

Proposed Incinerator Replacement at the Middelburg State Veterinary Laboratory, Eastern Cape

Final Basic Assessment Report

Report Prepared for

**Department of Rural Development and
Agrarian Reform**

Report Number 497875/Middelburg/3



Report Prepared by

 **srk** consulting

December 2017

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SRK Project Number 497875

December 2017

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List of Abbreviations

BAR	Basic Assessment Report
BID	Background Information Document
DEA	Department of Environmental Affairs (National)
DM	District Municipality
DRDAR	Department of Rural Development and Agrarian Reform
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EMPr	Environmental Management Programme
GADI	Grootfontein Agricultural Development Institute

IAPs	Interested and Affected Parties
LM	Local Municipality
MES	Minimum Emission Standards
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEM:WA	National Environmental Management: Waste Act (Act No 59 of 2008)
PPP	Public Participation Process
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
ToR	Terms of Reference
+ve	Positive
-ve	Negative

Glossary of Terms

Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Basic Assessment	An assessment of the positive and negative effects of a proposed development on the environment. The process involves collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of an application for environmental authorisation. A simpler process than EIA, that is subject to one phase (Basic Assessment) and generally does not include specialist studies.
Indigenous vegetation	Vegetation consisting of indigenous plant species occurring naturally in an area, regardless the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Interested and Affected Party	Any person, group of persons or organisation interested in or affected by an activity, and any Organ of State that may have jurisdiction over any aspect covered by the activity.
Registered Interested and Affected Party (IAP)	An Interested and Affected Party whose name is recorded in the register opened for the application / project.
Public Participation Process	A process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters relating to a proposed development.
No-go Alternative	The no-go alternative assumes that the proposed development does not go ahead and the site remains in its current state

Disclaimer

The opinions expressed in this report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd. (SRK) by the Department of Rural Development and Agrarian Reform. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

1 Introduction

1.1 Background and Introduction

The Department of Rural Development and Agrarian Reform (DRDAR) proposes to replace the existing incinerator at the Middelburg Veterinary Laboratory. The Laboratory generates organic waste during the conduct of diagnostic and analytical testing of specimen of animal origin. Organic waste, which includes animal carcasses and tissue samples, is disposed of through incineration.

The existing incinerator is used for incinerating organic waste at the Middelburg Veterinary Laboratory but it is more than 30 years old and as a result has become unserviceable. The chimney, burner and brick lining of the incinerator needs to be replaced as soon as possible. . One of the main objectives of the proposed incinerator replacement are to ensure that the facility complies with the relevant air quality and waste legislation and standards.

In terms of the List of Waste Management Activities as promulgated under the National Environmental Management: Waste Act (Act No 59 of 2008) (NEM:WA), the proposed development constitutes certain listed activities that require a Waste Management License prior to commencement of the activity. The process is undertaken in terms of the 2014 Environmental Impact Assessment (EIA) Regulations (as amended) as promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The applicant, DRDAR, must therefore apply to the Competent Authority for environmental approval to proceed with the development. In terms of Section 43(1)(a) of NEM:WA, the competent authority that must consider and decide on the application for authorisation in respect of the activities listed in Table 3-2 and Table 3-3 is the National Department of Environmental Affairs (DEA). As such, DRDAR has appointed SRK Consulting South Africa (Pty) Ltd. (SRK) as their independent Environmental Assessment Practitioner (EAP), to undertake the Basic Assessment process for the project. Since the existing incinerator is not licensed, an installation is also subject to a Section 22A process in terms of the National Environmental Management: Air Quality Act (Act No. 39 of 2004) (NEM:AQA). All legislative requirements are discussed in Section 3 of this report. This document constitutes the Final Basic Assessment Report (BAR), which forms part of the Basic Assessment process.

1.2 Details and Expertise of the Environmental Assessment Practitioners (EAPs)

SRK Consulting comprises over 1,500 professional staff worldwide, offering expertise in a wide range of environmental and engineering disciplines. SRK's Port Elizabeth environmental department has a distinguished track record of managing large environmental projects and has been practicing in the Eastern Cape since 2001. SRK has rigorous quality assurance standards and is ISO 9001 certified.

The qualifications and experience of the independent Environmental Assessment Practitioners (EAPs) undertaking the Basic Assessment are detailed below and Curriculum Vitae provided in **Error! Reference source not found.**

Project Director and Internal Reviewer: Rob Gardiner, MSc, MBA, Pr Sci Nat. Rob Gardiner is the Principal Environmental Scientist and head of SRK's Environmental Department in Port Elizabeth. He has more than 22 years environmental consulting experience covering a broad range of projects, including Environmental Impact Assessments (EIAs), Environmental Management Systems (EMS), Environmental Management Programmes (EMPr), and environmental auditing. His experience in the development, manufacturing, mining and public sectors has been gained in projects within South Africa, Lesotho, Botswana, Angola, Zimbabwe, Suriname and Argentina.

Project Manager: Karissa Nel, MEM (Environmental Management), EAPASA. Karissa Nel is a Senior Environmental Scientist and EAPASA registered EAP, and has been involved in environmental management for the past 10 years working on a variety of South African projects. Her experience includes Environmental Impact Assessments (EIAs), Environmental Management Programmes

(EMPr), Specialist Aquatic Assessments, Environmental Licensing, Environmental Auditing and Stakeholder Engagement.

Environmental Scientist: Karien Killian, MSc (Botany). Karien Killian is an Environmental Scientist and has been involved in environmental management for the past 3 years. Her experience includes Environmental Impact Assessments (EIAs), Environmental Management Programmes (EMPr), Water Use Licence Applications, Air Emission Licence Applications and Environmental Auditing.

1.3 Statement of SRK Independence

Neither SRK nor any of the authors of this report have any material present or contingent interest in the outcome of this report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK's fee for conducting this BA process is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the Report(s) or the BA process.

As required by the legislation, SRK has completed and submitted a declaration of interest, as part of the EIA application form, and the qualifications and experience of the individual practitioners responsible for this project are detailed above.

2 Project Description

2.1 Project Location

The DRDAR State Veterinary Clinic is located on the remainder of Farm 81 (Grootfontein) directly north of Middelburg in the Eastern Cape Province. The Grootfontein Agricultural College is located west of the site, and the closest residential area is Middelburg to the south. Access to the site is via the N9 west of the site. Refer to Figure 2-1 for the location of the site. The details of the relevant property is provided in Table 2-1.

Table 2-1: Property Description

Property Description	Remainder of Farm 81, Grootfontein
SG 21-digit code	C0480000000008100000
Centre co-ordinate of site	25°01'46.28" E 31°28'22.2"S
City/Closest Town	Middelburg
Province	Eastern Cape
Local Municipality	Lukhanji
District Municipality	Chris Hani

2.2 Proposed Development

DRDAR State Veterinary Clinic in Middelburg has an existing incinerator mainly for the incineration of animal carcasses at the clinic. The DRDAR proposes to replace the existing incinerator with a similar new incinerator as the existing incinerator has become unserviceable, i.e. the intention is to “replace like with like”. The new incinerator can only be purchased once the waste management license, and any other authorisations, have been issued. Since the applicant is dependent on readily available units by known suppliers, the size of the proposed incinerator could not be fixed for use in this study as is given as three potential different burn rates (45 kg/hour, 60 kg/hour and 75 kg/hour). All options have been assessed in the specialist Atmospheric Impact Report included in Appendix D.

The incineration process will be carried out by placing the material in the incinerator and igniting the diesel using an electrical burner. Incineration will be conducted as and when required, on average once a week. Carcasses are kept in a cold room until enough material has been gathered. The resulting ash will be placed in containers, collected and disposed of via an approved contractor (e.g. Compass Medical Waste Services) or disposed of at a licensed facility authorised to accept this waste. All other medical wastes, such as petri dishes and sharps, are also collected and disposed of by an approved service provider.

The process description is based on controlled-air incineration, which is the most widely used medical waste incinerator technology, and now dominates the market for new systems at hospitals and similar medical facilities. This technology is also known as starved-air incineration, two-stage incineration, or modular combustion.

Combustion of waste in controlled air incinerators occurs in two stages. In the first stage, waste is fed into the primary, or lower, combustion chamber, which is operated with less than the stoichiometric amount of air required for combustion. Combustion air enters the primary chamber from beneath the incinerator hearth (below the burning bed of waste). This air is called primary or underfire air. In the primary (starved-air) chamber, the low air-to-fuel ratio dries and facilitates volatilization of the waste, and most of the residual carbon in the ash burns. At these conditions, combustion gas temperatures are relatively low (760 to 980°C).



Figure 2-1: Site Locality Plan for the Middelburg incinerator

In the second stage, excess air is added to the volatile gases formed in the primary chamber to complete combustion. Secondary chamber temperatures are higher than primary chamber temperatures, typically 980 to 1,095°C. Depending on the heating value and moisture content of the waste, additional heat may be needed. This can be provided by auxiliary burners located at the entrance to the secondary (upper) chamber to maintain desired temperatures.

Waste feed and ash removal can be manual or automatic, depending on the unit size and options purchased. Because of the low air addition rates in the primary chamber, and corresponding low flue gas velocities (and turbulence), the amount of solids entrained in the gases leaving the primary chamber is low. Therefore, the majority of controlled air incinerators do not have add-on gas cleaning devices.

Several air pollutants are emitted from the incineration process due to the combustion of fuel and waste material within the furnace. The key pollutants emitted from veterinary waste incinerators are particulate matter, metals, acid gases, NO_x, CO, organics and various other materials present in medical wastes, such as pathogens, cytotoxins, and radioactive diagnostic materials. Emission rates depend on the design of the incinerator, combustion temperature, gas retention time, duct design, duct temperature and any control devices.

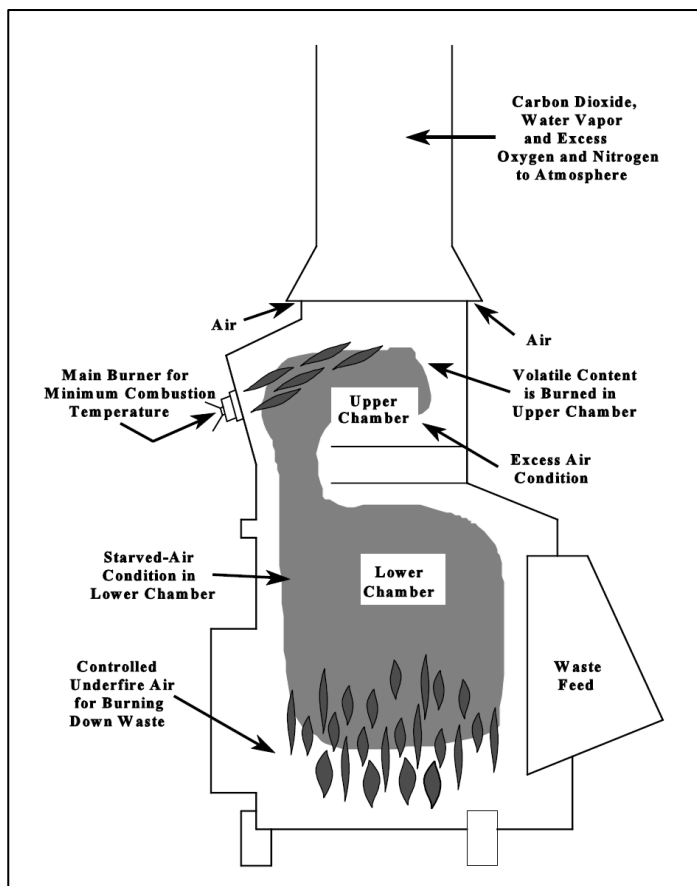


Figure 2-2: Typical schematic diagram of a controlled-air unit (Atmospheric Impact Report, Middelburg)

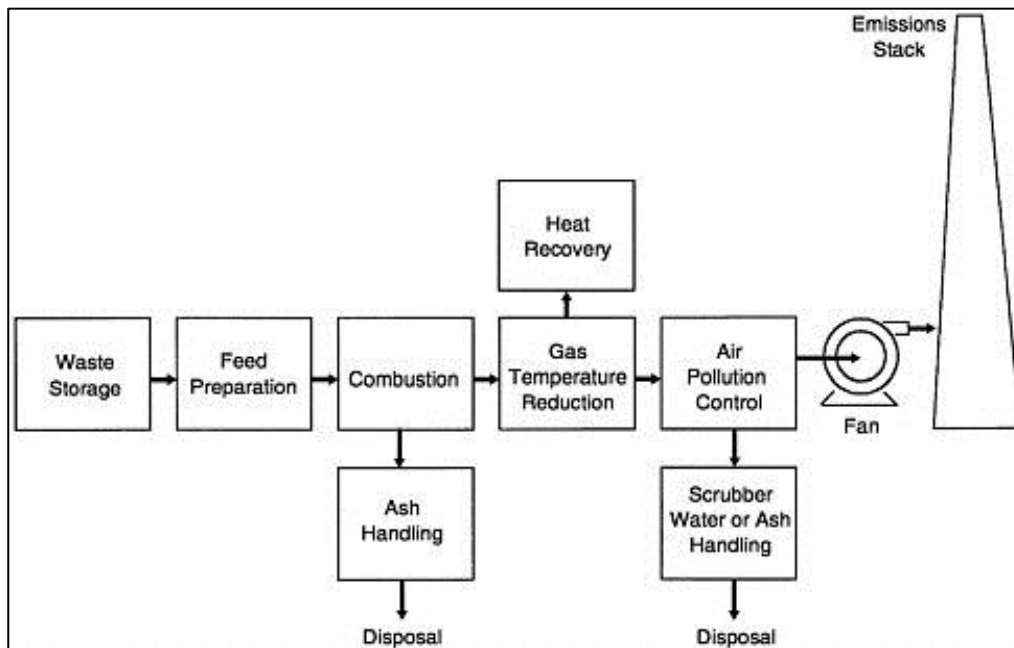


Figure 2-3: Typical waste incineration flow diagram (Atmospheric Impact Report, Middelburg)

2.3 Project Alternatives

Consideration of alternatives is an important element in the environmental assessment process. "Alternatives" are defined in the NEMA EIA regulations, 2014 (GN R 326 of 2014) as: "In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

- Property on which or location where the activity is proposed to be undertaken;
- Type of activity to be undertaken;
- Design or layout of the activity;
- Technology to be used in the activity; or
- Operational aspects of the activity; and
- The option of not implementing the activity" (No-Go option)

The role of the EAP is therefore to provide a framework for sound decision-making based on the principles of sustainable development. Potential alternatives that were considered for the proposed incinerator replacement are discussed below.

2.3.1 Location Alternative

The project proposes to replace the existing incinerator at the Middelburg Veterinary Laboratory with a similar new incinerator at exactly the same location.

No other location or property was considered as the purpose is to replace like with like, in so doing keeping the development footprint the same and minimising environmental impacts.

2.3.2 Activity Alternatives

The current on-site activity is incineration of veterinary waste and remains the preferred activity alternative. The following activity alternatives were considered during the design phase but were not found to be feasible and is therefore not assessed any further in this report:

1. Other facilities:

Incineration at other nearby facilities with licensed incinerators was considered, but no nearby facilities are available.

2. Burial or Landfill method of carcass disposal:

Burial of animal carcasses has historically been used as a disposal method in massive disease outbreaks. This method cannot be used routinely as it is unsustainable. The main disadvantages include:

- Unsustainability in terms of exhaustion of land for burial around the laboratories; and
- Contamination of underground water resources.

3. Outsourcing of hazardous waste disposal:

Outsourcing of hazardous waste disposal is a practical method which is currently being used by DRDAR. Compass Medical Waste Company has been contracted for this purpose. However, they do not dispose of animal carcasses. They dispose of all other waste including chemical waste and expired drugs and medicines, plastics, syringes and needles.

2.3.3 Design Alternatives

The existing incinerator will be replaced with a similar system. No abatement equipment is currently installed at the incinerator. The Atmospheric Impact Report determined that, due of the low air addition rates in the primary chamber, and corresponding low flue gas velocities (and turbulence), the amount of solids entrained in the gases leaving the primary chamber is low. Therefore, the majority of controlled air incinerators do not have add-on gas cleaning devices. There are no air pollution control and abatement technology proposed at the DRDAR State Veterinary Laboratory.

2.3.4 Technology Alternatives

Possible alternative methods for disposal of hazardous waste were considered but not deemed viable:

1. Hazardous Waste treatment and disposal at Landfills:

Hazardous waste can be sterilized through a number of methods including Autoclaving, irradiation or mechanical disinfection and then transported to the municipal landfill.

These methods are useful only for small quantities of hazardous waste generated by the laboratories but are impractical for disposal of animal carcasses. Radiation introduces its own hazard through exposure to the radiation rays.

2. Alkaline Hydrolysis:

Alkaline hydrolysis was also considered. This is a process by which organic matter is digested into a harmless liquid and bony material which material must still be disposed of. The disposal of these products would still be regulated by the NEM:WA (norms and standards).

The major draw backs to this system were:

- Cost - it is very expensive to establish and maintain; and
- The volume of waste left over is still too large. In the USA the system was abandoned because the incinerator was still required to burn the resulting solid waste.

2.3.5 Operational Alternatives

The new incinerator will have to be operated according to the supplier's Standard Operating Manual. Additional management or mitigation measures to manage the operational aspects have been suggested under the Impact Section in this report.

2.3.6 No-go Alternative

The current incinerator at the Middelburg State Veterinary Clinic has become unserviceable. The chimney, burner and brick lining of the incinerator needs to be replaced as soon as possible. There

are no other waste disposal options available to dispose of veterinary waste. If the existing incinerator continues to be used, air quality impacts from this unit will be increasingly higher negative impacts.

3 Relevant Legislation and Legal Requirements

3.1.1 National Environmental Management Act (Act No. 107 of 1998) (NEMA)

NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of the State, as well as to provide for matters connected therewith. Section 2 of NEMA establishes a set of principles that apply to the activities of all organs of state that may significantly affect the environment. These include the following:

- Development must be sustainable;
- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised; and
- Responsibility for the environmental health and safety consequences of a policy, project, product or service exists throughout its life cycle.

Section 28(1) states that:

“Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring.”

If such degradation/ pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks;
- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution; and
- Remedying the effects of the pollution.

Legal requirements for this project

The Department of Rural Development and Agrarian Reform (DRDAR) has a responsibility to ensure that the proposed incinerator replacement and associated construction activities and the Basic Assessment process conform to the principles of NEMA. The proponent is obliged to take action to prevent pollution or degradation of the environment in terms of Section 28 of NEMA.

3.1.2 NEMA 2014 EIA Regulations (as amended)

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an environmental authorisation (EA) issued by the competent authority. In this context, the 2014 EIA Regulations (as amended) GN R326 which came into effect on 8 December 2014 and amended in April 2017, promulgated in terms of NEMA, govern the process, methodologies and requirements for the undertaking of EIAs in support of EA applications. Listing Notices 1-3 in terms of NEMA list activities that require EA (“NEMA listed activities”).

GN R 982 of the EIA Regulations lays out two alternative authorisation processes. Depending on the type of activity that is proposed, either a Basic Assessment (BA) process or a Scoping & Environmental Impact Report process is required to obtain EA. Listing Notice 1¹ lists activities that require a BA

¹ GN R983 of 2014, as amended by GN327 of 2017.

process, while Listing Notice 2² lists activities that require S&EIR. Listing Notice 3³ lists activities in certain sensitive geographic areas that require a BA process.

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 Interested and Affected Party (IAP); and
- A draft EMP must be compiled and released for public comment.

GN R 982 sets out the procedures to be followed and content of reports compiled during the BA and S&EIR processes.

The NEMA National Appeal Regulations⁴ make provision for appeal against any decision issued by the relevant authorities. In terms of the Regulations, an appeal must be lodged with the relevant authority in writing within 20 days of the date on which notification of the decision (EA) was sent to the applicant or IAP (as applicable). The applicant, the decision-maker, interested and affected parties and organ of state must submit their responding statement, if any, to the appeal authority and the appellant within 20 days from the date of receipt of the appeal submission.

Legal requirements for this project

In light of the above, SRK has reviewed the legal requirements associated with the proposed activity in Middelburg, Eastern Cape.

It was concluded that the proposed incinerator replacement does not trigger any listed activities in terms of GN R 983, 984 or 985 (as amended). Listed activities that were considered during the legal review process are listed in Table 3-1:

Table 3-1: NEMA Listed Activities that were considered for this project during the legal review process

GNR 983 (Listing Notice 1):		
No.	Listed Activity	Project activities or infrastructure triggering the activity
34	The expansion or changes to existing facilities for any process or activity where such expansion or changes will result in the need for a permit or licence or amended permit or licence in terms of national or provincial legislation governing the release of emissions or pollution, excluding (i) where the facility, process or activity is included in the waste management activities published in terms of section 19 if the NEM:WA in which case the NEM:WA (2008) applies...	<p>The existing incinerator will not be expanded or added to (changed) in a manner that would trigger the need for a license, although it is recognised that an air emission license was originally required and a Section 22 A process needs to be followed to rectify that oversight. The incinerator will be replaced with a new one of similar capacity.</p> <p>This listed activity will not be triggered as the capacity of the incinerator will <u>not</u> be increased, and the footprint will <u>not</u> require expansion.</p>
GNR 984 (Listing Notice 2):		

² GN R984 of 2014, as amended by GN325 of 2017.

³ GN R985 of 2014, as amended by GN324 of 2017.

⁴ GN R993 of 2014, as amended by GN R2015 of 2015.

6	<p>The development of facilities or infrastructure for any process or activity which requires a permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding:</p> <p>(i) Activities identified and included in Listing Notice 1;</p> <p>(ii) Activities which are included in the list of waste management activities published in terms of section 19 if the NEM:WA in which case the NEM:WA (2008) applies...</p>	<p>The incinerator has been in operation for at least 30 years. It is however operated without an authorisation in terms of the National Environmental Management: Air Quality Act (Act No. 39 of 2004) and consequently a Section 22 A process is required.</p> <p>This listed activity will not be triggered as the incinerator and associated infrastructure are existing; it is not a <u>new development</u> or facility, but rather the replacement of like-with-like.</p>
28	<p>Commencing of an activity, which requires an atmospheric emission licence in terms of section 21 of the NEM:AQA (2004), excluding:</p> <p>(i) Activities identified under LN 1;</p> <p>(ii) Activities included in the list of waste management activities published in terms of section 19 if the NEM:WA in which case the NEM:WA (2008) applies...</p>	<p>The incinerator has been in operation for at least 30 years. It is however operated without an authorisation in terms of the National Environmental Management: Air Quality Act (Act No. 39 of 2004) and consequently a Section 22 A process is required.</p> <p>This listed activity will not be triggered as it is not a <u>commencement of a new activity</u>, but rather the replacement of like-with-like.</p>

3.1.3 National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA)

This Act (NEM:WA) seeks to reduce the amount of waste that is generated and, where waste is generated, to ensure that waste is re-used, recycled and recovered in an environmentally sound manner before being safely treated and disposed of.

In terms of section 19 of this Act, a list of waste management activities that have, or are likely to have, a detrimental effect on the environment, was published in General Notice 921 in Government Gazette 37083 of 29 November 2013. The list specifies two Categories (Category A & B) of activities, and depending on the type of activity undertaken, a Basic Assessment process (for Category A) or a Scoping and EIA process (for Category B) is required.

Legal requirements for this project

The listed activity described in Table 3-2, identified in Category A of the waste management activities as requiring a Basic Assessment process, applies to the proposed Incinerator replacement at Middelburg. Therefore, a Basic Assessment process must be conducted in accordance with the procedure stipulated in GN R 982 of the 2014 NEMA EIA Regulations, as amended.

Table 3-2: NEM:WA Listed Activity (2013) Applicable to the Proposed Project

No.	Listed activity	Project activities or infrastructure triggering the activity
7	<p><i>Category A -</i></p> <p>The treatment of hazardous waste using any form of treatment at a facility that has the capacity to process in excess of 500 kg but less than 1 ton per day.</p>	<p>The current daily throughput of the incinerator is approximately 100 - 300 kg/day, however the facility has the capacity to incinerate in excess of 500 kg/day (maximum of 900 kg/day).</p>

Due to the waste being considered a hazardous waste in terms of Schedule 3, Category A of NEM:WA, the National Department of Environmental Affairs (DEA) is the competent authority.

3.1.4 National Environmental Management: Air Quality Act (Act No. 39 of 2004) (NEM:AQA)

The object of this Act is to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air in the Republic, the prevention of air pollution and ecological degradation, and securing ecologically sustainable development while promoting justifiable economic and social development. Generally, the Act gives effect to section 24(b) of the Constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and wellbeing of people.

In terms of section 21(1) (b) of this Act, a list of activities which result in atmospheric emissions that have, or are likely to have, a detrimental effect on the environment including health, social conditions, economic conditions, ecological conditions or cultural heritage, was published in General Notice 893 in Government Gazette 37054 of 22 November 2013 (as amended on 12 June 2015).

Legal requirements for this project

The listed activity described in Table 3-3 applies to the proposed Incinerator replacement at Middelburg.

Table 3-3: NEM:AQA Listed Activity Applicable to the proposed project

Category of Listed Activity	Sub-category of the Listed Activity	Description of the Listed Activity
Category 8: Thermal Treatment of Hazardous and General Waste	Sub-category 8.2: Crematoria and Veterinary Waste Incineration	Cremation of human remains, companion animals (pets) and the incineration of veterinary waste.

The existing facility at the Middelburg State Veterinary Clinic is not licensed in terms of NEM:AQA. Therefore, in terms of section 22 A of this Act, which speaks of the consequences of unlawful conduct of listed activities resulting in atmospheric emission, section 24G of the National Environmental Management Act, 1998 (as amended) applies to the commencement, without an environmental authorisation, of a listed activity.

A Section 24G application form was completed and submitted to DEDEAT's Air Quality unit on 18 July 2016.

This Basic Assessment Report forms part of the Section 22A process as stipulated in Section 22A (4)(f) of NEM:AQA. The Report also satisfies the need for an Environmental Assessment Process in terms of NEM:WA.

An application for an Air Emission Licence (AEL) will be submitted online via the South African Atmospheric Emission Licencing and Inventory Portal (SAAELIP) as agreed upon in the meeting with DEA on 23 January 2017 (meeting minutes included in Appendix E5).

3.1.5 Other environmental legislation

In addition to the requirements for authorisation discussed above, there may be additional legislative requirements that need to be considered prior to commencing with the activity.

The following is a list of all additional legislation, policies and/or guidelines of relevant spheres of government that may be applicable to this application:

- South Africa's Constitution, 1996 (Act No. 108 of 1996), including the Bill of Rights (Chapter 2 Section 24);
- Environmental Conservation Act, 1989 (Act No. 73 of 1989) (ECA);

- National Ambient Air Quality Standards in Terms of Section 9(1)(a) and (b) of the NEM:AQA;
 - Model Noise Regulations published under the ECA;
 - Health Act, 1977 (Act No. 63 of 1977);
 - Occupational Health & Safety Act, 1993 (Act No. 85 of 1993);
 - National Heritage Resources Act, 1999 (Act No. 25 of 1999);
 - National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA);
 - National Forests Act, 1998 (Act No. 84 of 1998);
 - Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
 - The Water Act, 1956 (Act No. 54 of 1956);
 - Municipal Structures Act, 1998 (Act No. 117 of 1998); and
 - Municipal Systems Act, 2000 (Act No. 32 of 2000).
-

4 Need and Desirability

The existing incinerator is used for incinerating organic waste at the Middelburg State Veterinary Laboratory but it is more than 30 years old and as a result has become unserviceable. The chimney, burner and brick lining of the incinerator needs to be replaced as soon as possible. Some of the main objectives of the proposed incinerator replacement are to ensure that the facility complies with the relevant air quality and waste legislation and standards.

The main reasons why incineration of veterinary waste is deemed important includes, but are not limited to, the following:

- Incineration minimises infection risk to other animals as well as humans;
- Volume reduction of waste resulting in greater environmental protection; and
- Incineration eliminates the problem of leachate that is produced by landfills.

It should be noted that the proposed activity constitutes the replacement of an existing unit with a similar unit ('replacing like with like' scenario), which in this case will be better and more modern technology and which is likely to have less environmental (air quality) impact than the current old incinerator. The existing setting within which the incinerator at the DRDAR State Clinic is located, is also not contrary to the surrounding land uses

5 Description of the Environment

This chapter provides a description of the biophysical and socio-economic environments that could potentially be impacted by the proposed incinerator replacement.

Descriptions of the environment are based on a combination of on-site observations, GIS information, a specialist study, and a survey of the relevant literature to determine what could be expected on or near the site of the proposed development.

It should however be noted that there is an existing incinerator on site and that it is simply being replaced, the development footprint remains the same as well as the size of the incinerator.

5.1 Climate

The DRDAR State Veterinary Laboratory in Middelburg is located at approximately 31°28'22.20"S and 25° 1'46.28"E, and approximately 1,270 m above sea level. It experiences a cold semi-arid climate according to the Köppen Climate Classification system. Temperature and rainfall at Middelburg are best illustrated by long-term measurements at the SAWS meteorological station at Grootfontein Agricultural College (Figure 5-1). Winters are cool with average maximum temperatures dropping below 18.5°C between May and August, but are relatively cold at night dropping below 3.5°C. Summers are hot and the average maximums exceed 24.5°C from October to March, with extremes reaching more than 30°C in January. Middelburg receives an average of 362 mm of rainfall annually, with 72% of the rainfall occurring in the summer months from October to March. Rainfall seldom occurs in winter between April and September. (Atmospheric Impact Report, 2017).

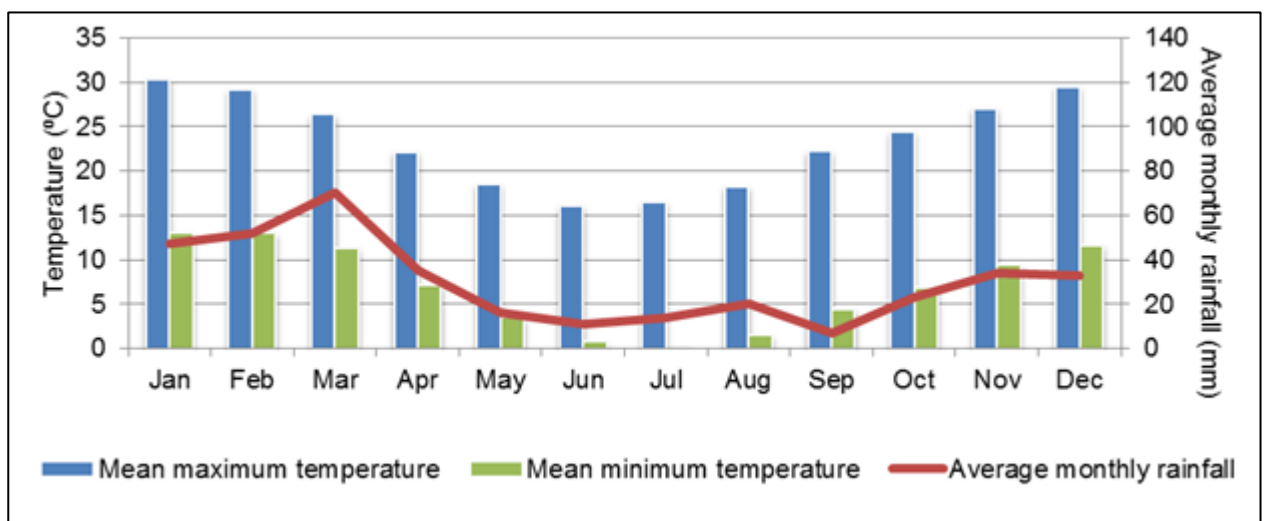


Figure 5-1: Average monthly maximum and minimum temperature at Grootfontein. The average monthly rainfall is in mm (SAWS, 1998)

5.2 Wind

The topography of the Eastern Cape rises gently from sea level in the southeast to the plains of the Great Karoo, and rises dramatically to the Drakensburg-Maluti escarpment of over 3 000 m in the northeast. The escarpment bisects inland areas while the southern parts are defined by a series of rolling hills and river valleys. The Middelburg area is relatively flat with some influence from topography on the wind flow, particularly from the northeast.

The hourly wind speed and wind direction data at Middelburg are presented in the annual windrose in Figure 5-2. A windrose illustrates the frequency of hourly wind from the 16 cardinal wind directions, with wind indicated from the direction it blows, i.e. easterly winds blow from the east. It also illustrates the frequency of average hourly wind speed in six wind speed classes in m/s. The windrose data is derived from a global weather model at approximately 30 km resolution.

In general, winds are light to fairly strong with the majority of hourly winds between 1.6 m/s and 8 m/s. Stronger winds reaching more than 8 m/s do occur, however seldom and mostly from the north to west sector and southeast. The predominant wind direction is north-westerly and east-southerly accounting for about 35% of all hourly winds. These sectors also represent the predominant wind direction, accounting for about 60% of all hourly winds (Atmospheric Impact Report, 2017).

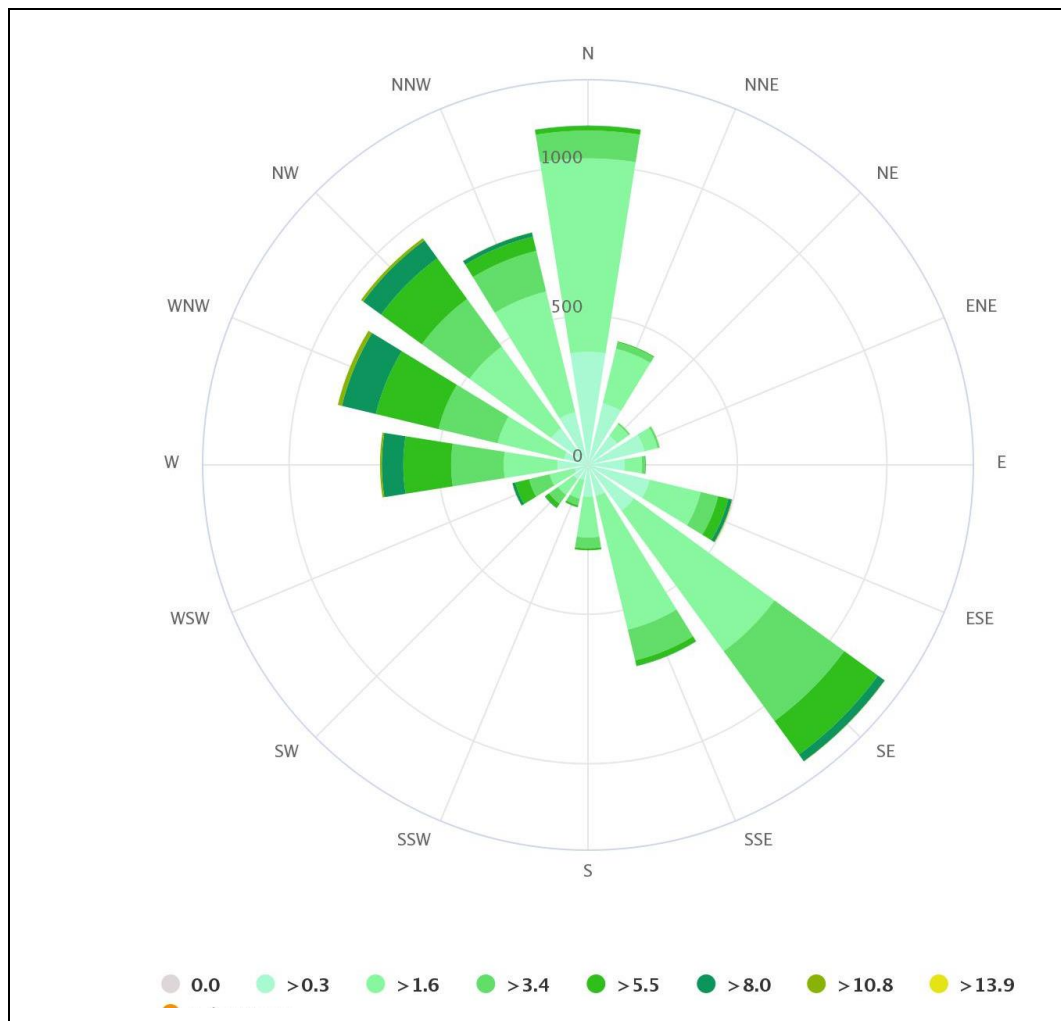


Figure 5-2: Annual windrose at Middelburg with wind speed (m/s) and frequency bands of 500 hours (<https://www.meteoblue.com/en/weather/forecast/modelclimate>)

5.3 Ambient Air Quality

There are no monitoring programs for particulates (PM₁₀ and PM_{2.5}), NO_x, SO₂ and CO in the municipality or in the vicinity of the DRDAR State Veterinary Laboratory located in Middelburg. It is therefore not possible to provide the current status of ambient air quality in terms of these selected pollutants in the vicinity of the Laboratory. Ambient air quality in Middelburg is influenced by a number of sources of air pollution, including large and smaller industry, transportation, agricultural burning, mining and the long range transport of pollutants from the interior. Emissions from industrial facilities include SO₂, NO_x and particulate matter. Emissions from vehicles travelling on nearby roads and the small-scale aviation industry are important sources of NO_x, SO₂, CO, CO₂, Pb, particulates and volatile organic compounds (VOCs). Biomass burning is an important source of atmospheric emissions in the province. Uncontrolled and controlled burning of natural vegetation, agricultural residue and waste burning are the main types of biomass burning that occur in the province. Fires can emit large quantities of particulate matter, ranging from coarse smut that deposit on surfaces (a nuisance) to fine inhalable particulate matter (PM₁₀). Gases emitted from biomass burning include CO, NO_x and VOCs. Other activities in the area include the handling of petrochemical products which mainly emit VOCs.

However, the DRDAR State Veterinary Laboratory is not located in close proximity of any of these pollutant sources.

More general information regarding the air quality constituents are available in the Atmospheric Impact Report in Appendix D.

5.4 Vegetation

According to SANBI BGIS (2017), the site falls within the Upper Karoo Bioregion and the Eastern Upper Karoo vegetation type, with the Tarkastad Montane Shrubland vegetation type directly north of the site (Mucina & Rutherford, 2012). Both vegetation types are considered Least Threatened in terms of conservation status. Eastern Upper Karoo is typically associated with flats and gently sloping plains, dominated by dwarf microphyllous shrubs, with 'white' grasses of the genera *Aristida* and *Eragrostis* (these become prominent especially in the early autumn months after good summer rains). The grass cover increases along a gradient from southwest. Tarkastad Montane Shrubland is typically associated with ridges, hills and isolated mountain slopes characterised by high surface rock cover, this often consisting of large, round boulders. The vegetation is low, semi-open, mixed shrubland with 'white' grasses and dwarf shrubs forming a prominent component of the vegetation.

5.5 Geology and soils

The Middelburg area consists predominantly of the Adelaide and Tarkastad Subgroups of the Beaufort Group of the Karoo Supergroup. The Tarkastad Subgroup comprises mostly of a lower sandstone rich Katberg Formation and overlying red mudstone rich Burgersdorp Formation. The Adelaide Subgroup comprises of grey and brownish-red mudstones and sandstones. Karoo Dolerite intrusions are present in some areas and due to its resistance to weathering, underlie most of the higher topography in the region (Johnson, et. al., 2006).

5.6 Land use and existing impacts

The site is situated within the Grootfontein Agricultural Development Institute (GADI) and land use surrounding the area is mainly in the form of agricultural activities. The site is just off the N9, which lies to the north west.

The closest residential areas to the DRDAR State Veterinary Laboratory within a 5 km radius are Grootfontein (0.1 km) to the west, Middelburg (2.4 km) to the south-west, Midros (2.7 km) to the south, and Kwanonzame (3.4 km) to the south. These areas have been selected as sensitive receptors for the study area and was specifically used in the specialist Air Quality Impact Report.

Although the DRDAR State Veterinary Laboratory has operated without an air emission licence, and therefore not monitored for comparison with the relative air quality standards, the air quality specialist found the estimated emission rates to be relatively low, even with no emission control devices in place. Therefore, emission concentrations currently complies with the Minimum Emission Standards (MES) for existing plants. This was concluded in the Atmospheric Impact Report (Appendix D).

Domestic waste is stored in disposal bins and removed on a weekly basis by GADI and taken to the municipal landfill site. There are currently no recycling facilities available in Middelburg. Medical waste such as scalpel blades, used needles, expired vaccines and used vaccine and drug bottles are removed regularly by Compass Medical Waste Services

6 Public Participation

A Public Participation Process (PPP) was undertaken with the intent of informing key local communities (directly affected people) about the proposed development and the Basic Assessment process underway. Public participation plays an important role in the compilation of environmental reports as well as the planning, design, and ultimately the implementation of the project. Public participation is a process leading to informed decision-making, through joint effort by the proponent, technical experts, governmental authorities, and systematically identified interested and affected parties (IAPs).

The overall aim of the PPP is to ensure that all Interested and Affected Parties (IAPs) have adequate opportunities to provide input into the process. More specifically, the objectives of the PPP are as follows:

- Identify IAPs and notify them of the proposed project and of the EIA process;
- Provide an opportunity for IAPs to raise issues and concerns;
- Provide an opportunity for IAPs to review and comment on all reports before they are finalised; and
- Provide a record of responses to comments and concerns available to IAPs.

6.1 Identification of Interested and Affected Parties

The PPP for the project was initiated with the development of a comprehensive IAP database (refer to Appendix E). The IAP database included:

- Commenting authorities;
- Landowners;
- Adjacent landowners;
- Residents' Association;
- Local and district municipality; and
- Ward Councillor.

6.2 Public Participation Activities

The Public Participation Process that was undertaken to solicit public opinion regarding the proposed activity has included the following activities so far (for proof of the activities below, please refer to the Appendix E):

- Placement of an onsite poster at the entrance of the Grootfontein Agricultural Development Institute Veterinary Diagnostic Centre on 25 February 2016;
- Placement of a notice in a newspaper circulating in the area (The Advertiser) on 4 March 2016 advertising the process and inviting registration as an IAP;
- Distribution of the Background Information Document (BID) for a 21-day comment period (9 March - 30 March 2016) to authorities, stakeholders and identified Interested and Affected Parties (IAPs);
- Preparation of a Draft Basic Assessment Report (DBAR);
- Inclusion in the DBAR of issues that were raised in response to the onsite poster, newspaper notice and BID, along with responses to these issues;
- Distribution of the complete DBAR to the relevant authorities for comment;
- Making a hard copy of complete DBAR available at a public venue (Middelburg Public Library) for review and comment by IAPs;
- Distribution of the Executive Summary of the DBAR to all IAPs and stakeholders registered for this project;
- Making an electronic copy of the complete DBAR available to IAPs and stakeholders upon request;
- Provision of a 30-day comment period on the DBAR (24 October-22 November 2017);

- Collation of comments on the DBAR, and incorporation of these into the Final Basic Assessment Report (FBAR) (this report);
- Distribution of the FBAR to the relevant authorities for informational purposes;
- Distribution of the executive summary of the FBAR to registered IAPs and stakeholders for informational purposes;
- Making an electronic copy of the complete FBAR available to IAPs and stakeholders upon request; and
- Submission of the FBAR to DEA for a decision regarding granting of the Waste Management Licence.

Activities that will still be undertaken as part of the public participation process are:

- Informing authorities, stakeholders and registered IAPs of the decision and appeal procedure once it is received.

6.3 Comments Received from I&APs

Comments received in response to the content of the onsite poster, newspaper notice and BID are summarised in Table 6-1 below. Original comments are included in Appendix E5. One comment was received in response to the content of the DBAR.

Table 6-1: Comments and Responses Table on the content of the onsite poster, newspaper notice and BID

Commentator	Issue Raised	Response (by SRK unless otherwise noted)
L Mardon (DEDEAT)	Facility needs to undergo a Section 22A process in terms of the Air Emissions Licence (AEL). Chris Hani is the AEL licensing authority. Proposes a meeting to discuss the matter.	Meetings was held to discuss the required process (refer to meeting records in Appendix E6).
A Tshikungulu (DAFF)	Proposed site is on campus of Grootfontein Agricultural Development Institute in close proximity of offices, classrooms and residential houses.	Note that the installation is the replacement of an existing unit (the impacts are already occurring). Please refer to section 7.2 of this report regarding the potential impacts on the environmental and nearby receptors. Potential impacts have been rated with very low significance and will therefore not affect students, staff and residents negatively.
A Tshikungulu (DAFF)	Facility will also be of value and use for the Grootfontein Agricultural Development Institute to dispose of its waste in term of the description of the development.	Noted.
A Prinsloo (Chris Hani DM)	Storage and disposal of waste generated.	Please refer to section 7.2 of this report regarding the potential impacts on the environmental and nearby receptors. Potential impacts have been rated with very low significance.
A Prinsloo (Chris Hani DM)	Smoke Emission issues / fumes.	Please refer to section 7.2 of this report regarding the potential impacts on the environmental and nearby receptors. Potential impacts have been rated with very low significance.
A Prinsloo (Chris Hani DM)	Noise issues.	Please refer to section 7.2 of this report regarding the potential impacts on the

Commentator	Issue Raised	Response (by SRK unless otherwise noted)
		environmental and nearby receptors. Potential impacts have been rated with very low significance.
A Prinsloo (Chris Hani DM)	Toilet facilities for staff.	Toilet facilities do not form part of the current scope of work.

Table 6-2: Comments and Responses Table on the content of the DBAR

Commentator	Issue Raised	Response (by SRK unless otherwise noted)
S Mduzana (DEDEAT)	Middelburg has a general waste landfill site. The waste for the proposed development must be disposed of at a site registered for hazardous waste.	Please refer to Table 7-13 under Potential Waste Management Impacts where the removal and disposal of hazardous waste is mentioned. The ash that is left after incineration will be removed by a registered service provider (e.g. Compass Medical Waste) authorised to remove hazardous waste.
S Mduzana (DEDEAT)	The replaced incinerator must be decontaminated prior to disposal. The DBAR must clearly indicate where the replaced incinerator will be disposed of.	The decommissioned incinerator will be decontaminated by means of mechanical disinfection and then either taken to a municipal landfill site or recycled should any part of the incinerator be suitable for recycling. Please refer to Potential Waste Management Impacts (Section 7.2.2) as well as Table 7-12 in this report.
S Mduzana (DEDEAT)	In the DBAR the waste is classified as Category A(6), however on the application it reflects Category A(7). Kindly rectify this in the FBAR.	Noted. Please refer to Table 3-2 in this report where it refers to the waste as Category A (7).
S Mduzana (DEDEAT)	The DBAR indicates that the AEL application will be submitted to CHDM. Confirmation of submission must be included in the FBAR.	Please note that the AEL application must be submitted to DEA and not CHDM as the waste is regarded as hazardous (See Meeting minutes in Appendix E8 (ii)). We are currently awaiting guidance from DEA which we require to complete the online AEL submission and we were therefore not able to submit the application prior to the release of the FBAR. Submission is expected to occur shortly.

7 Identification and Assessment of Potential Environmental Impacts

This section provides a brief indication of the significant potential positive and negative environmental impacts relating to the proposed incinerator replacement. Once a potential issue and/or potential impact has been identified it is necessary to identify which activity or aspect of the development would result in the impact. By considering the cause of the issue, the probability of the activity resulting in an impact can be determined. The associated impact can then be assessed to determine the significance and to define mitigation or management measures to address the impact.

The potential environmental impacts associated with activities during construction are usually short lived and mitigated in an Environmental Management Programme (EMPr) (refer to Appendix F for the draft EMPr). Once approved the EMPr will be implemented on-site and enforced by regular monitoring with submission of audit reports to the DEA.

The impact assessment methodology and the potential issues or impacts identified by the EAP and the atmospheric emission specialist are detailed in the sub-sections to follow. A copy of the Atmospheric Impact Report is included in Appendix D.

7.1 Impact Rating Methodology

The assessment of impacts will be based on the professional judgement of the Environmental Assessment Practitioners (EAPs) as well as that of external specialists, fieldwork, and desk-top analysis. The significance of potential impacts that may result from the proposed development will be determined in order to assist the competent authority in making a decision.

The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur. The criteria that are used to determine impact consequences are presented in Table 7-1 below.

Table 7-1: Criteria used to determine the Consequence of the Impact

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

Medium-term	2 to 15 years	2
Long-term	More than 15 years	3

The combined score of these three criteria corresponds to a Consequence Rating, as follows:

Table 7-2: Method used to determine the Consequence Score

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

Once the consequence has been derived, the probability of the impact occurring will be considered using the probability classifications presented in Table 7-3.

Table 7-3: Probability Classification

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

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

Table 7-4: Impact Significance Ratings

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

Significance Rating	Possible Impact Combinations		
	Consequence		Probability
	Very High	&	Improbable
	Very High	&	Possible
Very High	Very High	&	Probable
	Very High	&	Definite

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

Table 7-5: Impact status and confidence classification

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

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

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

Practicable mitigation measures will be recommended and impacts will be rated in the prescribed way both with and without the assumed effective implementation of mitigation measures. Mitigation measures will be classified as either:

- Essential: must be implemented and are non-negotiable; or
- Optional: must be shown to have been considered, and sound reasons provided by the proponent, if not implemented.

7.2 Assessment of Potential Impacts

7.2.1 Potential Air Quality Impacts

This section describes the impacts that the proposed activity will have on the air quality in the surrounding area, and provides recommendations for mitigation measures. Air quality impacts have been qualitatively assessed and rated by an Atmospheric Emission Specialist from uMoya-NILU Consulting.

USEPA AP42 emission factors were used to estimate emissions of particulates (PM₁₀ and PM_{2.5}), oxides of nitrogen (NO_x), sulphur dioxide (SO₂) and carbon monoxide (CO) from the proposed new incinerator, for three burn rates (45 kg/hour, 60 kg/hour and 75 kg/hour) to take account of a range of incinerator loads, under normal operating conditions. It is evident that resultant emission rates are relatively low, even with no emission control devices in place. Emission concentrations also comply with the Minimum Emission Standards (MES) for existing plants. However, emission concentrations exceed the MES for new plants for particulates for all three burn rates and for CO for the 60 kg/hour and 75 kg/hour burn rates. The specialist therefore recommended that a combination of control mechanisms be used to target specific pollutants to achieve compliance with the respective MES for implementation in 2020.

However, even though it is necessary to consider emissions at the stack for compliance purposes, ambient air quality/concentrations are mainly evaluated in order to assess the atmospheric impact of the facility on human health. DEA recommended an USEPA-approved SCREEN3 dispersion model is used to assess the effects and potential consequences of uncontrolled emissions from the proposed new incinerator in the surrounding environment. A compliance assessment was undertaken using the National Ambient Air Quality Standards (NAAQS) and internationally recognised guidelines, specifically in residential areas and other areas where human exposure could occur.

The NAAQS consists of a 'limit' value and a permitted frequency of exceedance. The limit value is the fixed concentration level aimed at reducing the harmful effects of a pollutant. The permitted frequency of exceedance represents the acceptable number of exceedances of the limit value expressed as the 99th percentile. Compliance with the ambient standard implies that the frequency of exceedance of the limit value does not exceed the permitted tolerance. Being a health-based standard, ambient concentrations below the standard imply that air quality poses an acceptable risk to human health, while exposure to ambient concentrations above the standard implies that there is an unacceptable risk to human health. The NAAQS for particulates (PM₁₀ and PM_{2.5}), NO₂, SO₂ and CO are presented in Table 7-6. The highest predicted ambient concentrations from the dispersion modelling exercise is presented in Table 7-7. No exceedance of the NAAQS is predicted within the site or in sensitive receptor areas around the site.

Table 7-6: Ambient air quality standards and guidelines

Pollutant	Averaging period	Limit value (µg/m ³)	Tolerance
PM ₁₀	24 hour	75	4
	1 year	40	0
PM _{2.5}	24 hour	40	4
	1 year	20	0
NO ₂	1 hour	200	88
	1 year	40	0
SO ₂	1 hour	350	88
	24 hour	125	4
	1 year	50	0
CO	1-hour	30 000	88
	8-hour running mean	10 000	11

Table 7-7: Maximum predicted ambient concentrations for the proposed new incinerator

Ambient Concentration ($\mu\text{g}/\text{m}^3$)	Burn Rate (kg/hour)								
	45	60	75	45	60	75	45	60	75
	1-hour Average			24-hour Average			Annual Average		
PM10	2.70	3.60	4.51	1.08	1.44	1.80	0.22	0.29	0.36
PM2.5	1.80	2.40	3.00	0.72	0.96	1.20	0.14	0.19	0.24
NO2	3.18	4.24	5.30	1.27	1.69	2.12	0.25	0.34	0.42
SO2	1.95	2.59	3.24	0.78	1.04	1.30	0.16	0.21	0.26
CO	2.64	3.52	4.40	1.85	2.47	3.08	0.21	0.28	0.35

Impact AQ1: Impact of dust during construction and decommissioning

Prior to **construction** of the proposed new incinerator at the Middelburg State Veterinary Laboratory, the old incinerator structures will be disassembled and moved off site. The proposed new incinerator and associated structures will be brought to site by truck and assembled at the same location where the current incinerator is located. Dust emissions and other emissions are not expected to be high during this process as the site is not located in a dusty environment (mainly on paved surfaces). No additional construction or clearing of vegetation is foreseen and the site would remain in its current condition. No mitigation measures are therefore proposed. This impact is rated as insignificant with and without mitigation measures.

The need or timeframe for **decommissioning** has not been established, however this potential impact is assessed for completeness. During decommissioning of the incinerator, the incinerator structures will be disassembled and moved off site. Dust emissions and other emissions are not expected to be high during this process and the site would remain in its current condition. No mitigation measures are therefore proposed. This impact is rated as Insignificant with and without mitigation measures. The outcome of the impact significance rating is given in Table 7-8.

Table 7-8: Significance rating of impact AQ1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence	Reversibility
Before and After Management	Local	Low	Short term	Very Low	Improbable	Insignificant	-	High	High

Impact AQ2: Impact of emissions of particulates (PM₁₀ and PM_{2.5}), NO_x, SO₂ and CO during construction and decommissioning

Particulate matter with a diameter equal to or less than 10 μm (PM₁₀) are generally emitted from motor vehicles, construction sites (windblown dust) and unpaved roads. All the roads surrounding the DRDAR State Veterinary facility as well as other surfaces are paved, and there will be a minimal increase in the amount of vehicles travelling to the site, or on the site during the construction phase. Should these coarse particles be present, these are generally found relatively close to the source except in strong winds. Residents and students of the Grootfontein Agricultural Development Institute (GADI), are the closest receptors to the site.

Motor vehicles, in particular diesel vehicles emit SO₂, due to the higher sulphur content of diesel fuel. A minimal increase in vehicular traffic is to be expected on site during the construction phase, and should there be diesel vehicles present (delivery vehicles) their effect would be once-off and short-lived.

The outcome of the impact significance rating is given in Table 7-9. Impacts during construction and decommissioning with or without mitigation will be local in extent, low intensity, of a short-term duration

and therefore of very low consequence. The probability of impacts occurring is improbable. The significance rating is therefore insignificant, implying that the potential impact is negligible and will not have an influence on the decision regarding the proposed development. The construction and decommissioning phase will not have a significant negative impact on the environment. No mitigation or management measures have been recommended. There is a high confidence associated with the impacts and the reversibility of the impacts is high.

Table 7-9: Significance rating of impact AQ2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence	Reversibility
Before and after Management	Local	Low	Short-term	Very low	Improbable	Insignificant	-	High	High

Impact AQ3: Impact of emissions of particulates (PM₁₀ and PM_{2.5}), NO_x, SO₂ and CO during operation

It should be noted that this is a replacement of an existing incinerator, therefore impacts are anticipated to be similar to what it was before the replacement. As the existing incinerator is very old and in a state of disrepair, replacing it with a new unit is likely to improve existing conditions (air quality impacts). The impact is however reflected as a negative impact, similar to a new installation, in order to present the potential effects of incineration at the site.

In order to assess the atmospheric impact of the incinerator on human health, a dispersion modelling study was undertaken in accordance with the regulations regarding air dispersion modelling specified for regulatory purposes – developed in terms of section 53 of AQA. The impact assessment only takes the emissions of the facility under consideration as well as prevailing ambient air concentrations into account during this assessment.

The dispersion modelling results for the predicted 1-hour, 24-hour and annual average ambient concentrations of particulates (PM₁₀ and PM_{2.5}), NO₂, SO₂ and CO resulting from emissions from the proposed new incinerator are listed below and the maximum predicted ambient concentrations presented in Table 7-10. The predicted ambient concentrations are based on uncontrolled emissions and are assessed against the respective National Ambient Air Quality Standards.

- The predicted 24-hour average and annual average PM₁₀ concentrations are very low and well below the NAAQS of 75 µg/m³ and 40 µg/m³ respectively, for the three burn rates (45 kg/hour, 60 kg/hour and 75 kg/hour);
- The predicted 24-hour average and annual average PM_{2.5} concentrations are very low and well below the NAAQS of 40 µg/m³ and 20 µg/m³ respectively, for the three burn rates;
- The predicted 1-hour average and annual average NO₂ concentrations are very low and well below the NAAQS of 200 µg/m³ and 40 µg/m³ respectively, for the three burn rates;
- The predicted 1-hour, 24-hour and annual average SO₂ concentrations are very low and well below the NAAQS of 350 µg/m³, 125 µg/m³ and 50 µg/m³ respectively, for the three burn rates; and
- The predicted 1-hour and 24-hour average CO concentrations are very low and well below the NAAQS of 30 000 µg/m³ and 10 000 µg/m³ respectively, for the three burn rates.

In all cases, ambient concentrations are very low on site and reach a maximum approximately 200 m downwind of the site. No exceedance of the NAAQS is predicted within the site or in residential and sensitive receptor areas around the site. The predicted PM₁₀, PM_{2.5}, NO₂, SO₂ and CO concentrations therefore comply with the NAAQS in the ambient environment.

Due to the low air addition rates in the primary chamber, and corresponding low flue gas velocities (and turbulence), the amount of solids entrained in the gases leaving the primary chamber is low.

Therefore, the majority of controlled air incinerators do not have add-on gas cleaning devices. There are no air pollution control and abatement technology proposed at the DRDAR State Veterinary Laboratory.

In accordance with the predicted ambient concentrations as above, odours should be very low on site and reach a maximum approximately 200 m downwind of the site. The residents and students of the Grootfontein Agricultural Development Institute (GADI) are the closest receptors to the site.

Table 7-10: Maximum predicted ambient concentrations for the proposed new incinerator

Ambient Concentration ($\mu\text{g}/\text{m}^3$)	Burn Rate (kg/hour)								
	45	60	75	45	60	75	45	60	75
	1-hour Average			24-hour Average			Annual Average		
PM ₁₀	2.70	3.60	4.51	1.08	1.44	1.80	0.22	0.29	0.36
PM _{2.5}	1.80	2.40	3.00	0.72	0.96	1.20	0.14	0.19	0.24
NO ₂	3.18	4.24	5.30	1.27	1.69	2.12	0.25	0.34	0.42
SO ₂	1.95	2.59	3.24	0.78	1.04	1.30	0.16	0.21	0.26
CO	2.64	3.52	4.40	1.85	2.47	3.08	0.21	0.28	0.35

The outcome of the impact significance rating is given in Table 7-11. Impacts during operation with or without mitigation will be local in extent, low intensity, of a long-term duration and therefore of low consequence. The probability of impacts occurring is improbable. The significance rating is therefore very low, implying that the potential impact is negligible and should not have any meaningful influence on the decision regarding the proposed development. The operational phase, with or without mitigation, will not have a significant negative impact on the environment. There is a high confidence associated with the impacts and the reversibility of the impacts is high.

Table 7-11: Significance rating of impact AQ3 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence	Reversibility
Before Management	Local	Low	Long-term	Low	Improbable	Very Low	-	High	High
Management Measures									
<ul style="list-style-type: none"> The incinerator should be operated according to the supplier's operating manual; Training should be provided to personnel responsible for operating the incinerator; Only trained personnel should be allowed to operate the incinerator; No unauthorised waste should be placed in the incinerator; and Air quality monitoring will be implemented at a frequency determined by DEA's Air Quality Management Department and specified in the Atmospheric Emission Licence. 									
After Management	Local	Low	Long-term	Low	Improbable	Very Low	-	High	

7.2.2 Potential Waste Management Impacts

This section describes the waste management impacts associated with the proposed development, the significance thereof and the recommended mitigation measures, as assessed and rated by the Environmental Assessment Practitioner (EAP).

Impact W1: Waste management impacts associated with construction and decommissioning

Prior to construction or decommissioning, the existing incinerator and associated structures needs to be disassembled, mechanically disinfected and removed off site. Both construction waste and waste

generated during the decommissioning phase will be removed off site by trucks and either taken to the municipal landfill site in Middelburg or be processed as scrap metal. Volumes of inert construction waste are estimated to be approximately one skip. Illegal disposal on site may lead to negative ecological as well as visual impacts. It is unlikely that illegal dumping will occur in this regard due to the valuable material to be disposed of. Recycling of the scrap metal is likely to occur and is recommended.

The outcome of the impact significance rating is given in Table 7-12. Impacts during construction and decommissioning with or without mitigation will be local in extent, medium intensity, of a short-term duration and therefore of very low consequence. The probability of impacts occurring is possible. The significance rating is therefore insignificant, implying that the potential impact is negligible and will not have an influence on the decision regarding the proposed development. The construction and decommissioning phase, with or without mitigation, will not have a significant negative impact on the environment. There is a high confidence associated with the impacts and the reversibility of the impacts is high.

Table 7-12: Significance rating of impact W1 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence	Reversibility
Before Management	Local	Medium	Short term	Very Low	Possible	Insignificant	-	Medium	High
Management Measures									
<ul style="list-style-type: none"> • Where possible, material should be recycled or taken to recycling facilities such as scrap metal yards; • The Contractor must identify and separate materials that can be reused or recycled to minimise waste, e.g. metals, packaging and plastics, and provide separate marked bins/ skips for these items. These wastes must then be sent for recycling and records kept of recycling should any recycling facilities be available; • No disposal of wastes, other than at the relevant registered landfill sites authorised to accept this waste; • No waste may be burned; and • Ensure that construction materials (e.g. bags of cement) are suitably stored and protected to avoid wastage. 									
After Management	Local	Low	Short-term	Very low	Possible	Insignificant	-	Medium	

Impact W2: Waste management impacts associated with incineration during operation

Operational activities will involve the incineration of veterinary waste. Animal carcasses destined for incineration will be kept in cold rooms until enough material have been gathered for incineration. On average, incineration will take place less than once a week. The resulting ash will be placed in containers and collected and disposed of via a contractor (e.g. Compass Medical Waste Services). Alternatively, the ash from incineration will be collected, stored in closed marked containers and disposed of at a licensed facility authorised to accept this waste when required. Disposal of ash on the site may lead to it becoming wind-blown, which can lead to further air quality and visual impacts.

The outcome of the impact significance rating is given in Table 7-13. Impacts during operation will be regional in extent, of medium intensity and duration, and therefore of medium consequence. The probability of impacts occurring is possible and the significance rating therefore low. With mitigation, this impact can be reduced to local, low intensity, of a medium-term duration and therefore of very low consequence. The probability of impacts occurring is improbable. The significance rating is therefore insignificant, implying that the potential impact is negligible and will not have an influence on the decision regarding the proposed development. The operational phase, with mitigation, will not have a significant negative impact on the environment. There is a high confidence associated with the impacts and the reversibility of the impacts is high.

Table 7-13: Significance rating of impact W2 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence	Reversibility
Before Management	Regional	Medium	Medium-term	Medium	Possible	Low	-	High	High
Management Measures									
<ul style="list-style-type: none"> No dumping within the surrounding area shall be permitted, and no waste may be buried or burned on site; All veterinary waste destined for incineration must be kept in a cold room, on an impermeable surface, until it can be incinerated in order to prevent impacts related to groundwater contamination (odours, tampering, etc.); Organic waste brought in from off-site should be stored in a suitable, marked, closed containers/bags and also stored in cold rooms until incineration; Ash from incineration must be collected and stored in closed marked containers and disposed of via a contractor authorised to remove hazardous waste (e.g. Compass Medical Waste Services) or disposed of at a licensed facility authorised to accept this waste (hazardous waste site); A detailed record should be held of all wastes that are incinerated (including waste type, weight, date of incineration etc.) as well as the use of diesel; and A detailed record should be held of all organic waste from outside sources (including waste type, weight, date of arrival, date of incineration, etc.). Records should be able to prove that all wastes received from outside sources have been incinerated. 									
After Management	Local	Low	Medium-term	Very Low	Improbable	Insignificant	-	High	

7.2.3 Potential Noise Impacts

This section describes the associated impacts that the proposed incinerator replacement could have on noise levels in the surrounding area during the construction phase of the development, as assessed and rated by the Environmental Assessment Practitioner (EAP).

Impact N1: Noise creation during construction and decommissioning

Noise will result mostly from the movement of vehicles and use of machinery (plant) for construction/ decommissioning related activities such as removal of the old incinerator and installation of the new incinerator.

The outcome of the impact significance rating is given in Table 7-14. The noise impact resulting from construction activities is rated as very low (-ve) with or without mitigation. Work will be limited to normal working hours and although the site is located within the Grootfontein Agricultural Development Institute grounds, both the construction and decommissioning phases will be of short duration, lasting only a few days. Therefore,, noise impacts during construction and decommissioning are estimated to be minimal.

Table 7-14: Significance rating of impact N1 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence	Reversibility
Before Management	Local	Medium	Short term	Very Low	Definite	Very Low	-	Medium	High
Management Measures									
<ul style="list-style-type: none"> Construction activities that are likely to result in noise levels in excess of 7 dB above ambient noise, at a distance of 100 m from the sources should be restricted to normal working hours (i.e. 6:00 to 18:00, Monday to Saturday) according to the Noise Control Regulations in terms of the Environmental Conservation Act (Act 73 of 1989) to reduce the noise impact to an acceptable level. Deliveries to the site should also be limited to these times. 									
After Management	Local	Low	Short term	Very low	Probable	Very Low	-	Medium	High

7.2.4 Potential Socio-Economic Impacts

During the construction and operational phase, no new employment opportunities will be created. The incinerator is likely to be installed by the manufacturers themselves and it would only take a few days to complete. During operation, no additional staff members would be required to operate the incinerators. Existing staff members would be trained on the specific operational requirements of the new incinerators.

Impacts on the health of surrounding communities would be similar or better than before the replacement, as the existing incinerator is a very old model and in a state of disrepair.

7.2.5 Cumulative Impacts

Background concentrations were not assessed as part of the Atmospheric Impact Report. Other sources of atmospheric emissions in the area would include vehicle exhaust emissions and smoke from coal fires in informal areas. No significant cumulative impacts have been identified specifically with regards to air quality.

8 Findings, Evaluations and Recommendations

This chapter evaluates the impact of the proposed incinerator replacement based on the findings of the Basic Assessment Report. The principal findings are presented in this chapter, followed by a discussion of the key factors DEA will have to consider in order to make a decision in the interests of sustainable development.

As is to be expected, the proposed new incinerator has the potential to cause negative impacts. The BAR has examined the available project layout information and drawn on both available (secondary) and specifically collected (primary) baseline data to identify and evaluate the environmental (biophysical and socio-economic) impacts of the proposed project.

The BAR aims to inform decision-makers of the key considerations by providing an objective and comprehensive analysis of the potential impacts and benefits of the project, and has created a platform for the formulation of mitigation measures to manage these impacts. These measures are consolidated in the Draft Environmental Management Programme (EMPr) which is attached as Appendix F.

This chapter presents the general conclusions drawn from the Basic Assessment process which should be considered by decision makers in evaluating the project. The chapter should be viewed as a supplement to the detailed assessment of individual impacts presented in the previous chapter.

8.1 Assumptions and Limitations

The following assumptions or limitations have been considered in the preparation of this report as well as the associated specialist reports:

- No existing ambient air quality concentrations were available for use in this study; and
- The new incinerator can only be purchased once the waste management license, and any other authorisations, have been issued. Since the applicant is dependent on readily available units by known suppliers, the size of the proposed incinerator could not be fixed for use in this study as is given as three potential different burn rates (45 kg/hour, 60 kg/hour and 75 kg/hour). All options have been assessed in the Atmospheric Impact Report.

8.2 Environmental Impact Statement

The evaluation is undertaken in the context of:

- The information provided during the BA;
- The assumptions made for this BA;
- The recommended mitigation measures, which it is assumed will be effectively implemented;
- The assessments provided by the specialist; and
- The practicality of the recommendations for mitigation.

The evaluation and the basis for the subsequent discussion are represented concisely in Table 8-1 below, which summarises the potentially significant impacts and their significance ratings before and after application of mitigation and/or enhancement measures.

Table 8-1: Summary of potential impacts of the proposed incinerator replacement at the Middelburg Veterinary Laboratory

Impact group	Impact Description	+ / -	Significance without mitigation	Significance with mitigation
CONSTRUCTION				
Air Quality	AQ1: Impact of dust	-	Insignificant	Insignificant

Impact group		Impact Description	+ / -	Significance without mitigation	Significance with mitigation
	AQ2: Particulates (PM ₁₀ and PM _{2.5}), NO _x , SO ₂ and CO			Insignificant	Insignificant
Waste	W1: Waste management (general)		-	Insignificant	Insignificant
Noise	N1: Noise		-	Very Low	Very Low
OPERATION					
Air Quality	AQ3: Particulates (PM ₁₀ and PM _{2.5}), NO _x , SO ₂ and CO		-	Very Low	Very Low
Waste	W2: Ash from incineration		-	Low	Insignificant
DECOMMISSIONING					
Air Quality	AQ1: Impact of dust		-	Insignificant	Insignificant
	AQ2: Particulates (PM ₁₀ and PM _{2.5}), NO _x , SO ₂ and CO		-	Insignificant	Insignificant
Waste	W1: Waste management (general)		-	Insignificant	Insignificant
Noise	N1: Noise		-	Very Low	Very Low

Key observations with regard to the overall impact ratings, assuming mitigation measures are effectively implemented, are highlighted as follows:

- The predicted air quality impacts associated with the construction and decommissioning phases, are rated **insignificant**;
- The predicted air quality impacts associated with incineration during the operational phase, is rated as **very low** and negative;
- The predicted impact from general construction waste as well as domestic waste during construction and decommissioning is rated as **insignificant**;
- The predicted impact from ash generated as a result of incineration is rated as **low** and negative; and
- The predicted impact from noise during construction and decommissioning is rated as **very low** and negative.

8.3 Conclusion and Authorisation Opinion

In terms of Section 31 (n) of NEMA, the EAP is required to provide an opinion as to whether the activity should or should not be authorised. In this section a qualified opinion is ventured and in this regard SRK believes that sufficient information is available for DEA to make a decision.

It is noted that the proposed incinerator replacement is not predicted to pose significant negative environmental or social impacts that cannot be mitigated to acceptable levels, and the atmospheric emission specialist has not noted any fatal flaws relating to the development.

With the above in mind, and in terms of meeting the objectives of sustainable development, the EAP is of the view that DEA should authorise the development of the proposed incinerator replacement, subject to effective implementation of the mitigation measures and EMPr proposed in this Basic Assessment.

8.4 Recommendations

The specific recommended mitigation measures are presented in the impact assessment section (Section 7) and are recorded in the Draft Environmental Management Programme (Appendix F) of this report.

Key recommendations, which are considered essential, are:

- Implement the EMPr to guide construction and operations activities and to provide a framework for the ongoing assessment of environmental performance;

- Minimise the physical footprint of the development and areas disturbed by construction activities and ensure the proposed incinerator replacement and associated activities remains within the footprint of the existing incinerator; and
 - Obtain other permits and authorisations as may be required, including, but not limited to an Atmospheric Emission Licence.
-

9 The Way Forward

The public participation process so far has given IAPs the opportunity to assist with identification of issues and potential impacts.

The Executive Summary of the DBAR was distributed to registered IAPs. A printed copy of the report was made available for public review at the Middelburg Public Library. An electronic copy of the DBAR was also made available upon request.

The DBAR was distributed to all relevant authorities and submitted to DEA for their comment before compilation of the FBAR (this report).

The FBAR is being released to registered IAPs, stakeholders & the relevant organs of state for informational purposes. The Executive Summary of this FBAR will be distributed to registered IAPs, stakeholders and relevant authorities. A printed copy of this report will be available for public review at the Middelburg Public Library and an electronic copy will be supplied by SRK upon request.

The FBAR will be submitted to DEA for a decision. Registered IAPs, stakeholders and the relevant organs of state will be notified as soon as a decision is communicated.

Prepared by:

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

Appendices

Appendix A: Site Plans

Appendix B: Photographs

Appendix C: Facility Illustrations

Appendix D: Specialist Report(s)

Appendix E: Public Participation Process

Appendix E1: Public Participation Summary

Appendix E2: Onsite Poster, Newspaper Notice & BID

Appendix E3: IAP Register

Appendix E4: Proof of BID distribution

Appendix E5: Original IAP Correspondence on BID

Appendix E6: Proof of distribution of DBAR

Appendix E7: Original IAP Correspondence on DBAR

Appendix E8: Meetings

Appendix E8(i): Record of Air Emission Licence Meeting

Appendix E8(ii): Record of DEA Meeting

Appendix F: Environmental Management Programme (EMPr)

Appendix G: Other Information

Appendix H: Waste Licence Application Form

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