M.		Oudeberg M.	\sim	\sim	Cistecephalus													
AN	BEA	delai		Hoedemaker M.																		
RM		Ā		Poortijo M	Middleton Fm				Endothiodon	Tropidostoma-Gorgonops												
				Footgie W.						Lycosuchus-Eunotosaurus												
1	Abrahamskraal Fm						Tapinocephalus	Diictodon-Styracocephalus														
				Koonap Fm		Volksrust Fm		Eosimops-Glanosuchus														
									Eodicynodon													
	GA	Waterford Fm		Waterford Fm		Waterford Fm																
	EC			Tierberg/Fort Brown	erg/Fort Brown		Fort Brown															

Figure 12: Vertebrate biozonation range chart for the Main Karoo Basin of South Africa (Council of Geoscience, 1998)



Figure 13: Vertebrate biozonation range chart for the Main Karoo Basin of South Africa (Banzai Environmental, 2022)

4.1.3. Regional Vegetation

According to Terrestrial Impact Assessment undertaken by The Biodiversity Company, the project area is situated within the Grassland Biome. In terms of climate, the temperate grasslands of the Highveld in South Africa have cold and dry conditions, with rainfall during the summer (which can sometimes be a strong summer rainfall) and winter drought (Mucina & Rutherford, 2006). Frost is common and there is a high risk of lightning-induced fires (Mucina & Rutherford, 2006).

In terms of vegetation structural composition, grasslands are characteristically dominated by grasses of the *Poaceae* Family (Mucina & Rutherford, 2006). On a fine-scale vegetation type, the project area overlaps with two vegetation types: the Basotho Montane Shrubland and the Northern Drakensberg Highland Grassland (**Figure 14**). The latter vegetation type is considered to be "Least Threatened" by Mucina and Rutherford (2006), thus only the former vegetation type, which is threatened.



Figure 14: Vegetation types along the study area (Biodiversity Company, 2022)

Basotho Montane Shrubland occurs in the Free State Province, Lesotho and very marginally into the KwaZulu-Natal Province (Mucina & Rutherford, 2006). It is characterised by tall and sometimes dense shrubland dominated by broad-leaved *mesophyllous* shrubs om steep talus slopes and kloofs of the mesas and other mountain flanks (Mucina & Rutherford, 2006).

Only two types of habitat units were recorded in the project area, namely the Transformed Habitat Unit and Degraded Habitat Unit. These habitat units and their surroundings have been impacted by a variety of historical and current anthropogenic-induced effects seen during the site visit, including pollution, vegetation clearing, the establishment of roads and informal settlements, livestock, and alien plant invasion. Such impacts resulted in changes in vegetation structure, which has subsequently impacted the natural vegetation composition and structure.

Although the project area still contains natural vegetation, it has been either transformed or degraded from its historical natural state. A look at the surrounding vegetation that is in close proximity to the proposed sewage treatment plant development indicates that all the project areas and their surroundings were severely degraded in their entirety. Thus, these observations concur with the "Low Plant Species Sensitivity" as suggested by the Screening Tool, and therefore have no particularly high botanical/conservation value.

Although not completely transformed, ecological processes on the project area have been significantly impacted by livestock trampling, illegal dumping and other pollution, informal settlements, invasion of alien invasive plants and weeds and habitat fragmentation. These impacts are the result of the development of informal settlements as well as bush clearing for an informal sports field.

The indigenous species that are present are opportunistic and do not constitute a recognizable plant community that may be described as 'indigenous vegetation' or as an 'ecosystem'." As such the area for the proposed sewage treatment plant development is considered to have a "Low Terrestrial Biodiversity Sensitivity" and both Habitat Units (Transformed and Degraded) have a "Very Low Site Ecological Importance". The "Very High" Terrestrial Biodiversity Sensitivity as indicated by the screening tool is disputed.

Free movement of terrestrial ground-dwelling species (apart from avifaunal species) between the project areas and natural areas is thus possible but unlikely. Furthermore, few indigenous faunal species or signs were recorded during the infield assessment, suggesting that the faunal diversity of the project areas is low and typical for a disturbed, remnant habitat in the region. They only mammalian fauna seen within the project area were domestic cattle (*Bos taurus*). No animal Species of Conservation Concern were recorded in the study

area, and none are expected to survive in the two Habitat Units. Thus, the "Medium Animal Species Sensitivity" is disputed, and the project areas have been identified as having a low animal species sensitivity.

A description of these habitat units is provided in Table 8.

Table 8: Habit Units Identified W	Vithin the Study Area
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Habitat	Conservation	Functional Integrity	Biodiversity	Receptor	Site Ecological
	Importance		Importance	Resilience	Importance
Transformed	Low	Very Low	Low	Very High	Very Low
Degraded	Low	Very Low	Low	High	Very Low

A total of 23 woody, graminoid, shrub and herbaceous plant species belonging to seven different families were recorded in the project area during the field assessment (**Table 9**). This includes seven exotic invasive species, six (6) of which have been assigned alien invader plant categories under the National Environmental Management: Biodiversity Act (NEMBA). Plants listed in Category 1b appear in green and those classified as 'not indigenous' or 'naturalised' according to NEMBA, appear in blue text. Some of the plant species recorded can be seen in **Figure 16**.



Figure 15: Indigenous flora recorded within the project area: A) Hyparrhenia hirta, B) Eragrostis gummiflua, C) Wahlenbergia undulata, D) Aristida congesta subsp. congesta (Biodiversity Company, 2022)

Family	Scientific Name	Common name	Threat Status (SANBI	SA Endemic	Alien Category	Veld Ecological
			2017)			Status
Asteraceae	Cosmos bipinnatus	Cosmos, Mexican Aster	NE	Not Indigenous; Naturalized exotic weed		
Poaceae	Aristida congesta subsp. congesta	Tassel Three-awn	LC	Indigenous, Not Endemic		Increaser II
Asteraceae	Bidens pilosa	Black Jack	NE	Not Indigenous; Naturalized exotic weed		
Poaceae	Brachiaria brizantha	Common Signal Grass	LC	Indigenous, Not Endemic		Increaser I
Asteraceae	Cirsium vulgare	Spear Thistle	NE	Not Indigenous; Naturalized exotic weed	NEMBA Category 1b.	
Poaceae	Cynodon dactylon	Couch Grass	LC	Not Endemic		Increaser II
Solanaceae	Datura ferox	Large Thorn Apple	NE	Not Indigenous; Naturalized exotic weed	NEMBA Category 1b.	
Polygonaceae	Persicaria lapathifolia	Spotted Knotweed	NE	Not Indigenous; Naturalized exotic weed	NEMBA Category 1b.	
Verbenaceae	Verbena bonariensis	Common Vervain	NE	Not Indigenous; Naturalized exotic weed	NEMBA Category 1b.	

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Table 9: Woody, graminoid, shrub and herbaceous plant species recorded in the project area.

Campanulaceae	Wahlenbergia undulata	African Bluebell, Wavy-leaf Bluebell, Pale Bluebell, African Bellflower	LC	Indigenous, Not Endemic		
Poaceae	Digitaria diagonalis	Brown-seed Finger Grass	LC	Indigenous, Not Endemic		Increaser II
Poaceae	Diheteropogon amplectens	Broad-leaved Bluestem	LC	Indigenous, Not Endemic		Decreaser
Poaceae	Eleusine corocana	Goose Grass	LC	Indigenous, Not Endemic		Increaser II
Poaceae	Eragrostis gummiflua	Gum Grass	LC	Not Endemic		Increaser II
Poaceae	Eragrostis rigidior	Broad Curly Leaf	LC	Not Endemic		Increaser II
Myrtaceae	Eucalyptus camaldulensis	Red River Gum	NE	Not Indigenous; Naturalized exotic weed	NEMBA Category 1b.	
Helictotrichon turgidulum	Helictotrichon turgidulum	Small Oats Grass	LC	Indigenous, Not Endemic		Decreaser
Poaceae	Hyparrhenia hirta	Common Thatching Grass	LC	Not Endemic		Increaser I
Poaceae	Panicum schinzii	Sweet Grass	LC	Indigenous, Not Endemic		Increaser II
Poaceae	Pennisetum clandestinum	Kikuyu Grass	NE	Not Indigenous, Naturalized exotic weed	NEMBA Category 1b.	

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Poaceae	Sporobolus africanus	Rat's Tail Dropseed, Rat's Tail Grass, Rush Grass, Tough Dropseed	LC	Indigenous, Not Endemic	Increaser III
Asteraceae	Tagetes minuta	Khaki Bush, Khaki Weed, African Marigold	NE	Not Indigenous; Naturalized exotic weed	
Poaceae	Urochloa mosambicensis	Bushveld Signal Grass	LC	Indigenous, Not Endemic	

A total of four avifaunal species belonging to four different families were recorded in the project area during the field assessment (**Table 10**). These species were observed flying overhead or their calls were heard in the area and identified. No herpetofauna (reptiles and amphibians) or mammals were seen during the field assessment. Furthermore, no faunal SCCs were recorded.

Family	Scientific Name	Common Name	Threat Status	SA Endemic
			(SANBI, 2016)	
hreskiornithidae	Bostruchia hagedash	Hadeda Ibis	Least Threatened	Indigenous; Not Endemic
Ardedeidae	Bubulcus ibis	Western Cattle Egret	Least Threatened	Indigenous; Not Endemic
Hirundinidae	Cecropis cucullata	Greater Striped Swallow	Least Threatened	Indigenous; Not Endemic
Columbidae	Spilopelia senegalensis	Laughing Dove	Least Threatened	Indigenous; Not Endemic

4.1.4. Hydrological and Aquatic Characteristics

The study area is located within a quaternary catchment C81F of the Upper Vaal Water Management Area (WMA), situated in the eastern Free State. The Upper Vaal Water Management Area (Upper Vaal WMA) includes the Vaal, Klip, Wilge, Liebenbergsvlei and Mooi Rivers and extends to the confluence of the Mooi and Vaal Rivers. It covers a catchment area of 55 565 km². This WMA includes the very important dams Vaal Dam, Grootdraai Dam and Sterkfontein Dam. The southern half of the WMA extends over the Free State, the northeast mainly falls within Mpumalanga and the northern and western parts in Gauteng and North West provinces respectively.

The Upper Vaal is the uppermost WMA in the Vaal River catchment and one of five WMAs in the Orange River Basin. It is surrounded by the Crocodile (West) and Marico, Olifants, Inkomati, Usutu to Mhlathuze, Thukela, Upper Orange and Middle Vaal WMAs and adjoins Lesotho in the southern extreme.

According on the to the Wetland Impact Assessment (**Appendix F1**), one wetland type was identified on site (**Figure 16**). The identified wetland was determined to be a channelled valley bottom wetland. The location and extent of the wetland and identified drainage line is illustrated in **Figure 17**.

Three wetland indicator plants (hydrophytes) were identified within the wetland area. Typha *capensis*, *Juncus effusus* and *Persicaria decipiens* were identified. Some of the hydrophytic plants can be seen in **Figure 18**. The soils within the wetland could not be observed in the auger as these were shallow. **Figure 19** illustrates the shallow streambed and slopes of the wetland; however, Longlands soil form was identified on the slopes.



Figure 16: Photograph illustrating the identified and delineated channelled valley bottom wetland (Biodiversity Company, 2022)



Figure 17: Map illustrating the location and extent of the wetland delineated within the assessment area of the proposed project (Biodiversity Company, 2022)



Figure 18: Wetland indicators at the project area. a) Juncus effusus, b) Persicaria decipiens



Figure 19: Wetland indicators at the project area. a) *Juncus effusus*, b) *Persicaria decipiens*

4.1.5. Heritage Features

A Heritage Impact Assessment was undertaken by Johan van Schalkwyk, a copy of the report is attached to **Appendix F2.** The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a limited pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer and industrial) component. The second component, although much younger, is a semi-urban one, in which large numbers of people were forcibly resettled in the area. The study revealed that no sites, features or objects of cultural significance were identified (**Figure 24**). Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development. Heritage resources are sparsely distributed on the wider landscape with highly significant (Grade 1) sites being rare. Because of the low likelihood of finding further significant heritage resources in the area of the proposed for development and the generally low density of sites in the wider landscape, the overall impacts to heritage are expected to be of generally low significance. For this proposed project, the assessment has determined that no sites, features or objects of cultural heritage significance occur in the project area, therefore no permits are required from SAHRA or the PHRA.

Until a few decades ago, this was still a rural farming area, with white farmers owning the various farms. However, with the implementation of the concept of separate development and the establishment of the socalled homelands, population densities increased sporadically as Sotho-speaking people from all over the former Orange Free State Province were forcefully resettled in the region that was to become known as Qwaqwa. This put much pressure on the natural environment, irreversibly changing.

From a review of the available old maps and aerial photographs it can be determined that the project area has always been open space, with the main activity being grazing or the making of agricultural fields. The farm Patricksdale was originally granted to A.J. Cronje in 1892 (**Figure 21**). However, he was not the first white to settle in the region. The Dutch Reformed Mission Church established a mission station in the region in 1874, named Eerste Zending or Lefika. They later, in 1932, opened a school in the region (**Figure 20**).

From the early military map dating to 1902 (Figure 22), the aerial map dating to 1952 (Figure 23) and 1:50 000 topographic maps (Figure 24 and 25), it can be seen that very little development took place in the region. That what is visible is viewed to be farming related. By the late 1960s, some homesteads and graves are also indicated, but the latter seems to have been removed or built over. By the middle 1980 (Figure 22) urban development increased dramatically as the various townships were developed.


Figure 20: Dutch Reformed Church Mission School dating to 1932 (Johan van Schalkwyk, 2022)



Figure 21: Copy of the original Deed of Transfer for the farm Patricksdale, dating to 1892



Figure 22: Section of the Surveyor General, Orange Free State, map dating to 1902



Figure 23: Aerial view of the project area dating to 1952 (CS-G photograph: 247_009_00270)



Figure 24: The project area indicated on the 1969 version of the 1:50 000 topographic map.



Figure 25: The project area indicated on the 1969 version of the 1:50 000 topographic map



Figure 26: Aerial view of the project area dating to 2004 (A) and Aerial view of the project area dating to 2021 (B) (Image: Google Earth) (Johan van Schalkwyk, 2022)



Figure 27: Location of heritage sites in the project area

(Please note, that as nothing was found on the site, nothing is indicated on the map) (Johan van Schalkwyk, 2022)

4.1.6. Palaeontological Features

The proposed development of a sewage treatment package plant in Lusaka, Phuthaditjhaba, Thabo Mofutsanyana District, Free State is underlain by the Triassic Elliot Formation (Stormberg Group, Karoo Supergroup). According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of the Elliot Formation is Very high (**Figure 32**).

The Elliot formation is known as the red beds of South Africa and is Upper Triassic and Lower Jurassic in age. This succession comprises of immature, fine- to medium-grained sandstones, mudstone, and siltstone. The strong red-purple-maroon diagenetic colouration is primarily argillaceous lithologies and lacks extensive marker beds. The Elliot Formation is 460 to 480m thick in the south of the Basin thinning towards the Free State Drakensberg and KwaZulu-Natal where it varies between 28 and 150m. The formation was generally deposited in a fluviolacustrine environment that consists of two different types of sandstone (lower and upper part of the Formation). These different sandstones are formed by different fluvial depositional styles.

The upper part of the Formation generally comprises of tabular, multi-storey sheet sandstones and associated facies caused by loessic, aeolian ephemeral, fluvial, and playa lake processes (Visser and Botha, 1980; Eriksson, 1984, 1985; Smith et al., 1993; Bordy et al., 2004b). In the lower part of the Formation the sandstones consist of multi-storey, asymmetrical channelfills. Scientists believe that these sediments were deposits in a perennial, moderately meandering fluvial systems (Botha, 1968; Visser and Botha, 1980; Smith et al., 1993; Bordy et al., 2004b). In the distal Drakensberg regions, the lower part of the Formation diminished in thickness. This part of the Formation is dominated by an association of seasonal to ephemeral anastomosing rivers with loessic floodplain fines, and semi-arid sheetflood deposits (Eriksson, 1984, 1985). The differences in fluvial style were generated by changes in the tectonic setting (like tectonic pulses and associated subsidence) as well as climatic conditions.

The Elliot Formation is represented by two Assemblage Zones. The *Scalenodontoides* Assemblage Zone (SAZ) is present in the Lower Elliot Formation (Stormberg Group, Karoo Supergroup) (Viglietti et al 2020a) while the *Massospondylus* Assemblage Zone (MAZ) is present in the Upper Elliot Formation (Viglietti et al 2020b). The SAZ is known for the traversodontid cynodont *Scalenodontoides macrodontes*, as well as the sauropodomorphs *Blikanasaurus cromptoni* and *Melanorosaurus readi* (Viglietti et al 2020a). The MAZ is the youngest Assemblage Zone tetrapod biozone in the Karoo Basin (upper Stormberg Group, Karoo Supergroup). This AZ is dominated by dinosaurs present in southern Gondwana. The crocodylomorph *Protosuchus haughtoni*, ornithischian *Lesothosaurus diagnosticus* as well as the sauropodomorph *Massospondylus carinatus* (Viglietti et al 2020b).



Figure 28: Extract of the 1:250 000 2828 Harrismith Geological map (1998) (Council of Geoscience, Pretoria) indicating the proposed development in blue and brown



Figure 29: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences).

According to the SAHRIS Palaeosensitivity map (**Figure 29**) the proposed development is underlain by sediments with a Very High (Red) Palaeontological Sensitivity. The colours on the PalaeoMap indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

As such a palaeontological impact assessment was undertaken and no fossiliferous outcrops were detected in the development footprint. An overall medium palaeontological sensitivity is allocated to the development footprint. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological reserves of the area and construction of the development may be authorised in its whole extent.

4.2 Socio economic conditions

The study area falls within Maluti-A-Phofung Local Municipality Ward 31 Considering that the extent of the proposed STP. Maluti-A-Phofung falls within the Thabo Mofutsanyana District Municipality. According to Statistics South Africa (StatsSA) 2011, the municipality is comprised of 35 wards and covers approximately 4

421 km² in extent. Phuthaditjhaba is the urban centre of Qwaqwa and serves as the administrative head office of Maluti-A-Phofung municipality. Surrounding Phuthaditjhaba are the rural villages of Qwaqwa, established on tribal land administered by the Department of Land Affairs. Harrismith is a service center for the surrounding rural areas and a trading belt serving the national road, N3, which links the Gauteng and KwaZulu-Natal provinces.

The information presented in this section and pertaining to these aspects was obtained from StatsSA 2011 census collated by Wazimap and has been contextualised for the proposed STP Development. It is important to note that the 2011 census data were used in this report because, according to StatsSA, the latest census data available is that of 2011 and the next census data generated will be for 2022. It must further be highlighted that while Stats SA desires to undertake a Census after every five years, (meaning that after the 2011 census, another census was supposed to have been undertaken in 2017), this was not undertaken due to the lack of capacity.

a) Key Demographics

According to the 2011 census, Maluti-A-Phofung Municipality extends over the smallest area in the Thabo Mofutsanyana municipal district but has the highest population density. It accommodates a population of 353453, which is 46% of the population of the district municipality. The population is relatively young; almost 22% is younger than 19 years. **Figure 30** illustrates the population structure of the municipality (Census, 2011).



Figure 30: Maluti-A-Phofung Local Municipality Population Structure (https://wazimap.co.za/profiles/municipality-FS194-maluti-a-phofung/#demographics)

b) Employment levels

In 2011, only 25.4% of the community members within the municipality were employed with 67% of these employed in the formal sector. Although the employment rate was low in this municipality, it was lower than the district employment rate and the provincial employment rate as 31.23% and 36.17% respectively. The average annual income was R15 000 which was the same the overall Thabo Mofutsanyana annual income rate and about half the amount of in Free State was R30 000. (Census, 2011; Stats SA, 2018); as presented in **Figure 31** below



Figure 31: Maluti-A-Phofung Local Municipality Employment and Income Statistics (https://wazimap.co.za/profiles/municipality-FS194-maluti-a-phofung/#economics)

c) Living Conditions

Water is considered as the most important basic need, and the water service level in the Municipality was 97%. 61% of the water was obtained from piped sources and 62% had a service provider (Figure 35). The electricity supply was at an unacceptable 3.9%. 3.9% of the Maluti-A-Phufong population did not have access to electricity in 2011. However, the electrical supply was about three-fifths of the rate of the district municipality level and approximately 80% compared to province supply.

Ablution facilities are significantly important for the health and environmental state of the community. In 2011, the provincial rate of population with ablution facilities was at 74.02% while the Malui-A-Phofung Municipality had 35.9% of the population with ablution facilities (**Figure 33**).



Figure 32: Maluti-A-Phofung Local Municipality Service Delivery (https://wazimap.co.za/profiles/municipality-FS194-maluti-a-phofung/#service_delivery)

5 ALTERNATIVES

In terms of the EIA Regulations published in Government Notice (GN) R982 of 2014, as amended in 2017, feasible and reasonable alternatives must be identified and considered within the Basic Assessment process. According to the above-mentioned, an alternative is defined as *"…in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:*

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

The purpose of alternatives as defined in the Department of Environmental Affairs and Tourism's (now Department of Forestry and Fisheries and the Environment (DFFE), 2004 Integrated Environmental Information Series on the Criteria for determining alternatives in EIA, ' *is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts.*'

In terms of Section 24 of NEMA, the proponent is required to demonstrate that alternatives have been described and investigated in sufficient detail during the BA process. It is important to highlight that alternatives must be practical, feasible, reasonable and viable to cater for an unbiased approach to the project and in turn to ensure environmental protection.

The role of alternatives is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts.

In order to ensure full disclosure of alternative activities, it is important that various role players contribute to their identification and evaluation. Stakeholders have an important contribution to make during the Basic assessment Process and each role is detailed as follows:

The role of the environmental practitioner is to:

- encourage the proponent to consider all feasible alternatives;
- provide opportunities for stakeholder input to the identification and evaluation of alternatives;

- document the process of identification and selection of alternatives;
- provide a comprehensive consideration of the impacts of each of the alternatives; and
- document the process of evaluation of alternatives.

The role of the proponent is to:

- assist in the identification of alternatives, particularly where these may be of a technical nature;
- disclose all information relevant to the identification and evaluation of alternatives;
- be open to the consideration of all reasonable alternatives; and
- be prepared for possible modifications to the project proposal before settling on a preferred option.

The role of the public is to:

- assist in the identification of alternatives, particularly where local knowledge is required;
- be open to the consideration of all reasonable alternatives; and
- recognise that there is rarely one favoured alternative that suits all stakeholders and that alternatives will be evaluated across a broad range of criteria, including environmental, social and economic aspects.

The applicability of each alternative type to the proposed project is outlined in **Table 11**. It must be highlighted that the alternatives presented below are derived from both the EIA Regulations (2014) as amended as well as the Department of Environmental Affairs and Tourism's (now DFFE) 2004 Integrated Environmental Information Series on the Criteria for determining alternatives in EIA. Where the alternative is applicable to the project, it will be further discussed in this report.

ALTERNATIVE	COMMENT	
No-go Option	This alternative must be discussed on all projects as it allows for an assessment of	
	impacts should the activity not be undertaken. Refer to Section 5.1 .	
Activity alternatives	No alternatives were considered for the activity of constructing the STP and	
	discharge pipeline.	
Location/ property	The location of the New STP is based on an assessment by the civil engineers of a	
alternatives	suitable area that will bring less impacts on the environment. This preferred option	
	is discussed in Section 5.2.	
Process alternatives	These are also known as technological and equipment alternative. CDC's technology	
	has been selected based on its accuracy, efficiency and cost effectiveness. CDC	
	prefers the proposed STP structure and pipeline design as the technology to be used.	
Demand alternatives	This is applicable to the demand for a product or service. An example of this would	
	be where there is a need to provide more drinking water. Examples of alternatives	
	can be through managing demand through various methods or providing additional	

Table 11: Alternatives types

ALTERNATIVE	
	drinking water. Specific to the proposed project, alternatives regarding the demand for the STP are not applicable as this STP will only be utilised for the operation of the Healthcare Facility. Therefore, these alternatives will not be discussed in this report.
Scheduling alternatives	Scheduling alternatives are also known as sequencing or phasing alternatives. This alternative is not applicable to the project.
Input alternatives	Not applicable to the project but mainly to industries where inputs and in turn outputs are crucial to operations.
Routing alternatives	Consideration of alternative routes generally applies to linear developments such as power lines, transport and pipeline routes. The prosed project is a linear one, hence the proposed route alternatives are discussed in Section 5.3 .
Site layout alternatives	No alternative was considered due to the proximity of the STP to the proposed healthcare facility (The wastewater source).
Scale alternatives	Scale alternatives for the project will not be applicable as only one outcome is required which is the development of a STP with a discharge pipeline. Additional area to be cleared will include vehicle turning point and working area.

5.1 The No-Go Option

The No-go option implies that the Project does not proceed and will thus comprise of CDC not going ahead with the construction of the STP and associated discharge pipeline. Ideally this would be the preferred alternative as the status quo of the environment remains unchanged, however due to the demand for adequate water and sanitation for the Healthcare facility, this alternative is not feasible.

There were three specialists' assessment undertaken to aid with this DBAR. A heritage Impact Assessment, Palaeontological Impact Assessment, a terrestrial impact assessment and a wetland and aquatics study. The findings and recommendation of the specialist's studies supports the use all proposed mitigation measures.

5.2 Site Location Alternatives

One site location alternative for the STP has been proposed by CDC and the appointed Engineers. This alternative has also been assessed by various specialists to outline the environmental implication that might be available. In this section, one alternative was analysed due to the proximity of the STP to the proposed Healthcare facility and according to the field assessments that were undertaken by the specialists. Advantages and disadvantages for this alternative will be described and the risks or impact to the environment will be highlighted. A NEMA query was issued by DESTEA that an Environmental Authorisation is not required for the Healthcare Facility (Clinic).

5.2.1 Preliminary design location (Preferred Option)

The preferred site for the proposed Healthcare Facility is a 'brownfields' site which was previously used as a community soccer field. The site is a disturbed and degraded site. The surrounding vegetation that is in close proximity to the proposed STP development indicates that all the project areas and their surroundings were severely degraded in their entirety.

Services (water, electricity, etc.) will be obtained by extending and upgrading the existing infrastructure on the property site.

The position of the activities using the latitude and longitude of the center point of the site is given below.

Proposed Development		Latitude (S)	Longitude (E)	Size of activity (Areas)	
1.	Sewage	treatment	28°33'6.04"S	28°51'58.06"E	225m ²
package plant					

Table 12: STP location

The advantages and disadvantages for this alternative is presented on **Table 12** below.

 Table 13: Advantages and disadvantages of the alternative (Preferred option)

Alternative	Advantages	Disadvantages
Preliminary	• The site is located in close proximity	• Treated sewage will discharge directly
Design	to the Health Care Facility	into the watercourse
(Preferred)	• The STP area is located in an area of	Proposed pipelines encroach into
	low botanical and faunal diversity	riparian areas and thus destructive to
	and sensitivity and present no faunal	the biodiversity found in the riparian
	or botanical constraints to the	areas;
	proposed development;	• Due to the increased linear extent of
	• No significant patches of intact	the preliminary design, the designated
	natural vegetation remain within the	ESA area and overall habitat will be
	project areas or immediate	impacted should Alternative 1 be
	surrounds as evidenced by the	implemented.
	disturbed and transformed habitats	
	within and outside of the proposed	

	sewage	treatme	nt plar
	develop	ment; and	
•	The are	a is considere	ed to have
	"Low	Terrestrial	Biodiversit
	Sensitivi	ty;	

Based on the above information, the preliminary design is the Preferred Option. Refer to **Appendix B** for the proposed preliminary design.

5.3 Routing Alternatives

Consideration of alternative routes generally applies to linear developments such as power lines, transport and pipeline routes. In route investigations, various corridors are investigated and compared in terms of their impacts.

5.3.1 Preliminary design route (Preferred option)

One (1) discharge pipeline with a length of approximately 198m is intended to be constructed along the tarred road to discharge treated wastewater in the Metsi Matsho Tributary. The discharge pipeline, with a pipe diameter of 160mm extends north of the sewage treatment package plant and discharge will flow into the Metsi Matsho Tributary located directly north of the sewage treatment package plant.

The co-ordinates in degrees, minutes and seconds for the proposed pipelines, a linear activity, was taken approximately every 100 meters.

Table 14: Pipeline coordinates

Proposed Development	Latitude (S)	Longitude (E)
Starting point of Activity	28°33'5.69"S	28°51'57.70"E
	28°33'3.50"S	28°51'56.86"E
	28°33'0.91"S	28°51'55.89"E
Ending point of Activity	28°32'58.84"S	28°51'54.90"E

5.3.2 Routing Alternative 1

Route alternative one (1) follows a similar path from the sewage treatment package and connects to the existing sewer line to discharge treated wastewater in the Metsi Matsho Tributary. Route alternative 1 is shorter than the preferred route. The limitations to this alternative is due to the existing infrastructure not being in working condition, this cannot be considered a viable option. Considering this alternative will result in further contribution of the deteriorated existing sewer infrastructure

5.4 Operational Alternatives

This alternative implies proceeding with the proposed development, that is, constructing a STP for the proposed Healthcare facility. This alternative implies that there will be activities that will be undertaken on site during the operational phase to treat sewage from the proposed Healthcare facility, including maintenance on a regular basis or as and when required. The following operational alternatives were considered for the project, which are:

- Treating wastewater and discharging in the Metsi Matsho Tributary (Preferred option)
- Using the treated wastewater for irrigation within the Health care facility precinct; and
- Using site sceptic tank only.

5.4.1 Discharging treated wastewater in the nearest watercourse

The STP Plant will have a Design flow capacity of 18 200 l/d with a peak flow of 0.6 l/s. The proposed STP will comprise a number of a gravity trunk sewer main pipe, which will feed into the pre-digestion chamber before it enters the bioreactor. The STP will consist of five main sections namely; Predigestion (septic tank), Balancing (equalisation), Bioreactor, Clarifier (Humus tank) and Disinfection tank (Chlorine contact tank). During operation of the STP the system will operate as follows:

- i. Sewer will flow into the underground septic tank (predigestion and balancing chambers)
- ii. The sewer will then be pumped into the bioreactor then passes through clarifier and disinfection tank
- iii. The resultant water will be treated or discharged in the tributary.

5.4.2 Using treated wastewater for irrigation

Using treated wastewater for irrigation within the healthcare precinct was not actioned on the basis that an additional irrigation system was not budgeted for as well as it being an additional mechanical infrastructure which would need to be maintained. There would also not be enough grass areas within the precinct to require the amount of treated water produced (See **Appendix B** for the designs).

5.4.3 Septic tank only

Due to the lack of service delivery currently as well as the lack of capacity in the treatment works, the option of a septic tank only was not considered.

6 PUBLIC PARTICIPATION PROCESS

The NEMA (1998) EIA Regulations, 2014, as amended, prescribe that the Environmental Impact Assessment process must include the undertaking of public participation in accordance with the Chapter 6 of the Regulations. The purpose of the Public Participation Process is to provide all potential and / or registered Interested and Affected Parties (I&APs), including the competent authority and any other stakeholder or organ of state, an opportunity to become involved in the EIA process and provide comments during the various phases of the project. Involvement by I&APs is critical, as it contributes to a better understanding of the proposed project among I&APs, raises important issues that need to be assessed and provides local insight that will enhance the EIA process. This chapter of the report provides details on the Public Participation Process followed during the public participation for the proposed Sewage Treatment Package Plant.

6.1 Identification of Interested and Affected Parties

Interested and Affected Parties (I&APs) were identified through various means from the inception phase of the project. These means included the placement of an advertisement in a local newspaper the placement of Site Notices and the distribution of Notification Letters. Each of these are discussed below.

6.2 Notification Letters

Regulation 41(2)(b) of the NEMA (1998) EIA Regulations, 2014, as amended requires that written notification be given to various parties who include the following:

(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;

(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;

(iii) the municipal councillors of the wards in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;

(iv) the municipality which has jurisdiction in the area;

(v) any organ of state having jurisdiction in respect of any aspect of the activity; and

(vi) any other party as required by the competent authority.

The Notification Letter that was compiled for the proposed development is attached as **Appendix E2.** The document provided a background on the project, the proposed activities as well as information on how one can register as an Interested and Affected Party (I&AP) on the project in order to be able to be kept abreast of

all developments. Notification letters were compiled and distributed to all adjacent landowners on the 31st of January 2022. Knock and Drop Registers were completed for all I&APs that received a notification letter on the aforementioned date. The knock and drop registers are attached to **Appendix E8**. Electronic version of the notification letters has also been sent to I&APs and is currently ongoing.

6.3 Newspaper Advertisement

Regulation 41(2)(c) and (d) of the NEMA (1998) EIA Regulations, 2014, as amended requires that PPP includes the placement of a Newspaper Advertisement to notify all potential I&APs about the proposed project and to invite them to register as I&APs, provide comments on the project as well as the availability of the DBAR. A newspaper advertisement was placed in the local newspaper (Eastern Free State Issue) for the week ending 18th February 2022 edition calling for registration with the project and comments. Proof of the newspaper advertisement is attached in **Appendix E1** of this report.

6.4 Notice Boards/Site Notices

In accordance with the NEMA (1998) EIA Regulations, 2014, as amended, a notice board detailing the proposed activity as well as the contact details of the EAP was placed on site. A2, A3 and A4 site notices presenting the project were erected on site and at visible and accessible locations close to the site on the 31st of January 2022 at the following locations indicated on Table 15 and Figure 36.

NR.	Address/Place	Latitude	Longitude	Size
1.	Tswelangpele School	28°33'12.52"S	28°52'0.83"E	A2
2.	Project location.	28°33'5.37"S	28°51'57.57"E	A2
3.	Unknown road within close proximity of site	28°33'3.82"S	28°51'56.92"E	A2
4.	Placed within close proximity East of proposed site	28°33'7.55"S	28°52'2.29"E	A2
5.	Placed within the community, North of the proposed site	28°32'56.45"S	28°51'56.41"E	A2
6.	Unknown road, corner of Molapo Secondary School	28°32'46.63"S	28°51'51.13"E	A3
7.	Unknown road, next to Letshaleholo Tavern	28°32'37.85"S	28°51'55.02"E	A2
8	Unknown road, next to the old sewer pump station	28°32'58.31"S	28°51'53.34"E	A2
9.	Placed at a Local shop within the Comet village	28°33'12.11"S	28°51'42.01"E	A3
10.	Local Youth Centre	28°33'2.07"S	28°51'32.27"E	A2
11.	Thabo Mofutsanyana District Office	28°32'28.27"S	28°48'4.11"E	A3
12.	Maluti-A-Phofung Local Municipality Office	28°32'4.44"S	28°48'28.96"E	A3

Table 15: Placement of site notices



Figure 33: Location of Site Notice Boards

Refer to **Appendix E3** for a copy of the Site Notice and proof of placement.

6.5 Availability of Draft Basic Assessment Report for review

A Public Participation Plan was submitted to DFFE on the 27th of January 2022, the plan was approved on the 1st of February 2022. The availability of the DBAR is according to the Public Participation Plan attached to **Appendix D2**.

Based on Regulation 40(1) of the NEMA (1998) EIA Regulations, 2014, as amended, the Draft Basic Assessment Report will be placed at the public venue (Community Youth Centre) and also on the GladAfrica website for the legislated period of at least 30 days. It is important to highlight that the review period was determined in line with the reckoning of days as defined in Regulation 3 of the NEMA EIA Regulations, 2014, as amended. The following commenting authorities will be provided with a copy of the report in both electronic as well as hardcopy format:

- Thabo Mofutsanyana District Municipality Departments;
 - Health & Safety and Environmental Department;
- Maluti-A-Phofung Local Municipality;
 - MAP Water;
 - Environmental Department;

- Ward Councillors;
- Mayor's office; and
- Infrastructure Development Department.
- Free state Provincial Government:
 - Department of Small Business Development, Tourism and Environmental Affairs (DESTEA);
 - Free State Heritage Resources Agency
- South African Heritage Resources Agency (SAHRA);
- Free State Heritage Resources Authority (FSHRA); and
- Department of Water and Sanitation (DWS).

SMS, e-mail notifications and telephone calls will be utilised to notify all registered I&APs about the availability of the report. An Interested and Affected Party Register is attached to **Appendix E4.** As per the approved Public Participation Plan, the I&APs were contacted to confirm their email addresses. In instances whereby, an I&AP does not have an email address, they will be notified by SMS of the availability of the Draft Report.

6.6 I&APs Register and Comments & response report

From the onset of the project, a database of persons, organizations and organs of state identified as I&APs or registered as I&APs was opened and is updated as and when required. The I&APs register is included in **Appendix E4**. Comments received from various I&APs have been captured in the Comments and Response Report. The Comments and Response report is attached to **Appendix E5**. All comments received during the DBAR Public review, will be captured and addressed in the Final Basic Assessment Report. Correspondence with I&APs have also been included in **Appendix E7**.

6.7 Focus Group Meetings/Public Open Day

All key municipal stakeholders were contacted regarding the project. In line with the directions from the Minister regarding the combat of COVID, a focus group meeting will be held through a virtual platform (Microsoft Teams) with key organs of state. No public open days or focus group meetings have been held to date with I&APs. Depending on the comments received during the public review period for the Draft Basic Assessment Report, a public open day/focus group meeting may be arranged accordingly and in line with the Public Participation Plan. This will however depend on the Disaster Management Regulations applicable at a time.

7 IMPACT ASSESSMENT METHODOLOGY

The main objective of this section is to provide independent and scientifically sound information on the impacts identified during the BA. Based on the requirements of the impact assessment, impacts identified, and issues and concerns raised are assessed with regard to their significance. The impact assessment is aimed at determining the impacts associated with the proposed development and the prescription of mitigation measures. Other impacts associated with the proposed development are discussed in detail in this section. The significance of the potential impacts is described in terms of their *nature, extent, duration, intensity* and *probability*.

In this report, impacts with a low significance are considered to have no influence on the decision to proceed with the proposed development. Impacts with a moderate significance will influence the decision, unless they can be effectively mitigated to a low significance, whereas impacts with a high significance - despite mitigation - would influence the decision to proceed with the proposed development.

7.1. Impact Mitigation Hierarchy

The Impact Mitigation Hierarchy provides steps that must be used in mitigating adverse impacts of a project and in turn ensuring environmental protection. There are various levels of preference for mitigation options with the most preferred method and the first step as avoidance and the least and final method as offset. Refer to **Figure 37** for an illustration of the Mitigation Hierarchy



Mitigation Hierarchy

Figure 34: Mitigation hierarchy showing levels of preference (Eco Intelligent, 2016)

Each of the mitigation types will be discussed and contextualised to the proposed STP.

Step 1: Avoidance - Although this is the most preferred form of mitigation on projects to avoid adverse environmental impacts as it will not result in the construction of the proposed activities, this is not suitable solution for the treating of wastewater for the proposed Lusaka Healthcare facility.

Step 2: Minimisation - This entails the reduction of adverse environmental impacts through various means as it based on the recognition that environmental impacts cannot be fully avoided in the proposed activity. The minimisation of adverse impacts will be adopted for the pre-construction, construction, and operational phase of the proposed project. The Mitigation measures proposed are discussed in **Chapter 8** of this report as well as in the Environmental Management Programme attached as **Appendix G.**

Step 3: Rectification - Where an impact has already taken place, rectification entails the implementation of corrective measures to avoid further adverse environmental impacts. Rectification will apply in cases where Contractors or maintenance employees have not adhered to specific restrictions or when the proposed mitigation measures are not adhered to or unforeseen impacts arise.

Step 4: Reduction - This is applicable where the above-mentioned rectification is not possible. Rectification requires new management practices and/or changes in methodology to ensure environmental protection.

Step 5: Environmental Offset - although this does not occur on the proposed development, it is meant to cater for the effects of the development through compensation of biodiversity losses by measures such as the establishment of new plants on another area outside the study area where it is not possible to avoid the clearance of vegetation or rehabilitate the disturbed areas.

7.2. Impact Assessment Methodology

In accordance with Government Notice R. 982, promulgated in terms of Section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), the EAP is required to assess the significance of potential impacts in terms of the following criteria:

- Nature of the impact;
- Extent of the impact;
- Intensity of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Reversibility of impacts; and
- Impact on irreplaceable resources; and
- Cumulative impacts.

Activities within the framework of the proposed development and their respective construction, operation, decommission and rehabilitation phases, give rise to certain impacts. Decommissioning is however not discussed as it is not anticipated that the Sewage treatment package plant will ever be decommissioned. However, should decommissioning ever take place, an impact assessment for closure shall be undertaken at that time. For the purpose of assessing these impacts, the project has been divided into three phases from which impacting activities can be identified, namely:

Construction phase:

This phase refers to all the construction related activities on site during closure of the site, until the contractor leaves the site.

Operation phase:

This phase refers to the period in which the proposed sewage treatment package plant will be operational for the proposed Healthcare Facility.

Monitoring:

This includes all activities undertaken to ensure that the environmental integrity of the site is maintained and preserved after Rehabilitation has taken place.

The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure. The methodology that will be used comprises of the following four steps:

- Step 1: Identification of positive and negative impacts of the project;
- Step 2: Identification of the significance rating of the impact before mitigation;
- Step 3: Identification of the mitigation measure and the mitigation efficiency; and
- Step 4: Identification of the significance rating of the impact after mitigation;

Activities that will be undertaken to give effect to the proposed development gives rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into the following phases discussed in **Table 14**.

PHASES OF A PROJECT IN WHICH IMPACTS WILL OCCUR
Status Quo
The study area as it currently exists.
Preconstruction
All activities undertaken before construction phase including specialist studies and
assessments
Construction (pre- rehabilitation phase)
All activities on site up to the start of construction, not including the transport of materials,
but including the initial site preparations. This also includes the impacts that would be
associated with planning.
Rehabilitation phase (closure and rehabilitation phase)
All activities undertaken to ensure the site is restored to its original state as humanely
possible.
Monitoring phase (post-closure phase)
All activities after Rehabilitation, including the operation and maintenance of the proposed
development.
The activities arising from each of the relevant phases have been included in the impacts assessment
tables. The assessment endeavours to identify activities that would require environmental
management actions to mitigate the impacts arising from them. The criteria against which the
activities were assessed are given in the next section.

Table 16: Project phases in a development

7.3. Assessment Criteria

The assessment of the impacts has been conducted according to a synthesis of criteria required by the guideline documents to the EIA regulations (2006) and integrated environmental management series published by the Department of Environmental Affairs and Tourism (DEAT) currently Department of Forestry, Fisheries and the Environment (DFFE). In addition to this, it is a requirement of the National Environmental Management Act (NEMA) 2014 Regulations as amended, Appendices 1 and 2 that an Impact and Risk Assessment process be undertaken for the Basic Assessments and Environmental Impact Reporting. The Assessment Criteria is based on the following:

- Nature of impact;
- Extent;

- Duration;
- Intensity;
- Probability;
- Determination of significance; and
- Reversibility of impact.

Each of these are explained in **Table 17** below.

Table 17: Assessment Criteria

ASSESSMENT CRITERIA	SCORING
a) Nature of Impact	
This is an appraisal of the type of effect the proposed activity	Scoring does not apply, impact
would have on the affected environmental component. The	will either be positive or
description should include what is being affected, how and	negative
whether the impact is positive or negative	
b) Extent (E)	
The physical and spatial size of the impact. This is classified	
as:	
i) Site	1
The impact could affect the whole, or a measurable portion	
of the site.	
ii) Local	2
The impacted area extends only as far as the activity, e.g. a	
footprint of the specific activity	
iii) Regional	3
The impact could affect areas such as neighbouring farms,	
transport corridors and the adjoining towns.	
iv) National	4
The impact could have an effect on South Africa.	
c) Duration (D)	
The lifetime of the impact; this is measured in the context of	
the lifetime of the proposed project.	
i) Short term	1
The impact will either disappear with mitigation or will be	

mitigated through natural processes (less than 1 year).	
ii) Medium term	
The impact will last up to the end of the phases, thereafter it	2
will be entirely negated (1 to 10 years).	
iii) Long term	
The impact will continue or last for the entire operational life	3
of the development but will be mitigated by direct human	
action or by natural processes thereafter.	
iv) Permanent	
Mitigation either by man or natural processes will not occur	4
in such a way or in such a time span that the impact can be	
considered transient, thus beyond decommissioning.	
d) Intensity (I)	
Is the impact destructive or benign? Does it destroy the	
impacted environment, alter its functioning, or slightly alter	
it? These are rated as:	
i) Low	1
The impact alters the affected environment in such a way	
that the natural processes or functions are not affected.	
ii) Medium (Moderate)	2
The affected environment is altered, but function and	
process continue, albeit in a modified way.	
iii) High	3
Function or process of the affected environment is disturbed	
to the extent where it temporarily or permanently ceases.	
This will be a relative evaluation within the context of all the	
activities and the other impacts within the framework of the	
project.	
e) Consequence of Impact (C)	
The anticipated consequence of the impact is determined	
using the following formula:	
Consequence = Duration + Extent + Intensity	
Consequence is rated as:	

i)	Negligible	3
An accept	table impact on natural systems, patterns or	
processes		
ii)	Low	4-5
A small in	npact on natural systems, patterns or processes,	
where the	e environment continues to function but in a	
modified	manner and for which mitigation is desirable but	
not essen	tial	
iii)	Moderate	6-8
A substan	tial alteration of natural systems, patterns or	
processes	, where environmental functions and processes are	
altered su	ich that they temporarily or permanently cease.	
Mitigatio	n will be required.	
iv)	High	9-10
A serious	alteration of natural systems, patterns or	
processes	. Impacts may result in the irreversible damage to	
irreplacea	able aspects if mitigation measures are not	
implemer	nted.	
v)	Very High	11-12
Very high	impact on natural systems, patterns or processes,	
where en	vironmental functions and processes are altered	
such that	could permanently cease, even with mitigation.	
f)	Probability (P)	
This desc	ribes the likelihood of the impacts actually	
occurring	. The impact may occur for any length of time	
during the	e life cycle of the activity, and hot at any given time.	
i)	Improbable	1
	The possibility of the impact occurring is very low,	
	due either to the circumstances, design or	
ii	experience.) Probable	
,	There is a possibility that the impact will occur to	2
	the extent that provisions must be made.	
ii	i) Highly probable	3
	or other stage of the development. Plans must be	

g)	Significance of impact with or without mitigation	
	contingency plans are relied on to contain the effect.	
	prevention plans, and mitigation actions or	
	The impact will take place regardless of any	4
	iv) Definite	
	drawn up before the undertaking of the activity.	

Score										
	4	Definite	4	8	1	2	16	20		
t₹	3	Highly probable	3	6	9	•	12	15		
abili	2	Probable	2	4	(5	8	10		
Prob	1	Improbable	1	2	(1) (1)	3	4	5		
			Negligible	Low	Mode	rate	High	Very High		
			1	2		3	4	5		
				Consequ	ence					
Signific	ance i	s determined throu	ugh a synthesi	is of impact						
charact	eristio	cs. Significance is a	n indication of	f the						
import	ance c	of the impact in ter	ms of both ph	iysical exten	t					
and tim	ne sca	le, and therefore in	dicates the le	vel of mitiga	ation					
require	d. To	determine significa	ince of the po	tential						
impact	/risk, t	the consequence is	multiplied by	v probability						
The cla	sses a	re rated as follows	:							
	i) No	significance				1-3				
The im	pact is	not substantial an	d does not re	quire any						
mitigat	ion. So	core 1-5								
	ii) Lo	w		4-6						
The im	pact is	of little importanc	1							
mitigat	ion. So	core 4-6								
	iii) №	ledium (Moderate		8-10						
The im	pact is	of importance and								
have a negative impact. Mitigation is required to reduce the										
negative impacts to acceptable levels. Score 8-10										

iv) High	12-16
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. Score 12-16	
v) Fatal Flaw	20
The impact presents a fatal flaw and the entire development	
option or entire project proposal is unacceptable. Score 20	
h) Reversibility of impact (R)	
The extent to which the impacts are reversible	
(i) Yes	
The impact is reversible within two years after construction.	
(ii) No	
The impact is reversible within 2 to 10 years after	
construction.	
i) The degree to which the impact can cause	
irreplaceable loss of resources	
(i) Low	
The impact results in the loss of resources but the natural,	
cultural and social processes/functions are not affected.	
(ii) Medium	
The loss of resources occurs but natural cultural and social	
processes continue, albeit in a modified manner.	
(iii) High	
The impact results in irreplaceable loss of resource.	

In order to maintain consistency, all potential impacts that have been identified during the BA process will be listed in impact assessment tables. The assessment criteria used in the tables will be applied to all of the impacts and a brief descriptive review of the impacts and their significance provided in the text of the report. The overall significance of impacts will be determined by considering consequence and probability.

8 DESCRIPTION AND ASSESSMENT OF ENVIRONMENTAL IMPACTS

A Basic Assessment Report (BAR) must contain all the information that is necessary for a good understanding of the nature of issues identified during the Basic Assessment (BA) process. The BAR must include a description of environmental issues and potential impacts, including cumulative impacts, mitigation measures that have been identified and other aspects as outlined in Appendix 4 of the NEMA EIA Regulations, 2014 as amended. This chapter also describes the environmental issues and impacts as identified during the BA Process for the proposed STP development. The proposed mitigation measures are discussed in this Chapter as well as as in the EMPr attached as **Appendix G** of this report.

The main objective of this section is to provide independent and scientifically sound information on the impacts identified during the Basic Assessment (BA) Process. Based on the requirements of the impact assessment, impacts identified, and issues and concerns raised are assessed with regard to their significance. The impact assessment is aimed at determining the impacts associated with the proposed development and the prescription of mitigation measures. Other impacts associated with the proposed development are discussed in detail in this section. It must be highlighted that the Impact Assessment Methodology discussed in **Chapter 7** of this report was used to assess the identified impacts.

In both themes, the potential impacts for all construction (activities related to rehabilitation) as well as the Monitoring phases of the projects are assessed It must be noted that the Impact Assessment Methodology as presented in **Chapter 7** of this report will be used to assess the impacts in terms of:

- nature, significance and consequences of the impact and risk;
- extent and duration of the impact and risk;
- probability of the impact and risk occurring;
- the degree to which the impact and risk can be reversed;
- the degree to which the impact and risk may cause irreplaceable loss of resources; and
- the degree to which the impact and risk can be avoided, managed or mitigated.

The cumulative impacts of the project will also be discussed.

In this report, impacts with a *low significance* are considered to have no influence on the decision to proceed with the proposed project. Impacts with a *moderate significance* will influence the decision unless they can be effectively mitigated to a low significance, whereas impacts with a *high significance* despite mitigation would influence the decision to proceed with the proposed project. The impacts discussed in this section were identified by the Project Team (including specialists). The potential impacts identified and elaborated on in

this chapter have been presented as follows:

- Theme 1: Impacts on the Biophysical Environment; and
- Theme 2: Impacts on the Human Environment.

For the purposes of this assessment, this impact assessment will **only** focus on the impacts that are likely to occur during the construction and operational phases of the proposed development based on the location alternatives of the site and the site sensitivities determined from desktop and field assessment.

5.1 Theme 1: Impacts on the Biophysical Environment

5.1.1 Loss of Floral Habitat and Species Diversity

Loss of floral species of Conservation Concern may take place during the construction and operational phases of the project as a result of the project activities outlined below:

Construction Phase

- Clearing of vegetation and preparing surface areas for construction.
- Encroachment of construction activities beyond the extent of the proposed project development footprint, leading to loss of habitat within areas of increased ecological sensitivity.
- Movement of construction vehicles and access and maintenance road/ servitude construction beyond the project development footprint.
- Compaction of soils due to movement of construction vehicles.
- Disturbance to soils leading to erosion.
- Dumping of litter and construction or waste material outside of designated areas.
- Alien invasive species proliferation leading to loss of floral habitat in the surrounding areas.
- Uncontrolled fires during construction.
- Dust generation during construction.

Operational Phase

- Ongoing disturbances and compaction of soils due to general operational and maintenance activities.
- Ongoing disturbances and altered runoff patterns leading to erosion and sedimentation of watercourses.
- Ongoing proliferation of alien and invasive floral species that may outcompete indigenous floral species and degrade faunal habitat.

- Disturbance within the project area and surrounds due to increased human activity and operational vehicles.
- Altered community composition of areas immediately adjacent to the project are due to altered ecosystem processes.
- Failure to implement an invasive species management programme.
- Ineffective rehabilitation of exposed and impacted areas.

Table 18 presents an assessment of the impacts associated with floral habitat and species diversity

sct phase	ature of impact	Extent	uration	Intensity	Consequence (E+ D+I)	obability	Reversibility	Loss of resources	Significance (C X P)	Significance
Proje	ž –	_	٥			Ĕ			Without Mitigation	With Mitigation
Preliminary Design location (Preferred)										
Construction	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

Table 18: Assessment of impacts related to floral habitat and species diversity

The proposed mitigation measures to avoid adverse impacts on the floral habitat and species diversity is provided below:

- The location and extent of areas of increased ecological importance and sensitivity should be considered during the pre-construction and planning phases;
- All infrastructure, with specific mention of contractor laydown areas/ site camps, and other temporary infrastructure, are to be placed outside of the aforementioned habitat units or within areas of low ecological sensitivity;
- In planning the project, connectivity between surrounding natural areas on either side of the proposed road should be considered, and it must be ensured that such spatial connectivity is not entirely lost, and by allowing as large areas of unfragmented natural habitat as possible to remain;
- The amount of vegetation, particularly indigenous vegetation cleared should be limited to only what is required;
- Careful planning, demolition and construction at the Metsi Matsho Tributary should take place in order to limit the extent of vegetation disturbance;

- Construction vehicles should be restricted to travelling only on designated roadways, to limit the ecological footprint of the proposed development activities;
- All areas of increased ecological sensitivity outside of the development footprint, that are at risk of being impacted by development activities should be clearly indicated on site, preferably temporarily fenced off during the construction phase and be strictly off limits for construction vehicles and workers; and
- No littering or dumping of waste and construction material within natural areas outside of the development footprint area may be allowed. All excess material must be removed from the construction areas once construction has been completed.

8.2.1 Destruction, further loss and fragmentation of the vegetation community

The distribution of ecologically sensitive habitat along the proposed pipeline route is not uniform, and the highest impact on faunal habitat will occur during the construction phase of the project, particularly when excavation activities for the pipeline are undertaken. Site clearing associated with the pipeline installation could lead to direct loss of habitat. **Table 19** presents an assessment of the impacts associated with loss of faunal habitat.

ict phase	ature of mpact	Extent	Duration	Intensity	Consequence (E+ D+I)	bability	Reversibility	Loss of resources	Significance (C X P)	Significance
Proje	Ž -					Ĕ			Without Mitigation	With Mitigation
Preliminary Design (Preferred)										
Construction	Negative	1 Site	2 Medi um	1 Low	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

 Table 19: Assessment of Impacts Associated with Destruction, further loss and fragmentation of the vegetation community

The proposed mitigation measures to avoid adverse impacts associated with loss of faunal habitat are provided below:

- Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further.
- All areas outside of the direct footprint that were disturbed by the geological sampling must be rehabilitated and restored to a natural state.

- Rehabilitation of the disturbed areas must be made a priority. Any disturbed area must be revegetated with plant and grass species which are endemic to this vegetation type.
- All activities must be restricted too within the low/medium sensitivity areas. No unnecessary loss of high sensitivity areas should be permitted.
- All construction/operational and access must make use of the existing roads.
- All laydown, chemical toilets etc. should be restricted to low/medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded.
- Construction impacts associated with the proposed project must be contained within the footprint of the demarcated areas as indicated on the final approved project layout plan.
- Prior to construction, the development footprint area must be demarcated on site to ensure that construction impacts are contained within this area. If necessary, these areas may be fenced or, alternatively, nearby sensitive areas are to be fenced to prevent access.

8.2.2 Loss of fauna migration connectivity

Excavation and construction activities are a source of significant disturbance particularly as a result of the machinery and construction personnel that are present on site for the duration of the construction of the proposed Sewage Treatment Package Plant. The installation of the pipeline that will discharge wastewater in the Metsi Matsho Tributary may impede the movement of faunal species using watercourses as migration corridors. **Table 20** presents an assessment of the impacts associated with faunal migration connectivity.

ct phase	ature of mpact	Extent	uration	itensity	E+ D+l)	obability	sibility	.oss of sources	Significance (C X P)	Significance
Proje	Š.	-	ā	<u>ع</u>	(Con	Рк	Rever	Ţ.	Without Mitigation	With Mitigation
Preliminary Des	Preliminary Design (Preferred)									
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

Table 20: Impacts associated with faunal migration connectivity

The proposed mitigation measures to avoid adverse impacts associated with faunal migration connectivity are provided below:
- The construction/installation of the sewer pipeline must allow for ongoing movement of faunal species and disturbance of watercourse should be minimised in line with the recommendations of the wetland specialist.
- It must be ensured that natural habitat in the vicinity of the study area is kept intact specifically those areas that are connected to other natural areas outside the study area extent.
- Areas used during the construction phase and not during the operational phase should be rehabilitated.

8.2.3 Introduction and spread of alien vegetation

The moving of soil and vegetation results in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, outcompete natural vegetation, and decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and impact on downstream users. **Table 21** presents an assessment of the impacts associated with the introduction and spread of alien vegetation.

ct phase	ature of mpact	Extent	uration	tensity	E+ D+l)	obability	rsibility	.oss of sources	Significance (C X P)	Significance
Proje	ž -		۵	5 	Con	Pr	Reve	- 9	Without Mitigation	With Mitigation
Preliminary Des	sign (Preferred	(k								
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

Table 21: Impacts associated with the introduction and spread of alien vegetation

The proposed mitigation measures associated with the introduction and spread of alien vegetation are provided below:

- Implement an Alien Plant Control Plan which specifies long-term monitoring schedules.
- Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area and returning it where possible afterwards.
- Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish.

- Where sedimentation has been observed, effective rehabilitation with a focus on the long-term control of alien invasive plants should be done.
- Rehabilitate or revegetate disturbed areas

8.2.4 Changes in water quality due to foreign materials and increased nutrients

Construction and operational activities will in treated wastewater being discharged in the watercourse result and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota and a reduction in watercourse function as well as human.

Table 21 presents an assessment of the impacts associated with changes in water quality due to foreign materials and increased nutrients.

ct phase	ature of mpact	Extent	uration	tensity	E+ D+l)	bability	rsibility	.oss of sources	Significance (C X P)	Significance
Proje	ž i	_	ā	E	CO	Рк	Revei	L L	Without Mitigation	With Mitigation
Proliminan / Do	rign (Droforrod	\								
Preliminary Des	sign (Preferred)	Г. <u>-</u>	[[I -	1	r		
Construction	Negative	1 Site	2 Medium	1 Low	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 LOW
Operational	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Cumulative	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low

Table 22: Impacts associated with changes in water quality due to foreign materials and increased nutrients.

The proposed mitigation measures associated with the changes in water quality due to foreign materials and increased nutrients is provided below:

- Provision of adequate sanitation facilities located outside of the watercourse and riparian area.
- Implementation of appropriate stormwater management around the excavations to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse.
- The development footprint must be fenced off from the watercourses, and no related impacts may be allowed into the watercourse e.g., water runoff from cleaning of equipment, vehicle access etc.
- After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use.
- Maintenance of construction vehicles / equipment should not take place within the watercourse or watercourse buffer.
- Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse
- Treatment of pollution identified should be prioritized accordingly.

8.2.5 Changes in the disturbance of watercourse, riparian, and instream habitat

The clearing of vegetation from construction within the watercourse; the setting up of construction camps and storage areas; the movement of construction vehicles and personnel during installation of pipelines as well as the inappropriate storage or dumping of building material/concrete in areas surrounding the direct development footprint may result in the disturbance of watercourse, riparian and instream habitat as well as in the compaction / disturbance of soils. This disturbance may also result in the proliferation of alien and invasive species within the surrounding watercourse. **Table 22** presents an assessment of the impacts associated with changes in disturbance of wetland, riparian and instream habitat system.

Table 23: Impacts Associated with the with changes in the disturbance of watercourse, riparian, and instream habitat

ict phase	ature of mpact	Extent	uration	tensity	E+ D+l)	obability	rsibility	.oss of sources	Significance (C X P)	Significance
Proje	z -		Δ	<u> </u>	Con	Pr.	Reve	_ 9	Without Mitigation	With Mitigation
Preliminary Des	sign (Preferred	(k								
Construction	Negative	1 Site	2 Medium	1 Low	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Cumulative	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low

The proposed mitigation measures associated with changes in the disturbance of watercourse, riparian, and instream habitat are provided below:

- A detailed method statement for proposed construction activities within watercourses must be compiled prior to construction.
- Limit construction activities within the watercourse and their associated buffer areas to the dry winter months.
- Temporary storm water management systems must be in place and preferential runoff channels be filled with aggregate and/or logs (branches included) to dissipate flows, limiting erosion and sedimentation
- Clearly demarcate the construction footprint with orange hazard tape (or similar) and strictly prohibit the movement of construction vehicles and personnel outside of the demarcated areas. Portions of the watercourses and associated buffer areas or the 1:100year flood line, (whichever is greatest) that are located outside of the demarcated construction footprint must be designated as no-go areas.
- Demarcation of the construction footprint must be signed off by an Environmental Control Office (ECO). Demarcation should not be removed until construction is complete, and rehabilitation has taken place.

- The footprint area of the must be kept a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.
- The footprint area of the must be kept a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas

8.2.6 Soil and Natural Vegetation disturbance

Construction and maintenance activities will result in earthworks and soil disturbance as well as the disturbance of natural vegetation. This could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity of the water. **Table 24** presents an assessment of the impacts associated with changes in sediment entering the existing the system

ct phase	ature of mpact	Extent	uration	itensity	E+ D+l)	bability	rsibility	.oss of sources	Significance (C X P)	Significance
Proje	ž -	_	Δ	드	Con	Prc	Revei	l a	Without	With
									Niitigation	Witigation
Preliminary Des	sign (Preferred	(৮								
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Cumulative	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low

Table 24: Impacts Associated with the soil and natural vegetation disturbance

The proposed mitigation measures associated with soil and natural vegetation disturbance are provided below:

- Construction in and around watercourses must be restricted to the dryer winter months where possible.
- Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area.
- Where sedimentation has been observed, effective rehabilitation with a focus on the long-term control of alien invasive plants should be done.
- Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover.
- Rehabilitation plans must be submitted and approved for rehabilitation of damage during construction and that plan must be implemented immediately upon completion of construction.
- Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access.

- During the construction phase measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation (method statement for working within riparian areas).
- Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.
- Runoff from the construction area must be managed to avoid erosion and pollution problems.

8.2.7 Changes in water flow regime

This potential impact is associated with changing the quantity and fluctuation properties of the watercourse are for example obstructing water flow. The source of this impact includes the compaction of soil and the clearing of vegetation during construction activities and installing of the pipeline. In the present project, this will include the construction of the sewer pipeline. **Table 25** presents an assessment of the impacts associated with changes in water flow regime.

Table 25: Impacts Associated with changes in water flow regime

ct phase	ature of mpact	Extent	uration	tensity	E+ D+l)	bability	sibility	.oss of sources	Significance (C X P)	Significance
Proje	, Na		ā	5	Con: (F	Prc	Rever	L P	Without Mitigation	With Mitigation
Preliminary Des	sign (Preferred	(k								
Construction	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Positive	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Positive	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

The proposed mitigation measures associated with changes in water flow regime are provided below:

- Construction affecting the watercourse must be restricted to the dryer winter months where possible.
- A temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse.
- During the excavation of trenches, flows should be diverted around active work areas where required.
 Water diversion must be temporary and re-directed flow must not be diverted towards any stream banks that could cause erosion
- Effective stormwater management should be a priority during the construction phase. This should be monitored as part of the EMPr. High energy stormwater input into the watercourses should be

prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be considered.

8.2.8 Impacts on contaminations of surface water due to hydrocarbons and spillages

The proposed project includes the construction of a sewer pipeline that will discharge treated wastewater in the Metsi Matsho Tributary. The excavations during construction phase is likely to lead to contamination of soils and the surrounding surface water system. Potential contamination could also occur during the operational phase of the project during maintenance and unforeseen leakages of the STP and sewer pipeline. **Table 26** presents an assessment of the impacts associated with pollution of surface water and soils due to demolition.

ct phase	ature of mpact	Extent	uration	itensity	(I+O +:	obability	sibility	oss of sources	Significance (C X P)	Significance
Proje	Š :=	_	ā	5	Con	Prc	Revei	l ar	Without Mitigation	With Mitigation
Preliminary Des	sign (Preferred	I)								
Construction	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	3 Highly probable	Y	Low	8-10 Medium	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	3 Highly probable	Y	Low	8-10 Medium	4-6 Low

Table 26: Impacts associated with pollution of surface water and soils due to spills and leaks

The proposed mitigation measures associated with potential contamination within riparian areas are provided below:

- Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility.
- Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering the north-western seep.
- Contamination of aquatic systems with unset cement or cement powder should be negated as it is detrimental to aquatic biota. Pre-cast structures should be made use of (where possible) to avoid the mixing of these materials on site, reducing the likelihood of cement in the river system.
- Pipelines crossing should preferably span the systems above ground. This prevents disruptions to subsurface flow dynamics and allows the pipeline to be monitored for leaks. Pipelines buried underground should be buried at a sufficient depth below ground level such that the pipelines do not interfere with surface water movement or create obstructions, where flows can cause erosion

- Check for oil leaks, keep a tidy operation, and promptly clean up any spills or litter.
- Cut off valves should be placed at regular intervals to shut down the pipeline in case of leaks, bursts and repairs
- Provide appropriate sanitation facilities for workers during construction and service them regularly.
- The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected must be disposed of at a licensed disposal facility.
- The Contractor must be in possession of an emergency spill kit that must be complete and available at all times on site.
- Any possible contamination of topsoil by hydrocarbons must be avoided.
- Any contaminated soil must be treated in situ or be placed in.
- Rehabilitation of the riparian areas affected by the development must be undertaken after construction.

8.2.9 Loss of Topsoil and Soil Compaction

Potential disturbance on soil includes compaction owing to vehicle traffic (during the construction phase) and increased surface runoff from the compacted areas. Soil pollution may emanate from petroleum hydrocarbon contamination owing to vehicle and machinery breakdown during the construction phase. The proposed construction of the STP and the discharge pipeline will require the clearance of vegetation and stripping of topsoil resulting in the loss of the original spatial distribution of the natural soil forms and horizon sequences. **Table 27** presents an assessment of the impacts associated with loss in topsoil and soil compaction.

ct phase	ature of mpact	Extent	uration	itensity	E+ D+l)	obability	sibility	.oss of sources	Significance (C X P)	Significance
Proje	Š :=	_	ā	<u> </u>	Con	Prc	Revei	L L	Without Mitigation	With Mitigation
Preliminary Des	sign (Preferred	I)								
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

Table 27: Impacts associated with loss in topsoil and soil compaction

The proposed mitigation measures associated with the topsoil and soil compaction are provided below:

• Topsoils should be excavated and stockpiled separately from the subsoils to be used during the rehabilitation of the road verges.

- Drip trays shall be provided in construction areas for stationary plant and for "parked" plants that have shown signs of oil leakages.
- Drip trays, sumps and bunds must be emptied regularly, especially before a known rain event and after a rain event, and the contents disposed of at a licensed disposal facility.
- All vehicles and equipment shall be kept in good working order and serviced regularly.
- Leaking equipment shall be repaired immediately or removed from the Site.
- A stormwater management plan must be compiled and implemented by the Contractor to take the increased surface water run-off rates and volumes and their erosion potential into consideration.
- Should concrete be mixed on site, mixing will take place within a demarcated fenced off concrete batching area at the Contractors Camp. Concrete must be mixed on an impervious surface.

8.2.10 Impacts on waste generated

Waste generation during the construction phase would have a negative impact on the environment, if not controlled adequately. Waste includes general construction rubble, hazardous waste (used oil, cement and concrete etc.). Waste generation during the operation phase would have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste (used oil etc.). Table **28** presents an assessment of the impacts associated with loss in topsoil and soil compaction.

ct phase	ature of mpact	Extent	uration	itensity	E+ D+l)	obability	sibility	.oss of sources	Significance (C X P)	Significance
Proje	ž -	_	٩	<u> </u>	Con	Prc	Revei	l re	Without Mitigation	With Mitigation
Preliminary De	sign (Preferred	I)								
Construction	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

Table 28: Impacts associated with loss in topsoil and soil compaction

The following mitigation measures are proposed in order to limit or reduce the impact of the proposed project on waste generation within the project area:

- Efforts must be made to ensure waste on site must be recycled and reused.
- No dumping of construction material on-site may take place
- Disposal of waste must be in accordance with relevant local and provincial legislative requirements.
- The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of it as prescribed in the applicable environmental legislation.

- Burning and burying of waste material would not be permitted.
- Where possible, construction waste on site must be reused or recycled.
- Further detailed mitigation measures are included in the EMP

8.3 Theme 2: Impacts on the Human Environment

8.3.1 Traffic on local roads

The movement of construction vehicles during the construction of the proposed sewage treatment package plant can result in an increase in traffic congestion on local roads. Activities during the construction phase of the project such as lane diversions, stop and go points, and temporary diversions will disrupt the normal flow of traffic. During the operational phase, traffic volumes is expected to improve. The assessment of this impact is indicated in **Table 28**.

ct phase	ature of mpact	Extent	uration	itensity	E+ D+I)	obability	versibility	eversibility	.oss of sources	Significance (C X P)	Significance
Proje	Ž -		٩	드	Con	Pr	Revei	- e	Without Mitigation	With Mitigation	
Preliminary Des	sign (Preferre	d)									
Construction	Negative	2 Local	1 Short term	1 Low	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low	
Operational	Positive	2 Local	1 Short term	1 Low	4-5 Low	1 Improbab le	Y	Low	4-6 Low	1-3 No Significance	
Cumulative	Positive	2 Local	1 Short term	1 Low	4-5 Low	2 Probable	Y	Low	4-6 Low	1-3 No Significance	

Tuble 29: Assessment of traffic imp	oacts
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The proposed mitigation measures for the management of traffic brought about by construction activities are as follows:

- There must be an erection of signage warning motorists about the presence of construction vehicles.
- Construction activities must be limited to daytime hours where possible.
- Construction vehicles must not exceed speed limits of 40km/h within the construction site.
- Construction vehicles travelling on public roads must adhere to speed limits.
- Construction vehicles must not dispose of soil or other material on roads. Where this occurs, the ECO and Contractor must ensure that the material must is removed before the end of the working day.

8.3.2 Dust and Air Quality Impacts

Clearance of vegetation, grading, excavation activities and increased traffic volumes will result in dust

generation and impact on the local community. Depending on the activities undertaken on site and the climatological conditions, the level of dust emissions will vary. An assessment of the potential dust and air quality impacts of all phases are shown in **Table 30**.

ct phase	ature of mpact	Extent	uration	tensity	(I+C +:	oba bility	ersibility	ersibility	Loss of sources	Significance (C X P)	Significance
Proje	÷ S		ā	드	(E	Prc	Rever	ц б	Without Mitigation	With Mitigation	
Preliminary Des	sign (Preferred)									
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low	
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low	
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low	

Table 30: Assessment of air quality impacts

The proposed mitigation measures for dust and air quality are as follows:

- Implement dust suppression measures in all areas that will be affected by construction activities and where dust will be generated. Dust suppression must also be undertaken during windy and dry weather conditions.
- A continuous dust monitoring process needs to be undertaken during construction.
- Speed restriction of no more than 40km/h must be implemented for all construction vehicles within the construction site.
- Heavy vehicles and machinery should be serviced regularly to minimise exhaust fume pollution.
- Soil stockpiles shall be located in sheltered areas, where possible, to limit the erosive effects of the wind.
- All vehicles transporting friable materials such as sand must be covered by a tarpaulin or wetted down.

8.3.3 Noise Impacts

Construction sites are synonymous with noise impacts. High noise levels can have an adverse impact on both site labourers as well as the public, including occupiers of adjacent properties. With regards to the proposed sewage treatment package plant, noise sensitive receptors such as nearby schools, and other organisations and facilities are situated adjacent to the study area. It is therefore important that this impact is assessed as presented in **Table 31.** During the operational phase of the project, it is not anticipated that the proposed STP will have an effect on the nearby receptors as planning has been considered during the planning and design

of the proposed STP and associated discharge pipeline.

ject phase	Vature of impact	Extent	Duration	Intensity	nsequence (E+ D+I)	robability	ersibility	Loss of esources	Significance (C X P)	Significance
Pro	-		_		S		Rev	-	Without Mitigation	With Mitigation
Preliminary Des	sign (Preferred	(k								
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

Table 31: Assessment of noise impacts

The proposed mitigation measures to address noise impacts in the undertaking of construction activities are as follows:

- The working hours stipulated in the Construction permit, where applicable, must be adhered to.
 Where this is not applicable, the following working hours must be adhered to: Monday to Friday from sunrise to sunset and where applicable on a Saturday which must be agreed upon between the community liaison officer and the Contractor.
- All construction plant and other equipment must be in a good working order to reduce possible noise pollution.
- Noise reduction is essential, and Contractors must endeavour to limit unnecessary noise, especially loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc.
- Should Blasting be undertaken on site:
 - All adjacent residents must be notified of the intention to undertake the initial blasting at least 7 working days in advance;
 - \circ $\;$ Method Statements for blasting shall be approved by the Engineer and the ECO; and
 - The survey of developments (buildings, etc.) should be conducted before the blasting takes place.

8.3.4 Heritage impacts

Construction activities such as excavations and grading could expose or damage features of heritage and cultural value beneath the surface. Although there are no Heritage features within the study area, heritage features immediately outside the boundary of the site and beneath the surface as described in **Section 4.1.3(g)** shall be noted. Should any heritage feature be identified during any stage of the project, activities must stop

and the FSHRA must be contacted. Refer to **Table 32** for an assessment of potential impacts on heritage resources.

ect phase	ature of impact	Extent	uration	ıtensity	E+ D+l)	obability	rsibilitv	Loss of ssources	Significance (C X P)	Significance
Proj	z			=	Cor	E.	Reve	2	Without Mitigation	With Mitigation
Preliminary Design (Preferred)										
Construction	Negative	1 Site	2 Medium	1 Low	4-5 Low	1 Improbable	Y	Low	4-6 Low	1-3 No Significance
Operational	Negative	1 Site	2 Medium	1 Low	4-5 Low	1 Improbable	Y	Low	4-6 Low	1-3 No Significance
Cumulative	Negative	1 Site	2 Medium	1 Low	4-5 Low	1 Improbable	Y	Low	4-6 Low	1-3 No Significance

Table 32: Assessment of heritage resources impacts

In order to protect Heritage Resources on site, the following mitigation measures are proposed:

- The Contractors and workers should be made aware of possible heritage and archaeological finds during the construction activities.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Should any graves be uncovered during the construction phase of the project, the applicant and appointed ECO must ensure in terms of section 38(6) of the Act, the responsible heritage resources authority (FSHRA), as well as the South African Police Service (SAPS) are notified;
- The ECO must train the Contractor to recognise any heritage features. Should there be a sign of such objects, construction must halt in that area immediately and a suitably qualified heritage specialist must be called to investigate through the ECO.

8.3.5 Palaeontological Resources

Construction activities such as excavations and grading could expose or damage features of heritage and cultural value beneath the surface. Refer to **Table 33** for an assessment of potential impacts on palaeontological resources.

Table 33: Palaeontological Resources

ct phase	ature of mpact	Extent	uration	tensity	(I+C +:	obability	sibilitv	.oss of sources	Significance (C X P)	Significance
Proje	Š :=	_	ā	5	Con	Ри	Revei	L L	Without Mitigation	With Mitigation
Preliminary Des	sign (Preferred)								
Construction	Negative	1 Site	2 Medium	1 Low	4-5 Low	1 Improbable	Y	Low	4-6 Low	1-3 No Significance
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	1 Improbable	Y	Low	1-3 No Significance	1-3 No Significance
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	1 Improbable	Y	Low	1-3 No Significance	1-3 No Significance

In order to protect potential Palaeontological Resources on site, the following mitigation measures are proposed:

- A field survey will be necessary for this project (according to SAHRA protocol) if fossils are found during construction.
- The ECO must survey for fossils before and or after clearing, blasting, drilling or excavating.
- Special care must be taken during the digging, drilling, blasting and excavating of foundations, trenches, channels and footings and removal of overburden as a site visit may have missed a fossiliferous outcrop.
- Should Fossils be unearthed the Contractor shall notify FSHRA and specialists to further investigation.
- The area must be fenced-off as a no-go area and the specialist must determine the buffer requirements.

8.3.6 Visual

Construction processes and sites are unsightly and can affect an area's sense of place. The clearance of indigenous vegetation will further result in adverse visual impact. In addition to this, the sewage treatment package plant will present a visible structure which will be a permanent feature during the operational phase. The overall assessment of this impact is summarised in **Table 34**.

Table 34: Assessment of Visual Impacts

ct phase	ature of mpact	Extent	uration	tensity	(I+C +:	oba bility	sibility	.oss of sources	Significance (C X P)	Significance
Proje	Š.	_	ā	5	Con	Prc	Revei	L L	Without Mitigation	With Mitigation
Preliminary Des	Preliminary Design (Preferred)									
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

In order to mitigate the potential visual Impacts, the following measures are proposed:

- Dust levels must be kept down by regularly wetting dirt roads and exposed soil areas inside the site.
- Clearly demarcate the construction site to limit the area of disturbance.
- Remove all waste, including cleared vegetation from site as soon as possible unless the material will be reused on site. A dedicated area for the placement of waste that will either be removed or reused must be identified and demarcated.
- Domestic waste generated from the site camp must be kept in labelled bins with lids and removed every week or more often as the need arises and be disposed of at a registered landfill.
 Proof of the disposal must be kept. Where waste is removed from site through other means, e.g. arrangement with adjacent landowners, written confirmation of this arrangement must be obtained.

8.3.7 Health and Safety Impacts

The Construction activities planned will bring about various impact that can affect the Health and Safety of human beings. Some of the impacts are applicable to the Operational Phase where maintenance of the site will be undertaken. Based on this, Health and Safety issues are crucial to the project. There is the potential risk sanitation if there is no maintenance of the proposed activity. The overall assessment of this impact is summarised in **Table 35**.

ct phase	ature of mpact	Extent	uration	itensity	(I+D +:	obability	rsibility	sibility	.oss of sources	Significance (C X P)	Significance
Proje	Š :=		ā	5	Con	Рк	Revei	L L	Without Mitigation	With Mitigation	
Preliminary Des	sign (Preferred	1)									
Construction	Negative	2 Local	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low	
Operational	Positive	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low	
Cumulative	Positive	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low	

Table 35: Assessment of Health and Safety Impacts

In order to mitigate the potential visual Impacts, the following measures are proposed:

- Contractor must appoint a Health and Safety Officer for the construction phase of the project
- Suitable Personal Protective Equipment (PPE) must be worn at all times by all employees on site during the construction and maintenance phases of the project.
- With the exception of the project team members, no persons should be allowed to enter the construction site area.
- The site and crew are to be managed in strict accordance with the OHS Act.
- The Contractor must ensure that all emergency procedures are in place prior to commencing work.
 Emergency procedures must include (but not be limited to) fire, spills, contamination of soil, accidents to employees and limiting casual access to the construction site for workers, use of hazardous substances and materials, etc.
- The Contractor must ensure that lists of all emergency telephone numbers / contact persons are kept up to date and that all numbers and names are posted at relevant locations throughout the construction site.
- The nearest emergency service provider must be identified during all phases of the project as well as its capacity and the magnitude of accidents it will be able to handle. The contact details of this emergency centre, including police and ambulance services must be available at prominent locations around the construction site.
- A Health and Safety Officer as well as an independent firm must be appointed to audit the site's compliance with the OHS Act during construction.
- It is recommended that the adjacent neighbours and affected community members be contacted in advance to ensure that they are forewarned of the construction and maintenance activities planned in the area.

8.3.8 Employment Opportunities

The proposed development will have a positive impact within the Maluti-A-Phofung Local Municipality as suppliers of construction materials will experience economic growth during the construction phase. During the construction phase, the creation of skilled and semiskilled jobs will be created. The use of local labour, as far as possible, is recommended as this would have a positive impact on the local economy and would prevent influx of job seekers from outside the Free State province. During the operation phase the creation of jobs will be created for the maintenance of the STP. The impact is considered to be positive. The overall assessment of this impact is summarised in **Table 36**.

ect phase	lature of impact	Extent	Duration	ntensity	(E+ D+I)	robability	Reversibility	Loss of esources	Significance (C X P)	Significance
Pro	2				8	٩		-	Without Mitigation	With Mitigation
Preliminary Design (Preferred),										
Construction	Positive	2 Local	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	Positive	1-3 No Significance
Operational	Temporary j	ob opportuniti	es for the local re	sidents and suppl	iers will only be c	reated during the	const	ruction pha	se of the project.	

Table 36: Assessment of Temporary Employment Impacts

8.4 Cumulative Impacts

The NEMA EIA Regulations (2014) defines a "cumulative impact" in relation to an activity, as the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

The majority of the project area is located within a designated ESA2 area. Although the project area still contains natural vegetation, it has been either transformed or degraded from its historical natural state. Habitat loss due to construction of the proposed Healthcare facility (clinic), STP and discharge sewer line would result in cumulative impacts on available habitat and further reduce the effective functioning of the ESA. The area has been altered from its original state. However, it can still affect species in the surrounding area by means of erosion, dust, fire, alien vegetation introduction and proliferation, poor waste management resulting in increase in pest numbers, as well as chemical spills. This would also increase habitat fragmentation and potentially result in a loss of broad-scale landscape connectivity.

Mitigation measures to ameliorate these impacts during the construction, and operational phases of the project have been discussed in some sections of this chapter and are prescribed in detail in the EMPr attached as **Appendix H** of this report.

9 CONCLUSION, ENVIRONMENTAL IMPACT STATEMENT AND RECOMMENDATIONS

CDC is applying for an environmental authorisation to construct a STP for the proposed Lusaka Healthcare Facility in Phuthaditjhaba, Thabo Mufotsanyana District Municipality, Free State Province. The issuing of an EA is crucial to the project as it will allow for the construction and subsequent operation and maintenance of the of the sewage treatment package plant in order for the Lusaka Healthcare Facility and the Free State Department of Health to its mandate to ensure that the facility is equipped with suitable sanitation facilities.

Based on the summary of this Basic Assessment, it is a conclusion of this report that the proposed project will have moderate to low impacts on the bio-physical environment provided all mitigation measures detailed in this report as well as the EMPR in are adhered to. It is anticipated that the proposed project will improve and satisfy sanitation requirements for the healthcare facility.

In the undertaking of any Basic Assessment Process, Public participation is a legislative requirement as set out in the NEMA EIA Regulations. The Public participation process involved sourcing of comments from I&AP, particularly adjacent land owners. It must be highlighted that to date, the project has not drawn sufficient attention to warrant public meetings or any focus groups. Consultation with all the key stakeholders was undertaken to inform them about the proposed project. GA Environment will issue this report for public review and depending on the comments and queries that will be raised by the public, GA Environment will advise on the way forward.

9.1 Environmental Impact Statement

In terms of Section 24 of NEMA, A total of three (3) alternatives types were assessed for the project, namely STP location alternatives, Sewer pipeline routing alternatives and operational alternatives in addition to the no-go alternative. The advantages and disadvantages of each of these alternatives as well as the reason for the preferred alternative are presented in this report. Following the assessments of the alternative types, one (1) location alternative was fully assessed for the proposed development. The findings and recommendation of the specialist's studies supports the use of the proposed alternative subject to adherence to the proposed mitigation measures. The preferred location alternative is recommended because it poses less risks to the environment due to the level of disturbance in the proposed STP footprint. The proposed route for the sewer pipeline also presents less disturbance.

The proposed development will require clearance of vegetation however, according to the Terrestrial Biodiversity Compliance Statement no significant patches of intact natural vegetation remain within the project areas or immediate surrounds which is evident in the disturbed and transformed habitats within and outside of the proposed sewage treatment plant development. The project area is of low botanical and faunal diversity as well as sensitivity and present no faunal or botanical constraints to the proposed development and no specific ecological mitigation is thus required. The Palaeontological Impact Assessment indicate an overall medium palaeontological sensitivity to the development footprint. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological reserves of the area and construction of the development may be authorised in its whole extent. The Wetland Assessment concluded that the establishment of the pipeline and various activities which will pose risks to the identified wetland areas, has a level of risk determined to vary from low to moderate. The risk rating determined that the risks posed by the development could be reduced to a low rating with the implementation of mitigation measures including the buffer zone.

The proposed Sewage Treatment Package Plant and associated infrastructure is acceptable for development and no fatal flaws/red flags have been identified. The construction impacts, if effectively and sufficiently managed according to the mitigation measures outlined in **Chapter 8** of this report, specialist reports and the draft environmental management programme (EMPr), will predominately be of low significance, post mitigation. Operational impacts can be similarly mitigated, and residual impacts are expected to be of low significance overall. Positive impacts include job creation and employment opportunities for both the construction and operational phases, skills transfer and development. With the above in mind, it is recommended that the proposed development of the Sewage Treatment Package Plant and the associated discharge pipeline be supported on the condition that all mitigation measures mentioned in this report, the specialist studies and the draft EMPr are implemented and adhered to throughout the project lifecycle.

9.2 EAP's Recommendations

The proposed development of the sewage treatment package plant will take place in predominately disturbed/transformed areas and is considered a 'brownfields' site. Limited encroachment into sensitive areas will occur and both the riparian buffer and 1:100 flood line of the Metsi Matsho Tributary is respected with the exception of the discharge pipelines encroaching slightly into to riparian area of the tributary. As discussed in the preceding section, all significant negative impacts can be successfully mitigated and managed to acceptable levels (low) during the entire project lifecycle. All mitigation measures as detailed in this DBAR, the attached specialist reports and the draft EMPr must be implemented and adhered to for all phases of the project i.e., planning, construction and operation.

In addition, the following specific recommendations apply:

9.2.1 Planning and Design

- No treated wastewater/effluent may be discharged directly into any watercourse without the appropriate Water Use Licence in place.
- Chemical levels of Ammonium, Nitrate, Nitrite, Phosphate, Natrium and Chlorine should be monitored and managed.
- Buildings and other hardened surface infrastructure (including storm water attenuation measures) should be located outside of buffered watercourses, sensitive areas and riparian habitat.
- The sensitivity map must be used as a decision-making tool to guide the layout design. Development on areas of high environmental sensitivity must be avoided.
- No construction camps should be allowed in or within 20m of a riparian area.
- No stockpile areas should be located in or within 20m of riparian areas

9.2.2 Construction

- Construction should preferably take place during the low flow/winter months in order to minimise the risk of sediment and debris being washed into riparian areas.
- No natural watercourse is to be used for the cleaning of tools or any other apparatus. This includes for purposes of bathing, or the washing of clothes etc.
- During the construction and operational phases, erosion and siltation measures should be implemented (e.g. the use of temporary silt traps downstream of construction areas).
- Debris and sediment trapping, as well as energy dissipation control structures, should be put in place where storm water may enter riparian areas.
- No construction camps should be allowed in or within 20 m of a riparian area.
- No stockpile areas should be located in or within 20 m of a riparian area.
- The Contractor must be trained to recognise any cultural heritage and palaeontological features. Should such features be discovered during the construction phase, a Chance Find Protocol must be implemented immediately, and a suitably qualified heritage specialist must be called to investigate through the ECO

9.2.3 Operation

- No protected plants may be removed without the relevant permits from the local authority.
- Ensure that overland discharge of excess purified effluent (if required) is undertaken in a controlled

manner does not cause erosion.

- The operator must develop a management and monitoring programme for alien and invasive species detailing actions to prevent the establishment of invasive plants and methods of removal of site during construction.
- Water quality monitoring and/or sampling should be undertaken upstream and downstream of the discharge point to ensure there are no significant water quality changes. The frequency of monitoring and/or sampling should be determined by a qualified aquatic ecologist.
- Adhere to all recommendations outlined in the Environmental Management Programme and management plans attached as **Appendix G**.

Based on the environmental assessment of the site conditions, and the potential impact of the proposed STP, the preliminary design has emerged as the most viable option subject to adherence to mitigation measures outlined in this report and the EMPr. It is the EAPs recommendation that the project be authorised that these activities are completed within a period of 5 years to avoid dire impacts on the environment which cannot be corrected. It is therefore recommended that the project be authorised for a period of 5 years. The proposed construction phase will commence in April 2022 and conclude in May 2024.

It is therefore strongly advised that the recommendations highlighted in this section be included as conditions of authorisation by the DFFE. GA Environment's recommendation following this Basic Assessment is that the applicant COEGA Development Corporation be granted an Environmental Authorisation for the proposed Sewage Treatment Package Plant subject to the condition that all Mitigation Measures provided be strictly adhered to and closely monitored by an independent EAP to avoid adverse environmental Impacts.

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