



**DRAFT**

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT**

**CONSTRUCTION OF NEW BURGERSFORT LANDFILL SITE**

**CONTRACT NUMBER: FTLM/CS78/17/18**

**18 September 2019**

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## **EXECUTIVE SUMMARY**

### **Introduction**

Engineerex as an independent firm has been appointed to undertake the Environmental Impact Assessment (EIA) process for Waste Management Licence for the proposed Development of New Burgersfort Landfill Site within the Fetakgomo Tubatse Local Municipality. The Project Applicant is the Fetakgomo Tubatse Local Municipality.

### **Site Description**

The proposed project site is a “greenfield” site and is located on part of Portion 9 of Farm Aapiesdoorndraai 298 KT (hereafter refer to as “the site”). Currently the site is a bushy area that is 30 hectares (ha) in extent. It is located along Penge Road, approximately 10 km from Burgersfort Town, Apiesdoring, Ga-Mohala, and Manoke.

### **Waste Description**

Waste generated from Burgersfort Town and some parts of Burgersfort Region such as Apiesdoring, Ga-Mohala, Manoke etc, is mostly non-hazardous or general waste which includes: food waste, metal, plastic, paper, PPE, brake blocks and other material. This waste needs to be treated and managed efficiently and this is the reason for the need to develop the New Burgersfort Landfill Site.

### **Project Description**

The project entails the construction of a new landfill on a site, including all related facilities and structures.

### **Legal Requirement**

Government Notice (GN 921 of 2013), gazetted and effective from 29 November 2013, provides a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. Two categories of the listed waste management activities require a Waste Management Licence (WML).

*The proposed new Burgersfort Landfill triggers waste management activities that are listed in terms of Category B of GN R921 of 2013 and thus requires a WML in terms of NEMWA. See Table 0-1 for Category B Waste Management Activities:*

Table 0-1: Applicable NEMWA listed waste management activities for Category B:

<b>Waste Management Activities for Category B:</b>	
7	The disposal of any quantity of hazardous waste to land.
8	The disposal of general waste to land covering an area in excess of 200m <sup>2</sup> and with a total capacity exceeding 25 000 tons.
9	The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by or under other legislation.

It is anticipated that a Water Use Licence (WUL) in terms of GA sections 21c; f; g; h; j and i of the National Water Act 36 of 1998 (NWA) will be required.

- Impeding or diverting the flow of water in a water course (21c)
- Disposing in any manner of water which contains waste from, or has been heated in, any industrial or power generation process (21h)
- Altering the bed, banks, course or characteristics of a watercourse (21i)
- Potentially there is need to submit the civil design report and geohydro report if there is potential of partial treatment of leachate and subsequent disposal of partially treated wastewater in a river which might affect ground water (21f).
- Potentially, there is need to submit a registration form obtained from LEDET to register the water use for disposal of leachate, depending of design (21g)

Due to the findings from the flood line survey there is also potential of triggering a Water Use Licence (WUL) in terms of sections 21j number 4 of the National Water Act 36 of 1998 (NWA) will be required (Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people) (21j) .

### **Project Motivation**

The municipality currently manages the existing Burgersfort Landfill site which is located on the eastern side of the region and used to serve areas like Burgersfort Town, Steelpoort, Praktiseer, Ohrigstad and local mines. The existing landfill reached its design capacity in utilisation, and its allocated permit expired in 2018.

Owing to the absence of a nearby landfill within Burgersfort, there is now a widespread challenge of illegal dumping in areas like Praktiseer, Tukakgomo, along the R37 and R555 roads. Used diapers are generally a problem of illegal dumping within the municipality. To quickly arrest the situation and prevent further pollution of the environment, and increasing the risks of the spreading of diseases, it is critically important that the Municipality establishes a new landfill in Burgersfort Region.

### **Project Benefits**

The proposed development will have the following benefits:

- Reduce and eliminate risks of mismanaging of general and inert waste.
- The Landfill Site Recycling activities will contribute towards sustainable waste management on site.
- Provide a long-term sustainable waste management strategy of Waste. This will also eliminate certain recurrent and long-term costs associated with private disposal of waste and contribute to business efficiency within the municipality.
- Create employment for skilled and semi-skilled people during the construction and operation of the proposed Landfill site.
- Advance economic disposal of waste with the municipality due to minimised distance to the waste disposal facility
- Mitigate increasing illegal disposal of waste within Burgersfort Region
- Increase the life span of Malogeng Landfill Site that is currently catering the entire municipality

### **Environmental Impact Assessment Process**

The Assessment (EIA) process entailed:

- Identifying the legal framework in terms of the proposed project;
- Identifying and engaging with Interested and Affected Parties (I&APs) and allow for adequate participation in the process;
- Assessing the receiving environment in terms of current state and potential positive or negative impacts;
- Duly consider alternatives for achieving the project's objectives;
- Identify significant issues to be investigated further during the execution of the EIA phase;
- Determine the scope of the ensuing EIA phase, in terms of specialist studies, public participation, assessment of impacts and appraisal of alternatives;
- Coming-up with holistic mitigation measures for identified and assessed deleterious impacts and enhancing positive impacts of the project; and
- Allow for informed decision-making with regard to the EIA process.

### **Environmental Impact Assessment Specialist Studies**

Specialist studies were undertaken during the EIA process in order to assist with the development of an understanding of the system processes and the potential impacts of the proposed New Burgersfort Landfill Site Project on both the social and biophysical environments.

These studies include:

1. Geotechnical Assessment
2. Hydrological Study
3. Hydro-geological Study
4. Topographical Study
5. Heritage Impact Assessment
6. Flood line Study

The results of the above-mentioned specialist studies were analysed and interpreted in order to assess their potential impact on the proposed development in terms of the environment, and devise potential study area with respect to selected activities and development of the necessary mitigation measures in order to minimise negative impacts and optimise positive impacts. The specialist recommendations have been incorporated in the Environmental Management Programme (EMPr) enclosed as Annexure A of the EIAR.

#### **Conclusion and Recommendation**

The EIA Report consists of a detailed identification of various biophysical and social issues that enabled the identification of potential impacts and key environmental issues. A holistic approach based on the principles of EIA was used to integrate and weigh the likely impacts of developing the New Burgersfort Landfill Site. The studies show that the Landfill site will have a benefit to the environment as it seeks to remediate the impacts of the development. Specialist studies undertaken further indicate that the project will not have any negative impacts that cannot be mitigated and there are environmental benefits for undertaking the project. Based on the results of the EIA, Engineerex recommends that this report be accepted by the authorities to allow Fetakgomo Tubatse Local Municipality to proceed with the proposed project.

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## GLOSSARY

**Alternative:** Different means of meeting the general purpose and requirements of the activity, which may include site or location alternatives; alternatives to the type of activity being undertaken; the design or layout of the activity; the technology to be used in the activity and the operational aspects of the activity.

**Development:** Means 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, including any associated post development monitoring, 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.

**Cumulative Impact:** The impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

**Do-nothing Alternative:** The 'do-nothing' or 'No go' alternative is the option of not undertaking the proposed activity, that is, the maintenance of the status quo.

**Environmental Assessment Practitioner (EAP):** The individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instrument introduced through the EIA Regulations.

**Environmental Management Programme (EMPr):** A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. The EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

**Environmental Impact:** A change to the environment, whether adverse or beneficial, wholly or partially, resulting from an organisation's activities, products or services.

**Fatal Flaw:** Issue or conflict (real or perceived) that could result in a development being rejected or stopped. Such an issue or conflict would be considered to be a significant issue that mitigation could not address.

**Integrated Environmental Management:** A philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy (and principles) is interpreted as applying to the planning, assessment, implementation and management of any proposal (project, plan, programme or policy) or activity - at local, national and international level - that has a potentially significant effect on the environment. Implementation of this philosophy relies on the selection and application of appropriate tools for a particular proposal or activity. These may include environmental assessment tools (such as strategic environmental assessment and risk assessment), environmental management tools (such as monitoring, auditing and reporting) and decision-making tools (such as multi-criteria decision support systems or advisory councils).

**Interested and Affected Party:** For the purposes of Chapter 5 of the NEMA and in relation to the assessment of the environmental impact of a listed activity or related activity, means an interested and affected party contemplated in Section 24(4)(a)(v), and which includes - (a) any person, group of persons or organisation interested in or affected by such operation or activity; and (b) any organ of state that may have jurisdiction over any aspect of the operation or activity.

**Leachate:** Highly contaminated water which has seeped through the waste.

**Mitigate:** The implementation of practical measures designed to avoid, reduce or remedy adverse impacts, or to enhance beneficial impacts of an action.

**Piezometer:** A device used to measure groundwater levels, providing information essential to understanding site baseline information.

**Watercourse: Means:**

- a) a river or spring;
- b) a natural channel or depression in which water flows regularly or intermittently;
- c) a wetland, lake or dam into which, or from which, water flows; and
- d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.

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

**Work Face:** The active part of the landfill where waste is deposited.

## LIST OF ACRONYMS

Acronym	Description
BA	Basic Assessment
BID	Background Information Document
CA	Competent Authority
CBA	Critical Biodiversity Area
CMA	Catchment Management Agency
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
DWAF	Department of Water Affairs and Forestry
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMF	Environmental Management Framework
EMI	Environmental Management Inspectorate
EMPr	Environmental Management Programme
ESA	Ecological Support Area
ESS	Environmental Scoping Study
ESR	Environmental Scoping Report
FTLM	Fetakgomo Tubatse Local Municipality
GA	General Authorisation
GTLM	Greater Tubatse Local Municipality
GN	Government Notice
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
LEDET	Limpopo Department: Economic Development Environment and Tourism
LHRA	Limpopo Heritage Resources Authority
NEMA	National Environmental Management Act
NEM:WA	National Environmental Management: Waste Act
NHRA	National Heritage Resources Act
NWA	National Water Act
PPP	Public Participation Process
PHRA	Provincial Heritage Resources Authority
SANRAL	South African National Roads Agency
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAWS	South African Weather Services
SAWIC	South African Waste Information Centre
SEMAs	Specific National Environmental Management Acts
SANBI	South African National Biodiversity Institute
S&EIR	Scoping and Environmental Impact Reporting
TP	Test Pits
TBF	Tubatse Business Forum
WMA	Water Management Area
WML	Waste Management Licence
WULA	Water Use Licence Application

## **1 INTRODUCTION**

### **1.1 Background**

The Fetakgomo Tubatse Local Municipality (FTLM) intend to establish and operate a new Class B waste disposal site (landfill) that will cater for areas located within the Burgersfort region and its surrounding settlements. The municipality currently manages the existing Burgersfort Landfill site which is located on the eastern side of the region and used to serve areas like Burgersfort Town, Steelpoort, Praktiseer, Ohrigstad and mines. The existing landfill reached its design capacity in utilisation, and its allocated permit ended in 2018. Closure permit for the site has been obtained and closure processes for Burgersfort Landfill site are underway as requested by law, that processes should resume a year before closure.

Regulation GNR 636 published under National Environmental Management: Waste Act, 2008 (Act No.59 of 2008), requires that engineering design report and drawings for Class B Landfill be prepared and included in the application for waste management licence approval for landfill sites or cell developments. Consequently, the Municipality enlisted the services of Engineerex (Pty) Ltd (Engineerex) to facilitate the application of the landfill licence.

### **1.2 Need and Motivation for the Landfill**

According to the IDP (2018/2019), FTLM is on a drive to ensure that the whole area of the municipality receives waste management services. These have triggered the municipality to develop a Public Private Partnership program of which the process is at procurement stage for the preferred bidder to engage with the negotiations.

Waste management services are currently rendered by the municipality in areas such as Apel, Mhlaletse, Nkoana, Burgersfort; Praktiseer, Steelpoort, Ga-Mapodile, Ohrigstad and Nchabeleng. For other areas, the municipality relies on independent contractors.

Dumping and burning of waste has become a more common way of disposing waste in Burgersfort Region due to lack of disposal facility. There is generally a problem of illegal dumping in areas like Praktiseer, Tukakgomo, along the R37 road and the R555 road. Used diapers are generally a problem of illegal dumping within the municipality. Improvement in refuse removal has also been very slow. The total number of households benefiting from this service from households having their refuse removed by municipality weekly, has improved to 8279 of the households receiving the service by 2016. However, it is becoming costly to residents in Burgersfort as they get charged services fees for refuse collection and transporting them away to other landfills.

The proposed development will have the following benefits:

- Reduce and eliminate risk of mismanaging of general and inert waste.
- The Landfill Site Recycling activities will contribute towards sustainable waste management on site.
- Provide a long-term sustainable waste management strategy of Waste. This will also eliminate certain recurrent and long-term costs associated with private disposal of waste and contribute to business efficiency within the municipality.
- Create employment for skilled and semi-skilled people during the construction and operation of the proposed Landfill site.
- Advance economic disposal of waste with the municipality due to minimised distance to the waste disposal facility
- Mitigate increasing illegal disposal of waste within Burgersfort Region
- Increase the life span of Malogeng Landfill Site that is currently catering the entire municipality

### **1.3 Approach and Process to the EIA**

The proposed development of the new Burgersfort Landfill requires an EIA in accordance with the NEMA EIA Regulations, 2014. Following the preparation of the Scoping Report, a range of environmental impacts that are associated with the proposed development and alternatives were identified for the EIA. For the process of the EIA, the following were undertaken.

#### **1.3.1 Scoping**

This draft EIA Report was preceded by a comprehensive Scoping Process. During the Scoping Phase, the Scoping Report was made available to Interested and Affected Parties (I&APs) and stakeholders for a 30-day comment period in 11/12/2018 - 24/01/2019. The comments received from stakeholders during the 30-day review of the Scoping Report were incorporated into the Scoping Report (where required), and the finalised Scoping Report was submitted to LEDET (Limpopo Department: Economic Development Environment and Tourism) on the 01<sup>st</sup> of March 2019, in accordance with Regulation 21 (1) of the 2014 NEMA EIA Regulations, for decision-making in terms of Regulation 22 of the 2014 NEMA EIA Regulations. The comments received from I&APs during the Scoping Phase have been included under *Section 7.2.5 of this report in Table 7-2: "Comments and Responses on Application"*.

The following was done to adequately assess and provide sufficient responses to the issues raised during the Scoping Phase, the EIA focused on the following tasks:

- Reviewing the approval for the Scoping Report as Plan of Study for EIA including the relevant conditions of approval;
- Continued public participation;
- Conducting specialist investigations on all the significant issues identified and raised in the Scoping Process;
- Evaluate and summarise the findings of the specialist reports;
- Undertaking a detailed impact assessment process, assessing alternatives, and providing potential mitigation measures;
- Documenting the findings of the Impact Assessment into an Environmental Impact Report (EIR); and
- Compiling a framework Environmental Management Programme.

### **1.3.2 Public Participation Process (PPP)**

A PPP was conducted in accordance with the Plan of Study for EIA. The public meetings were held on the 06<sup>th</sup> of December 2018. A summary of comments received from, and a summary of issues raised by the registered I&APs, the date of their receipt and responses of the EAP to those comments are presented in section 7.2.5 of this EIA report.

### **1.3.3 Specialist Studies**

All necessary specialist studies were undertaken, which include Topographical, Geotechnical and Hydrological, and Heritage, among others. The summaries of the outcomes of each specialist study conducted are presented in section 4 of this report.

### **1.3.4 Environmental Impact Report**

This draft report is part of the S&EIR process which must be undertaken for any activity included on Listing Notice 2. These activities are typically large scale or significant polluting activities. As a result, the full range of potential impacts has been established through a scoping exercise and are being assessed in this report.

Environmental Management Program (EMPr) for the mitigation of impacts has been provided herein as an Annexure A. The EMPr provides mitigation measures for the construction related impacts of the proposed developments.



### **1.3.5 Waste Management License**

Following the 30-day review of the EIA draft Report, the final EIR will be submitted to LEDET in terms of Section 49 of the NEMWA in the name of the applicant. It is anticipated that the application to LEDET will be submitted on the 20<sup>th</sup> of October 2019.

## **2 GOVERNANCE FRAMEWORK AND ENVIRONMENTAL PROCESS**

The introduction of landfill permits by Section 20 of the Environment Conservation Act, 1989, resulted in the development of the Minimum Requirements series of documents to guide waste disposal to landfill. The promulgation of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) and the recent regulations and standards, has changed the way in which landfills will be regulated in future. The following is the legislation that is governing South Africa's Landfill Sites, which should be complied with during the process of landfill licence application process and operation of the landfill.

### **2.1 The South African Constitution, 1996 (Act No.108 of 1996)**

The South Africa Constitution is the most important law in South Africa which through the Bill of Rights gives every South African citizen basic human rights including the right to live in an environment that is not harmful and will be protected for present and future generations through the prevention of pollution and ecological degradation. Therefore, anyone managing any aspect of waste must ensure that no harm is caused to people or the environment in the process. In addition, the constitution assigns responsibility for refuse removal, refuse dumps and solid waste disposal to local government i.e municipalities.

### **2.2 National Environmental Management: Waste Act, 2008 (Act No.59 of 2008)**

The National Environmental Management: Waste Act (NEMWA) aims to *inter alia* regulate waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

### **2.3 List of Waste Management Activities, 2013**

Government Notice (GN 921 of 2013), gazetted and effective from 29 November 2013 provides a list of waste management activities that have, or are likely to have, a detrimental effect on the

environment. As per the Notice, the following are three categories each landfill can potentially assume.

- Category A – must conduct a Basic Assessment (BA) process;
- Category B – must conduct a Scoping and Environmental Impact Reporting (S&EIR) Process, also referred to as EIA Process; and
- Category C – needs to only comply with the relevant requirements or standards determined by the Minister.

*The proposed new Burgersfort Landfill triggers waste management activities that are listed in terms of Category B of GN R921 of 2013 and thus requires a WML in terms of NEMWA. See Table 2-1 for Category B Waste Management Activities:*

Table 2-1: Applicable NEMWA listed waste management activities for Category B:

<b>Waste Management Activities for Category B:</b>	
7	The disposal of any quantity of hazardous waste to land.
8	The disposal of general waste to land covering an area in excess of 200m <sup>2</sup> and with a total capacity exceeding 25 000 tons.
9	The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by or under other legislation.

#### **2.4 Waste Classification and Management Regulations, 2013**

The purpose of the Waste Classification and Management Regulations (GN R634 of 2013 promulgate in terms of NEMWA is to:

- Regulate the classification and management of waste in a manner which supports and implements the provisions of the Act;
- Establish a mechanism and procedure for the listing of waste management activities that do not require a Waste Management Licence;
- Prescribe requirements for the disposal of waste to landfill;
- Prescribe requirements and timeframes for the management of certain wastes; and
- Prescribe general duties of waste generators, transporters and managers.

The applicant is required to comply with Waste Classification and Management Regulations, 2013.

## 2.5 National Norms and Standards for Assessment of Waste for landfill, 2013

The National Norms and Standards for assessment of waste to Landfill (GN 635 of 2013) in terms of NEMWA specify the analysis required to identify the chemical substances present in the waste and defines the threshold limits for total concentration and leachable concentration of a particular element or chemical substance in a waste.

Classification of wastes for disposal at new Burgersfort Landfill must comply with the National Norms and Standards for the Assessment of Waste for Landfill, 2013.

## 2.6 National Norms and Standards for Disposal of Waste to Landfill, 2013

The National Norms and Standards for Disposal of Waste to Landfill (GN 636 of 2013) in terms of NEMWA specify containment barrier design of landfills for the disposal of different waste types classified in terms of the National Norms and Standards for the Assessment of Waste for Landfill, 2013 or schedule 3 of NEMWA.

## 2.7 National Water Act, 1998 (Act No. 36 of 1998) (NWA)

NWA 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, managed and controlled in a sustainable and appropriate manner, for the benefit of all.

### ***Water Use Licence Application***

It is also anticipated that a Water Use Licence (WUL) will be required in terms of sections 21 of the National Water Act 36 of 1998 (NWA). The WUL is triggered in terms of GA sections 21c; f; g; h; j and l which are described in Table 2-2.

Table 2-2: Applicable GA Sections of NWA Act 36 of 1998

General Authorisation Section	Description
21c	Impeding or diverting the flow of water in a water course
21f	Potentially there is need to submit the civil design report and geohydro report if there is potential of partial treatment of

General Authorisation Section	Description
	leachate and subsequent disposal of partially treated wastewater in a river which might affect ground water.
21g	Potentially, there is need to submit a registration form obtained from LEDET to register the water use for disposal of leachate, depending of design.
21h	Disposing in any manner of water which contains waste from, or has been heated in, any industrial or power generation process
21i	Altering the bed, banks, course or characteristics of a watercourse.
21j	Due to the findings from the flood line survey there is also potential of triggering a Water Use Licence (WUL) in terms of sections 21j number 4 of the National Water Act 36 of 1998 (NWA) will be required (Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people).

## 2.8 EIA Regulations, 2014 (GN R982)

The EIA Regulations, 2014 (GN R982, which came into effect on 08 December 2014, as amended by GN R326 of 2017) were promulgated in terms of Section 24 and 44 of NEMA and govern the process, methodologies and requirements for EIA processes. The Regulations out two alternative authorisation processes depending on the type of activity that is proposed; either a BA process or S& EIR process is required to obtain Environmental Authorisation (EA).

The regulations for both processes – BA and S&EIR – stipulate that:

- Public participation must be undertaken as part of the assessment process;
- The assessment must be conducted by an independent EAP;
- The relevant authorities must respond to applications and submissions within stipulated time frames;
- Decisions taken by the authorities can be appealed by the proponent or any other EAP; and
- A draft Environmental Management Programme (EMPr) must be compiled and released for public comment.

Appendices 1-5 of GN R982 of 2014 set out the procedures to be followed and the content of reports compiled during the S&EIR processes.

*As the proposed construction of the new Burgersfort landfill triggers Category B waste management activities listed in GN 921 of 2013 in terms of NEMWA. This requires that an S&EIR process is conducted in line with requirements in the EIA Regulations, 2014.*

## **2.9 SAWIC's Minimum Liner Requirements for Category/General B Landfill**

SAWIC's Minimum Liner Requirements for Category/General B Landfill are shown in Figure 2-1 and explained below:

### **O Layer**

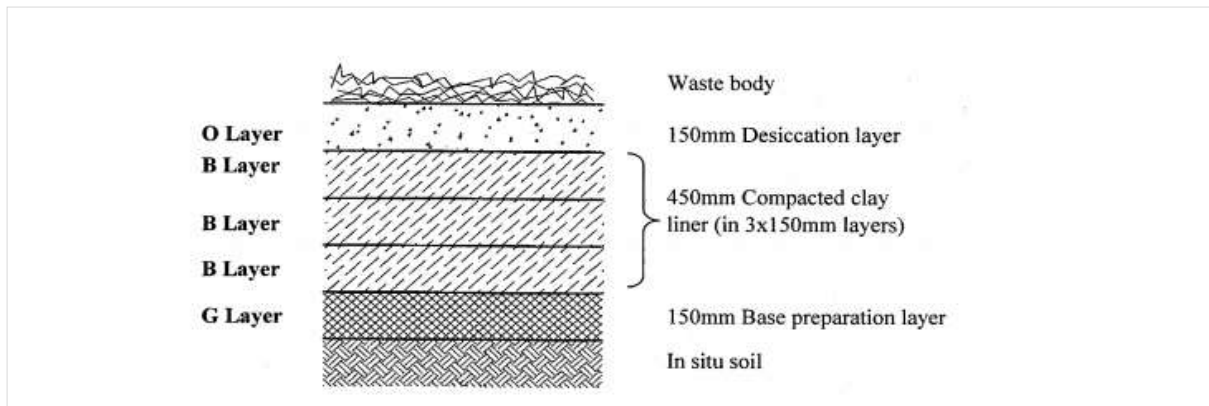
A desiccation protection layer consisting of 150mm of soil, gravel, rubble or other similar material that completely covers the B layer for G:M:B- and G:L:B- landfills and protects it from desiccation and cracking until it is covered by waste. Under certain circumstances, the thickness of the O layer may need to be increased.

### **B Layer**

A 150mm thick compacted clay liner layer. This must be compacted to a minimum density of 95% Standard Proctor maximum dry density at a water content of Proctor optimum to optimum +2%. Permeabilities must be such that the outflow rates stated in Section 8.4.3 are not exceeded. Interfaces between B layers must be lightly scarified to assist in bonding the layers together. The surface of every clay liner layer must be graded towards the leachate collection drain or sumps at a minimum gradient of 2% for general waste disposal sites and 5% for hazardous waste disposal sites. At the discretion of the Department, B layers may be replaced by a geomembrane, a GCL, or a composite liner.

### **G Layer**

This is a base preparation layer consisting of a compacted layer of reworked in-situ soil with a minimum thickness of 150mm and constructed to the same compaction standards as a B layer. Where the permeability of a G layer can be proven to be of the same standard as a B layer it may replace the lowest B layer. The surface of every G layer must be graded towards a leachate collection drain or sump in the case of B + landfill or to a central channel on the down gradient side of a B - landfill, from which sporadic leachate can be collected if it occurs. The central channel must contain a prism of A layer material so as to act as an efficient leachate collector or finger drain. The minimum gradient must be 2% for G sites and 5% for H sites.



Source: SAWIC Minimum Requirements for Waste Disposal by Landfill

Figure 2-1: Capping and lining systems of the General B Landfill

## 2.10 Planning Policy Framework

### 2.10.1 FTLM Draft Waste Management By-Law, 2017

The purpose of the FTLM Draft Waste Management By-Law (2017) is to regulate the removal and disposal of waste by establishing a system to ensure that the removal and disposal is done in a manner that would not cause harm to human health or damage to the environment, and in particular, without-

- Risk to water, air, soil, plants or animals.
- Causing nuisance through noise or odours.
- Adversely affecting rural or urban areas of special interest.
- To provide for procedures, methods, practices and standards to regulate the disposal of solid waste and removal thereof within the area under the jurisdiction of the municipality.
- To promote compliance with the waste act.

### 2.10.2 Integrated Development Plan (IDP), 2018/2019

Solid waste disposal and industrial waste disposal infrastructure is needed as there has been an emergence of many industries thus the high demand. There is a little of these waste disposal facilities in place within the municipality some are not regulated to ensure environmental soundness, health and hygiene.

### 3 PROJECT AND SITE DESCRIPTION

The FTLM (LIM476) intends to establish and operate a new waste disposal site (Class B Landfill) that will cater for areas within the Burgersfort region and its surrounding settlements. The land on which the proposed landfill is earmarked was donated by the then Department of Rural Development and Land Reform to GTM/ FTLM. The proposed project site is a “greenfield” site and is located on part of Portion 9 of Farm Aapiesdaorndraai 298 KT (hereafter refer to as “the site”). The project entails the construction of a new landfill on a site that has an area of 30 hectares (ha) in extent and located along Penge Road, approximately 10 km from Burgersfort Town, Apiesdoring, Ga-Mohala, and Manoke. **Figure 3-1** depicts the proposed landfill site in relation to the above-mentioned waste collection areas.



**Figure 3-1: Landfill Site Location**

The site’s neighbouring towns are: Praktiseer to the north Steelpoort to the west and Ohrigstad to the east. Figure 3-2 shows at the location of the New Burgersfort Landfill site relative to the aforementioned neighbouring towns:





**Figure 3-2: Topographic Map Showing Site Location**

The Site can be accessed through two possible routes as depicted in Figure 3-3.



**Figure 3-3: Access to the Site Location**

The property details and geographic coordinates for the New Burgersfort Landfill site are provided in Table 3-1:

Table 3-1: Property Details Farm

Name	Description
Name / Erf Number	Portion 9 of Farm Aapiesdoorndraai 298 KT
SG 21 Digit Code	TOKT00000000029800009
Physical Address	Penge (Road 02537)
Co-ordinates	Corner 1 - 30°21'32.65"E 24°37'2.99"S Corner 2 - 30°21'55.21"E 24°37'14.43"S z Corner 3 - 30°21'53.69"E 24°37'25.35"S Corner 4 – 30°21'28.89"E 24°37'21.50"S

## **4 SPECIALIST STUDIES UNDERTAKEN DURING THE EIA PHASE**

As part of the EIA phase specialist studies were conducted. Each independent specialist was required to identify means of avoiding, mitigating and/or managing the negative impacts in his/her particular field of the investigation. The recommended management strategies which are contained in the EMP (Annexure A). Below are summaries of the findings of each study:

### **4.1.1 Biodiversity Impact Assessment**

An appropriate biodiversity specialist was involved when in a biodiversity area, such as in a Critical Biodiversity Area or Ecological Support Area identified in the Limpopo Conservation Plan (version 2) might be impacted, or where there is a high likelihood that threatened species are present. According to the Biodiversity Assessment, the project area is situated largely in an Ecological Support Area (ESA) and the 200m buffer around the site extends into a Critical Biodiversity Area (CBA). The site is situated in the Sekhukhune Plains Bushveld (SVcb 27), a vulnerable vegetation community according to Mucina and Rutherford, 2006. The hill is expected to be excluded from the waste disposal area and development will have to be structured around sensitive ecosystems, where possible. There are no formal or informal protected areas within five kilometres of the site or any threatened terrestrial ecosystem present.

### **4.1.2 Flood Line Investigation**

#### **Method**

A desktop study and a visual inspection of the catchment area was done in order to establish the predominant veld coverage as well as establishing that the area falls within Drainage Basin 4 outlined in the SANRAL Drainage Manual (this drainage basin is used in the computation of the Standard Design Flood Method). Flood hydrology parameters were also determined in order to derive a realistic run-off coefficient to be used in the peak flow calculation methods.

#### **Findings**

A fairly large portion of the catchment was found to be fairly mountainous and largely rural, with a few informal dwelling units. The flood plain was drawn and 5 tributaries run in close proximity to the landfill site as shown in Figure 4-1:

The 1 in 50 and 1 in 100-year flood levels were investigated to certify such according to the national Water Act, 1998 (Act No. 36 of 1998), as well as recommending probable flood mitigation measures for the landfill site. According to the Flood Line Report, three non-perennial rivers may have an impact on the landfill site as the floodlines intersect the proposed area, due to this LD&S recommended that catchwater berms and drains be constructed around the landfill site to ensure drainage is done to such an extent that the 50- and 100- year flood events are mitigated. For the detailed report refer to **Annexure B**.

### **4.1.3 Geo-hydrological Assessment**

#### **Method**

A walk-over survey was conducted to establish drainage features, access and to obtain a general overview of the site. Thirty six test pits, denoted as TP1 to TP36 were excavated using a CAT 422E tractorloader- backhoe to refusal depths ranging between 0.6 and 3.8m below existing ground level. The profiling (soil profiles) was done in accordance with the MCCSSO method. Thirteen disturbed samples representative of the cover - and in-situ soils were selected for laboratory testing to confirm the in-situ assessments of moisture, grading, plasticity, consistency, structure, permeability and to ascertain the engineering properties of each horizon. Four geophysical traverses were conducted on the site. Water samples were extracted from the seven boreholes and submitted for analyses to Yanka Labs in Witbank.

#### **Findings**

According to the Geohydrological report, the site is dry and no seepage was recorded and according to local residents, the area has been drought stricken for about 20 years. Based on the available rainfall figures, the proposed landfill is only capable of generating sporadic leachate which will require some management and a costly leachate management system will not be necessary. In addition to the expected low generation of leachate, the provision of upslope cut-off trenches, an effective low to nonpermeable clay liner and inter layer capping to restrict movement of surface water onto and from the landfill site should theoretically be effective. Sufficient quantities of acceptable quality, soft excavable fill - and liner material are available on site. For a detailed report refer to **Annexure C**.

### **4.1.4 Geotechnical Investigation**

#### **Method**

A walk-over survey was conducted to establish drainage features, access and to obtain a general overview of the site. Thirty six test pits, denoted as TP1 to TP36 were excavated using a CAT 422E

tractorloader- backhoe to refusal depths ranging between 0.6 and 3.8m below existing ground level. The profiling (soil profiles) was done in accordance with the MCCSSO method. Thirteen disturbed samples representative of the cover - and in-situ soils were selected for laboratory testing to confirm the in-situ assessments of moisture, grading, plasticity, consistency, structure, permeability and to ascertain the engineering properties of each horizon. Four geophysical traverses were conducted on the site. Water samples were extracted from the seven boreholes and submitted for analyses to Yanka Labs in Witbank.

### **Findings**

The geotechnical investigation was received on the 2<sup>nd</sup> of September 2019 for the purpose of in-situ soils investigations and laboratory tests, assuring that the geologic factors affecting the location, design, construction, operation and maintenance of engineering works are recognized and adequately provided for. According to the Geotech report, variances in groundwater, soil and rock quality and quantity from those predicted may be encountered during construction and these should be recorded, however no warranty against these variations is expressed or implied, due to the geological changes that can occur over time due to natural processes, or human activity. For a detailed report refer to **Annexure C**.

### **4.1.5 Heritage Impact Assessment**

#### **Method**

A survey of the relevant literature was conducted. A survey of HIAs done for projects in the region by various heritage consultants was conducted with the aim of determining the heritage potential of the area. The Heritage Atlas Database, various SAHRA databases, the Environmental Potential Atlas, the Chief Surveyor General and the National Archives of South Africa were consulted. Local people on site, herding cattle or collecting firewood, were interviewed as to the location and origin of sites in the study area but no usable information was obtained from these sources.

#### **Findings**

Two cultural sites (classified as ruins) are located on the opposite side of the hill, approximately 432 m north-east of the site, (refer to Figure 6-3). These sites need to be protected in terms of the types and ranges of heritage resources as identified in Section 3 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) [NHRA]. According to the physical survey, at least five graves marked with stone cairns, two of which have small monolith like stones planted as headstones were found. The site

is very overgrown with vegetation and it seems as if it has been forgotten, serving as an indication of its age.

From a heritage point of view, it is recommended that the areas where the heritage sites have been identified be excised and that these areas are permanently fenced off and avoided. If that is not possible, both areas should be submitted to a full-scale Phase II archaeological investigation and the graves should be relocated. The Palaeontological Sensitivity Map (SAHRIS) indicates that the study area has a low sensitivity of fossil remains to be found and no palaeontological studies are required, but a protocol for finds is required. Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. For a detailed report refer to **Annexure D**.

#### **4.1.6 Topographical Study**

##### **Method**

The topographical study established benchmarks around the site which were determined by making use of the South African Permanently Operating Reference Stations (Trignet). Using Real Time Kinematic GNSS procedures, the topography of the site was recorded, with specific detail given to the streams, road, culverts and hillside.

##### **Findings**

They found that access to the site was West from the Penge road at BM4, through the bush and across the stream bed. The D2537 road is in very poor condition with potholes and erosion on the shoulders evident. The culverts are mostly blocked by indiscriminate dumping of refuse as well as bush clearing crews disposing of thorn bushes. The Western side of the road (Downstream side) is much eroded with areas showing possibilities of collapse in the near future. For a detailed report refer to **Annexure E**.

#### **4.1.7 Other Studies**

A desktop study was done for other studies such as Ecological, Protected Tree Species, Red Data/Endemic Species, Alien Vegetation, Vegetation and Faunal Habitat Availability, Wetlands, Mammals and Avifauna; which were found to have low to very low impacts

## 5 ALTERNATIVES

Three scenarios have been considered for the layout of the New Burgersfort Landfill Site. The proposed minimum structures common for each of the alternatives are as follows:

### 5.1 Description of Minimum Structures Required

The intended landfill is expected to be made up of the following structures:

- It is proposed to provide a concrete type palisade **fence** on the registered site boundaries together with a secondary barbed wire typed fence along the berm positions not adjoining the outer perimeter.
- **Clean and dirty storm water** is dealt with by constructing earth cut berms. The final berm size will be determined in line with the storm water runoff calculations and scour potential (concrete lined channel on the invert of the berm).
- Only light industrial developments will be allowed within the buffer zone that will be determined by the competent authority.
- **One main gate** has been allowed for that allows access to the waste facility itself through the preferred access route 1. This will allow more controlled access to the site.
- **Basic infrastructure (buildings)** had been allowed for, which can be listed as follows:
  - A **guard house** at the main entrance area with its own toilet area.
  - **Parking bays** for staff and visitors.
  - **Office block** that had one office, a small boardroom, reception, toilet facilities for both male and female together with a small shower, small filing room and kitchen area.
  - The ground staff has a **dedicated ablution facility**, together with an eating area, kitchenette area, toilets for both male and female, with a small shower.
  - A **workshop area** with two work bays and a storeroom.
  - A **12 m weighbridge** (one weighbridge) with a weighbridge house that includes a toilet area.
  - A **recycling area** in line with a R3 type facility.

The landfill facility includes the following areas:

- A recycling sorting area.
- Composting area the size of which will be determined by the design
- Building rubble area the size of which will be determined by the design
- Waste cells

- **Water supply** will be either by means of a borehole – if the water quality is acceptable, which will be pumped to two 10 000 ℓ “Jo-Jo” tanks that will be positioned on stands to assist in water pressure. Alternatively, it will be carted from a suitable source and pumped into the “Jo-Jo” tanks”.
- **Electricity** will be provided by means of a generator, until such time that an Eskom Connection is available in close proximity.
- **Sewage** will flow into one centralised septic tank or soakaway.

It is expected that the estimated tonnage of general municipal waste will be more than 600 tons per month according to the landfill evaluation of Old Burgersfort Landfill Site 2018, and the life span of the landfill in the order of 10 to 15 years. The expected tonnage of general municipal waste and the life span of the landfill will be assessed and determined during the concept and viability-, and EIA phase.

Waste disposal cells will be constructed and operated in accordance with the Minimum Requirements for Waste Disposal to Landfill (DWAF, 2nd Edition, 1998) and the current National Norms and Standards for Disposal of Waste to Landfill (GNR 636, 2013) as required. The landfill capacity available for waste disposal (airspace) and thus the life of a landfill, depends on the available footprint suitable for waste disposal at the preferred site; the potential depth to which cells can be excavated; the height above ground level to which the waste can be disposed of; and the expected waste disposal rate in tons per year. In turn, the cell depth is influenced by geotechnical and geo-hydrological conditions.

## **5.2 Proposed Landfill Site and Specialist Studies Findings**

Figure 5-1 presents the characteristic of the site in relation to findings of specialist studies. These findings were considered in arriving at the preferred alternative of the landfill layout.



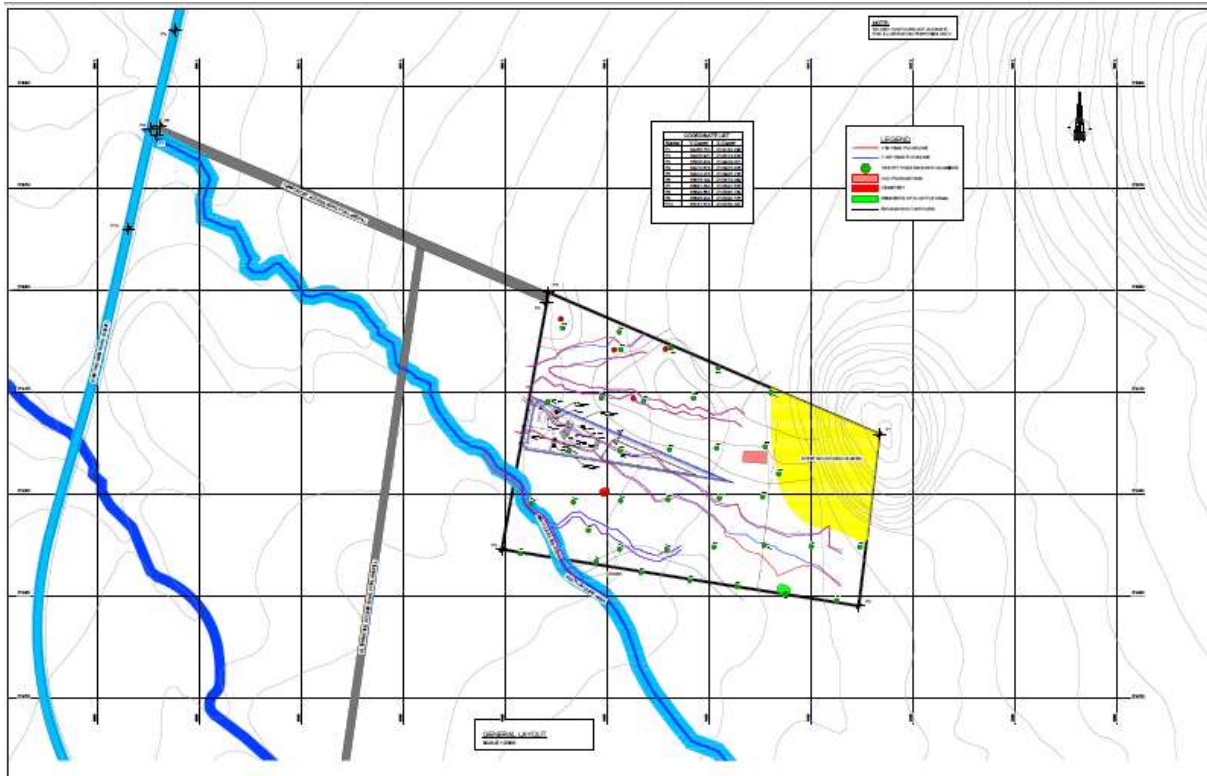


Figure 5-1: Key Findings identified by the specialist studies

The key findings identified by the specialist studies include:

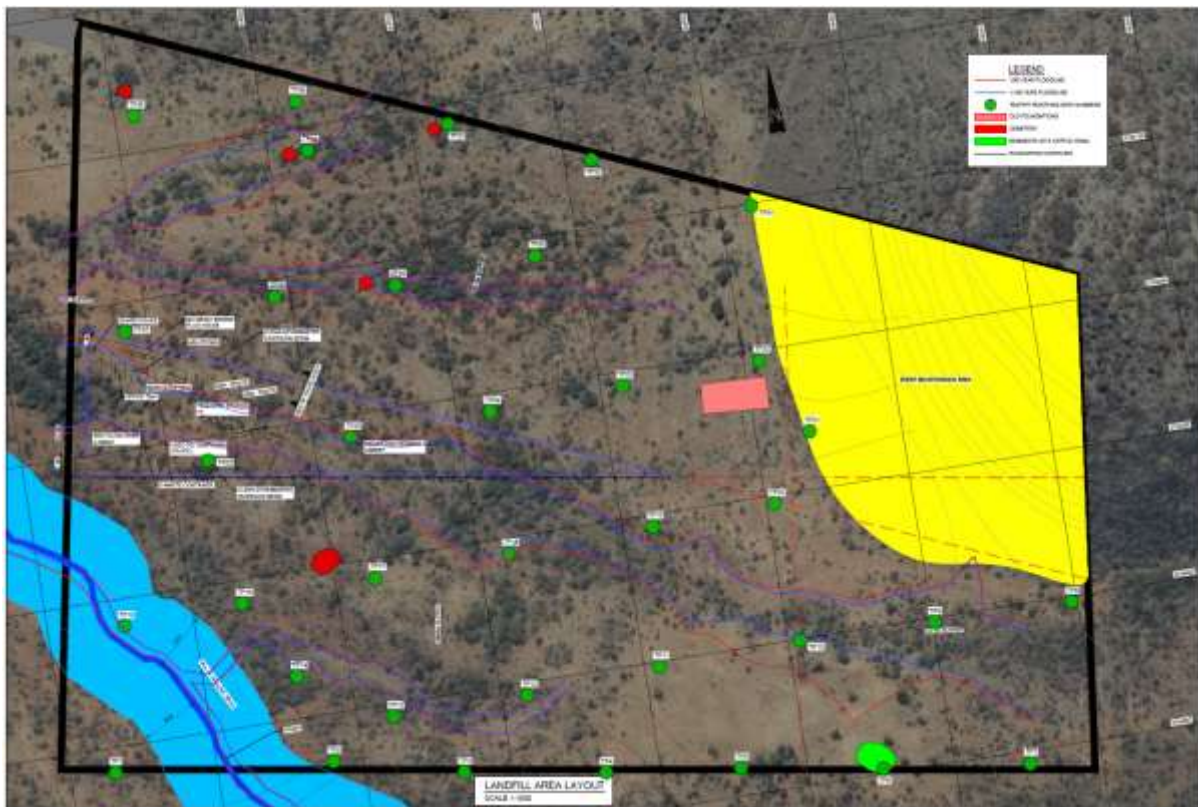
- The red box has been identified as a homestead site with rectangular foundations where some mud structures and stone remains used to be by the Heritage Survey
- The large red dot in the SW area of the site has been identified as a burial site with at least five graves marked with stone cairns by the Heritage Survey
- The four red dots in the NW area of the site have been identified as areas that can only be excavated to a depth of 2.2 meters
- The lime green area has been identified as the remnants of a cattle kraal by the Heritage Survey.
- The blue area in the SW corner of the site is the Buffer zone of Steelpoort River.
- The area highlighted in yellow is a Portion of a hill found on the site.

Given the above characteristics at the site, three alternative landfill layout are discussed here under.

### 5.2.1 Alternative 1

Figure 5-2: presents the proposed layout for alternative 1. In this alternative:

- The buildings and related structures are proposed to be located to the SW area adjacent to the left boundary
- The graveyard to be relocated.



**Figure 5-2: Conceptual Layout of Proposed Landfill Site Option 1**

Disadvantages of this option include the following:

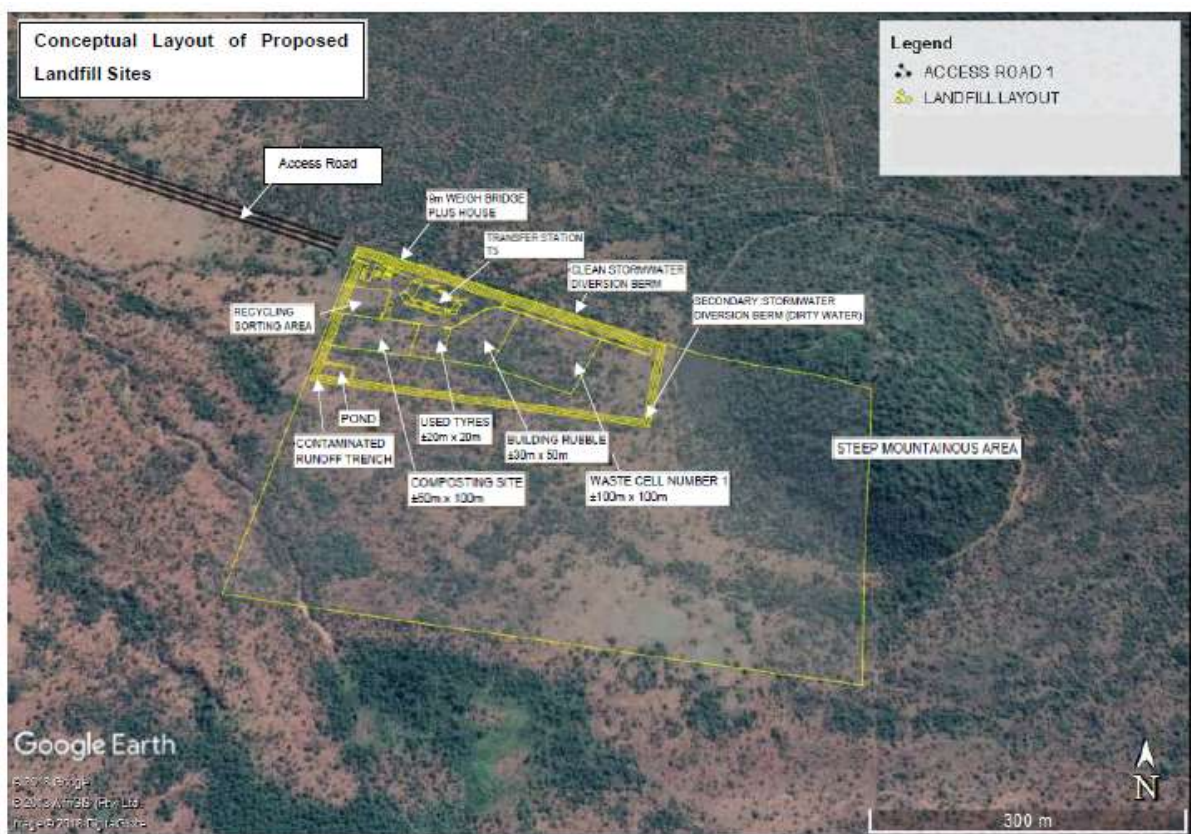
- Its layout and orientation in terms of the site poses accessibility challenges as there would be need to further develop an access road from both route option which would lead to the guard house weigh bridge and other structures. This brings about security concerns as monitoring is compromised by the distance between the entrance and the areas where waste would be recorded.
- The location of the structures makes use of excavable areas, it would be best if these areas are reserved for the excavation of cells and structures be constructed in areas that have excavation challenges represented by the red dots.

The site is a sidehill fill which slopes with an even gradient of 4 % north-westwards towards the Steelpoort River, the major drainage feature of the area and it places structure of high value like the weigh bridge on top of areas identified as flood prone, increasing the maintenance budget.

### 5.2.2 Alternative 2 (Preferred)

Figure 5-3: presents the proposed layout for alternative 2. In this alternative:

- The buildings and structures are proposed to be located to the NW area adjacent to the left boundary. This makes use of the area identified in the geotechnical report to more have excavable challenges, were a maximum depth of 2.2 meters is reachable, but steel suitable for laying foundation for the proposed structures.
- The graveyard to be fenced off and a buffer zone of at least 10 meters allowed around the perimeter.



**Figure 5-3: Conceptual Layout of Proposed Landfill Site Option 2**

The advantages of option two include the following:

- There is an existing road giving direct access to the proposed structure, reducing the amount of money used for road construction.

- The structures are located at an area that is relatively topographically high as the landfill site drains to the SW corner, lowering the amount of money spent on installation of drainage mechanisms for the structures.
- The layout places overland structures like an overland leachate tank, weigh bridge and offices in areas identified to be difficult to excavate, freeing up space for the excavation of cells in the landfill site

The disadvantage of this option is that it places the structures in a location that can only be excavated to depths of 2.2 meters however, according to the geotechnical report, it is sufficient for landfill sites and for the foundation of the proposed structures.

### 5.2.3 Alternative 3

Figure 5-4: presents the proposed layout for alternative 3. In this alternative:

- The building and structures are proposed to be located to the South area adjacent to the bottom boundary. This would elicit the need to construct a bridge over the section of the road that goes over the tributary.
- The graves would need to be relocated.

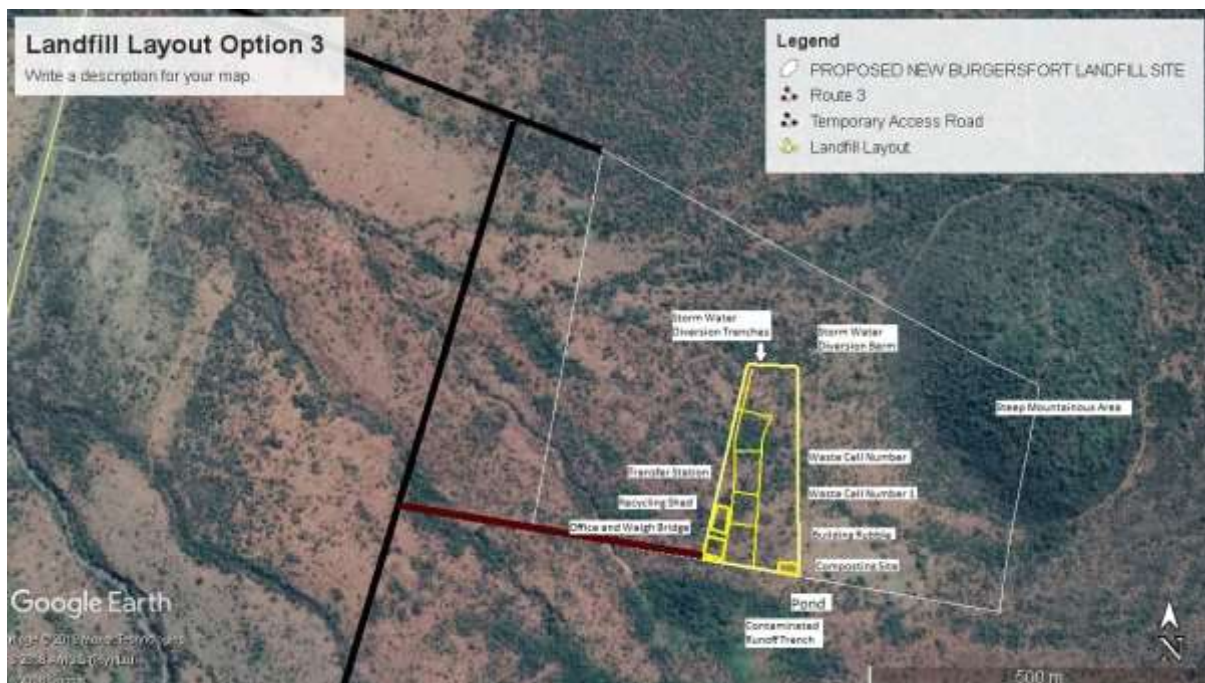


Figure 5-4: Conceptual Layout of Proposed Landfill Site Option 3

The advantage of option three is that it is located in a section of the site that has no excavability issues.

The disadvantages of option three are the following:

- This option is located within the flood plain as identified by the flood line study posing seepage challenges to the ground water table.
- The proposed route to access this option elicits the need to construct a bridge and ensure the route is reinforced to carry the weight of heavy refuse removal trucks as it is located in the most flood prone area of the landfill site. The topographical Study found that this road is in very poor condition with potholes and erosion on the shoulders evident. The culverts are mostly blocked by indiscriminate dumping of refuse as well as bush clearing crews disposing of thorn bushes. The Western side of the road (Downstream side) is very eroded with areas showing possibilities of collapse in the near future.
- The proposed location of the structures lies on top of a burial site as identified by the Heritage Report, it has been suggested by the Specialist Survey that if this option is selected the graves would have to be relocated.

### **5.3 Conclusion**

Alternative 2 has been considered to be the most favourable option as it has an existing road giving direct access to the proposed structure, reducing the amount of money used for road construction, it has structures that are located in areas that are considered topographically high as the landfill site drains to the SW corner, lowering the amount of money spent on installation of drainage mechanisms for the structures and the layout places overland structures like an overland leachate tank, weigh bridge and offices in areas identified to be difficult to excavate, freeing up space for the excavation of cells in the landfill site.

## **6 AFFECTED ENVIRONMENT**

This section provides a description of the following aspects:

- Biophysical Environment, and
- Socio-Economic Environment.

### **6.1 Biophysical Environment**

The biophysical assessment determines the potential aspects and impacts of the proposed development on the following environmental features:

- Climate
- Air Quality
- Heritage
- Geology and Soil
- Land Use
- Services and Infrastructure
- Biodiversity
- Noise and Vibrations
- Surface Water
- Traffic and Transportation
- Waste

#### **6.1.1 Climate**

According to the rain gauge data received from the South African Weather Service (2018) for Lydenburg (nearest weather station), the wettest six months of the year is between November and April, with an average rainfall of 79 mm between 1987 and 2015. According to the Geotechnical report Annexure C, the current rainfall figures are such that this landfill site is only capable of generating sporadic leachate which will require some management and a costly leachate management system will not be necessary. The area is said to have been drought stricken for the past 20 years and it is expected that when precipitation begins again, aquifer recharge should be rapid and the groundwater table may rise well above its established mean level with subsequent high discharges which will together with the four streams in and around the site, flow westwards towards the Steelpoort River, about 3.5km downslope from the site.

The South African Weather Services data shows that the predominant wind direction is East-South-East (ESE) between the months of January and August, and North-North-West (NNW) between September and December. The average predominant wind direction is ESE. Refer to Figure 6-2 and Figure 6-1 showing the average wind direction and wind speed. This wind direction and speed has the potential to affect Alverton, Lekgwabeng communities in the general Northern region and informal communities to the East of Penge road.

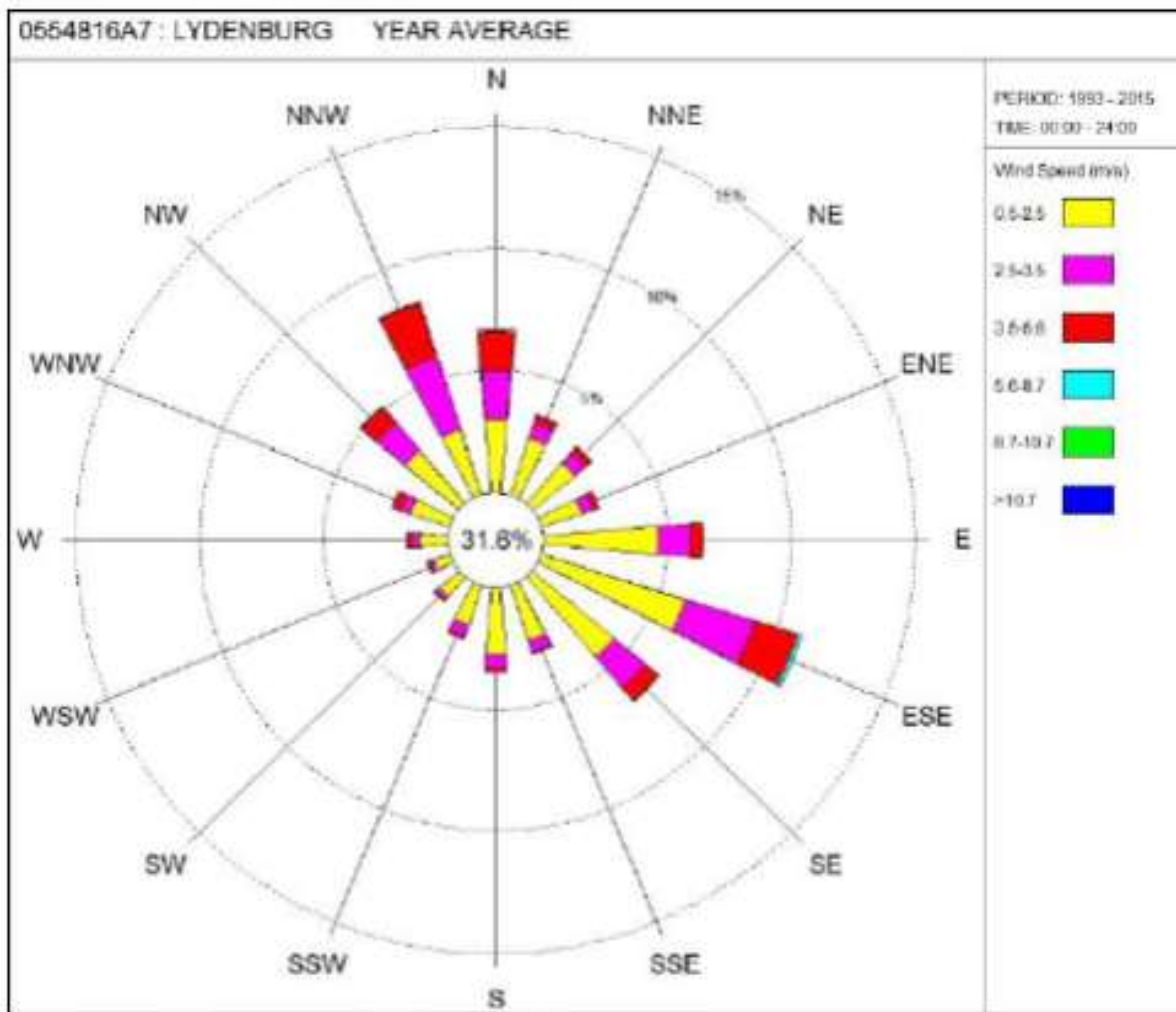


Figure 6-1: Average Wind Direction for Lydenburg from 1993 to 2015



**Figure 6-2: Average Wind Direction for the Project Site (SAWS; 1993-2015)**

### 6.1.2 Air Quality

Locations with the potential to be affected by the wind direction and speed include Alverton, Lekgwabeng communities in the general Northern region and informal communities to the East of Penge road. For mitigation of the impacts of wind speed and direction please see the EMPr in **Annexure A**. There will be increased pollution from cars as there is significant traffic in the area due to the transportation of minerals which introduces a substantial increase of carbon dioxide. Other pollutants like pesticides can also emanate from the farms around Ohrigstad towards Burgersfort, of which the extent has not yet been determined.

Dust will be generated during construction of the landfill. The operational phase of the landfill is likely to result in the generation of odours (nuisance), dust (nuisance) and landfill gases/ pollutants that are classified as greenhouse gases including methane, carbon dioxide and trace constituents of non-methane organic compounds. These impacts can be easily mitigated.

### 6.1.3 Heritage

According to the Heritage Survey, a burial site with at least five graves marked with stone cairns, a homestead site with rectangular foundations where some mud structures and stone remains used to



be and very low-density surface scatter assumed to be of Pedi origin (c. 1/250m<sup>2</sup> and as such has no significance) were identified as Heritage Resources on the site. These are shown in Figure 6-3 below.

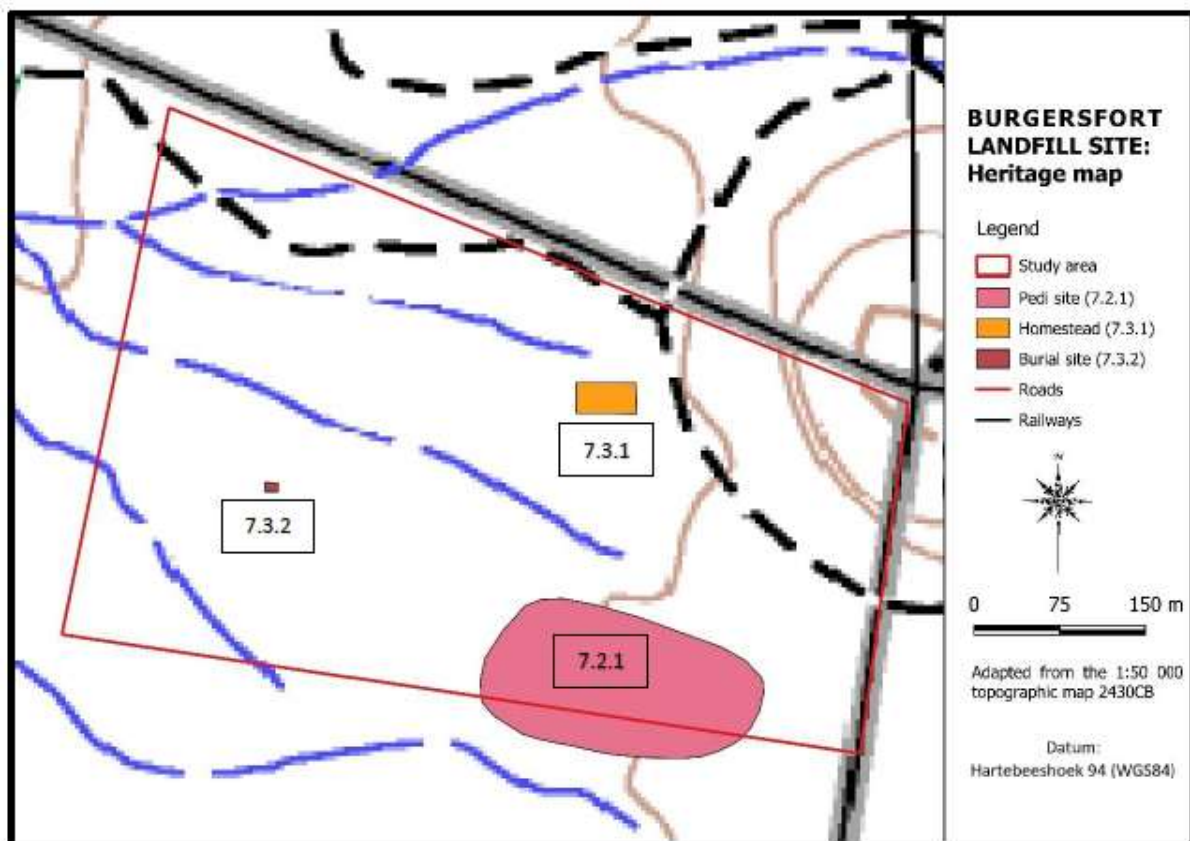
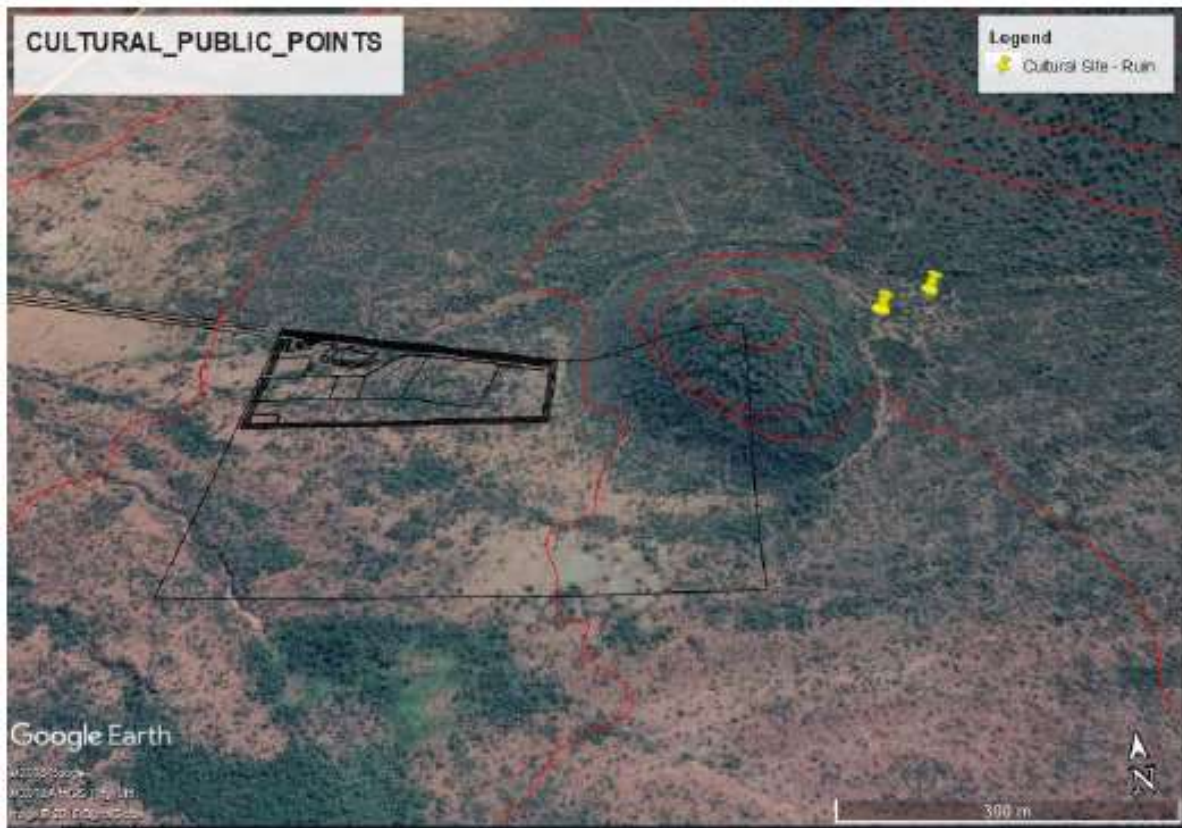


Figure 6-3: Location of heritage sites in the study area

According to the vectorised ortho image dated 12 June 2008 (Ref\_50K\_2430CB), two cultural sites (classified as ruins) are located on the opposite side of the hill, approximately 432 m north-east of the site, (refer to Figure 6-4). These sites need to be protected in terms of the types and ranges of heritage resources as identified in Section 3 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) [NHRA].

According to the Heritage Survey, the homestead, burial site and Pedi sites should be formally fenced off with a suitable, durable type of fence, leaving a buffer area of at least 10m around to outer edges of the burial site; Archaeological investigation/Relocation of graves: If it is not possible to retain the graves, it should be documented in full prior to their relocation. In that case, a permit would be required from PHRA/SAHRA, as well as other institutions



**Figure 6-4: Cultural Sites**

In terms of the NHRA, any person who intends to undertake a development which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent; or the re zoning of a site exceeding 10 000 m<sup>2</sup> in extent; is required to notify the regional Heritage Resources Authority. The proposed site comprises an area of 30 hectares and the development footprint (Development Phase 1) is seven (7) hectares in extent.

According to the palaeontological sensitivity map (SAHRA, Palaeontological (fossil) Sensitivity Map), the proposed site is largely situated in a low palaeontological sensitive area where no palaeontological studies are required, however a protocol for finds was done.

An online query application was made to the Limpopo Heritage Resources Authority (LHRA) on 21 November 2018 notifying the Department of the intent of the proposed development. The Department was furnished with details regarding the location, nature and extent of the proposed development to determine the applicability of the requirement for a paleontological/heritage impact assessment.

#### 6.1.4 Geology and Soil

The site is currently open space and blanketed by surficial deposit of alluvium and scree with the hill area towards the north-eastern corner of the site consisting of fine-grained laminated shale and subordinate mudstone with occasional limestone layers. Linear features inferred from aero magnetic data and dolerite dykes traverse the area in a south-western to north-eastern direction.

The main geotechnical constraints associated with the expected geology on site are excavatability, ponding and seepage, active clays and compressibility as investigated through test pits (green dots) shown in Figure 6-5. Fracturing within these rocks appears to be extensive and structural lineaments will be verified with a geotechnical survey during the EIA phase. The volume estimates for the proposed Class B landfill cells shall be based on 1:4 side slopes above ground level, and 1:3 below ground level as per DWS requirements.

Erosion and land degradation have been identified as a challenge in the area, which if not managed, will also impact on future agricultural activities in the area. Sufficient quantities of acceptable quality, soft excavatable fill - and liner material have been identified on site providing material for the provision of upslope cut-off trenches, effective low to nonpermeable clay liner and inter layer capping to restrict movement of surface water onto and from the landfill site.

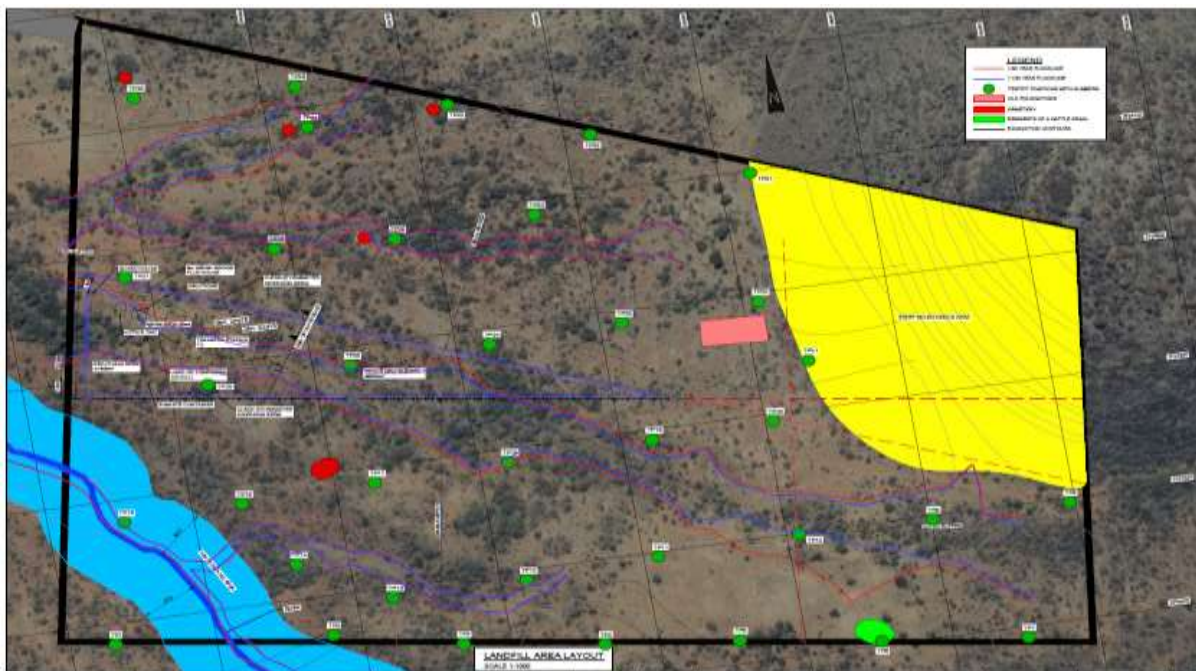
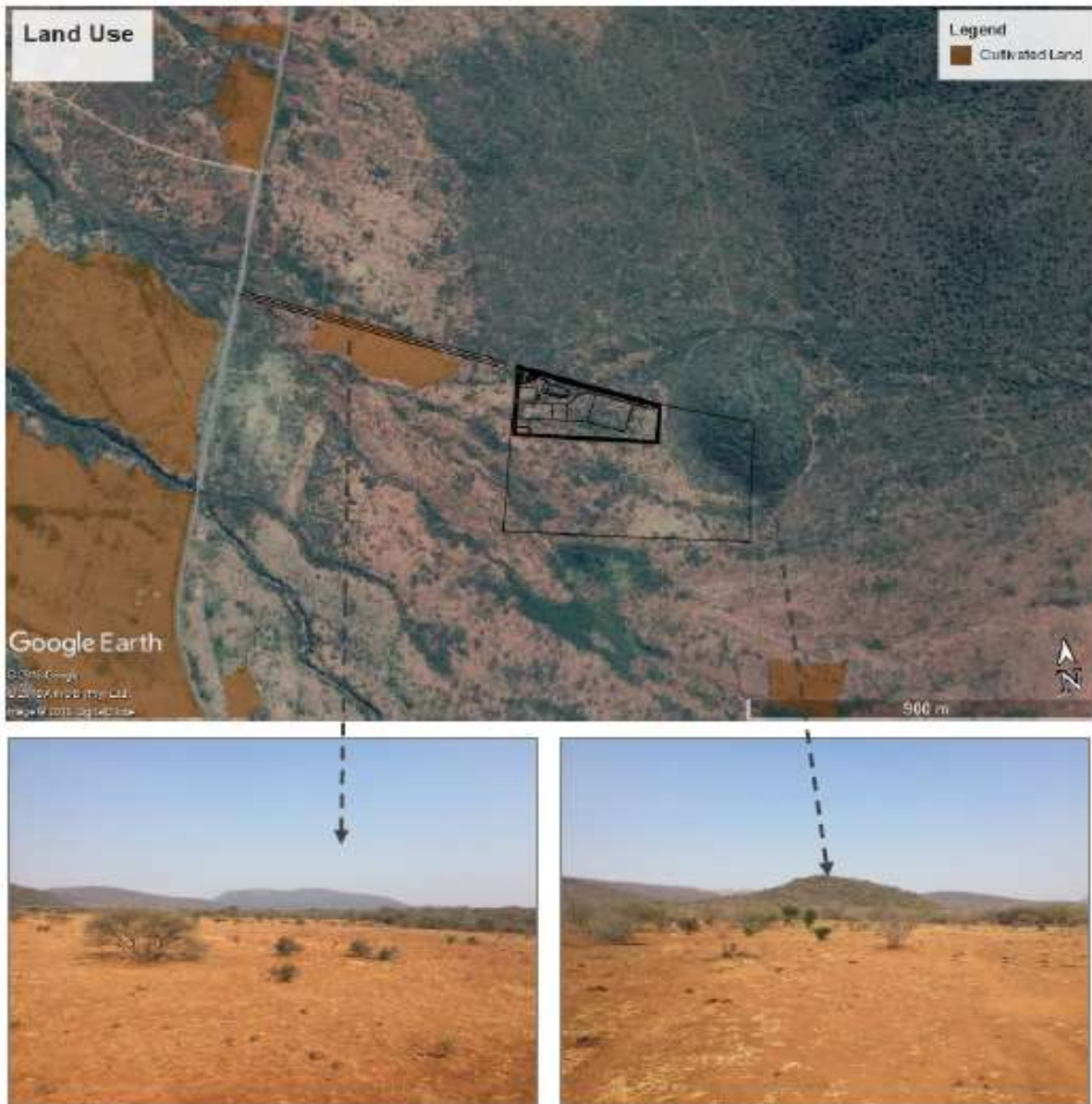


Figure 6-5: Map for excavation contours and pyroxenite boulders of intermediate excavation.

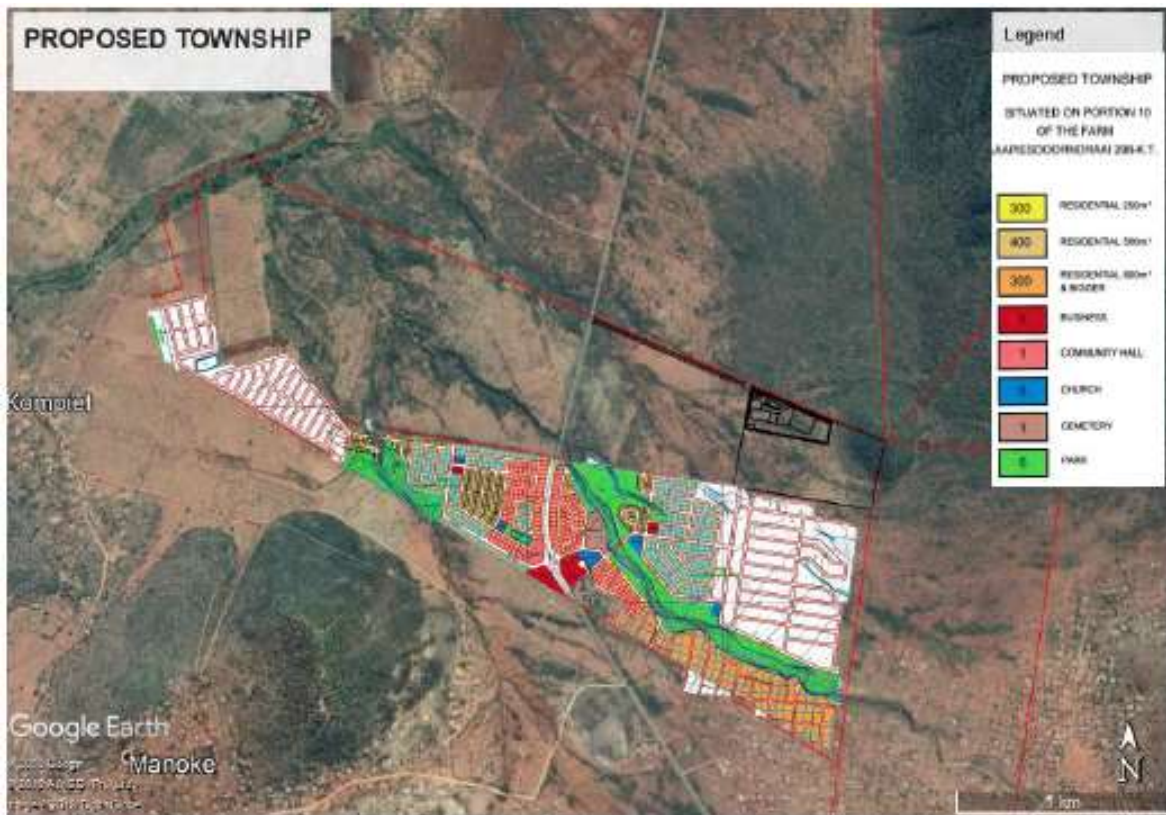
### 6.1.5 Land Use

A small portion of cultivated land, approximately 5,4 hectares (ha), is located west of the proposed landfill site. The proposed access road (from the D2537 road) traverses the portion of land as shown in Figure 6-6. The total footprint (area) of the cultivated land that will be impacted by the proposed access road is 0.7 ha, refer to the Figure 6-6 below. The first arrow pointing from the area highlighted in brown is the cultivated land which is traversed by the Route 1 which is the preferred route.



**Figure 6-6: Cultivated Semi-Commercial/ Subsistence Dryland**

It should be noted that FTLM intends to establish a township on Portion 10 of the Farm Aapiesdoorndraai 298 KT shown in Figure 6-7. The Portion 10 is located directly south of the proposed landfill site.



**Figure 6-7: Proposed Township on Portion 10 of the Farm Aapiesdoorndraai 298 KT**

The proposed Aapiesdoorndraai Township encompasses 1034 stands comprising 1004 x Residential 1 stands, 5 x Residential 3 stands, 7 x Municipal stands, 1 x Sport stand, 5 x Institutional stands, 6 x Business 1 stands, 6 x Public Open Space and 1 x Special zoning stand.

It is assumed that the proposed stand adjacent (South) to the proposed landfill site is zoned as Special. Tendencies are that if land is zoned special and/or light/heavy industrial then land next to such zoning could accept the development of a landfill site and allow for waste disposal. However, the proposed zoning of the stand adjacent to the proposed landfill site needs to be subjected to confirmation. In addition, the site would possibly require rezoning/subdivision or a Special Consent to change land use from 'agriculture' to 'special' and to allow for waste disposal. It was suggested that FTLM initiate the zoning/land use application to run parallel with the EIA process.

### 6.1.6 Access

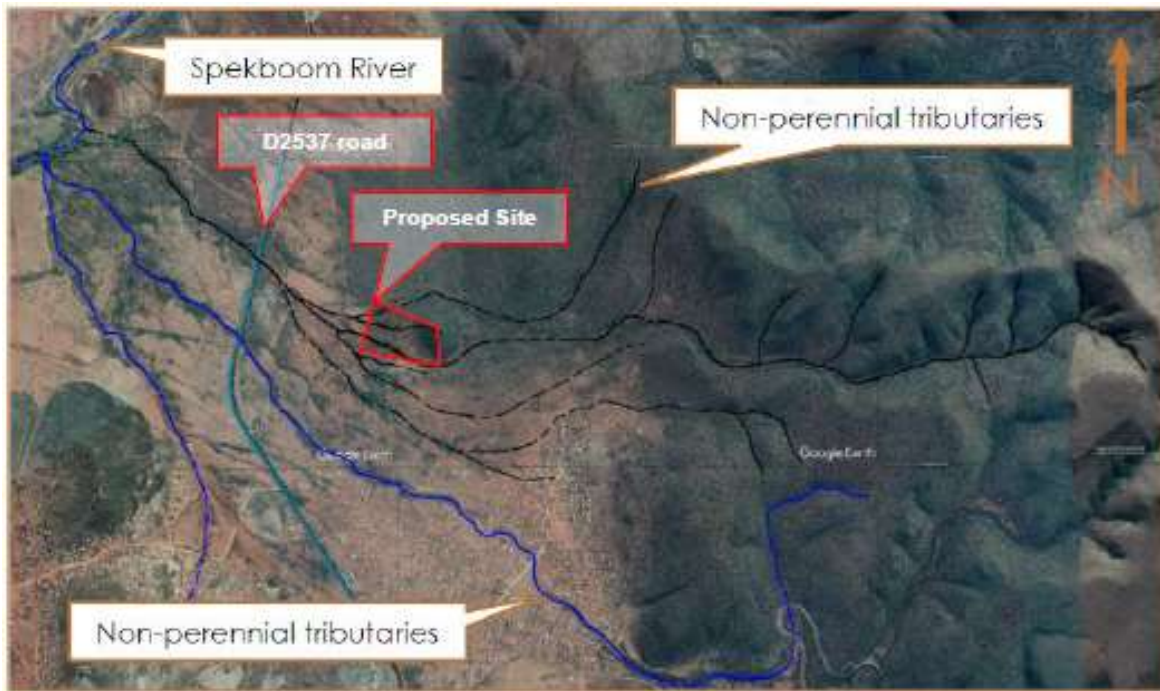
Major access roads into the development, main feeder routes, activity spines and corridors, to be in line with the Town Planners proposed layouts – two (2) possible access routes are proposed, leading from the existing surfaced road on the Western side to the Eastern side with a 20 m road reserve **Access Route 1** and a proposed access road from the South to the North access from the Proposed Township (refer to Figure 7-5)(access road from the planned residential development towards the proposed landfill site), **Access Route 2** as shown on Figure 6-8 below.



**Figure 6-8: Major access roads into the development**

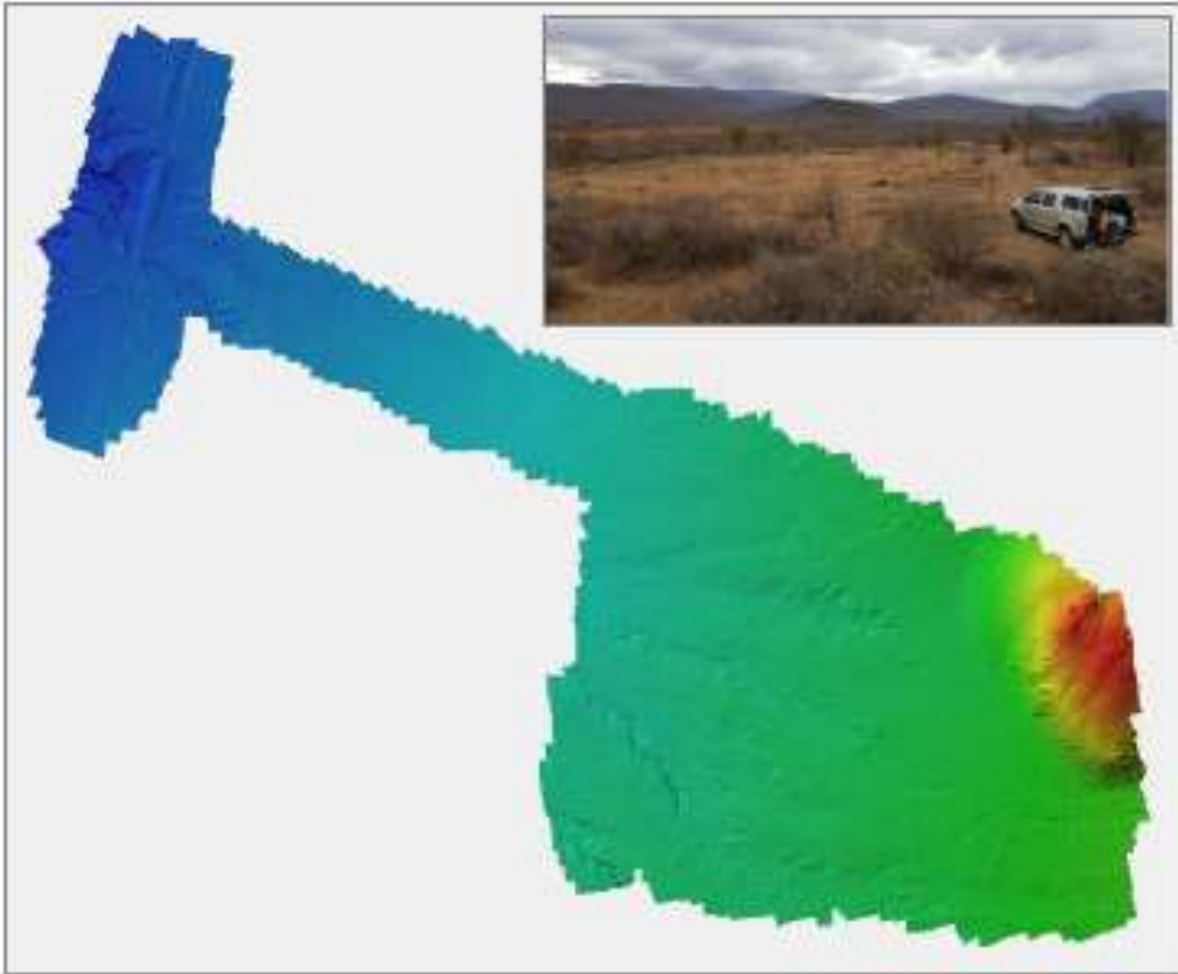
### 6.1.7 Landscape and Visual Effects

The site slopes from the hill (east, approximately 55m high) towards the D2537 road (north-west) and the Spekboom River (Figure 8).



**Figure 6-9: River System**

The site is within the Steelpoort River catchment area and the river is located downslope and 3.5km away. There is a fairly steep slope toward the hill (approximately 55m high), which ultimately flattens out to roughly 2-5% (gradient of 1: 28) as it approaches the Spekboom River in the west (Figure 6-9). The site is bisected by four drainage courses. There is potential that areas downslope from the proposed site are below the 1:50 flood line and waste disposal activities could result in water pollution. Mitigation measures for the river system are addressed in the EMPr (Annexure A).



**Figure 6-10: Digital Elevation Model (DEM) of the Terrain**

It will ultimately be motivated for a natural landfill to be developed to blend in with the hill to get to the expected airspace and life-span. The high-lying area of the hill should be conserved to retain the natural vegetation and characteristics with the aim to accommodate possible future land use activities (i.e. hiking trails, mountain biking, etc.) as part of the landfill closure, rehabilitation and end-use plan.

#### **6.1.8 Services and infrastructure**

There are currently no existing services on the proposed site, however the services considered includes:

- Possible borehole(s) for supply of potable water. If not suitable, water will be carted to site.
- Two JoJo tanks (on stands) for storage of water.
- Allowance for a generator on site, until ESKOM power is available. The generator will in future serve as backup to main power supply.



- Septic tanks or soak away (depending on soil conditions and risk of pollution) to be provided for.

The landfill site will require a buffer zone of approximately 200m to be registered within or outside of the proposed site boundary. No residential development may take place within a proclaimed buffer zone, however, developments such as light and heavy industrial development may be permitted.

#### **6.1.9 Biodiversity**

Based on the Limpopo Conservation Plan (Version 2) the project area is situated largely in an Ecological Support Area (ESA) and the 200m buffer around the site extends into a Critical Biodiversity Area (CBA). However, the specific area of development does not fall within the Critical Biodiversity Area. The site is situated in the Sekhukhune Plains Bushveld (SVcb 27), a vulnerable vegetation community according to Mucina and Rutherford, 2006. ESAs are ecological process areas connecting and therefore sustaining Critical Biodiversity Areas and terrestrial features, (i.e. riparian habitat surrounding) these areas according to SANBI, are a focus for rehabilitation and no intensive land uses should be undertaken.

Ridges buffer areas were identified as areas with slopes steeper than 5°. This was supplemented by the ridges and koppies data for Merafong (received from North West Province in 2009). Applications involving activities on a ridge that must be subjected to an environmental authorisation in any form must, in addition to any other requirements, be supported by a study describing the ecological conditions of the ridge, a survey of flora and fauna, impacts of the activity, slope stability and cultural and social aspects and values. The hill is expected to be excluded from the waste disposal area and development will have to be structured around sensitive ecosystems, where possible.

There are no formal or informal protected areas within five kilometres of the site or any threatened terrestrial ecosystem present.

#### **6.1.10 Noise and Vibrations**

Construction of the new Burgersfort landfill may generate noise in the local area (> 1km from the site). The operation of the landfill may also cause noise in surrounding areas due to waste delivery trucks and on-site activities and machinery.

The potential impact on noise and safety as a result of the proposed development (within the surrounding area) could also increase due to the D2537 road that is in very poor condition with potholes and erosion on the shoulders that are evident. Mitigation measures have been addressed in the EMPr.

### 6.1.11 Surface Water

The site is located in quaternary drainage region B41K, within the boundary of the Olifants Water Management Area (WMA). The major rivers within the Olifants WMA comprise the Elands, Wilge, Steelpoort, Olifants and Letaba River.

The Mabitsana River is located approximately 800 metres south of the site which has a short-lived (ephemeral) flow variability. There are no wetlands in close proximity ( $\geq 500$  m) to the site. The ecological buffers, adopted for non-perennial rivers within urban areas is 20 m, and forms part of Ecological Support Areas.

The landfill site is crossed by various stream systems that ultimately join and drain into the Spekboom River which is a tributary of the Steelpoort River. There are three non-perennial streams (Figure 6-11) running from the hill towards the D2537 road. These non-perennial rivers may have an impact on the landfill site as the flood lines intersect the proposed area.



**Figure 6-11: Streams Identified on the Site**

The 1:50 and 1:100-year flood levels will be investigated to certify such according to the national Water Act, 1998 (Act No. 36 of 1998), as well as recommending probable flood mitigation measures for the landfill site. The flood line investigation will be confirmed during the EIA Phase. The importance of the flood-line was discussed for both the use of the landfill and the proposed township on Portion 10 of the Farm Aapiesdoorndraai 298 KT.

According to input received from a geohydrologist by means of a basic desktop study conducted, the following information emerged:

- The water level of the area is generally in the region of 14 m below the existing ground level.
- The site is predicted to be underlain by hornfels, which in general is not a good aquifer, making the site ideal for a landfill site.
- Due to the Mabitsana River, that is located within close proximity to the site, it is suggested that at least one monitoring borehole upstream from the landfill site and one downstream towards the river be established.

#### **6.1.12 Traffic and Transportation**

Construction of the new Burgersfort landfill may generate additional traffic flows and show an increase in waste delivery trucks along D2537 road during the Construction and Operational Phase.

The Western side (Figure 6-12) of the D2537 road is much eroded with areas showing possibilities of collapse in the near future.



**Figure 6-12: Penge Road Looking North**

The proposed development can potentially impact on road user's safety (within the local environment) as a result of the poor condition (such as potholes and erosion on the road shoulders).

To manage the effects of large traffic volumes construction Contractors must put in place a traffic management plan.

### **6.1.13 Waste**

Waste generated from Burgersfort Town, Apiesdoring, Ga-Mohala, and Manoke is mostly non-hazardous or general waste which includes food waste, metal, plastic, paper, PPE, brake blocks and other material. This waste needs to be treated and managed efficiently and this is the reason for the need to develop the New Burgersfort Landfill Site.

## **6.2 Socio - Economic Environment**

### **6.2.1 Population**

According to Statistics South Africa Community Survey, 2016 the total population of the FTLM is approximately 490 381 with 106 050 households; these make FTLM a municipality with highest population in the District. Community Survey, 2016 as compared to the 2011 STATS SA results indicates that the FTLM has a population increase of 489 902 (12%) with household increase of 125 454. As per the current Community Survey, 2016 the FTLM households increased with 19 404 (15%).

### **6.2.2 Education**

There are 225 primary and 133 secondary schools and eight (8) private schools with 128 740 learners and 4 711 Educators in FTLM. The Department of Education Limpopo has developed two state of the art schools namely Nthame Primary School at Riba – Cross and Batubatse Primary School in Praktiseer. Generally, in rural or semi-rural areas, such as this the predominance of primary schools is not unusual as many pupils leave school at the earliest possible time to find employment to assist and support the family. The privileged scholars, who can afford to further their education, either attend the secondary schools in the area or secondary schools located in larger towns outside the area.

### **6.2.3 Future Settlement Developments**

According to the town planning department FTLM intends to establish a township on Portion 10 of the Farm Aapiesdoorndraai 298 KT. The Portion 10 is located directly south of the proposed landfill site, as shown in Figure 6-7 and mushrooming unplanned settlements are evident to the east of Penge Road.

## 7 STAKEHOLDER ENGAGEMENT

The stakeholder engagement forms a key component of the S&EIA process. The objectives of stakeholder engagement are outlined in this section, followed by a summary of the approach followed, in compliance with Chapter 6 of the EIA Regulations, 2014.

### 7.1 Objectives and Approach to Stakeholder Engagement

The overall aim of stakeholder engagement is to ensure that all I&APs have adequate opportunity to provide input into the process and raise their comments and concerns. More specifically, the objectives of stakeholder engagement are to:

- Identify I&APs and inform them about the proposed development and S&EIR process;
- Provide stakeholders with the opportunity to participate effectively in the process and identify relevant issues and concerns; and
- Provide stakeholders with the opportunity to review documentation and assist in identifying mitigation and management options to address potential environmental issues.

### 7.2 Stakeholder Engagement Conducted

Table 7-1 outlines the processes undertaken for the public participation conducted as part of this EIA:

Table 7-1: public participation

Task	Objectives	Dates
Advertise commencement of EIA process and release Background Information Document (BID).	Notify Interested and Affected Parties (I&APs) of the commencement of the EIA process (publish newspaper advertisement, place site notices, give written notice and provide Background Information Document to I&APs). Provide the public 30-days to register as an I&APs and to provide comments on the application by no later than 26 November 2018.	25/10/2018 – 26/11/2018
Open and Maintain a Register of all I&APs.	Update the I&APs stakeholder database and record comments received on the application.	25/10/2018 – 26/11/2018
Draft Scoping Report subjected to a public participation process of at least 30 days.	To notify I&APs of the availability of the draft Scoping Report for review and comment for 30-days. Note that the EAP conducting Public Participation (PP) must refrain from conducting any PP during the	11/12/2018 - 24/01/2019

Task	Objectives	Dates
	period of 15 December to 5 January. The 30-days review and commenting period has therefore been adopted to exclude days between 15 December to 5 January.	
Incorporation comments received into final Scoping Report.	Ensure that the issues raised by I&APs are addressed and incorporated into the final Scoping Report.	24/01/2019 - 28/01/2019
Submit final Scoping Report to LEDET. which has been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received.	LEDET must, within 43 days of acknowledgement receipt of the final Scoping Report accept or refuse the Scoping Report.	25/01/2019 – 11/03/2019
Public Participation Meeting	To present the findings of Scoping Report to I&APs and to provide an opportunity for commenting.	06 December 2018

### 7.2.1 Identification of Key Stakeholders

As required by the EIA Regulations, 2014, relevant local, provincial and national authorities, conservation bodies, local forums and representatives and surrounding land owners and occupants have been notified of the EIA.

Engineerex (Pty) Ltd advised all interested and affected parties to register as stakeholders for the proposed development of the New Burgersfort Landfill.

Relevant authorities (Organs of State) have been automatically registered as I&APs. In accordance with the EIA Regulations, 2014 all other persons were requested in writing to be placed on the register, submit written comments or attend meetings in order to be registered as stakeholders and included in future communication regarding the project, and advertisements advised that I&APs register as such. The stakeholder database will be updated throughout the process.

### 7.2.2 Notification of the EIA Process and BID

Newspaper advertisements announcing the commencement of the S&EIA process, the availability of a Background Information Document (BID) for stakeholder review and inviting I&APs to register on the project database was placed on Platinum Gazette local newspaper on the 25th of October 2018, the advert was published in English.

Site notices with details of the project, EIA process and EAP contact details were placed at the following places:

- Along the D2537 Road;
- On site notice; and
- FTLM Offices.

### **7.2.3 Notification of the EIA Process and Scoping Report to I&APs**

Registered stakeholders were notified by email, telephone and post of the availability of the Scoping Report for public comment. Hard copies of the full report will also be made available for viewing. Stakeholders were provided with a 30-day commenting period.

### **7.2.4 Public Participation Meeting**

A Public Participating meeting at which the findings of the Scoping Phase are presented for discussion. A Public Open Day was held during the comment period to provide stakeholders with the opportunity to discuss any concerns related to the proposed project. The public participation meeting was conducted on 06 December 2018.

### **7.2.5 Public Participation Comments and Responses**

Issues raised by authorities and the public were summarized and responded to in an Issues and Responses Summary, forms part of the approved Scoping Report herein presented in Table 7-2.

Table 7-2: Comments and Responses on Application

ID	I&AP	Comment and/or Concern from I&AP	Date Received	Response from EAP
1.	Snyman de Jager Attorneys on behalf of Silver Crest Waste Disposal (PTY) Ltd	<ul style="list-style-type: none"> <li>❖ Silver Crest Waste Disposal (PTY) Ltd has already a valid Solid Waste Permit in terms of Section 20 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) the certificate issued by the Department of Environmental Affairs.</li> <li>❖ Silver Crest Waste Disposal (PTY) Ltd is therefore an Interested and Affected Party in terms of an application advertised in the Platinum Gazette, dated 26 October 2018.</li> <li>❖ Silver Crest Waste Disposal (PTY) Ltd shall oppose any new application as our existing rights will be prejudiced.</li> <li>❖ Silver Crest Waste Disposal (PTY) Ltd already has a valid permit under permit number 12/9/11/P56 to establish a waste disposal site at Aapiesdoorndraai, a portion of portion 24 of a portion of the remainder of the farm Aapiesdoorndraai 298 KT.</li> <li>❖ Influence the viability of the already existing right of Silver Crest Solid Waste (PTY) Ltd.</li> <li>❖ Department of Environmental Affairs, Lucas Mahlangu, to be included in this process.</li> </ul>	06-11-2018 03-12-2018	<ul style="list-style-type: none"> <li>❖ The Burgersfort Landfill permit was permitted in terms of Section 20(1) of the Environmental Conservation Act, 1989 (Act No 73 of 1989) as amended.</li> <li>❖ The permit expired in 2008.</li> <li>❖ An application was then lodged for the extension in terms of Section 50 of the Water Act 2008. The municipality established built drawings, maps and drilled boreholes with coordinates at the Landfill as conditions for consideration of extension and review of the expired permit by the Department of Water and Sanitation (DWS). The license /permit variation was granted from 2008 till 2018. FTLM is thus applying for a WML in terms of the NEMWA.</li> <li>❖ It is assumed that the proposed stand adjacent (South) to the proposed landfill site is zoned as Special. Tendencies are that if land is zoned special and/or light industrial then land next to such zoning could accept the development of a landfill site and allow for waste disposal.</li> <li>❖ However, the proposed zoning of the stand adjacent to the proposed landfill site needs to be subjected to confirmation.</li> <li>❖ Refer to section 5.1.5 in this report.</li> </ul>



ID	I&AP	Comment and/or Concern from I&AP	Date Received	Response from EAP
				<ul style="list-style-type: none"> <li>❖ Taking this up will depend on whether the Municipality can accept the terms and conditions that come with this offer</li> </ul>
2.	Resident of the old farm Apiesdooringdraai 298 KT	<ul style="list-style-type: none"> <li>❖ Notice to FTLM about the land claim of Apies. Ref: attached to FTLM. We once spoke to some of the MMs about our land claim, people were flocking in Apies coming from various places, MMs know about Apies.</li> <li>❖ The main issue we want to know is how FTLM knows the Portion 9. We want an explanation if possible.</li> <li>❖ Main reasons and our objection on Portion 9, is that it is surrounded by various villages namely: Apies, Manoke, Dresden, Alverton, Motodi, Praktiseer, Bothashoek, Dithabaneng, Mashamothane and Nazareth.</li> <li>❖ Pollution will cover the whole villages. It will be more sickness in all villages and grazing places, it is an Agricultural place Portion 9, 10, 11 and Manoke portions. What about flowing of dirty substances.</li> </ul>	22-11-2018	<ul style="list-style-type: none"> <li>❖ Noted.</li> <li>❖ An agreement of donation, which includes Portion 9 of the farm Aapiesdoorndraai 298 KT, was entered into by and between the Department of Rural Development and Land Reform and Greater Tubatse Local Municipality.</li> <li>❖ The subsequent EIA phase shall take into account the recommended management measures (including built-engineering design considerations) required to mitigate potential impacts</li> </ul>

ID	I&AP	Comment and/or Concern from I&AP	Date Received	Response from EAP
3.	Resident of Manoke Village	<p>The landfill should be placed at a place that is at least 5-10km from people's houses.</p> <ul style="list-style-type: none"> <li>❖ Potential health hazard if mismanaged.</li> <li>❖ The landfill is close to our homes at Manoke and Dresten Village. I am under the impression that the land there belongs to Kgoshi Manoke, you need to see him.</li> <li>❖ I want to know if you as Engineerex have seen the area of interest and spoken to the people living around and Chiefs in that respect?</li> <li>❖ Include Kgosi Manoke of Manoke Village in this process.</li> </ul>	22-11-2018	<p>Noted. The nearest dwelling/ houses at this point in time is currently further than 1 km. These dwellings/ houses are, located to the South and South-East of the proposed landfill site. Refer to section 5.1 in the Scoping report.</p> <ul style="list-style-type: none"> <li>❖ The subsequent EIA phase shall take into account the recommended management measures (including built-engineering design considerations) required to mitigate potential impacts of pollution on the surrounding villages.</li> <li>❖ Engineerex has done a site recognisance. <ul style="list-style-type: none"> <li>❖ The EAP suggest that the Ward Councillor, Them Mgwatla; (bongwato198@gmail.com) speak to the people living around the area and the Chiefs, in order to arrange and confirm a public meeting date and to communicate the date with the EAP to schedule the public meeting.</li> <li>❖ Noted. Mr Kgosi Manoke of Manoke Village has been informed and included in this process.</li> </ul> </li> </ul>
4.	Official from Department of Agriculture, Forestry and Fisheries (Polokwane)	<ul style="list-style-type: none"> <li>❖ Main area of interest with regard to the proposed activity is the clearance of vegetation.</li> <li>❖ Possible interest and/or concern in this process is with regard to protected trees listed in terms of National forest Act, Act No.84 of 1998.</li> <li>❖ Require the EIA Report for comments.</li> <li>❖ Include Land Use and Soil Management in this process. Contact details provided in the I&amp;AP Registration Form sent to EAP.</li> </ul>	12-11-2018	<ul style="list-style-type: none"> <li>❖ Noted. A biodiversity specialist will be involved during the EIA phase to undertake a Biodiversity Assessment, due to the development falling within a biodiversity area, categorised as an Ecological Support Area.</li> <li>❖ The biodiversity specialist shall, inter alia, survey the areas for Red and Orange Data plant species.</li> <li>❖ Noted</li> </ul>

ID	I&AP	Comment and/or Concern from I&AP	Date Received	Response from EAP
				❖ Noted Mr Steven from Land Use and Soil Management has been included in this process.
5.	Tubatse Business Forum (TBF)	❖ Tubatse Business Forum (TBF) would like to register and be part of the public participation process as an interested and affected party for the proposed development of the new Burgersfort landfill site on part of Portion 9 of the farm Appiesdooring 298KT which is where we are operating as a forum. This follows the notice published on Platinum Gazette newspaper.	02-12-2018	❖ We confirm having registered Tubatse Business Forum (TBF) as an Interested and Affected Party on 05 December 2018.
6.	South African Heritage Resource Agency (SAHRA)	❖ SAHRA has received your emailed notification of a project that is undergoing a NEMA application process. ❖ We would like to inform you that we do not accept emailed applications for SAHRA comments on development applications. If a case on SAHRIS has been created please include the SAHRIS case number and the province in which the development will occur in, in all communications with SAHRA. If there is no existing case on SAHRIS, then a new case must be created and all available documents and their appendices must be submitted to the case.	02-11-2018	❖ Noted. A new case has been created on SAHRIS with the Limpopo Provincial Heritage Resources Agency (LIHRA), and available documents have been submitted to the case on 21 November 2018.
7.	Sekhukhune District Environmental Forum	❖ Attached is the contact details of Sekhukhune District Environmental Forum Members for public participation purpose.	06-11-2018	❖ We confirm having registered Sekhukhune District Environmental Forum as an Interested and Affected Party on 05 December 2018.

### **7.3 Way Forward**

The stakeholder input has been taken into account. The Final Scoping Report was submitted to LEDET and Engineerex received an acknowledgement letter on the 01<sup>st</sup> of March 2019. This draft EIA and EMPr (Annexure A) will be circulated to the public on the 10<sup>th</sup> of September 2019.

## **8 METHODOLOGY FOR RATING THE SIGNIFICANCE OF IMPACTS**

In order to allow for sufficient consideration of all environmental impacts, impacts were assessed on a preliminary basis using a common, defensible method of assessing significance that will enable comparisons to be made between risks/impacts and will enable authorities, stakeholders and the client to understand the process and rationale upon which risks/impacts have been assessed. The method to be used for assessing risks/impacts is outlined in the sections below.

### **8.1 Assessment of the Sensitivity to Change**

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

- An activity is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or infrastructure that is possessed by an organisation.
- An environmental aspect<sup>1</sup> is an element of an organizations activities, products and services which can interact with the environment. The interaction of an aspect with the environment may result in an impact.
- Environmental risks/impacts are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. In the case where the impact is on human health or wellbeing, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is.
- Receptors can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as wetlands, flora and riverine systems.
- Resources include components of the biophysical environment.
- Frequency of activity refers to how often the proposed activity will take place.
- Frequency of impact refers to the frequency with which a stressor (aspect) will impact on the receptor.

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<sup>1</sup> The definition has been aligned with that used in the ISO 14001 Standard.

- Severity refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.
- Extent refers to the geographical scale of the impact.
- Duration refers to the length of time over which the stressor will cause a change in the resource or receptor.

The significance of the impact is then assessed by rating each variable numerically according to the defined criteria. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The frequency of the activity and the frequency of the impact together comprise the likelihood (Table 5) of the impact occurring and can obtain a maximum value of 10. The severity, spatial scope and duration of the impact together comprise the consequence (Table 6) of the impact and when summed can obtain a maximum value of 15.

Table 8-1: Criteria for Assessing Likelihood of Impacts

<b>PROBABILITY</b>	<b>RATING</b>
Highly unlikely	1
Possible	2
Likely	3
Highly likely	4
Definite	5
<b>SENSITIVITY</b>	<b>RATING</b>
Ecology not sensitive/important	1
Ecology with limited sensitivity/importance	2
Ecology moderately sensitive/ /important	3
Ecology highly sensitive /important	4
Ecology critically sensitive /important	5

Table 8-2: Criteria for Assessing Consequence of Impacts

<b>SIGNIFICANCE</b>	<b>RATING</b>
Insignificant / ecosystem structure and function unchanged	1
Small / ecosystem structure and function largely unchanged	2
Significant / ecosystem structure and function moderately altered	3
Great / harmful/ ecosystem structure and function largely altered	4
Disastrous / ecosystem structure and function seriously to critically altered	5
<b>EXTENT</b>	<b>RATING</b>
Activity specific/ < 5 ha impacted / Study areas affected < 100m	1

Development specific/ within the site boundary / < 100ha impacted / Study areas affected < 100m	2
Local area/ within 1 km of the site boundary / < 5000ha impacted / Study areas affected < 1000m	3
Regional within 5 km of the site boundary / < 2000ha impacted / Study areas affected < 3000m	4
National / > 2000ha impacted / Study areas affected > 3000m	5
<b>DURATION</b>	<b>RATING</b>
One day to one month	1
One month to one year	2
One year to five years	3
Life of operation or less than 20 years	4
Permanent	5

The values for likelihood and consequence of the impact are then read off a significance-rating matrix (Table 7) and are used to determine whether mitigation is necessary<sup>2</sup>. The assessment of significance is undertaken twice. Initially, significance is based on only natural and existing mitigation measures (including built-in engineering designs). The subsequent assessment takes into account the recommended management measures required to mitigate the impacts (Table 8). Measures such as demolishing infrastructure, and reinstatement and rehabilitation of land, are considered post-mitigation.

The model outcome of the impacts was then assessed in terms of impact certainty and consideration of available information. The Precautionary Principle is applied in line with South Africa's National Environmental Management Act, 1997 (Act No. 108 of 1997) in instances of uncertainty or lack of information, by increasing assigned ratings or adjusting final model outcomes. In certain instances, where a variable or outcome requires rational adjustment due to model limitations, the model outcomes have been adjusted.

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<sup>2</sup> Some risks/impacts that have low significance will however still require mitigation.

Table 8-3: Significance Rating Matrix.

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

Table 8-4: Positive/Negative Mitigation Ratings

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



## 8.2 Methodology for Risk Assessment

Risk taking into account reversibility, the irreplaceable loss of resources and impact avoidance/management and mitigation.

The reversibility (Table 9) and irreplaceable loss of resources (Table 10) when summed can obtain a maximum value of 6. The extent of impact avoidance/ management/ mitigation (Table 11) carries a maximum value of 3. The values are then read off a significance rating matrix (Table 12) and are used to determine the level of residual risk.

Table 8-5: Impact Reversibility

CRITERIA	DEFINITION	RATING
Reversible	Can be reversed immediately (<month)	1
Moderate Reversibility	Can be reversed over a period of time (one month – one year)	2
Irreversible	Permanent alteration, cannot be reversed	3

Table 8-6: Irreplaceable loss of resources

CRITERIA	DEFINITION	RATING
Unlikely	It is unlikely that impacts will lead to an irreplaceable loss of resources.	1
Likely	Impacts have potential to lead to an irreplaceable loss of resources.	2
Definite	Impacts will definitely lead to an irreplaceable loss of resources.	3

Table 8-7: Impact Avoidance/Management/Mitigation degree

CRITERIA	DEFINITION	RATING
Possible	It is possible to avoid, manage and mitigate impacts	1
Moderately possible	Avoidance, management or mitigation possible but will require additional/alternative locations/technology – and financial resources.	2
Impossible	It is not possible to avoid, manage and mitigate impacts	3

Table 8-8: Risk Rating Matrix

	(IMPACT REVERSIBILITY + IRREPLACEABLE LOSS OF RESOURCES)		
(Impact Avoidance/ Management /Mitigation)	1	2	3
	2	4	6
	3	6	9

Risk Rating = (Impact Reversibility + Irreplaceable loss of resources) / Impact Avoidance

Table 8-9: Risk significance after mitigation

SIGNIFICANCE RATING	VALUE	DEFINITION
High	7-9	Risk higher than limit of acceptable change. Some environmental functions will permanently cease.
Medium	4-6	Receiving environment is likely to absorb impacts, however altered environment will be evident, and environment will function in a modified way.
Low	1-3	Risk indiscernible, natural environmental functions will not be affected.

Table 8-10: Site Risk Assessment Matrix

No.	Aspects	POTENTIAL IMPACT	LIKELIHOOD		CONSEQUENCE			SIGNIFICANCE RATING	LIKELIHOOD		CONSEQUENCE	RISK ASSESSMENT
		Description	Probability	Sensitivity	Significance	Extent	Duration	SIGNIFICANCE RATING	Degree to which impact can be reversed	Degree to which impact may cause irreplaceable loss of resources	Degree to which impact can be avoided, managed or mitigated	SIGNIFICANCE RATING
1	Topography	Loss of natural topography (hills, valleys, scenery).	3	4	2	3	4	Medium Low	2	1	2	Medium
2	Geology and Soil	Alteration of geological formations.	2	2	2	2	5	Low	2	2	2	Medium
		Construction on steep slopes promotes the loss of soil through surface erosion.	3	3	2	1	3	Low	1	1	1	Low
		Soil compaction from construction activities may cause erosion.	2	2	3	1	4	Low	1	1	1	Low
		Soil contamination of oil spillage from construction activities.	3	3	2	1	2	Low	2	1	1	Low
3	Climate	Wind direction might have a negative impact on the local community.	3	3	3	3	4	Medium Low	2	1	1	Low
4	Air Quality	Dust (construction phase)	3	3	1	2	3	Low	1	1	1	Low
		Exhaust fumes from construction trucks.	2	2	2	2	2	Very Low	1	1	1	Low
		Landfill is likely to generate greenhouse gases i.e. methane, carbon dioxide.	3	2	2	2	5	Low	2	1	2	Medium

No.	Aspects	POTENTIAL IMPACT	LIKELIHOOD		CONSEQUENCE			SIGNIFICANCE RATING	LIKELIHOOD		CONSEQUENCE	RISK ASSESSMENT
		Description	Probability	Sensitivity	Significance	Extent	Duration	SIGNIFICANCE RATING	Degree to which impact can be reversed	Degree to which impact may cause irreplaceable loss of resources	Degree to which impact can be avoided, managed or mitigated	SIGNIFICANCE RATING
		Traffic on unpaved roads.	3	3	1	3	4	Low	2	1	2	Medium
5	Noise	Movement of heavy vehicles	3	3	1	3	4	Low	2	1	2	Medium
		Blasting - construction phase.	5	3	3	1	2	Low	1	1	1	Low
6	Hydrology & Geohydrology	Disruption of ecological functioning of river systems.	3	3	3	4	4	Medium Low	2	2	2	Medium
		Possible Pollution of rivers and groundwater.	2	3	3	2	4	Low	2	2	2	Medium
		Risk of landfill leachate contaminating groundwater.	2	3	4	3	4	Medium Low	2	2	2	Medium
7	Terrestrial Biodiversity	Loss of flora and fauna habitat.	4	3	4	2	4	Medium Low	2	2	2	Medium
		Loss of nearby wetlands.	1	3	1	3	4	Low	2	2	2	Medium
9	Visual	Visual disturbances associated with the construction works that might be experienced by neighbouring residents.	4	3	4	3	4	Medium High	3	1	2	Medium
10	Heritage	Possible disruption of heritage.	2	2	2	2	5	Low	1	1	1	Low

## 9 CONCLUSION

In order to apply for a WML for the operation of the New Burgersfort landfill, an Environmental Impact Assessment, is being undertaken in terms of the EIA Regulations of 2014, promulgated in terms of NEMA.

This draft EIA has selected option two as the best possible Landfill Site Layout for the New Burgersfort landfill for the following reasons:

- There is an existing road giving direct access to the proposed structure, reducing the amount of money used for road construction
- The structures are located at an areas that is relatively topographically high as the landfill site drains to the SW corner, lowering the amount of money spent on installation of drainage mechanisms for the structures.
- The layout places overland structures like an overland leachate tank, weigh bridge and offices in areas identified to be difficult to excavate, freeing up space for the excavation of cells in the landfill site

The following key environmental issues associated with the construction and operation of the new Burgersfort Landfill site have been identified:

- Air quality – the landfill may generate emissions such as air pollutants (health related), odours and dust (nuisance) that significantly affect air quality;
- Noise – the operation of the landfill may increase noise levels in surrounding areas due to waste delivery trucks and on-site activities and machinery;
- Geohydrology – the disposal of waste at New Burgersfort landfill site may affect underlying aquifers through alteration of flow or pollution of groundwater and also affect river systems;
- Traffic – waste delivery trucks may have significant impact on the existing road network, traffic flows and other road users; and
- Visual – the operation of the landfill may affect the current visual character and sense of place of the surrounding areas through on-site activities and machinery and deposition of waste above the current ground level.

The EMPr (Annexure A) will attempt to mitigate the construction related impacts of the proposed development.

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SAWIC Minimum Requirements for Waste Disposal by Landfill

# **ANNEXURES**

## **Annexure A: EMPr**



## **Annexure B: Flood Line Investigation Report**

## **Annexure C: Geohydrological Report**

## **Annexure C: Geotech Report**

## **Annexure D: Heritage Impact Assessment Report**

## **Annexure E: Topographical Report**