ENVIRONMENTAL CONSULTING

Royale Energy (Pty) Ltd

DRAFT BASIC ASSESSMENT REPORT

Proposed New Service Station on Erven 1685 & 1729, Kriel, Mpumalanga Province

August 2017

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Executive Summary

Introduction

The applicant, Royale Energy (Pty) Ltd proposes to develop a service station and associated infrastructure on Erven 1685 & 1729, Kriel next to the R547, Mpumalanga Province. Part of the erf 1685 is currently used as a repair workshop for vehicles and the other part is vacant land; the proposed development will be built on the vacant land. Erf 1729 will form part of the thoroughfare to provide access to the Service Station from the R547 Road.

The service station will provide road users on the R547 and the surrounding road network with service station facilities and associated retail amenities, including a convenience store.

Below is a summary of the development proposal:

1. Five $30m^3$ capacity underground fuel storage tanks for the storage of Diesel and Unleaded Petrol
2. Five pump dispensers
3. Fuel tank filler points
4. Separator system for surface runoff
5. Associated underground fuel and filler lines
6. A forecourt canopy covering the forecourt area
7. A convenience store
8. ATM's.

Environmental legislation:

The application for Environmental Authorisation is being made to the Competent Authority, namely the Provincial Department of Agriculture, Rural Development, Land and Environmental Affairs ("DARDLEA"), and is required as the proposed development triggers an activity which is listed in terms of the National Environmental Management Act ("NEMA") Environmental Impact Assessment ("EIA") Regulations, 2014, as amended.

The activity that will be triggered is contained in Listing Notice Number 1, Activity No. 14 of Government Notice No. 327 of 2017:

- *Activity 14: The development and related operation of facilities or infrastructure for the storage, or storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic meters.*

In terms of the EIA Regulations a Basic Assessment type application for environmental authorisation needs to be followed. This Basic Assessment Report has been compiled in fulfilment of the requirements of the EIA Regulations.

Description of the Surrounding Environment

The town of Kriel is situated between Ogies and Bethal, approximately 121 km east of Johannesburg in Mpumalanga Province. The area falls within the Ga-Nala functional area, Emalahleni Local Municipality and the Nkangala District Municipality. The site is situated on Erven 1685 & 1729, Kriel, located next to the R547 on Groen Avenue, Kriel, Mpumalanga.

Erf 1685 is currently zoned as Institutional and Erf 1729 as Open Space. Erf 1685 on which the service station will be located is being rezoned to Business 1. The southwestern part of the Erf 1685 is currently used by a vehicle repair workshop with the remainder of the site comprising undeveloped land which is grassed and regularly mowed. Erf 1729 is currently vacant. Please refer to **Figure 1** below showing a Google Earth (2016) image of the proposed site location and approximate Erf boundary.

Figure 1: Site locality plan

Image courtesy of Google Earth, 2016

Adjacent to the site, approximately 230 m to the north, beyond the R547 are industrial buildings which include manufacturers of industrial products and vehicle repair shops. Residential houses are located opposite Groen Road towards the northeast of the site with a church and Krielpark Primary School being located to the east. More residential houses are located opposite Vredenhof Road to the south. The R547 is located adjacent to the site to the west with residential houses beyond that and the Steenkoolspruit Perennial River located approximately 620 m to the east. A westerly orientated canal connected to the Steenskoolspruit River is located 345 m to the west and an unnamed dam is located approximately 575 m to the northwest of the site.

Two major sources of employment in the Kriel area are the two coal-fired power stations; the Matla power station located approximately 12 km southwest of Kriel and the Kriel power station approximately 7 km to the east. There are numerous coal mines in the area with the closest one being located approximately 5.7 km to the south of Kriel.

Public Participation

A public participation process is required in order to fulfil the requirements of a Basic Assessment process. The public participation process needs to be undertaken in accordance with Chapter 6 the NEMA EIA Regulations 2017 (GN. No. 326).

The public participation process will be started in line with the submission of the Draft BAR to the Authorities.

Initial and Draft Basic Assessment Report Notification:

Identified interested and affected parties as well as Organs of State will be notified of the Basic Assessment process and at the same time notified of the availability of the draft Basic Assessment Report (draft BAR) for review and comment. The following parties will be notified of the availability of the draft BAR:

- Department of Agriculture, Rural Development, Land and Environmental Affairs ("DARDLEA")
- Adjacent landowners/occupants
- Ratepayer's/ Home owners Associations in the area
- Department of Water and Sanitation
- Department of Transport and Public Works
- South African Heritage Resource Agency
- Emalahleni Local Municipality – Sub-councillor
- Emalahleni Local Municipality – Ward Councillor (Ward 26)

In accordance with Section 41 (2) of the 2017 NEMA EIA Regulations (GN. No. 326), notice will be given to all potential or registered interested and affected parties.

In accordance with Section 40 (1) of the NEMA EIA 2017 Regulations (GN. No. 326), all potential or registered interested and affected parties, including the Competent Authority will be given the opportunity to review and comment on the draft BAR and EMPr for a period of at least 30 days.

Comments received and responses sent during the initial public comment period for the draft BAR will be recorded in a Comments and Responses Report which will be attached as part of **Appendix F** of the final BAR. All issues raised during this period will also be included in the final BAR for review by all registered stakeholders during the final public participation period prior to submission of the final BAR to DARDLEA for a decision.

Final Basic Assessment Report Notification:

Following the first round of public participation, the application for Environmental Authorisation will be submitted to the Competent Authority.

After the submission of the application for Environmental Authorisation, in accordance with Section 40 (3) of the 2017 NEMA EIA Regulations (GN. No. 326), all potential or registered interested and affected parties, including the Competent Authority will be given the opportunity to review and comment on the final BAR and EMPr for a period of at least 30 days.

The final BAR will include all issues and concerns raised by registered stakeholders during the draft BAR phase public participation process.

Comments received and responses sent during the public comment period for the final BAR will be recorded in an updated Comments and Responses Report. In accordance with Section 19 (1) (a) of the 2017 NEMA EIA Regulations (GN. No. 326), within a period of 90 days from the submission of the Environmental Authorisation Application, the final BAR, the final EMPr, the updated Comments and Responses Report and copies of all comments received and responses sent during the public participation periods will be submitted to the DARDLEA for a decision.

As per Section 20 (1) of the NEMA EIA Regulations 2017 (GN. No. 326), the applicant will then await the DARDLEA's decision within 107 days of the Department's receipt of the final BAR.

Potentially Significant Impacts Identified

The potential impacts associated with the development on Erven 1685 & 1729, Kriel, have been identified as follows:

1. Soil and groundwater contamination and pollution associated with the construction and operational phases: there is the possibility of a spill of hazardous substances used on site for construction purposes as well as product loss associated with system leaks and fuel delivery during the operational phase.
2. Dust generated during construction activities due to heavy vehicles traversing the site; loading, offloading and stockpiling of soil and materials; etc.
3. Traffic and access impacts associated with any heavy construction-type vehicles and machinery accessing the site for the construction of the service station.
4. A minor risk of fire and explosion associated with fuel delivery, storage and dispensing activities during the operational phase.
5. Income and employment opportunities associated with the development, as well as a possible negative impact on income and employment opportunities at competitor service station sites.
6. Noise and vibration associated with heavy machinery and equipment during the construction phase and tanker fuel deliveries during the operational phase.
7. Visual impact during construction due to construction vehicles and stockpiles and visual impacts, especially at night from site lighting during the operational phase.

The Basic Assessment has determined that none of these associated impacts has been found to be of an unacceptable level; all of these impacts can either be avoided or minimised, provided that the mitigation measures recommended in the EMPr are followed. These impacts are considered to contribute only marginally to the cumulative impacts associated with the developed nature of the area where the proposed site is proposed to be located.

Benefits which have been identified associated with operating the site include job opportunities, income for staff working at the site, an income stream for the applicant as well as income contribution to the local economy via rates and taxes.

The No Go Alternative: The No Go Alternative entails maintaining the status quo at the site, which is a vehicle repair workshop to the south with the rest being vacant grass covered

land. There are no specific benefits to maintaining the site as it is, although none of the negative impacts associated with the proposed service station development would occur if the site is not developed.

Negative impacts associated with the no go alternative would be the lack of capital investment in the area, no job creation and no services as proposed by the development would be provided.

The need, desirability and potential impacts of the proposed development, from an environmental perspective, are considered in detail in this report.

Alternatives Identified and Investigated

The NEMA EIA Regulations, 2014, as amended, require that an Applicant identify and investigate alternative "means of meeting the general purposes and requirements of the activity" for which authorisation is being applied for.

Alternative technologies, designs and layouts for the fuel storage and dispensing infrastructure; as well as alternative means of operating the facility have been investigated. Best practice alternatives have been identified which have been assessed further against the No Go Alternative, or the option of not proceeding with the development.

Locality alternatives:
Property and location alternatives and the identification of the preferred site were based on access needs for the facility, as concluded by the Feasibility Study.

The service station is suitably positioned to provide service station facilities to users of the busy R547 Road. The Feasibility Analysis carried out in 2013 by Finland Consultants established that the service stations surrounding the proposed site have not met the area's fuel service demand and that a new service station on the proposed site will benefit the area without compromising the existing service stations' profitability. According to the report, the proposed development will be the only service station situated on the R547 and will service the southern part of Kriel.

Activity alternatives:
"Alternatives", in relation to a proposed activity, mean different means of meeting the general purpose and requirements of the activity. In this instance, the applicant's general purpose is to establish a new service station with a convenience store in an area historically underserviced by other service stations.

It is not considered necessary to investigate either locality or activity alternatives: the general purpose and requirements of the application is to establish a Service Station in response to an area underserved by service stations in this vicinity, which has identified it as a profitable market within the Kriel area. This is confirmed by the Feasibility Analysis contained in **Appendix G** by Finland Consultants.

Design/layout alternatives:

The following design/layout alternatives were investigated as part of best practice measures for this service station, including;

1. Tank Size
2. Tank material and structure
3. Type of fuel delivery lines
4. Monitoring wells
5. Tank layouts
6. Leak detector systems
7. Overfill protection devices
8. Separator systems
9. Site layout and configuration

Based on the considerations above the most suitable design and layout alternatives were adopted based on oil industry experience – please refer to **Appendix B** for the Site Layout Plan.

Technology Alternatives

The following technology alternatives were investigated as part of best practice measures for this service station, including;

1. Stock Monitoring: manual product monitoring using a dipstick compared to the use of automatic tank gauging (ATG).
2. Tank material: the use of jacketed Glass Reinforced Polyester (GRP) coated tanks as opposed to unlined, mild steel tanks.
3. Fuel delivery lines: a variety of different technologies could be used, from unlined galvanised lines to piping comprising non-corrosive, secondary contained fuel lines. The latter being the preferred and more environmentally sound option.
4. Sumps: sumps below fuel dispensers which are equipped with fuel proof entry boots has been identified and investigated as the industry best practice technology alternative.

As illustrated above, various different technology alternatives have been identified and investigated and tested over time by the oil industry internationally and by various oil companies specifically. The proposed technology contained in this best practice alternative is considered the most feasible and appropriate, based on the minimisation of health, safety and environmental risks associated with possible spillages, subsoil, and groundwater contamination and vapour emissions.

Operational Alternatives:

A variety of alternative operational aspects of the activity of fuel dispensing have been identified over time. The protocols adopted have evolved and are based on practical experience aimed at minimising health, safety and environmental risks. Some of these have been listed below:

1. Emergency fuel delivery cut-off during product offloading: the immediate activation of an emergency cut-off switch if an incident occurs which requires the cessation of fuel delivery.
2. Regular stock monitoring: best practice operational process alternative includes Automatic Tank Gauging (ATG) as opposed to regular manual stock monitoring. ATG allows for the rapid detection of possible product losses and thus more rapid remedial action.
3. Creation of an Emergency response plan which will be followed in the event of a spill.
4. Adopting energy efficient equipment, such as low energy lighting, control of air conditioning temperature ranges and the optimal use of natural lighting through the correct positioning of windows etc.
5. Water use minimisation measures, such as low flow toilets and taps, waterless urinals and auto-stop taps

The No Go Alternative:

The No Go Alternative entails maintaining the status quo of the site, which is of an undeveloped area.

Negative impacts associated with the No-Go Alternative could include lack of job creation and capital investment and provision of services in an area which historically had been underserviced. There would be no temporary or permanent employment opportunities created, with the associated economic and social upliftment and skills transfer, during the construction and operational phases of the development

Benefits which have been identified associated with operating the site include job creation and income for the staff required; an income stream for the applicant as well as income contribution to the local economy.

The development proposal includes the preferred layout, design and operational alternatives indicated above. The development proposal has been comparatively assessed against the No-Go Option (i.e. the option of maintaining the status quo of the current galvanising facility) in this EIA process.

Key Findings and Comparative Assessment

The key findings of the assessment of the development proposal against the No-Go Alternative are as follows:

Potential Positive Impacts

1. The proposed service station will result in an overall increase in jobs and income in the medium- to long-term for the area.

2. The development entails investment in infrastructure and services for the area, as well as providing an income stream for the Applicant.

3. The construction phase of the development will provide temporary employment opportunities, with the main beneficiaries of this anticipated to be previously disadvantaged communities.

Potential Negative Impacts

1. There will be temporary construction phase impacts such as noise; dust; vibration; heavy vehicle traffic and visual impacts associated with the development.

2. The development will generate waste as well as utilise scarce resources such as water during the construction and operational phases.

3. There will be associated air quality impacts associated with fuel vapour emissions during fuel delivery by road tanker, storage (via vent pipes) and during dispensing activities.

4. There is a very minor risk of fire and explosion associated with the operation of a service station, provided the recommended design and operational mitigation measures are implemented.

5. The development will have negative noise impacts associated with building services (such as extractor fans) and with traffic visiting the development, and in particular with road tanker delivery vehicle noise.

6. There is a risk of soil and groundwater contamination associated with fuel delivery, storage and dispensing activities.

7. The No-Go Alternative entails an under-utilised property situated within the urban edge of Kriel. As such, the noise impacts (general ambient noise) and air quality impacts (degraded ambient air quality) will continue to occur associated with the No-Go Alternative.

<u>In summary, the assessment found the following:</u>

1. The potential negative impacts associated with the proposed development can all be mitigated to an acceptable level; and

2. The positive impacts associated with the No-Go Alternative are not considered of a sufficiently high significance as to outweigh the positive impacts associated with the proposed development.

Based on the findings of this Draft Basic Assessment Report, the EAP finds it reasonable to recommend the proposed development as the preferred alternative for this Environmental Application, provided that the mitigation measures contained in Section 13 of the report and in the Environmental Management Programme is are adhered to.

DRAFT BASIC ASSESSMENT REPORT

APPLICATION FOR PROPOSED NEW SERVICE STATION ON ERVEN 1685 & 1729, KRIEL, MPUMALANGA PROVINCE

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DRAFT BASIC ASSESSMENT REPORT

PROPOSED NEW SERVICE STATION ON ERVEN 1685 & 1729, KRIEL, MPUMALANGA PROVINCE

1 DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTIONERS

Sillito Environmental Consulting (SEC) has been appointed as the independent Environmental Assessment Practitioner (EAP) to submit an application for a proposed new service station in Kriel, Mpumalanga. The applicant, Royale Energy (Pty) Ltd, proposes to establish the new facility on Erven 1685 & 1729 located on the R547.

This report was prepared by Jako Schonken of SEC, and reviewed by Adrian Sillito.

Adrian Sillito is a certified environmental assessment practitioner (CEAPSA), Professional Natural Scientist (Pr.Sci.Nat.) and a member of the International Association for Impact Assessment (IAIA). Adrian has twenty years' experience in the field of environmental management and impact assessment. Jako has an Environmental Management degree from CPUT and has three years' experience in environmental management and impact assessment.

SEC has extensive experience in the Environmental Impact Assessment field and has completed many hundreds of environmental applications in most provinces of South Africa since 1998.

SEC does not have any financial or other interests in the undertaking of the proposed activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014, as amended, and any specific environmental management Act; and does not have any vested interest in the proposed activity.

2 INTRODUCTION & TERMS OF REFERENCE

Sillito Environmental Consulting (SEC) has been appointed as the independent Environmental Assessment Practitioner (EAP) by the applicant; Royale Energy (Pty) Ltd. SEC is to facilitate an application in terms of the National Environmental Management Act (NEMA) of 107 and as amended for a proposed new service station, to be situated on Erven 1685 & 1729, Kriel, Mpumalanga Province.

SEC's scope of work includes undertaking an EIA process to make application in terms of the NEMA.

The application needs to be made to the competent authority, namely the provincial Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA).

2.1 Project background and description of the activity

The applicant, Royale Energy (Pty) Ltd proposes to develop a service station and associated infrastructure on Erven 1685 & 1729, Kriel next to the R547, Mpumalanga Province.

The town of Kriel is situated between Ogies and Bethal, approximately 121 km east of Johannesburg in the Mpumalanga Province. The area falls within the Ga- Nala functional area Emalahleni Local Municipality and the Nkangala District Municipality. The site is situated on Erven 1685 & 1729, Kriel, located next to the R547 on Groen Avenue, Kriel, Mpumalanga.

In terms of the 2014 Environmental Impact Assessment Regulations, as amended in 2017 (Government Notice Numbers 326, 327, 325 and 324 promulgated under the National Environmental Management Act, Act No. 107 of 1998, an application for a Basic Assessment is required.

The list of activities (with regard to Government Notice No 327) for which an authorisation is required in terms of this application includes:

- ***Listing Notice 1 (Government Notice No. 327), Activity 14: The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.***

This EIA process complies with the requirements of both the 2014 EIA Regulations and the 2017 Amendment of the 2014 EIA Regulations. The requirements and guidelines of the Provincial Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) and of the National Department of Environmental Affairs (DEA) were followed during the preparation of this Final EIA Report.

2.2 Legislation and Guidelines Considered in the Preparation of the Draft BAR

Legislation	Administering Authority
The National Environmental Management Act, Act 107 of 1998, as amended.	DARDLEA
EIA regulations in terms of Chapter 5 of the NEMA, 1998. Regulations 326, 327, 325 and 324 of April 2017	DARDLEA
Guideline Document, EIA Regulations, Implementation of Sections 21, 22 and 26 of the Environment Conservation Act, 1998	DEA
DEA Integrated Environmental Management Guideline Series, Guideline 3: General Guide to the Environmental Impact Assessment Regulations, 2006	DEA
DEA Integrated Environmental Management Guideline Series, Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations, 2006	DEA
DEA Integrated Environmental Management Guideline Series, Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Assessment Regulations, 2006	DEA
DEA Companion to the NEMA EIA Regulations of 2010	DEA
DEA Integrated Environmental Management Guideline Series, Guideline 5: Companion to the Environmental Impact Assessment Regulations, 2012	DEA

3 ACTIVITY DESCRIPTION

The service station will provide users of the R547 and the surrounding road network with service station facilities and support retail amenities, such as a convenience store. The service station will provide access points for incoming and outgoing traffic on the R547 via a thoroughfare through Erf 1729 and will have an access point to Groen Avenue as well.

Below is a summary of the development proposal:

1. Five $30m^3$ capacity underground fuel storage tanks for the storage of Diesel and Unleaded Petrol
2. Five pump dispensers
3. Fuel tank filler points
4. Separator system for surface runoff
5. Associated underground fuel and filler lines
6. A forecourt canopy covering the forecourt area
7. A convenience store
8. Four ATM's.

4 NEED AND DESIRIBILITY OF THE ACTIVITY

Erf 1685 is currently a partially developed site which is situated adjacent to Groen Avenue in Kriel. Erf 1729 is situated between Erf 1685 and the R547 and will provide access between the proposed service station and the R547. The R547 is the main thoroughfare through the town and connects Kriel to the surrounding road network linking the adjacent towns of Witbank and Kinross.

A Feasibility Study has been undertaken by Finland Consultants (please refer to the study in **Appendix D**). The study was undertaken to address the financial feasibility of the proposed development, which is an aspect of the need and desirability of the development. This was based on the following factors:

1. Current demand for fuel in the area, derived from traffic counts undertaken together with vehicle attraction rates appropriate for the proposed site;
2. Projected future demand for fuel based on anticipated traffic volumes associated with sites which have been earmarked for development in the area; and
3. Competing service station sites and retail outlets that may impact the feasibility of the site.

According to the Feasibility Study, it was found that between 2% and 5% of the passing traffic stream will fill up at the proposed service station. This is influenced by the strategic location of the site, ease of access, travelling speed of traffic and the visibility of the service station. The availability of parking, a convenience store, ATM's, and toilet facilities on site and the associated security will be provide draw points to motorists.

The proposed service station will be the only one located on the R547 road from Witbank to Kinross. The nearest other service stations comprise:

- Caltex Mega Motors (Approximately 836 m to the north)
- Engen Pit Stop (Approximately 58 m to the north)
- Exel Kriel (Approximately 1.7 km to the northeast)

The Finland report states that taking the other three service stations into account, the location of the proposed service station is optimal as it taps into the traffic travelling in both directions on the R547 Road and is the closest and most accessible service station to the southern part of town.

The proposed service stations will have a negligible impact on the three competitor sites' sales and the report states that no job losses will occur at these competitor sites. This is due to the location of the site and that the other service stations draw traffic from different streams than the proposed service station.

According to the feasibility study, the required level of sales can be realised and proposed site will be financially viable. The projected volume of fuel that will be pumped per year is approximately 350 000 litres and the convenience shop's annual turnover is expected to be R450 000.

Fourteen staff members will be employed on the forecourt (7 staff per shift) with 10 people employed in the convenience shop.

Erf 1685 is currently zoned as Institutional Use and is currently being rezoned as Business 1. Only the southern portion of the site has been developed as a repair workshop for vehicles, the rest of the site has never been developed and has been left vacant with grass growing on it. Erf 1729 is zoned as Open Space and the Landowner is in the process of negotiation with the Municipality to acquire it.

The following questions pertaining to the Need and Desirability of the proposed development, which are based on existing Need and Desirability Guidelines, have been addressed:

Need

1. *Is the proposed land use considered appropriate within the timeframe intended by the approved SDF and as agreed to by the relevant authority?*

Yes, the property is currently zoned as Institutional Use and is being rezoned as Business 1 Use. The Emalahleni Municipality's Spatial Planning and Land Use Management By-Laws make provision for the development of services such as service stations and are aligned with the SDF.

2. *Does the community/area need the activity, in other words, is it a societal priority?*

Yes. This has been confirmed by the Feasibility Study conducted by Finland Consultants.

3. *Are the requisite infrastructural services available?*

Yes. This has been confirmed by the Feasibility Study conducted by Finland Consultants.

4. *Is this project part of a national programme to address an issue of national concern or importance?*

Yes, the development proposal aligns with local and provincial government's spatial and economic planning imperatives for the area, such as the local SDF. This is due to the position of the development along the R547 Road which connects the mines and power stations in the area to the town of Kriel and serves as an artery for traffic.

Desirability

1. *Is the activity the best practicable environmental option [in other words to ensure that the development will be socially, economically and environmentally sustainable] for the site?*

Yes. The assessment of the impacts associated with the development contained in **Section 13** below, finds that the proposed development is the preferred alternative for this current site. Further, there are no associated negative impacts which cannot be mitigated to an acceptable level; together with several positive socio-economic impacts associated with the development.

2. *Would the approval of the application compromise the integrity of the approved IDP and SDF agreed by the relevant authority?*

   No. As mentioned in the "Need" component, the development proposal aligns with local and provincial government's spatial and economic planning imperatives for the area, such as the local SDF.

3. *Would the approval of this application compromise the integrity of the existing environmental management priorities for the area?*

   No. The closest environmental management priority area to the site is the Steenkoolspruit River (a perennial river), located approximately 615 m to the west of the site. The river meanders in a southerly direction and has a number of associated dams and channelled valley-bottomed wetlands according to spatial data assembled by the South African National Biodiversity Institute. The proposed development will not influence the wetland or the river in any way.

4. *Is this site the best site for the proposed land use?*

   Yes. Please refer to the assessment of impacts contained in **Section 13** below, which finds that the positive impacts associated with the proposed development on Erven 1685 & 1729 outweigh the negative impacts associated with the existing, "under-utilised" site.

5. *How will the activity impact the natural and cultural environment?*

   It is unlikely that the proposed development will have an impact on the natural environment as the site is located on a transformed piece of land. The closest natural environment to the site is the Steenkoolspruit River (a perennial river), located approximately 615 m to the west of the site and its associated wetlands and dams.

   A Heritage Notification of Intent to Develop will be submitted to confirm that the proposed development will have little impact on the cultural environment as there are no significant heritage sites close by. The building located on the southern part of the site is not older than 60 years and is therefore not classified as sensitive.

   Please refer to **Section 13** of the report below, which provides a full description and assessment of the anticipated impacts of the proposed development on the surrounding natural and cultural environment.

6. *How will the activity impact on people's wellbeing (ito noise, odours, sense of place etc.)?*

   During the construction phase, the heavy machinery used on site will emit some noise. Mitigation measures contained in the EMPr will moderate the impact of the noise to levels below what is deemed as disturbing. The proposed development will not emit disturbing odours. The sense of place of the surrounding area is unlikely to be influenced by the development as Kriel is a built-up area and the service station will be constructed next to the busy R547 Road.

   Please refer to **Section 13** of the report below, which provides a full description and assessment of the anticipated social impacts of the proposed development on the surrounding environment.

7. *Will the activity result in unacceptable opportunity costs (e.g. using the land for the next best purpose)?*

   No. The land is currently zoned as Institutional Use and is being rezoned as Business 1 Use. Part of the site is currently utilised as a vehicle repair workshop but most of it is vacant grass covered land.

   From the information provided above, we have not identified any development constraints on the site from a botanical or heritage perspective.

8. *Will the activity result in unacceptable cumulative impacts?*

   Cumulative impacts associated with developing the site for fuel retailing purposes include noise, light, vibration and dust during the construction phase; and noise, light, vibration, fuel vapour emissions and risk of soil and groundwater contamination associated with a spill or leak during the operational phase.

   Please refer to **Section 13** of the report below, which provides a full description and assessment of the anticipated impacts of the proposed development, some of which are cumulative in nature.

5 DESCRIPTION OF RECEIVING ENVIRONMENT

5.1 Property Description

GPS Location:
Eastings: 29°15'24.71"E

Southings: 26°15'21.81"S
Elevation: 1555 m amsl

Size of Erf 1685, Kriel: 9 272 m^2
Size of Erf 1729, Kriel: 26 783 m^2

Site access:
The two entrances to the site will be from Groen Avenue and the R547 via Erf 1729.

Surface Slope:
Based on the findings of the site and a review of the relevant 1:50 000 scale orthophotograph (2629AD) and from Google Earth, the area in the vicinity of the site is has a slope towards the northwest at <3°

Current Activities and Land Use

The area for the proposed site is mostly grass covered which is regularly mowed with the Zakaria vehicle repair workshop located on the southern portion of Erf 1685, Kriel. Erf 1729, kriel is also grass covered and vacant.

Please refer to the site location drawings in **Appendix A** as well as photographs of the site in **Appendix C**.

5.2 Land Use Character of Surrounding Area

A description of the surrounding environment beyond the property boundary is as follows:

North:
Mowed grass covered area with the R547 located approximately 50 m from the property boundary. Beyond the R547 are industrial and commercial buildings which include manufacturers, repair shops and small businesses like a PEP Store. The Kriel Mall is located approximately 700 m to the northeast.

East:
Residential properties are located approximately 40 m to the northeast, with an open strip of undeveloped land (pipeline servitude) located approximately 110 m from the site. A church and Krielpark Primary School is located across Groen Avenue approximately 50 m and 300 m respectively to the southeast. More residential houses are located beyond the school, some 400 m away.

South:
The of The Krielpark Primary School is located to the southeast of the site with the A.G.S Church located approximately 450 m to the south. Residential houses are located across

Vredenhof Road approximately 70 m to the south with another open strip of undeveloped land located approximately 260 m to the south of the site.

West

The R547 is located 50 m to the west of the site boundary, with residential houses 90 m beyond that. The Steenkoolspruit River is located approximately 615 m to the west. A canal connected to the Steenskoolspruit River is located 345 m to the west and an unnamed dam is located approximately 575 m to the northwest of the site.

5.3 Site Access

The entrance and access points to and from the site will be from the R547 and Groen Avenue respectively with 50% distribution from the R547 and 50% from Groen Avenue, according to the Traffic Impact Statement drafted by Route^2 Transport Strategies. The proposed arrangement will ensure safe ingress and egress for vehicles utilising the site according to the Traffic Impact Statement.

5.4 Sensitive Features in the Vicinity of the Site

The proposed site is situated on the main access road through Kriel. The area consists predominantly of residential and commercial developments with facilities including schools, a police station and a shopping centre. To the east of the town lies the Steenkoolspruit River and associated wetlands, dams and canals. The town is predominantly surrounded by agricultural activities, with little natural vegetation and untransformed land.

A summary of the potentially sensitive natural and man-made features in the close vicinity of the site is presented below. This summary is based on the site visit, review of the 1:50 000 scale Topocadastral map (2629AD), SANBI's BGIS maps and reference to Google Earth 2016 respectively.

Natural:

- The Steenkoolspruit River (a perennial river) is located approximately 615 m to the west of the site. The river meanders in a southerly direction and has a number of associated dams and channelled valley-bottomed wetlands, according to spatial data assembled by the South African National Biodiversity Institute.

Man-made:

- The town of Kriel is surrounded by agricultural activities with little remaining natural vegetation, apart from the strips of ground bordering the natural drainage channels.
- The Kriel Power Station (coal powered) is located approximately 8 km to the west of the site, with the Matla Power Station (also coals powered) located approximately 12 km to the southwest of the site.
- The town of Kriel is typically surrounded by coal mines with the closest one being located approximately 6 km to the south of Kriel.

5.5 Groundcover

According to the Mucina and Rutherford (2006) SANBI national vegetation map, the original vegetation that would have been present in the area is predominantly Eastern Highveld Grassland. The ecosystem threat status for this vegetation type is classified Endangered. The portion of this ecosystem protected is 24% of the original area. However according to the finer scale Landcover Network map (2010); currently there is no vegetation of conservation importance identified on the proposed service station site.

Please refer to **Appendix D** for Biodiversity Maps showing the areas of conservation value relative to the proposed service station development.

5.6 Geology

According to the available geological map for the area (2628DC East Rand) published by the Council of Geoscience, the study area is underlain by Permian age Vryheid Formation bedrock characterised by sandstone, shale and coal beds. The bedrock layer is anticipated to be overlain by sandy Transported sediments of Quaternary age.

5.7 Hydrology

Review of the available Topocadastral map (2629AD), the available Google Earth image as well as the site walkover assessment at and in the vicinity of the site by the EAP determined that the following natural drainage features occur in the vicinity of the site:

- The Steenkoolspruit River and its associated wetland are located approximately 345 m to the west of the site.
- The wetland is classified as a channelled valley-bottomed wetland and is a National Freshwater Ecosystem Priority Area according to BGIS data.

5.8 Hydrogeology & Groundwater Use

A review of the 1: 500 000 scale hydrogeological map produced by the DWS (Sheet 2526 Johannesburg) indicated that the superficial cover material in the area comprises of Palaeozoic deposits (unconsolidated to semi-consolidated sediments predominantly consisting of sandstone.

Groundwater quality is shown to vary from 70 - 300 mS/m. Potable drinking water has a conductivity limit of typically < 300 mS/m. As such the water quality can be considered good. In addition, the hydrogeological map indicates that the Kriel area is underlain by an aquifer which is an intergranular and fractured aquifer.

The Aquifer Classification map also indicates the following for this area:

Aquifer classification: Minor (Moderately yielding aquifer system of variable water quality).
Aquifer vulnerability: Moderate (likelihood of contamination from surface reaching the aquifer).
Susceptibility: Medium (ease with which the aquifer can be contaminated).

6 REGIONAL PLANNING CONTEXT

Erf 1685 is currently zoned for Institutional and is being rezoned as Business 1. Erf 1729 is zoned as Open Space and will be used to access the site from the R547.

7 SOCIO – ECONOMIC CONTEXT

2001 Census data reflects the existing social and economic characteristics of the town of Kriel as follows:

Area: 37.87 km²
Population: 11695 (308.82 per km²)
Households: 3915 (103.38 per km²)

Gender	People	Percentage
Male	6030	51.56%
Female	5665	48.44%

Population group	People	Percentage
Black African	6172	52.77%
White	5335	45.62%
Indian or Asian	102	0.87%
Coloured	87	0.74%

First language	People	Percentage
Afrikaans	4564	39.03%
isiZulu	2726	23.31%
English	999	8.54%
isiXhosa	735	6.28%
Sepedi	660	5.64%
SiSwati	643	5.50%
isiNdebele	598	5.11%
Sesotho	424	3.63%
Xitsonga	156	1.33%
Setswana	90	0.77%
Other	66	0.56%
Tshivenda	36	0.31%

A new census took place in 2011 but does not reflect the town of Kriel by itself, but rather the whole of the Emalahleni Local Municipality where Kriel falls under the Ga-Nala functional area.

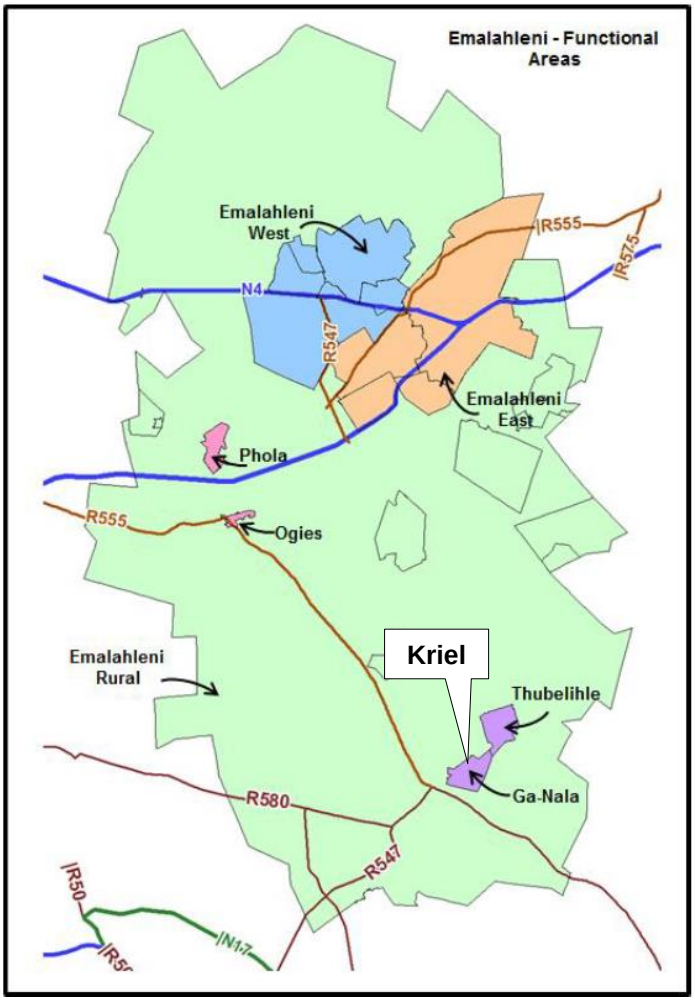


Figure B: Emalahleni Demographic Analysis – Functional Areas
Image courtesy of Emalahleni SDF

Population size

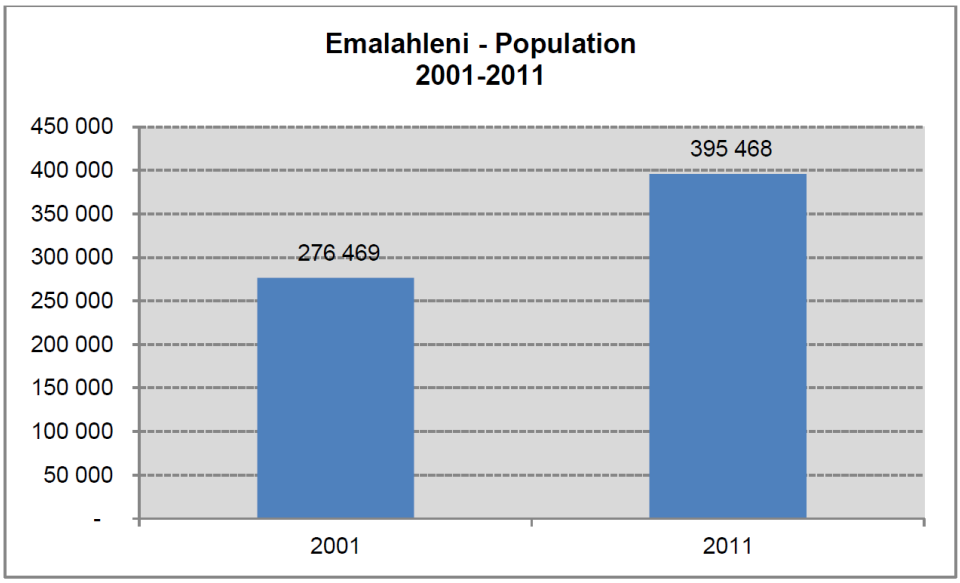


Figure C: Emalahleni Local Municipality Population Contribution, 2001 - 2011
Image courtesy of Emalahleni SDF

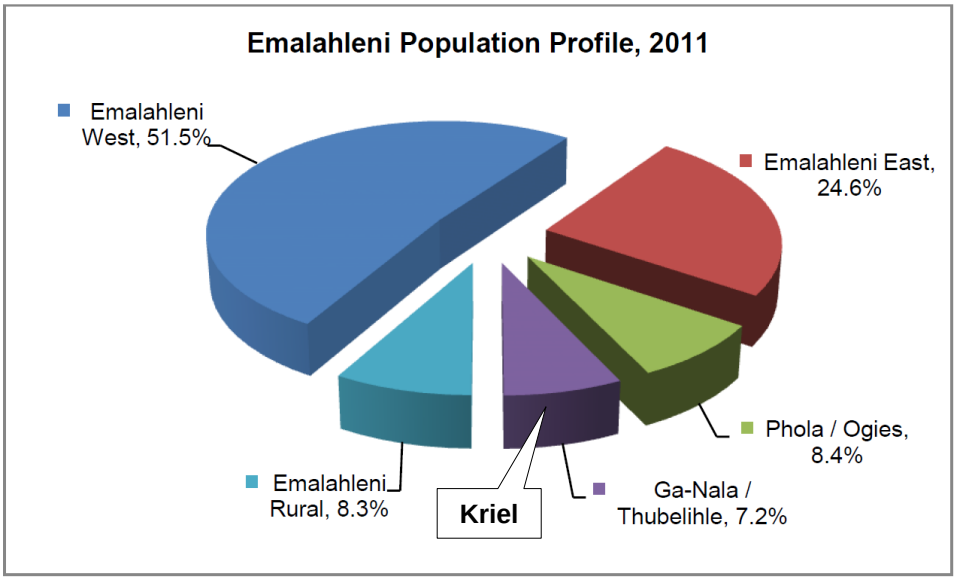


Figure D: Functional Areas Population Distributions to Emalahleni Local Municipality
Image courtesy of Emalahleni SDF

Age Profile

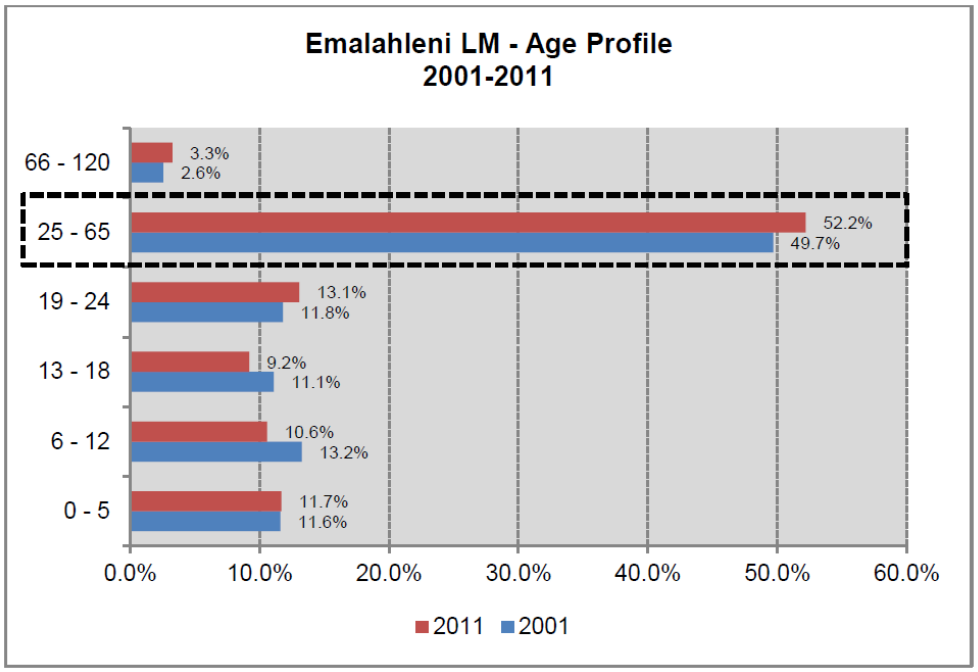
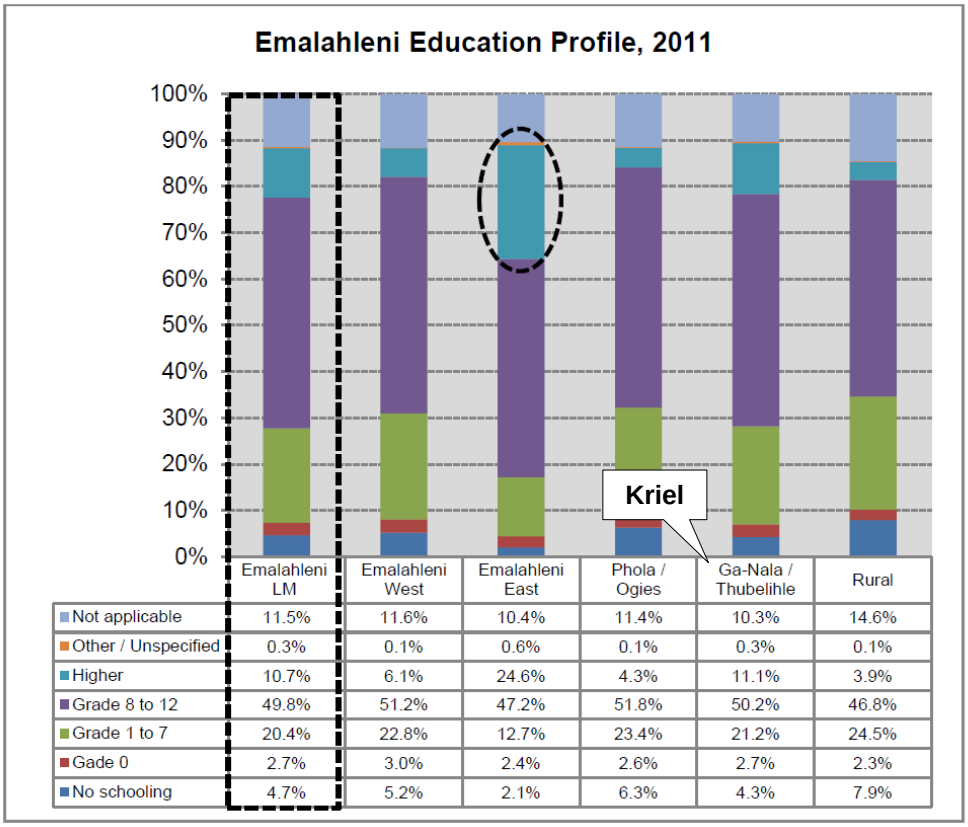


Figure E: Emalahleni Local Municipality Age Profile, 2001 - 2011
Image courtesy of Emalahleni SDF

As shown in Figure E the Emalahleni Local Municipality is characterised by a strong economically active population segment, representing more than half (52.2%) of the total population. The Emalahleni municipal area has a limited older population segment (aged 65+).

Education Profile



	Emalahleni LM	Emalahleni West	Emalahleni East	Phola / Ogies	Ga-Nala / Thubelihle	Rural
Not applicable	11.5%	11.6%	10.4%	11.4%	10.3%	14.6%
Other / Unspecified	0.3%	0.1%	0.6%	0.1%	0.3%	0.1%
Higher	10.7%	6.1%	24.6%	4.3%	11.1%	3.9%
Grade 8 to 12	49.8%	51.2%	47.2%	51.8%	50.2%	46.8%
Grade 1 to 7	20.4%	22.8%	12.7%	23.4%	21.2%	24.5%
Gade 0	2.7%	3.0%	2.4%	2.6%	2.7%	2.3%
No schooling	4.7%	5.2%	2.1%	6.3%	4.3%	7.9%

Figure F: Emalahleni Local Municipality Education Profile, 2011

Image courtesy of Emalahleni SDF

The 2011 highest level of education profile, as shown in Figure F, indicates a large proportion of individuals within the local municipality (49.8%) have at least a secondary (Grade 8-12) level of education. Emalahleni East (24.6%) has the highest number of individuals with a higher education, while the highest level of 'no schooling' is namely in the Rural parts of the Municipality.

Employment Status

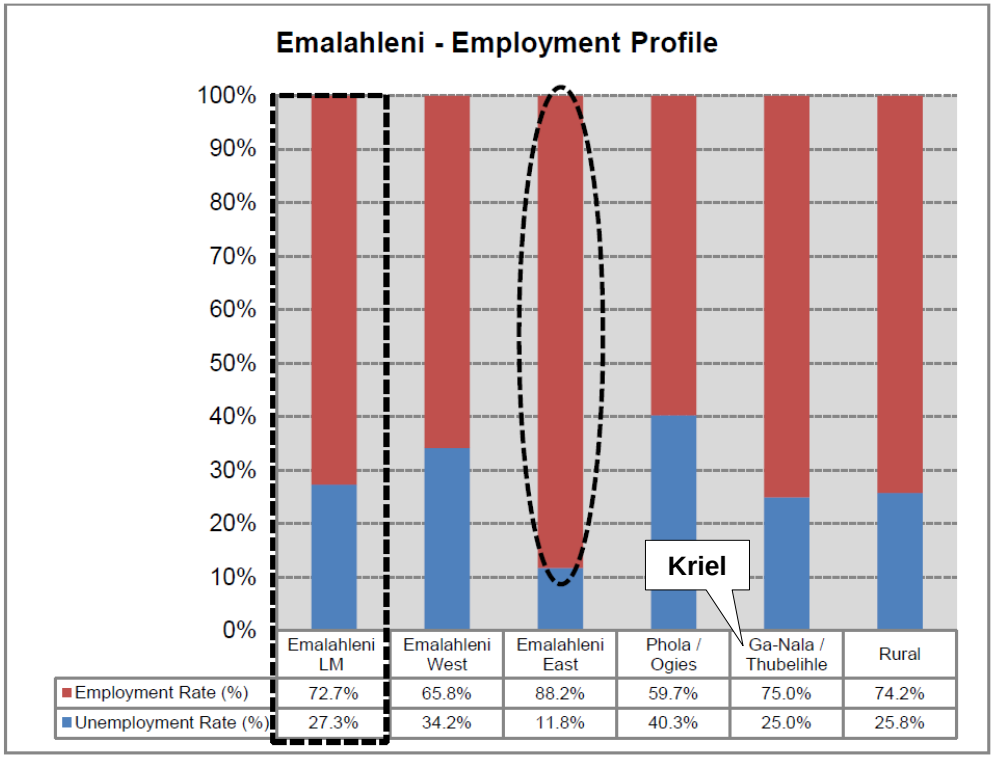
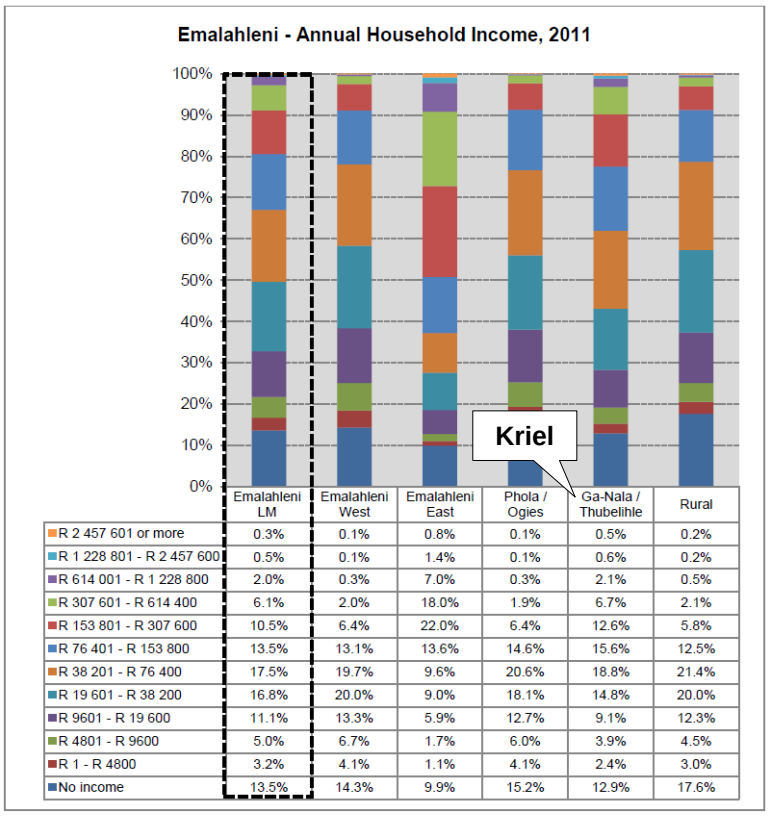


Figure G: Emalahleni Local Municipality Employment Status, 2011
Image courtesy of Emalahleni SDF

According to the 2011 profile (Figure G) the Emalahleni Lpocal Municipality has a relatively high unemployment rate namely 27.3%, which is well above the national unemployment rate of 25.2% (as recorded for the fourth quarter of 2014, the worst rate of joblessness seen since the first labour force survey in 2008). In terms of the functional areas, Emalahleni East has the highest employment levels (88.2%) followed by Ga-Nala/ Thubelihle (75.0%). The Phola/ Ogies functional area has the lowest employment levels, recorded at 59.7% for 2011.

Household Income



	Emalahleni LM	Emalahleni West	Emalahleni East	Phola / Ogies	Ga-Nala / Thubelihle	Rural
R 2 457 601 or more	0.3%	0.1%	0.8%	0.1%	0.5%	0.2%
R 1 228 801 - R 2 457 600	0.5%	0.1%	1.4%	0.1%	0.6%	0.2%
R 614 001 - R 1 228 800	2.0%	0.3%	7.0%	0.3%	2.1%	0.5%
R 307 601 - R 614 400	6.1%	2.0%	18.0%	1.9%	6.7%	2.1%
R 153 801 - R 307 600	10.5%	6.4%	22.0%	6.4%	12.6%	5.8%
R 76 401 - R 153 800	13.5%	13.1%	13.6%	14.6%	15.6%	12.5%
R 38 201 - R 76 400	17.5%	19.7%	9.6%	20.6%	18.8%	21.4%
R 19 601 - R 38 200	16.8%	20.0%	9.0%	18.1%	14.8%	20.0%
R 9601 - R 19 600	11.1%	13.3%	5.9%	12.7%	9.1%	12.3%
R 4801 - R 9600	5.0%	6.7%	1.7%	6.0%	3.9%	4.5%
R 1 - R 4800	3.2%	4.1%	1.1%	4.1%	2.4%	3.0%
No income	13.5%	14.3%	9.9%	15.2%	12.9%	17.6%

Figure H: Emalahleni Local Municipality Annual Household Income
Image courtesy of Emalahleni SDF

As shown in Figure H, the annual household income of Emalahleni (2011) is diverse, with most below the MLL. Emalahleni Rural area has the highest number of households with no income. Note that the profile of Emalahleni East is notably different than that of the remaining regions. This area comprises the formal eMalalahleni Town area, as opposed to eMalahleni West (Kwa-Guqa) and the small towns in the municipal area whose profiles are comparable with Emalahleni Rural.

Economic Indicators

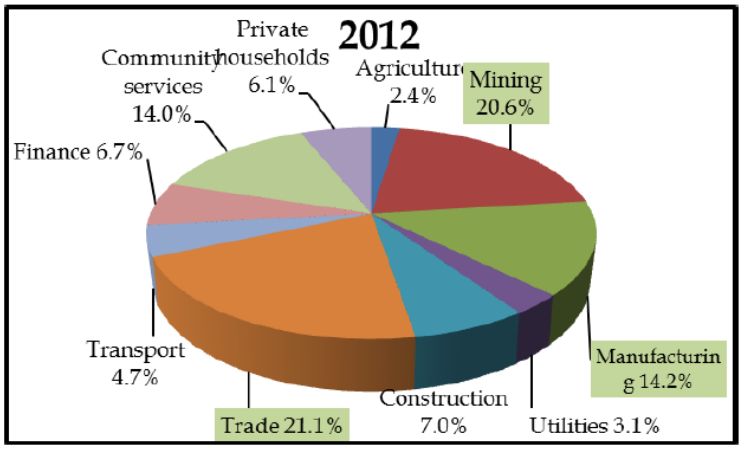


Figure I: Emalahleni Local Municipality Contributing Economic Sectors
Image courtesy of Emalahleni SDF

8 CULTURAL / HISTORICAL FEATURES

The proposed site has been cleared in the past associated with original agricultural and subsequent residential activities in years gone by. The site is, however, greater than 5 000m² and therefore it is required that a Notice of Intent to Develop to be submitted to the relevant heritage authority (South African Heritage Resources Agency) in terms of Section 38 of the National Heritage Resources Act, 1999 (Act 25 of 1999):

Section 38 (1): Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as
(c) any development or other activity which will change the character of a site
(i) exceeding 5 000 m² in extent;

…must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

A Heritage Impact Assessment (HIA) featuring the potential impacts to heritage resources that might occur through the proposed development was conducted by ASHA Consulting (Pty) Ltd.

No significant heritage resources were identified on the site. The only possible heritage resources identified were isolated archaeological artefacts (either Stone Age or Iron Age) and fossils. However, it is unlikely that significant fossils would be impacted since the uppermost deposits are likely somewhat disturbed from past agriculture and road development (the R547 used to run through the site) and the next few meters of sediment is likely to be weathered. This results in poor preservation of fossils. The structure on site (which will not be directly impacted) is less than 60 years of age and the landscape is a modern urban landscape (post-1973) in which a service station is seen as an appropriate development.

The proposed service station is unlikely to have any significant impacts on heritage resources. As such, there can be no objection on heritage grounds to the project proceeding.

The HIA will be submitted to SAHRA (Mpumalanga) upon submission of the Draft Basic Assessment Report and the case will be registered on the South African Heritage Resources Information System (SAHRIS).

9 SERVICES

The facility will be linked to the Municipal electricity, water and sewer systems and the site will be serviced by the Emalahleni Municipal waste collection services.

According to the project engineers from Design Oriented Team (D.O.T.), there is an existing sewerage pipeline along the R547, to which the development will connect.

10 ALTERNATIVES AND THE NO-GO OPTION

10.1 Property and Location/Site alternatives

Property and location alternatives and the identification of the preferred site were based on access needs for the facility and from health and safety perspectives at the site.

The proposed site will be positioned to provide service station facilities to users of the busy R547 Road as well as Groen Avenue. The Feasibility Analysis that was carried out in 2013 by Finland Consultants established that the existing service stations in the vicinity of the proposed site have not met the area's fuel service demand and that a new service station on the proposed site will benefit the area without compromising the older service stations' profitability.

10.2 Activity Alternatives

Alternatives, in relation to a proposed activity, mean different means of meeting the general purpose and requirements of the activity. In this instance, the applicant's general purpose is to establish a new service station with a convenience store in an area historically underserviced by service stations. The need for a service station in the area is confirmed by the Feasibility Analysis contained in Appendix G that was carried out by Finland Consultants.

As a clear need has been defined in the specific area of Kriel where the service station is proposed, it is thus not considered necessary to investigate activity alternatives for this application.

10.3 Design or Layout Alternatives

Tank Size:

The applicant is proposing to install five 30 m³ capacity Underground Storage Tanks (UST's) at the service station site. The 30 m³ capacity tanks are considered as the most suitable design alternative to meet the capacity needs of the proposed service station. The 30 m³ tanks is considered to be an adequate tank size to meet storage and sales demand and to reduce the pressure on tanker deliveries and standardise fuel storage capacity, which is a

trend evident across the oil industry. The current option is considered to be the most suitable for the site and therefore no comparative assessment of tank sizes will take place as part of the alternatives assessment of this project.

Tank material and structure:

Examples of the alternative materials and structure identified and investigated for the tank design include:

- Mild steel tanks with no outer protection;
- Mild steel tanks with bitumen coating for corrosion protection;
- Mild steel tanks with glass reinforced polyester coating (GRP); and
- Jacketed mild steel tanks with an interstitial space between the GRP layers. This space is monitored via an electronic monitoring system which sounds an alarm and shuts down the dispensing system.
- Other design considerations include tanks with and without bounce plates (which are located at the base of the tank below the dip point). Tanks without bounce plates were sometimes punctured by the wooden dipstick after many years of dipping. This lead to the failure of the tank, possible contamination and the requirement for the tank to be decommissioned and removed.
- The best practice alternative identified and investigated for this application is a jacketed mild steel tank (double wall tanks) with an interstitial space between GRP layers within which a vacuum is held and monitored via an electronic monitoring system. The system sounds an alarm and shuts down the dispensing system on detection of any liquid in the interstitial space. The tank includes a bounce plate beneath the dip point and a tank bottom protector is installed in the dip tube. This is to ensure that the environmental risks are minimised from possible tank corrosion and puncture failure.

Therefore no comparative assessment of tank materials and structure will take place as part of the alternatives assessment of this project.

Product delivery lines:

Many alternative designs have also been identified and investigated for product delivery lines. In the past, corrosion protected galvanised steel lines were used by oil companies. These lines often had various elbows and T-pieces along their length. This alternative proved problematic as the joints would often corrode and in certain environments the galvanised lines also corroded. This led to frequent line failures and the associated environmental and economic impacts.

The alternative identified as best practice includes secondary contained pipe work systems. The pipe type is a KPS LPG (Liquefied Petroleum Gas) Pipe System, which is totally corrosion free. The LPG pipes have a conductive inner layer. There is an interstitial space between the outer and inner pipes to allow for pressure testing and monitoring. The piping is designed to be laid in continuous lengths, eliminating buried fittings in the piping system. Electro-welding technology is used to fuse the pipe lengths together, creating a strong, permanent bond.

An electronic Line Leak Detection system is installed in all delivery lines which will detect any loss of pressure resulting from a leak. The system is connected to the submersible pumps in such a way that all pumps are immediately disabled once a leak is detected. Therefore no comparative assessment of product delivery lines will take place as part of the alternatives assessment of this project.

Monitoring wells:
Observation or monitoring wells are installed in the subsoils in the sand back fill adjacent to tanks for the monitoring of groundwater and identification of possible leaking tanks. In the past, oil companies did not install monitoring wells, which resulted in significant delays in detecting any subsurface product losses, with an associated high level of environmental risk. This alternative (i.e. no monitoring wells) was identified, but the alternative identified as best practice for this application is the installation of monitoring wells in order to monitor the subsurface environment and minimise environmental risk. Therefore no comparative assessment of the use of a monitoring well versus not installing a monitoring well will take place as part of the alternatives assessment of this project.

Tank layout:
Various different layouts have been identified and investigated over time and following practical experience. Initially tanks were placed wherever was convenient across the site. More recently the “tank farm” approach has been adopted where all tanks are located together to allow for easier monitoring, which also reduces the number of monitoring wells required. This minimises environmental risk and is considered to be best practice and is thus included in this application.

In the best practice tank and infrastructure layout, vent and filler lines are sloped back to the underground storage tank so that fuel does not remain in the pipes once the pumps have been switched off. The alternative of keeping the vent and filler lines flat resulted in fuel remaining in the pipes, which could result in a product loss if a line leak occurred. The alternative identified as best practice is therefore considered the most environmentally sound

and therefore no comparative assessment of tank layouts will take place as part of the alternatives assessment for this project.

Underground storage tanks vs. Aboveground storage tanks:
The alternative of an aboveground storage tank (AST) as opposed to an underground storage tank (UST) was identified and investigated. Owing to the limited size of the refuelling area (given allowance for truck turning circles, proximity to buildings, etc.) and for safety reasons (municipal and fire department requirements generally stipulate underground tanks in order to minimise safety risks) the underground option was considered more environmentally and practically appropriate for this site.

Therefore no comparative assessment of installation of UST's versus AST's will take place as part of the alternatives assessment of this project.

Leak detectors:
In best practice tank and infrastructure design, leak detectors are installed which immediately switch off the submersible pump contained within the tank should a leak be detected. In the past, systems which had no leak detectors were assessed and found that, in the event of a system failure, product could continue to flow out of the system, with the associated higher environmental impact and risks.

Therefore no comparative assessment of the installation of leak detectors versus not installing leak detectors will take place as part of the alternatives assessment of this project.

Overfill protection devices:
The design alternative that includes overfill protection devices in the tank filling pipe work to prevent tank overfills during filling operations was identified and investigated. The alternative without overfill protection was assessed, and it was found that a serious loss of product could result if the overfilling was not manually noted. This could result in surface spillage and, depending on the volumes of product lost, overland flow of product with associated environmental risk. Therefore no comparative assessment of overfill protection device installation versus not installing an overfill protection device will take place as part of the alternatives assessment of this project.

Separator system:
Best practice alternatives include the installation of a separator system. The surface around the tank filler points will be sloped to a catch pit which will feed to the separator system, so that in the event of a spillage, this will be contained. This system separates any floating

product from the water which is then sent into a side holding tank. The water passing through the system then feeds to the municipal sewer system. The alternative of operating without a separator system was identified and investigated and it was found that the associated environmental risk is unacceptably high. Therefore no comparative assessment of installation of a separator system versus not installing a separator system will take place as part of the alternatives assessment for this project.

Hard surface area around pump islands in forecourt area:
The surface surrounding the pump islands will consist of 150mm reinforced concrete surface bed on well compacted ground according to the Engineers' specifications. 80mm interlocking concrete paving will be used for the paving

Summary of most feasible and reasonable design/ layout alternative:
As can be seen, various different design and layout alternatives have been considered and tested over time by the oil industry both internationally and by various oil companies specifically. The proposed design and layout of the tanks and associated infrastructure contained in the current layout is that considered most environmentally and practically appropriate for this site. This alternative is considered the most feasible and appropriate, based on the minimisation of health, safety and environmental risks associated with possible spillages, subsoil, and groundwater contamination and vapour emissions.

It is important to note that many of these design considerations could also be considered as technology alternatives and as such should realistically be considered under each heading.

Summary of Preferred Design/Layout Alternatives

- Tank Size
  The 30 m³ capacity tanks are considered as the most suitable design alternative to meet the capacity needs of the proposed service station.

- Tank material and structure
  The best practice alternative identified for this application is a jacketed mild steel tank (double wall tanks) with an interstitial space between GRP layers within which a vacuum is held and monitored via an electronic monitoring system.

- Monitoring wells
  The installation of monitoring wells to monitor the subsurface environment was identified as best practice for this application.

- Tank layout

  The underground storage tank option was considered to be more environmentally and practically appropriate for this site.

- Leak detectors

  Leak detectors will be installed which immediately switch off the submersible pump contained within the tank should a leak be detected.

- Overfill protection devices

  The overfill protection devices in the tank filling pipe prevent tank overfills during filling operations and was identified as best practice for this application.

- Separator system

  Best practice alternatives include the installation of a separator system.

- Hard surface area around pump islands in forecourt area

  Best practice in the industry dictates that the area around the pump islands will be hard surfacing.

10.4 Technology Alternatives

As advised, many of the items listed in the design and layout alternatives section could be considered under this heading also.

Stock monitoring:

Examples of technology alternatives include the use of regular manual product monitoring using a dipstick compared to the use of automatic tank gauging (ATG). It is proposed to include the ATG system in this application as it allows for onsite as well as remote product determination and is identified as industry best practice. This continuous monitoring system allows for the rapid detection of any product anomalies and quicker reactions to a possible system failure, therefore reducing the risk to the environment. The system also allows for the immediate sounding of an alarm once a leak has been detected and the immediate shutting down of the dispensing system. Therefore no comparative assessment of stock monitoring will take place as part of the alternatives assessment for this project.

Tank material:

The use of jacketed GRP coated tanks as opposed to unlined, mild steel tanks can also be identified and investigated as a technology alternative. The jacketed GRP tank is

significantly more corrosion resistant than the unlined tank and is considered a best practice technology alternative. Therefore no comparative assessment of tank materials will take place as part of the alternatives assessment for this project.

Fuel delivery lines:
With regard to fuel lines, a variety of different technologies could be used from unlined galvanised lines to piping comprising non-corrosive fuel lines. It is proposed to utilise non-corrosive fuel lines as they are considered the best practice alternative within the industry. These have been selected to limit the possibility of pipe failure due to corrosion, which was the most common cause of pipe failure before non-corrosive pipe work systems were introduced to the RSA. Therefore no comparative assessment of fuel delivery lines will take place as part of the alternatives assessment of this project.

Sumps:
Locating all fuel line joints and entry points from the fuel lines to the tanks, within sumps which are equipped with fuel proof entry boots has been identified and investigated as the industry best practice technology alternative. This system ensures that no water entry or product loss can occur. Electronic sensors are placed within these sumps to detect the presence of water or hydrocarbons and are linked to the submersible pumps in such a way as to shut down all pumps in the event that hydrocarbons are detected. Sumps will also be situated under the pump dispensers.

The alternative of not using sumps was identified and it was found that the environmental risk associated with a possible system failure and associated soil and groundwater contamination, was higher. Therefore no comparative assessment of using sumps versus not using sumps will take place as part of the alternatives assessment of this project.

Summary of most feasible and reasonable technology alternatives:
As illustrated above, various different technology alternatives have been identified and investigated and tested over time by the oil industry internationally and by various oil companies specifically. The proposed technology contained in this best practice alternative is considered the most feasible and appropriate, based on the minimisation of health, safety and environmental risks associated with possible spillages, subsoil, and groundwater contamination and vapour emissions.

- Stock monitoring

  The automatic tank gauging (ATG) system allows for onsite as well as remote product determination and is identified as industry best practice.

- Tank material

  The jacketed GRP tank is significantly more corrosion resistant than the unlined tank and is considered a best practice technology alternative.

- Fuel delivery lines

  The use of non-corrosive fuel lines is considered the best practice alternative within the industry.

- Sumps

  Sumps which are equipped with fuel proof entry boots has been identified and investigated as the industry best practice technology alternative

10.5 Operational Alternatives

A variety of alternative operational aspects of the activity of fuel dispensing have been identified over time. The protocols adopted have evolved and are based on practical experience aimed at minimising health, safety and environmental risks.

Emergency fuel delivery cut-off during product offloading:
The operational alternative identified and investigated as industry best practice includes the continuous presence of the fuel tanker driver during product offloading. This allows for the immediate activation of an emergency cut-off switch if an incident occurs which requires the cessation of fuel delivery. The hypothetical alternative of no driver being present has been identified and excluded as too risky from a health, safety and environmental perspective. Therefore no comparative assessment of use of emergency fuel delivery cut-off will take place as part of the alternatives assessment of this project.

Regular stock monitoring:
The best practice operational process alternative includes Automatic Tank Gauging (ATG) as opposed to regular manual stock monitoring. ATG allows for the rapid detection of possible product losses and thus more rapid remedial action. This reduces the health, safety and environmental risks (subsoil and groundwater contamination and vapour emissions) associated with product losses. Therefore no comparative assessment of regular stock monitoring will take place as part of the alternatives assessment of this project.

Emergency response plan:

The best practice operational alternative identified and investigated includes an emergency response plan, which will be followed in the event of a spill. The alternative of operating without a response plan in place has been assessed and it has been ascertained that the health, safety and environmental risks are greater due to a slower response and remediation time. Therefore no comparative assessment of operating with an emergency response plan versus without an emergency response plan will take place as part of the alternatives assessment of this project.

Shop and Ablution Facilities:

The following water and energy efficiency technology measures have been identified and investigated as best practice, which will be utilised for the overall development, have been chosen in order to minimise resource use. Therefore, no comparative assessment of "standard" versus "best practice" energy and water efficiency technologies will take place as part of the alternatives assessment of this project.

Water use minimisation:

- Low flow taps will be installed for all basins and sinks in the shop and ablution facilities as opposed to standard fixtures which allow a greater amount of water to be used during washing activities.
- Auto-stop taps will be installed in the ablution facility, which will significantly reduce the amount of water utilised during a hand washing session.
- Dual-flush toilet cisterns will be installed throughout the development. Standard cisterns use approximately 25 litres of water per flush while dual flush cisterns use approximately 9 litres of water per flush for the maximum flush option.

<u>Energy efficiency:</u>

- Solar hot water geysers will be installed at the development. This is as opposed to standard geysers which require up to 40% more electricity to operate than solar geysers.
- Compact florescent light bulbs (CFL's) and Light Emitting Diodes (LED's) will be used in all components of the development as far as possible, as opposed to standard tungsten light bulbs which utilize significantly more electricity than CFL's or LED's.
- The air conditioners in the shop will be pre-set to 21°C, with an associated decrease in electricity usage as opposed to user-controlled air conditioning units.

- Outside temperature sensors will be installed with the air conditioners so that the units do not operate when outside temperatures are between 18°C and 22°C. In these instances, fresh air supply to the air conditioned buildings must be ensured. This is as opposed to operating without these sensors, with an associated higher electricity usage when the air conditioners are utilised unnecessarily.
- The design of the development must optimise the use of natural light in all components through the correct positioning and sizing of windows and thereby saving the need to install additional lighting and associated long terms energy use.
- The roofing of all components of the development must be insulated as opposed to not insulated, thereby reducing energy use for heating and cooling of the buildings.

Summary of most feasible and reasonable operational alternatives:

- Emergency fuel delivery cut-off during product offloading:
  The operational alternative identified and investigated as industry best practice includes the continuous presence of the fuel tanker driver during product offloading.

- Regular stock monitoring:
  The best practice operational process alternative includes Automatic Tank Gauging (ATG) as opposed to regular manual stock monitoring.

- Emergency response plan
  The best practice operational alternative identified and investigated includes an emergency response plan, which will be followed in the event of a spill.

- Shop and Ablution Facilities
  The following water and energy efficiency technology measures have been identified and investigated as best practice:
  - Water use minimisation
  - Energy efficiency

10.6 No-Go Alternative

The No Go Alternative means “the option of not implementing the activity”, or maintaining the status quo at the site. In terms of the No Go Alternative, the site of the proposed service

station would not be developed as a service station and would remain unutilised a parking area. Should this option be considered the following would be applicable:

Negative impacts associated with the No Go Alternative include:

- No capital investment would result.
- No fuel supply services or infrastructure would be put in place in support of the demand for fuel on site.
- There would be no temporary or permanent employment opportunities created, with the associated economic and social upliftment and skills transfer, during the construction and operational phases of the development
- Further negative impacts associated with the No-Go alternative will entail the site remaining as the status quo, which means that the site will remain vacant.

Positive impacts associated with the No Go Alternative include:

Cumulative negative impacts associated with developing the site for fuel retailing purposes would not occur. These include noise, light, vibration and dust during the construction phase; and noise, light, vibration, fuel vapour emissions and risk of soil and groundwater contamination associated with a spill or leak during the operational phase.

However, no significant benefits associated with the No Go Alternative have been identified, which would support the site remaining undeveloped.

No environmental risk factors were determined which should prevent the proposed development of the Service Station from taking place. The No Go Alternative is thus not the preferred alternative for this application.

10.7 Summary of Alternatives Investigated and Outcome of Investigation

During the alternatives assessment the Design/Layout, Technology, Operational and the No Go Alternatives were investigated. It was not considered necessary to investigate either site or activity alternatives: the general purpose and requirements of the application is to establish a Service Station in response to a profitable market within the Kriel area.

The design and layout alternatives assessed include:

1. Tank size
2. Tank material and structure

3. Product delivery lines
4. Monitoring wells
5. Tank layout
6. Underground vs. Aboveground storage tanks
7. Leak detectors
8. Overfill protection devices
9. Separator system

The technology alternatives assessed include:

1. Stock Monitoring: manual product monitoring using a dipstick compared to the use of automatic tank gauging (ATG).
2. Tank material: The use of jacketed GRP coated tanks as opposed to unlined, mild steel tanks.
3. Fuel delivery lines: a variety of different technologies could be used, from unlined galvanised lines to piping comprising non-corrosive fuel lines.
4. Sumps: sumps which are equipped with fuel proof entry boots has been identified and investigated as the industry best practice technology alternative.

As illustrated above, various different technology alternatives have been identified and investigated and tested over time by the oil industry internationally and by various oil companies specifically. The proposed technology contained in this best practice alternative is considered the most feasible and appropriate, based on the minimisation of health, safety and environmental risks associated with possible spillages, subsoil, and groundwater contamination and vapour emissions.

A variety of alternative operational aspects of the activity of fuel dispensing have been identified over time. The protocols adopted have evolved and are based on practical experience aimed at minimising health, safety and environmental risks. Some of these have been listed below:

1. Emergency fuel delivery cut-off during product offloading: the immediate activation of an emergency cut-off switch if an incident occurs which requires the cessation of fuel delivery.
2. Regular stock monitoring: best practice operational process alternative includes Automatic Tank Gauging (ATG) as opposed to regular manual stock monitoring. ATG allows for the rapid detection of possible product losses and thus more rapid remedial action.
3. Creation of an Emergency response plan which will be followed in the event of a spill.

4. Adopting energy efficient equipment, such as low energy lighting, control of air conditioning temperature ranges and the optimal use of natural lighting through the correct positioning of windows etc.
5. Water use minimisation measures, such as low flow toilets and taps, waterless urinals and auto-stop taps

11 PUBLIC PARTICIPATION

The public participation process will be started upon submission of the Draft BAR to the Authorities.

11.1 Communication with Stakeholders

A public participation process is required in order to fulfil the requirements of a Basic Assessment Process. In terms of the National Environmental Management Act ("NEMA"), 1998 (Act 107 of 1998),as amended, the public participation process needs to be undertaken in accordance with the NEMA EIA Regulations, 2017. The following activities will therefore be undertaken.

Draft BAR Notification

The following parties will be notified of the Basic Assessment Process and at the same time notified of the availability of the Draft Basic Assessment Report (Draft BAR) for review and comment:

- Department of Agriculture, Rural Development, Land and Environmental Affairs ("DARDLEA")
- Adjacent landowners/occupants
- Ratepayer's/ Home owners Associations in the area
- Department of Water and Sanitation
- Department of Transport and Public Works
- South African Heritage Resource Agency
- Emalahleni Local Municipality – Sub-councillor
- Emalahleni Local Municipality – Ward Councillor (Ward 26)

In addition to the above, the following will be undertaken;

- Registered notification letters in English will be sent to the all property owners adjacent to Erven 1685 and 1729, Kriel. A list of the recipients of these letters of notification can be found in **Appendix F** along with copies of the notifications.

- A newspaper advertisement will be published in the Kosmos News, a community newspaper. A copy of t which is contained in **Appendix F**.
- A notice will be placed in a highly visible location at the site, notifying Interested and Affected Parties of the chance to participate. Photographs of the notice can be seen in **Appendix F**.
- A hard copy of the Draft BAR will be sent to the Kriel Library to be accessed by the public.
- Uploading the Draft BAR to the SEC website (www.environmentalconsultants.co.za) for public review.

All interested and Affected Parties will be given the opportunity to review and comment on the Draft BAR for a period of 30 days.

The Final BAR will be circulated for 30 days prior to submission to DARDLEA for their decision and including the updated Comments and Responses Report.

12 IDENTIFICATION AND ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS

Methodology and rating Scale used to determine the impacts of the proposed development:

ITEM	DEFINITION
EXTENT	
Local	Extending only as far as the boundaries of the activity, limited to the site and its immediate surroundings
Regional	Impact on the broader region
National	Will have an impact on a national scale or across international borders
DURATION	
Short-term	0-5 years
Medium-Term	5-15 years
Long-Term	>15 years, where the impact will cease after the operational life of the activity
Permanent	Where mitigation, either by natural process or human intervention, will not occur in such a way or in such a time span that the impact can be considered transient.
MAGNITUDE OR INTENSITY	
Low	Where the receiving natural, cultural or social function/environment is negligibly affected or where the impact is so low that remedial action is not required.
Medium	Where the affected environment is altered, but not severely and the impact can be mitigated successfully and natural, cultural or social functions and processes can continue, albeit in a modified way.
High	Where natural, cultural or social functions or processes are substantially altered to a very large degree. If a negative impact then this could lead to unacceptable consequences for the cultural and/or social functions and/or irreplaceable loss of biodiversity to the extent that natural, cultural or social functions could temporarily or permanently cease.
PROBABILITY	
Improbable	Where the possibility of the impact materialising is very low, either because of design or historic experience
Probable	Where there is a distinct possibility that the impact will occur

Highly Probable	Where it is most likely that the impact will occur
Definite	Where the impact will undoubtedly occur, regardless of any prevention measures
SIGNIFICANCE	
Low	Where a potential impact will have a negligible effect on natural, cultural or social environments and the effect on the decision is negligible. This will not require special design considerations for the project
Medium	Where it would have, or there would be a moderate risk to natural, cultural or social environments and should influence the decision. The project will require modification or mitigation measures to be included in the design
High	Where it would have, or there would be a high risk to natural, cultural or social environments. These impacts should have a major influence on decision making.
Very High	Where it would have, or there would be a high risk of, an irreversible negative impact on biodiversity and irreplaceable loss of natural capital that could result in the project being environmentally unacceptable, even with mitigation. Alternatively, it could lead to a major positive effect. Impacts of this nature must be a central factor in decision making.
STATUS OF IMPACT	
Whether the impact is positive (a benefit), negative (a cost) or neutral (status quo maintained)	
DEGREE OF CONFIDENCE IN PREDICTIONS	
The degree of confidence in the predictions is based on the availability of information and specialist knowledge (e.g. low, medium or high)	
MITIGATION	
Mechanisms used to control, minimise and or eliminate negative impacts on the environment and to enhance project benefits. Mitigation measures should be considered in terms of the following hierarchy: (1) avoidance, (2) minimisation, (3) restoration and (4) off-sets.	

13 DESCRIPTION AND ASSESSMNET OF SIGNIFICANCE OF IMPACTS

13.1 Impacts that may result from the planning, design, construction and decommissioning phases;

Potential impacts geographical and physical aspects:	**Soil and groundwater contamination and pollution (surface spillages)**
Nature of impact:	During the construction phase of the service station development there is the possibility of a spill of any hazardous substances used on site for construction purposes. If hazardous materials seep into the soil and groundwater and associated ecosystems at the site, this will lead to the degradation of the natural environment.
Extent and duration of impact:	The extent of the impact will be local in the vicinity of the site. The duration short term (hours to days) as rapid response and clean-up is anticipated.
Probability of occurrence:	Improbable with proposed mitigation measures.
Degree to which the impact can be reversed:	• The impact is reversible with remediation procedures. • Mitigation measures can be implemented to reduce the risk of contamination.
Degree to which the impact may cause irreplaceable loss of resources:	It is unlikely given the scale of any spill or leak that might occur, considering the scale of the service station development, that any irreplaceable resources would be lost.
Cumulative impact prior to mitigation:	The proposed activity will have a cumulative impact on the possible contamination of soil and ground water as there are other activities in the vicinity of the site with a contamination risk: commercial activities in close proximity to the proposed site and the users of the streets adjacent to the site.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	High
Degree to which the impact can be mitigated:	The impact can be mitigated with the appropriate management and avoidance measures.
Proposed mitigation:	1. During the construction phase of the service station development, the correct protocols will be used to train staff, thereby minimising the likelihood of such an incident occurring. 2. Adequate training construction personnel will ensure that incidents resulting in product spills are minimised and that the correct actions are taken in the event of an incident. 3. In the event of such an emergency condition, a suitably trained clean-up contractor will be appointed to clean up the spill. Hazardous waste may be generated where absorbent materials are used to mop up a product spill. This will be suitably contained and handled by a specialist contractor using the correct personal

	protective equipment and hazardous waste temporary storage receptacles. 4. Disposal of such waste at a suitable hazardous landfill site with chain-of-custody documentation provided by the contractor as proof of end recipient. 5. The ECO should supervise any remediation procedures in order to ensure that the correct material is treated.
Cumulative impact post mitigation:	The cumulative impact associated with a spill or leak of hazardous substances during the construction phase once all recommended mitigation measures are in place can be considered low.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Low

Potential impacts geographical and physical aspects:	**Dust**
Nature of impact:	Construction activities at the site will include heavy vehicles traversing the site; loading, offloading and stockpiling of soil and materials; etc. The existing workshop will be demolished which will have some dust impacts.
Extent and duration of impact:	The extent of the impact will be local in the vicinity of the construction site. The duration of the impact will be short term for the duration of demolition of the workshop and site construction.
Probability of occurrence:	Definite during construction phase.
Degree to which the impact can be reversed:	The impact cannot be reversed but can be easily mitigated.
Degree to which the impact may cause irreplaceable loss of resources:	Dust impacts will not cause loss of any irreplaceable resources.
Cumulative impact prior to mitigation:	The impact can be considered cumulative to the area, as there are other activities in the vicinity of the site which are sources of dust, such as industrial and agricultural land use and other adjacent road users.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be mitigated:	The impact can be easily mitigated with appropriate dust suppression and avoidance measures.
Proposed mitigation:	1. An environmental management programme (EMP) will be used to minimise dust impacts during the construction phase. 2. The EMP will be monitored by an Environmental Control Officer during the construction phase to ensure that it is being complied with. 3. Appropriate dust management measures contained in the EMP include the use of water bowsers and wetting down, as well as the erection of shade netting screens to prevent offsite movement of dust.
Cumulative impact post mitigation:	The cumulative dust impacts associated with construction of the service station once all recommended mitigation measures are implemented can be considered minor.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Low

Potential impacts geographical and physical aspects:	**Traffic and Access**
Nature of impact:	There are traffic safety impacts associated with any heavy construction-type vehicles and machinery accessing the site for the construction of the service station. There will be a temporary increase in the amount of heavy traffic at the site during the construction phase causing an increase in road traffic and associated noise, light and vibration.
Extent and duration of impact:	The impact will be felt locally: on the adjacent R547 Road and Groen Avenue which are the immediate surrounding streets. The duration is short-term, for the duration of the service station construction.
Probability of occurrence:	Definite.
Degree to which the impact can be reversed:	The impact can easily be reversed if construction activities cease.
Degree to which the impact may cause irreplaceable loss of resources:	No irreplaceable resources will be impacted by heavy traffic flows to the site during construction.
Cumulative impact prior to mitigation:	The impact is considered to be cumulative, as the surrounding road network will be used by other heavy vehicles accessing other facilities surrounding the site.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium
Degree to which the impact can be mitigated:	The impact can be easily mitigated
Proposed mitigation:	1. The contractor must provide a traffic marshal for situations where heavy construction traffic may impede normal traffic flows on any roads adjacent to the site. 2. All vehicles will be legally compliant. 3. All drivers will be competent and in possession of an appropriate

	valid driver's license. 4. All vehicles travelling on site will adhere to the specified speed limits. 5. The movement of all vehicles will be controlled such that they remain on designated routes. 6. No member of the workforce will be permitted to drive a vehicle under the influence of alcohol or narcotic substances.
Cumulative impact post mitigation:	The development will have a cumulative impact on the surrounding roads as there are other residential, commercial and industrial vehicles using the surrounding roads and have minor traffic impacts.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Low

Potential impacts on biological aspects:	**Fauna and Flora**
Nature of impact:	Not applicable as described in Section 5.5, there is no natural flora or fauna remaining on the site.
Extent and duration of impact:	
Probability of occurrence:	
Degree to which the impact can be reversed:	
Degree to which the impact may cause irreplaceable loss of resources:	
Cumulative impact prior to mitigation:	
Significance rating of impact prior to mitigation (Low, Medium, High, or Very-High)	
Degree to which the impact can be mitigated:	
Proposed mitigation:	
Cumulative impact post mitigation:	
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	

Potential impacts on socio-economic aspects:	**Fire, Health and Safety Risk**
Nature of impact:	Fire risk associated with the use of any electrical construction equipment.
Extent and duration of impact:	The extent will be local in the immediate vicinity of the site and short term with rapid fire fighting response anticipated.
Probability of occurrence:	It is unlikely that a fire or explosion will occur provided health and safety protocols are followed.
Degree to which the impact can be reversed:	The impact can be reversed over some time, but can be easily avoided in the first place.
Degree to which the impact may cause irreplaceable loss of resources:	This impact may cause loss of irreplaceable resources, such as human life.
Cumulative impact prior to mitigation:	The impact can be considered to be cumulative to the area, as the site is located within a developed area and other activities in the vicinity of the site, such as at the nearby industrial facilities to the north, which have some fire risk potential.
Significance rating of impact prior to mitigation (Low, Medium, High, or Very-High)	Medium
Degree to which the impact can be mitigated:	The impact can easily be avoided with appropriate fire prevention measures followed during construction.
Proposed mitigation:	1. Adequate training in emergency response situations of the contractor and construction personnel undertaking the construction activities will be carried out. 2. Fire fighting facilities will be to Oil Industry standards, which will include hand-held fire extinguishers and a hose reel. These facilities must be approved by the local fire department. 3. Minimisation of hot work by using alternative methods and equipment such as air driven tools, cold cutting and pre-fabrication off site. 4. The use of appropriate shielding and screening such as blanketing with fire fighting foam and water screens to minimise fire risk. 5. Minimisation of spark quenching by wetting down and/or using construction power tools such as jack hammers under running water. 6. A fire attendant will be on stand-by during the construction process.
Cumulative impact post mitigation:	The cumulative impact of Fire, Health and Safety Risk associated with construction of the fuel storage infrastructure once all mitigation and fire management measures are implemented can be considered to be low.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Low

Potential impacts on socio-economic aspects:	**Income and Employment**
Nature of impact:	The construction of the new site will provide income and job opportunities during the construction phase.
Extent and duration of impact:	The extent is local, as workers form any nearby areas, are likely to benefit. The duration is short-term, for the duration of the construction.
Probability of occurrence:	This benefit will definitely occur.
Degree to which the impact can be reversed:	N/A: this is a benefit.
Degree to which the impact may cause irreplaceable loss of resources:	N/A: this is a benefit.
Cumulative impact prior to mitigation:	N/A: this is a benefit.
Significance rating of impact prior to mitigation (Low, Medium, High, or Very-High)	N/A: this is a benefit.
Degree to which the impact can be mitigated:	N/A: this is a benefit.
Proposed mitigation:	N/A: this is a benefit.
Cumulative impact post mitigation:	N/A: this is a benefit.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Low

Potential noise impacts:	**Noise**
Nature of impact:	Construction activities at the site would entail the use of heavy machinery and equipment. The activities, including the demolition of the existing workshop, would emit some noise.
Extent and duration of impact:	The extent is local in the immediate vicinity of the site with the noise impacts lasting as long as the construction of the site.
Probability of occurrence:	Definite.
Degree to which the impact can be reversed:	The impact is not reversible, but mitigation measures can be implemented to ensure that noise levels remain acceptable, both for neighbouring properties as well as for workers on the site.
Degree to which the impact may cause irreplaceable loss of resources:	No irreplaceable resources will be lost.
Cumulative impact prior to mitigation:	The impact is considered to be cumulative, as the surrounding road network (the R547 in particular) will be used by other heavy vehicles accessing other facilities (mines, power stations etc.) surrounding the site.
Significance rating of impact prior to mitigation (Low, Medium, High, or Very-High)	Medium
Degree to which the impact can be mitigated:	The impact can easily be mitigated by implementing appropriate noise reduction and management measures.
Proposed mitigation:	1. The construction contractor must use modern equipment, which produces the least noise. 2. Any unavoidably noisy equipment must be identified and located in an area where it has least impact. 3. The use of noise shielding screens must be considered and the operation of such machinery restricted to when it is actually required. 4. No noise generating work is to be conducted outside of normal working hours as approved by the local authority.
Cumulative impact post mitigation:	Construction activities at the site will not contribute to the noise levels experienced in the area to any great degree, as the environmental noise in the area will already be at a substantial level due to the developed nature of the surrounding area.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Low

Potential visual impacts:	**Visual**
Nature of impact:	The construction vehicles and machinery which would be used during the development of the service station, as well as materials stockpiles established at the site, will have a minor visual impact on the surrounding environment.
Extent and duration of impact:	The visual impact would be on the immediate surrounding area from where the construction site would be visible; and the impact would be short-term for the duration of decommissioning activities at the site.
Probability of occurrence:	Probable (even though on a minor scale)
Degree to which the impact can be reversed:	The impact can easily be reversed by when construction activities cease at the site.
Degree to which the impact may cause irreplaceable loss of resources:	There are no irreplaceable resources which would be impacted by the visual impacts of the construction site.
Cumulative impact prior to mitigation:	The impact is considered to be cumulative due to the developed nature of

	the surrounding area.
Significance rating of impact prior to mitigation (Low, Medium, High, or Very-High)	Low
Degree to which the impact can be mitigated:	The impact can be mitigated, but is considered to be appropriate given the nature of the surrounding area and other activities in the vicinity.
Proposed mitigation:	Implementation of the Environmental Management Programme, including screening of the site during construction activities, screening of stockpiles, etc.
Cumulative impact post mitigation:	N/A
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Very Low

13.2 Impacts that may result from the operational phase

Potential impacts geographical and physical aspects:	**Soil and groundwater contamination and pollution (surface spillages)**
Nature of impact:	Contamination of the subsoil and subsequently ground water as a result of product loss associated with system leaks and with leaks during dispensing and road tanker fuel deliveries
Extent and duration of impact:	Localised spillages in vicinity of pump dispenser points and filler points. Short-term (days to weeks) minor spillages will primarily volatilise.
Probability of occurrence:	Improbable with proposed mitigation measures.
Degree to which the impact can be reversed:	The impact is reversible with remediation procedures. Mitigation measures can be implemented to reduce the risk of contamination.
Degree to which the impact may cause irreplaceable loss of resources:	Without appropriate mitigation measures implemented, there is a very minor likelihood that contamination of a large enough scale could cause loss of irreplaceable natural resources such as soil and ground water.
Cumulative impact prior to mitigation:	Possible contamination of soil and ground water can be considered a cumulative impact, as there are other activities in the vicinity of the site with a contamination risk: industrial land uses and other activities surrounding the site.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	High
Degree to which the impact can be mitigated:	The impact can be mitigated with the appropriate management and avoidance measures.
Proposed mitigation:	1. All dispenser pumps will be located on pump islands surrounded by hardened surfaces, which will prevent downward migration of any free product and promote horizontal flow into the collection pit/s. The filler points are located inside containment manholes, which are surrounded by concrete hard standing. The containment manholes will contain minor spillages from flexible fuel delivery pipe disconnection. 2. Shear-off valves will be anchored below fuel dispensers, so that no spillage occurs if the dispenser is accidentally knocked over. There are also breakaway couplings on the hoses in case a car pulls away from the pump dispenser while the nozzle is still in the filler. 3. Experience has shown that minor spillages on the forecourt readily evaporate. The volatile components contain the more problematic compounds such as benzene, which readily evaporate leaving behind the less volatile, less mobile and less harmful heavier components. Given sufficient time, natural attenuation will completely break down these compounds. 4. Automatic cut-off devices are built into both the underground storage tanks and the pump dispensers, to prevent tank overfills and spillages. 5. As a natural product, hydrocarbons will ultimately naturally breakdown and attenuate themselves.
Cumulative impact post mitigation:	The risk of soil and groundwater contamination once all recommended mitigation measures are in place can be considered low.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Low

Potential impacts geographical and physical aspects:	**Soil and groundwater contamination and pollution (subsurface leaks)**
Nature of impact:	Contamination of soil and shallow groundwater due to subsurface losses of product, such as a tank failure or line leak.
Extent and duration of impact:	Local, due to leak detection systems, which will cut off fuel supply from lines at an early stage. Product monitoring in tanks will also allow for early

	detection of product loss.
Probability of occurrence:	Improbable with proposed mitigation measures.
Degree to which the impact can be reversed:	The impact is reversible with remediation procedures. Mitigation measures can be implemented to reduce the risk of contamination.
Degree to which the impact may cause irreplaceable loss of resources:	Without appropriate mitigation measures implemented, there is a very minor likelihood that contamination of a large enough scale could cause loss of irreplaceable natural resources such as soil and ground water.
Cumulative impact prior to mitigation:	Possible contamination of soil and ground water can be considered a cumulative impact, as there are other activities in the in the vicinity of the site with a contamination risk: commercial land use and other activities surrounding the site.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	High
Degree to which the impact can be mitigated:	The impact can be mitigated with the appropriate management and avoidance measures.
Proposed mitigation:	1. The proposed installation will comply with SANS 1535 (relating to tank manufacture standards) and SANS 10089 Part 3 (relating to underground tanks and pipe installation standards). 2. The underground storage tanks will comprise glass reinforced polyester (GRP) coated tanks. The outer coating is used to minimise the possibility of corrosive failure of the tank. 3. Internationally approved non-corrosive pipe work systems will be installed. This is to limit the possibility of pipe failure due to corrosion; this being the most common cause of pipe failure before this system was introduced to the RSA. 4. Any joints in the fuel lines will be located within containment manholes, which also occur where the pipe work enters the underground storage tanks and under the pump dispensers. These manholes will be regularly inspected as part of the normal management procedures at the service station. 5. Leak detectors will be installed at various positions on the fuel delivery system. Delivery lines are pressurised at all times, and leak detectors will immediately switch off the submersible pump in the underground storage tank should a leak be detected. 6. Vent and filler lines will be sloped back to the underground storage tank so that fuel does not remain in the pipes. 7. Continuous electronic monitoring of underground stock will be done to allow for the early identification of abnormalities. Should these occur, management would review these and take appropriate action to rectify the situation 8. Observation wells will be installed in the sand fill surrounding the underground storage tanks. These can be used to check for product losses (visual and olfactory assessment), and may be used for product recovery/remediation purposes. 9. As a natural product, hydrocarbons will ultimately naturally breakdown and attenuate themselves. 10. All incidences in the event of contamination on site or pollution of water resources, including groundwater must be reported to the relevant authorities, including DARDLEA and Department of Water Affairs and Sanitation.
Cumulative impact post mitigation:	The risk of soil and groundwater contamination once all recommended mitigation measures are in place can be considered low.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Medium

Potential impacts geographical and physical aspects:	**Traffic and Access** There will only be a very minor amount of traffic directly associated with the service station development. Studies carried out by the Department of Transport have shown that service stations are not primary generators of traffic i.e. they are not trip generators. This means that clients visiting a service station do so on their way to or from another appointment, which trigger the journey. A feasibility study carried out by Finland Consultants has concluded that due to the good access points the site has from The R547 Road and Groen Avenue, traffic will be drawn from the roads resulting in a decreased amount of cars.

Potential impacts geographical and physical aspects:	**Atmospheric emissions**
Nature of impact:	Product vapour dispersing across the site and to surrounding areas primarily from the tank vent pipes, especially during a road tanker fuel delivery and to a lesser extent (smaller quantity and volumes) during vehicle refuelling.
Extent and duration of impact:	Local emissions occur in the immediate vicinity of vent pipes, filler points and in the vicinity of dispensing operations. Short term related to dispensing, spillages and road tanker fuel delivery. Medium term related to

	breather pipes.
Probability of occurrence:	Improbable with proposed mitigation measures.
Degree to which the impact can be reversed:	The impact can be reversed.
Degree to which the impact may cause irreplaceable loss of resources:	No irreplaceable resources will be impacted by atmospheric emissions of the service station.
Cumulative impact prior to mitigation:	The impact is considered to be cumulative, as the surrounding road network will be used by vehicles and the surrounding land uses might also be sources of air emissions.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium
Degree to which the impact can be mitigated:	The impact can be mitigated.
Proposed mitigation:	1. Careful location of vent pipes at elevated positions to ensure that vapour does not discharge into sensitive areas, and that the distances to any sensitive areas between the vent pipe and receptor should be maximised to maximise vapour dispersion and located away from fresh air ventilation intakes and windows able to open. 2. The location of the vent pipes needs to take into consideration the climatic conditions, including any prevailing wind directions. 3. Rapid dispersion of vapour into the atmosphere takes place. 4. Pressure vacuum vents will be fitted to underground storage tank vent pipes, to minimise vapour loss from tanks. 5. Primary vapour recovery technology will be utilised during fuel deliveries in order to minimise fuel vapour discharge. This technology entails retention of the fuel vapour emitted from the fuel tanks during fuel delivery, with the vapour being retained and redirected to the delivery tanker to be transported back to the refinery for recycling. 6. Adequate training of road tanker fuel delivery drivers will be carried out, to prevent incorrect fuel delivery procedures, which may result in surface spillage.
Cumulative impact post mitigation:	The cumulative air emissions impact associated with activities at the service station once all recommended mitigation measures are implemented can be considered low.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Low

Potential impacts on biological aspects:	**Fauna and Flora** Not applicable as described in Section 5.5, there is no natural flora or fauna remaining on the site.

Potential impacts on socio-economic aspects:	**Fire, Health and Safety Risk**
Nature of impact:	Fire and associated smoke and disturbance associated with evacuation of the site and surrounding area; risk to life and property.
Extent and duration of impact:	Local (anticipated to be highly localised, with ponding in the vicinity of pump dispenser and filler points in the case of tanker delivery) The duration will be short term (rapid fire fighting response anticipated).
Probability of occurrence:	Improbable with proposed mitigation measures.
Degree to which the impact can be reversed:	The impact can be reversed over some time but can be easily mitigated.
Degree to which the impact may cause irreplaceable loss of resources:	This impact may cause loss of irreplaceable resources, namely human life.
Cumulative impact prior to mitigation:	The impact can be considered to be cumulative to the area, as there are other activities in the vicinity of the site, such as industries, that have some fire risk potential.
Significance rating of impact prior to mitigation (Low, Medium, High, or Very-High)	High
Degree to which the impact can be mitigated:	The impact can easily be avoided with appropriate fire management measures installed during operational phase.
Proposed mitigation:	1. Adequate training of management and forecourt personnel in emergency response situations will be carried out. 2. Fire fighting facilities will be to Oil Industry standards, which will include hand-held fire extinguishers and a hose reel. These facilities are approved by the local fire department. 3. Refuelling will occur on a hard standing area (both fuel delivery and dispensing to clients), which is sloped to a contained environment, removing the bulk of any spilled product if it is of sufficient quantity to allow for surface runoff. 4. Shear-off valves will be installed in the pump dispensers and fuel dispensing hoses, to prevent fuel spillages should they be knocked over or ripped off. 5. Filler containment manholes will be installed at filler points, to contain minor spillages. 6. Overfill protection devices will be installed.

	7. During a fuel delivery, the tanker driver will be present at all times (with a fire extinguisher) during product off-loading. Emergency cut-off switches will be installed.
Cumulative impact post mitigation:	The cumulative impact of Fire, Health and Safety Risk associated with operation of the fuel storage infrastructure once all mitigation and fire management measures are implemented can be considered to be low.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Medium

Potential impacts on socio-economic aspects:	**Income and Employment**
Nature of impact:	The benefits associated with the proposed service station relate to the capital investment and income it will generate, to the benefit of the applicant as well as to the surrounding local economy. The development will also generate job opportunities. Drawbacks include the loss of jobs at competitor service stations.
Extent and duration of impact:	The extent of the impact will be local and the duration will be for the lifespan of the service station.
Probability of occurrence:	Probable
Degree to which the impact can be reversed:	The impact will be reversed over a long period where the economy will trigger more job opportunities at the service stations.
Degree to which the impact may cause irreplaceable loss of resources:	The impact may cause a loss of jobs
Cumulative impact prior to mitigation:	The impact is considered to be cumulative and of medium significance as the development may cause a loss of jobs at competitor service stations.
Significance rating of impact prior to mitigation (Low, Medium, High, or Very-High)	Medium
Degree to which the impact can be mitigated:	Low
Proposed mitigation:	Not to build the service station or building the service station in another location
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Low

Potential noise impacts:	**Noise**
Nature of impact:	Generation of noise associated with road tanker fuel deliveries and with client vehicles frequenting the site during the operational phase and to a lesser degree operational phase equipment such as compressors and air conditioner and refrigeration units.
Extent and duration of impact:	The extent is local in the immediate vicinity of the site. Duration is frequent, low-level noise and vibration of short to medium duration.
Probability of occurrence:	Definite.
Degree to which the impact can be reversed:	The impact is reversible.
Degree to which the impact may cause irreplaceable loss of resources:	The impact will not cause irreplaceable loss of resources.
Cumulative impact prior to mitigation:	The impact is considered to be cumulative and of low significance, as the surrounding road network (especially the R547 Road) will be used by other vehicles accessing the other facilities surrounding the site. Also, other service stations in close proximity commercial activities in the surrounding area have noise impacts.
Significance rating of impact prior to mitigation (Low, Medium, High, or Very-High)	Low
Degree to which the impact can be mitigated:	The impact can easily be mitigated by implementing appropriate noise reduction and management measures.
Proposed mitigation:	1. Every attempt must be made to reduce noise levels to ensure minimum nuisance by the noise source. 2. The site operator must use appropriate, modern equipment, which produces the least noise. 3. Any unavoidably noisy equipment must be identified and located in an area where it has least impact. 4. The use of noise shielding screens should be considered by the project team as and when required. This would be applicable to items such as air conditioning units, compressors and refrigeration equipment. 5. The provisions of SABS 1200A Sub clause 4.1 regarding "built-up areas" shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas. 6. No amplified music shall be allowed on site. The use of radios, tape recorders, compact disc players, television sets etc. shall not be permitted unless the volume is kept sufficiently low as to avoid any intrusion on members of the public within range. 7. No on-site noise generating work, such as routine maintenance and repairs, is to be conducted outside of approved working hours unless in consultation with the local authority and advised

	to the adjacent property owners/occupants prior to works taking place.
Cumulative impact post mitigation:	The impact is considered to be cumulative and of low significance, as the surrounding road network will be used by other vehicles accessing the other facilities surrounding the site. Also, commercial activities in the surrounding area have noise impacts.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Low

Potential visual impacts:	**Visual**
Nature of impact:	A minor increase in light impacts can be expected during the operational phase associated with site lighting and signage (and primarily with under canopy lighting in the case of the proposed service station development).
Extent and duration of impact:	The visual impact would be on the immediate surrounding area from where the site is visible.
Probability of occurrence:	Probable (even though on a minor scale)
Degree to which the impact can be reversed:	The impact can easily be reversed with mitigation measures.
Degree to which the impact may cause irreplaceable loss of resources:	There are no irreplaceable resources which would be impacted by the visual impacts of the service station.
Cumulative impact prior to mitigation:	The impact is considered to be cumulative due to the surrounding land uses (roads, residential; commercial; industrial) of the surrounding area.
Significance rating of impact prior to mitigation (Low, Medium, High, or Very-High)	Low
Degree to which the impact can be mitigated:	The impact can be easily mitigated.
Proposed mitigation:	Any site lighting (in particular, under canopy lighting), which may impact nearby residential properties, must be designed in such a way that this impact is minimised.
Cumulative impact post mitigation:	With mitigation measures implemented the cumulative impact will be very low.
Significance rating of impact after mitigation (Low, Medium, High, or Very-High)	Very Low

14 ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

The following assumptions, uncertainties and gaps in knowledge were identified in the impact assessment undertaken:

- That the applicant will act in a responsible manner and take appropriate and prompt action when incidents occur at the site, in order to (1) determine the cause of the incident and, (2) rectify the cause of the problem.
- That the development will be used for the activities proposed.
- That the information provided by the applicant, engineers and specialists are deemed accurate and unbiased.
- That the applicant will adhere to the mitigation measures presented in the EIA Report and draft EMP.
- That the full recommendations of the specialist studies are implemented.
- That the monitoring and auditing programmes suggested are implemented.
- That construction activity will be conducted by experienced person/s (contractors and principle agents).
- That an experienced independent environmental control officer (ECO) will be appointed for the construction phase of this project and that regular ECO site visits

will occur to ensure that the EMP is complied with and that every effort is made to minimise environmental impacts.

- That the available data, including Topocadastral maps, Orthophotographs, geological maps and DWEA national ground water database information, are reasonably accurate.

15 EAP OPINION AND FURTHER RECOMMENDATIONS

The investigation of alternatives for this application, and the assessment of the impacts associated with the development proposal and with the No Go Alternative, or the option of doing nothing, have found the following:

Best practice design, layout and technology alternatives, as well as operating protocols, are available for fuel storage and handling facilities, these are based on oil industry research and experience, and are aimed at avoiding or minimising the health, safety and environmental risks associated with these facilities.

These best practice alternatives and protocols have been included in the development proposal. With the inclusion of these best practice measures, the impact assessment found that the potential impacts associated with the service station can all be avoided altogether, or at least minimised or mitigated to acceptable levels.

There are benefits associated with the development of the service station, which include meeting the undersupplied fuel demand in the area. Other benefits include job provision, and an income contribution to the local economy, as well as to the applicant.

The impact assessment found that, whilst there are no negative impacts associated with the No Go Alternative, the benefits associated with developing the site will not be realised. Furthermore, there are no specific benefits to maintaining the status quo at the site.

15.1 Summary of Preferred Design/Layout Alternatives

- Tank Size

  The 30 m³ capacity tanks are considered as the most suitable design alternative to meet the capacity needs of the proposed service station.

- Tank material and structure

The best practice alternative identified for this application is a jacketed mild steel tank (double wall tanks) with an interstitial space between GRP layers within which a vacuum is held and monitored via an electronic monitoring system.

- Monitoring wells
  The installation of monitoring wells to monitor the subsurface environment was identified as best practice for this application.

- Tank layout
  The underground storage tank option was considered to be more environmentally and practically appropriate for this site.

- Leak detectors
  Leak detectors will be installed which immediately switch off the submersible pump contained within the tank should a leak be detected.

- Overfill protection devices
  The overfill protection devices in the tank filling pipe prevent tank overfills during filling operations and was identified as best practice for this application.

- Separator system
  Best practice alternatives include the installation of a separator system.

- Hard surface area around pump islands in forecourt area
  Best practice in the industry dictates that the area around the pump islands will be hard surfacing.

15.2 Summary of most feasible and reasonable technology alternatives:

- Stock monitoring
  The automatic tank gauging (ATG) system allows for onsite as well as remote product determination and is identified as industry best practice.

- Tank material
  The jacketed GRP tank is significantly more corrosion resistant than the unlined tank and is considered a best practice technology alternative.

- Fuel delivery lines

The use of non-corrosive fuel lines is considered the best practice alternative within the industry.

- Sumps
  Sumps which are equipped with fuel proof entry boots has been identified and investigated as the industry best practice technology alternative

15.3 Summary of most feasible and reasonable operational alternatives:

- Emergency fuel delivery cut-off during product offloading:
  The operational alternative identified and investigated as industry best practice includes the continuous presence of the fuel tanker driver during product offloading.

- Regular stock monitoring:
  The best practice operational process alternative includes Automatic Tank Gauging (ATG) as opposed to regular manual stock monitoring.

- Emergency response plan
  The best practice operational alternative identified and investigated includes an emergency response plan, which will be followed in the event of a spill.

- Shop and Ablution Development
  The following water and energy efficiency technology measures have been identified and investigated as best practice:
  - Water use minimisation
  - Energy efficiency

15.4 Mitigation Measures to be included in the Environmental Authorisation

Construction / Decommissioning Phase Mitigation Measures

- **Soil and groundwater contamination and pollution (surface spillages)**

Proposed mitigation:

1. During the construction phase of the service station development, the correct protocols will be used to train staff, thereby minimising the likelihood of such an incident occurring.

2. Adequate training construction personnel will ensure that incidents resulting in product spills are minimised and that the correct actions are taken in the event of an incident.
3. In the event of such an emergency condition, a suitably trained clean-up contractor will be appointed to clean up the spill. Hazardous waste may be generated where absorbent materials are used to mop up a product spill. This will be suitably contained and handled by a specialist contractor using the correct personal protective equipment and hazardous waste temporary storage receptacles.
4. Disposal of such waste at a suitable hazardous landfill site with chain-of-custody documentation provided by the contractor as proof of end recipient.
5. The ECO should supervise any remediation procedures in order to ensure that the correct material is treated.

- **Dust**

Proposed mitigation:

1. An environmental management programme (EMP) will be used to minimise dust impacts during the construction phase.
2. The EMP will be monitored by an Environmental Control Officer during the construction phase to ensure that it is being complied with.
3. Appropriate dust management measures contained in the EMP include the use of water bowsers and wetting down, as well as the erection of shade netting screens to prevent offsite movement of dust.

- **Traffic and Access**

Proposed mitigation:

1. The contractor must provide a traffic marshal for situations where heavy construction traffic may impede normal traffic flows on any roads adjacent to the site.
2. All vehicles will be legally compliant.
3. All drivers will be competent and in possession of an appropriate valid driver's license.
4. All vehicles travelling on site will adhere to the specified speed limits.
5. The movement of all vehicles will be controlled such that they remain on designated routes.
6. No member of the workforce will be permitted to drive a vehicle under the influence of alcohol or narcotic substances.

- **Fire, Health and Safety Risk**

Proposed mitigation:

1. Adequate training in emergency response situations of the contractor and construction personnel undertaking the construction activities will be carried out.
2. Fire fighting facilities will be to Oil Industry standards, which will include hand-held fire extinguishers and a hose reel. These facilities must be approved by the local fire department.
3. Minimisation of hot work by using alternative methods and equipment such as air driven tools, cold cutting and pre-fabrication off site.
4. The use of appropriate shielding and screening such as blanketing with fire fighting foam and water screens to minimise fire risk.
5. Minimisation of spark quenching by wetting down and/or using construction power tools such as jack hammers under running water.
6. A fire attendant will be on stand-by during the construction process.

- **Noise**

Proposed mitigation:

1. The construction contractor must use modern equipment, which produces the least noise.
2. Any unavoidably noisy equipment must be identified and located in an area where it has least impact.
3. The use of noise shielding screens must be considered and the operation of such machinery restricted to when it is actually required.
4. No noise generating work is to be conducted outside of normal working hours as approved by the local authority.

- **Visual**

Proposed mitigation:

Implementation of the Environmental Management Programme, including screening of the site during construction activities, screening of stockpiles, etc.

Operational phase mitigation measures:

- **Soil and groundwater contamination and pollution (surface spillages)**

Proposed mitigation:

1. All dispenser pumps will be located on pump islands surrounded by hardened surfaces, which will prevent downward migration of any free product and promote horizontal flow into the collection pit/s. The filler points are located inside containment manholes, which are surrounded by concrete hard standing. The containment manholes will contain minor spillages from flexible fuel delivery pipe disconnection.
2. Shear-off valves will be anchored below fuel dispensers, so that no spillage occurs if the dispenser is accidentally knocked over. There are also breakaway couplings on the hoses in case a car pulls away from the pump dispenser while the nozzle is still in the filler.
3. Experience has shown that minor spillages on the forecourt readily evaporate. The volatile components contain the more problematic compounds such as benzene, which readily evaporate leaving behind the less volatile, less mobile and less harmful heavier components. Given sufficient time, natural attenuation will completely break down these compounds.
4. Automatic cut-off devices are built into both the underground storage tanks and the pump dispensers, to prevent tank overfills and spillages.
5. As a natural product, hydrocarbons will ultimately naturally breakdown and attenuate themselves.

- **Soil and groundwater contamination and pollution (subsurface leaks)**

Proposed mitigation:

1. The proposed installation will comply with SANS 1535 (relating to tank manufacture standards) and SANS 10089 Part 3 (relating to underground tanks and pipe installation standards).
2. The underground storage tanks will comprise glass reinforced polyester (GRP) coated tanks. The outer coating is used to minimise the possibility of corrosive failure of the tank.
3. Internationally approved non-corrosive pipe work systems will be installed. This is to limit the possibility of pipe failure due to corrosion; this being the most common cause of pipe failure before this system was introduced to the RSA.
4. Any joints in the fuel lines will be located within containment manholes, which also occur where the pipe work enters the underground storage tanks and under the pump dispensers. These manholes will be regularly inspected as part of the normal management procedures at the service station.

5. Leak detectors will be installed at various positions on the fuel delivery system. Delivery lines are pressurised at all times, and leak detectors will immediately switch off the submersible pump in the underground storage tank should a leak be detected.
6. Vent and filler lines will be sloped back to the underground storage tank so that fuel does not remain in the pipes.
7. Continuous electronic monitoring of underground stock will be done to allow for the early identification of abnormalities. Should these occur, management would review these and take appropriate action to rectify the situation
8. Observation wells will be installed in the sand fill surrounding the underground storage tanks. These can be used to check for product losses (visual and olfactory assessment), and may be used for product recovery/remediation purposes.
9. As a natural product, hydrocarbons will ultimately naturally breakdown and attenuate themselves.
10. All incidences in the event of contamination on site or pollution of water resources, including groundwater must be reported to the relevant authorities, including DARDLEA and Department of Water Affairs and Sanitation.

- **Atmospheric emissions**

Proposed mitigation:

1. Careful location of vent pipes at elevated positions to ensure that vapour does not discharge into sensitive areas, and that the distances to any sensitive areas between the vent pipe and receptor should be maximised to maximise vapour dispersion and located away from fresh air ventilation intakes and windows able to open.
2. The location of the vent pipes needs to take into consideration the climatic conditions, including any prevailing wind directions.
3. Rapid dispersion of vapour into the atmosphere takes place.
4. Pressure vacuum vents will be fitted to underground storage tank vent pipes, to minimise vapour loss from tanks.
5. Primary vapour recovery technology will be utilised during fuel deliveries in order to minimise fuel vapour discharge. This technology entails retention of the fuel vapour emitted from the fuel tanks during fuel delivery, with the vapour being retained and redirected to the delivery tanker to be transported back to the refinery for recycling.
6. Adequate training of road tanker fuel delivery drivers will be carried out, to prevent incorrect fuel delivery procedures, which may result in surface spillage.

- **Fire, Health and Safety Risk**

Proposed mitigation:

1. Adequate training of management and forecourt personnel in emergency response situations will be carried out.
2. Fire fighting facilities will be to Oil Industry standards, which will include hand-held fire extinguishers and a hose reel. These facilities are approved by the local fire department.
3. Refuelling will occur on a hard standing area (both fuel delivery and dispensing to clients), which is sloped to a contained environment, removing the bulk of any spilled product if it is of sufficient quantity to allow for surface runoff.
4. Shear-off valves will be installed in the pump dispensers and fuel dispensing hoses, to prevent fuel spillages should they be knocked over or ripped off.
5. Filler containment manholes will be installed at filler points, to contain minor spillages.
6. Overfill protection devices will be installed.
7. During a fuel delivery, the tanker driver will be present at all times (with a fire extinguisher) during product off-loading. Emergency cut-off switches will be installed.

- **Potential noise impacts**

Proposed mitigation:

1. Every attempt must be made to reduce noise levels to ensure minimum nuisance by the noise source.
2. The site operator must use appropriate, modern equipment, which produces the least noise.
3. Any unavoidably noisy equipment must be identified and located in an area where it has least impact.
4. The use of noise shielding screens should be considered by the project team as and when required. This would be applicable to items such as air conditioning units, compressors and refrigeration equipment.
5. The provisions of SABS 1200A Sub clause 4.1 regarding "built-up areas" shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas.
6. No amplified music shall be allowed on site. The use of radios, tape recorders, compact disc players, television sets etc. shall not be permitted unless the volume is kept sufficiently low as to avoid any intrusion on members of the public within range.
7. No on-site noise generating work, such as routine maintenance and repairs, is to be conducted outside of approved working hours unless in consultation with the local

authority and advised to the adjacent property owners/occupants prior to works taking place.

- **Potential visual impacts**

Proposed mitigation:

Any site lighting (in particular, under canopy lighting), which may impact nearby residential properties, must be designed in such a way that this impact is minimised.

Based on the findings of this Basic Assessment Report, which has been informed by input from independent specialists, the EAP finds it reasonable to recommend the proposed development as the preferred alternative for this Environmental Application.

This EIA Report and supporting documentation is considered to be adequate in meeting the requirements of the relevant legislation and those of the DARDLEA, and the EAP believes that sufficient information is presented for the purposes of decision-making.

- **Potential heritage impacts**

Proposed mitigation:

If any archaeological material, fossils, or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist or palaeontologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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