ENVIRONMENTAL IMPACT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME FOR AN EXPLORATION RIGHT APPLICATION FOR PETROLEUM PRODUCTS ON VARIOUS FARMS IN THE MAGISTERIAL DISTRICTS OF MATATIELE AND MT FLETCHER, EASTERN CAPE (12/3/295 ER)

September 2016


NAME OF APPLICANT: Rhino Oil and Gas Exploration South Africa (Pty) Ltd

TEL NO: (021) 21 412 1577

POSTAL ADDRESS: PO Box 225, Rondebosch, 7701

PHYSICAL ADDRESS: Icon Building, Suite 300, Cnr Long Street & Hans Strijdom Ave, Cape Town

PASA REFERENCE NUMBER: 12/3/295 ER

PREPARED BY: SLR Consulting (South Africa) (Pty) Ltd
This report has been prepared by an SLR Group company with all reasonable skill, care and diligence, taking into account the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

---

### DOCUMENT INFORMATION

<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th>ENVIRONMENTAL IMPACT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME FOR AN EXPLORATION RIGHT APPLICATION FOR PETROLEUM PRODUCTS ON VARIOUS FARMS IN THE MAGISTERIAL DISTRICTS OF MATATIELE AND MT FLETCHER, EASTERN CAPE (12/3/295 ER)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Status</strong></td>
<td>Final for submission</td>
</tr>
<tr>
<td><strong>Applicant</strong></td>
<td>Rhino Oil and Gas Exploration South Africa (Pty) Ltd</td>
</tr>
<tr>
<td><strong>Project Number</strong></td>
<td>723.18034.00005</td>
</tr>
<tr>
<td><strong>Project Manager</strong></td>
<td>M Hemming</td>
</tr>
<tr>
<td><strong>Author</strong></td>
<td>J Blood and M Hemming</td>
</tr>
<tr>
<td><strong>Reviewer</strong></td>
<td>J Crowther</td>
</tr>
<tr>
<td><strong>Client</strong></td>
<td>Rhino Oil and Gas Exploration South Africa (Pty) Ltd</td>
</tr>
<tr>
<td><strong>Date last printed</strong></td>
<td>2016/09/30 03:43:00 PM 2016/09/29 04:00:00 PM 2016/09/29 03:35:00 PM</td>
</tr>
<tr>
<td><strong>Date last saved</strong></td>
<td>2016/09/30 03:43:00 PM 2016/09/29 04:35:00 PM 2016/09/29 03:55:00 PM</td>
</tr>
<tr>
<td><strong>Keywords</strong></td>
<td>Rhino Oil and Gas, Exploration Right, EIA and EMPR</td>
</tr>
<tr>
<td><strong>Report Number</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>Issue Date</strong></td>
<td>September 2016</td>
</tr>
</tbody>
</table>

---

SLR office, Johannesburg, South Africa

**Physical Address:**
Unit 7
Fourways Manor Office Park
Corner Roos and Macbeth Streets
Fourways
Johannesburg
South Africa

**Postal Address:**
PO Box 1596
Cramerview, 2060

Tel: +27 (011) 467 0945
Fax: +27 (011) 467 0978
Web: www.slrconsulting.com
1. Introduction and Background

This Environmental Impact Report ("EIR") and Environmental Management Programme ("EMPr") have been compiled and were distributed for review and comment as part of the Scoping and Environmental Impact Assessment (hereafter collectively referred to as “EIA”) process that was undertaken for the application by Rhino Oil & Gas Exploration South Africa (Pty) Ltd (hereafter referred to as "Rhino Oil and Gas") for an Exploration Right ("ER") for petroleum products on various farms in the magisterial districts of Matatiele and Mount Fletcher, Eastern Cape, South Africa (12/3/295 ER).

This EIR summarises the EIA process followed to date and provides an overview of the proposed project and the affected environment. It provides an assessment of the impacts of the proposed project and sets out the recommend management measures. Interested and Affected Parties ("I&APs") were asked to comment on the EIA and EMPr prior to it being submitted to the Petroleum Agency of South Africa ("PASA") for decision-making.

In early 2015 Rhino Oil and Gas lodged an application for an ER to explore for petroleum products (including oil, gas, condensate, coal bed methane, helium and biogenic gas) with PASA in terms of Section 79 of the Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA), as amended. PASA accepted the ER application on 22 May 2015 (Ref: 12/3/295 ER).

The purpose of exploration is to identify the existence of any commercially viable reserves of oil and / or gas. Exploration is a technically complex and iterative process consisting of a number of stages typically termed i) early-phase exploration, ii) appraisal and iii) well drilling. Data from each stage improves the knowledge and understanding of the resource, and informs the following stage, which is only undertaken if results are positive. Exploration can require a period of up to 10 years to inform a decision on a production right application. Rhino Oil and Gas is proposing to only undertake ‘early-phase exploration’ activities.

The initial ER application area was approximately 120 000 ha in extent and covered approximately 175 properties (farms and portions) (see Figure 1-1 for the regional setting of the project). The proposed ‘early-phase exploration’ activities as included in the initial ER application were:

- various non-invasive and remote exploration techniques (including analysis of existing data and full tensor gradiometry gravity survey);
- the drilling of up to 10 core boreholes; and
Subsequent to the acceptance of the Scoping Report, Rhino Oil and Gas reduced the extent of the ER application area through the exclusion of the Malekgalonyane (Ongeluksnek) Nature Reserve to an area of 109,292 ha. In addition, Rhino Oil and Gas has excluded the ground-based core hole drilling and seismic surveys from proposed ‘early-phase exploration’ work for which they are seeking environmental authorisation. Thus the current focus of the application and the related environmental assessment work is now only related to the proposed remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey).
If the application is approved, Rhino Oil and Gas would be in a position to conduct the remote exploration and to develop a more detailed understanding of the potential oil and gas resources in the ER area. Thereafter, should Rhino Oil and Gas propose to conduct ground-based exploration activities this would need to be informed by a further application to PASA and a separate environmental assessment and authorisation process. A benefit of this revised approach is that any future application for ground-based exploration activities will be focussed on specified sites, thereby enabling I&APs to know where Rhino Oil and Gas proposes to access land and conduct ground-based exploration activities.

The approval being sought as part of this application does not include any activities relating to the appraisal or well drilling phases that comprise a commercial viability assessment of a possible resource, nor any aspect of production. Thus no wells, permeability testing, pressure testing or hydraulic fracturing (commonly referred to as “fracking”) is proposed as part of the initial three-year exploration programme.

1.1 Opportunity to Comment

This EIR was distributed for a 30-day comment period from 12 August to 13 September 2016. Copies of the report were made available for download from the SLR website (go to: http://www.ccaenvironmental.co.za/sub-oil-gas-minerals/) and were available in hard copy at the locations described below. An electronic copy of the EIR was emailed or provided on CD on request. The reports’ Executive Summary was also translated into Sesotho and isiXhosa and was available for download from the SLR website or was emailed on request.

<table>
<thead>
<tr>
<th>Location name</th>
<th>Physical Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matatiele Public Library</td>
<td>102 Main Street, Matatiele, 4730</td>
</tr>
<tr>
<td>Maluti Magistrate Offices</td>
<td>101 Main Street, Matatiele, 4730</td>
</tr>
<tr>
<td>Mount Fletcher Public Library</td>
<td>Enkululekweni Location, Mount Fletcher</td>
</tr>
<tr>
<td>Elundini Local Municipality (Mount Fletcher Offices)</td>
<td>272 Back Street, Mount Fletcher</td>
</tr>
<tr>
<td>Maclear Public Library</td>
<td>Van Riebeeck Street, Maclear, 5480</td>
</tr>
<tr>
<td>Bakoena Traditional Council</td>
<td>Chief Mosheshoe’s Office, Queen’s Mercy</td>
</tr>
<tr>
<td>Ramohlaokaana Traditional Council</td>
<td>Queen Sibi’s Office, Hebron</td>
</tr>
<tr>
<td>Bakoena Traditional Council</td>
<td>Chief Lebenya’s Office, Seqhobong</td>
</tr>
<tr>
<td>Amahlubi Traditional Council</td>
<td>Chief Zibi’s Office, Ezingonyamini, Kwa Dzingwa</td>
</tr>
</tbody>
</table>

2. Legislative requirements

An application for an exploration right requires statutory approval in terms of both the MPRDA and the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), as amended.

The MPRDA provides that mineral and petroleum resources are the common heritage of all South Africans and that the State, as custodian thereof, is entitled to issue rights to ensure the sustainable
development of South Africa’s mineral and petroleum resources within a framework of national environmental policy, while promoting economic and social development.

Any right granted under the MPRDA is a limited real right in respect of the mineral or petroleum and the land to which such right relates. The holder of a right is entitled to the rights referred to in Section 5 of the MPRDA and such other rights as may be granted to, acquired by or conferred upon such holder under the MPRDA or any other law. Mineral and petroleum rights are however also specific and have limitations in terms of the target resources, included land, the work programme and a timeframe. Any change to the scope of a right (i.e. further exploration or future production activities) would need to be subject to additional authorisation/approval in terms of the MPRDA and NEMA.

In terms of section 79 of the MPRDA an exploration right is required from the Minister of Mineral Resources (or delegated authority) prior to the commencement of any exploration activities. A requirement for obtaining an ER is that an applicant must comply with Chapter 5 of NEMA with regards to consultation and reporting (see below). The Minister (or delegated authority) may only grant the ER if an Environmental Authorisation is issued.

Section 2 of NEMA sets the environmental principles to be applied by all organs of State when taking decisions that significantly affect the environment. Included amongst the key principles is that all development must be socially, economically and environmentally sustainable and that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. NEMA also provides for the participation of I&APs and stipulates that decisions must take into account the interests, needs and values of all I&APs.

Chapter 5 of NEMA outlines the general objectives and implementation of Integrated Environmental Management (IEM), which provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and developments. Section 24 provides a framework for granting of Environmental Authorisations. In order to give effect to the general objectives of IEM, the potential impacts of listed activities must be considered, investigated, assessed and reported on to the competent authority. The proposed exploration right application triggers Activity 18 of Listing Notice 2 (GN R984) and a Scoping and EIA process must be undertaken to inform a decision from PASA on an environmental authorisation. Rhino Oil and Gas appointed SLR Consulting (South Africa) (Pty) Ltd (hereafter referred to as "SLR") as the independent environmental assessment practitioner ("EAP") responsible for undertaking the EIA process.

The scope of the current EIA process is aligned specifically to the early-phase exploration work programme (i.e. aerial full tensor gradiometry gravity survey). The environmental assessment of further ground based exploration including core hole drilling, seismic surveys, appraisal or well drilling activities
for exploration or future production falls outside of the scope of this EIA process. If such work were to be proposed by Rhino Oil and Gas then it would be required to seek further approval from PASA in terms of the MPRDA and NEMA. Any further approval would be subject to an additional environmental assessment process with further public consultation as is required by NEMA.

In accordance with the EIA Regulations 2014, all other legislation and guidelines that were considered in the preparation of the EIR are documented. Review of the proposed exploration work programme in terms of the relevant legislation has not identified other requirements for authorisation.

3. Study Methodology

3.1 Scoping

A Scoping process was undertaken between October 2015 and April 2016 and concluded with a Scoping Report being submitted to PASA. The Scoping Report included copies of all supporting documents and inputs received during the public participation conducted during the Scoping phase. The Scoping Report was accepted by PASA on 10 June 2016, granting permission for the EIA to continue in terms of the Plan of Study described in the Scoping Report and the conditions included in the acceptance.

3.2 Key Issues Considered

The key issues and concerns identified by the project team, with I&AP input, during the Scoping Phase are detailed below.

<table>
<thead>
<tr>
<th>Key issues identified by the project team, with I&amp;APs input</th>
<th>Manner in which the issues were incorporated, or the reasons for not including them</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Procedural issues</td>
<td>The level of public opposition to the project has been documented in the Scoping and EIA Reports. Where people have registered their opposition to the project, this has been recorded. All objections received have been recorded. The EIA report has attempted to present accurate project information and a realistic assessment of impacts in order that I&amp;APs can make an informed judgement. Applications for mineral rights are made in terms of the MPRDA through a regulated process. The decision requirements in the legislation include that the applicant must have financial resources and the technical ability. Rhino Oil and Gas maintain that they comply with these requirements. It is evident that much of the opposition is not directly against the merits of exploration activities as proposed, but rather against the anticipated outcome and risks that, if successful, could result from exploration. No attempt has been made to address issues and objections that are based on concerns that relating to further exploration or future</td>
</tr>
<tr>
<td>&quot;Concern, even fear, of the future risks that might arise from production should a resource be found;&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Concern that given the money involved, if any hydrocarbon resource is found, it will not be possible to stop production regardless of what the future EIA processes may indicate in terms of risk. Thus the only way to avoid such risks is to not open the door to such projects;&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Hydrocarbon based energy is a flawed concept and countries are moving away from new hydrocarbons in favour of a renewable energy system;&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;A deep mistrust of government institutions and the true motives and people behind such an application;&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Significant doubt over government’s ability to enforce compliance to the legislation;&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;South Africa does not understand unconventional hydrocarbon extraction risks and the necessary legislative framework to protect the environment is not in place; and&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Lack of understanding of how an exploration programme is undertaken and what is actually being authorised.&quot;</td>
<td></td>
</tr>
</tbody>
</table>
Numerous objections have been made to the project and EIA process. NEMA does not specifically provide a mechanism to address objections raised in the EIA process. Under the MPRDA unresolved objections would be tabled before the Regional Mining Development and Environmental Committee.

The EIA should assess the potential future exploration and production related impacts (including hydraulic fracturing) The scope of the EIA is aligned with the early-phase exploration as proposed by Rhino Oil and Gas. Should Rhino Oil and Gas propose to conduct exploration activities outside of this scope, this would need to be informed by a further application to PASA and a separate environmental assessment and authorisation process.

The Strategic Environmental Assessment (SEA) for Shale Gas Development in the Karoo should be extended to cover this area/application or at least inform current EIA process. Or the findings of the SEA applied to this EIA The scope and terms of the SEA were finalized by the DEA and is limited to Shale Gas Development in the geographic Karoo. Refer to section 2.5.5.

Time available for I&AP consultation and participation is insufficient; An extension of time for public consultation in the Scoping phase was secured.

The adequacy of the public participation process / methodology was challenged, particularly with regards informing rural communities. Additional efforts were undertaken in order to address this. Refer to section 5.2 of the Scoping Report as well as Box 4 in the EIA. EIA feedback meetings will be held with each of the four Traditional Authorities in the area.

Protected area or other areas incompatible with exploration should be excluded. Cognisance should be given to restrictions imposed by legislation and regulation, particularly the Petroleum Regulations The extent of the proposed ER has been adjusted to exclude protected areas. The scope of the EIA is aligned with the early-phase exploration as proposed by Rhino Oil and Gas. Restrictions relating to future exploration or production activities have not been detailed in this EIA.

Provide a detailed baseline description of the affected environment, desktop assessment is not adequate. Refer to Section 5 of the EIR. The large size of the application area, information constraints of the exploration process and the nature of the early-phase exploration did not allow for, nor warrant, detailed baseline assessments of the whole application area. However, it is noted that the databases that were utilized generally have good coverage, providing adequately accurate representation of the field conditions.

Confirm the location of the exploration sites and assess impacts at these sites. The nature of exploration is such that the applicant cannot confirm the location of core hole drilling sites or seismic survey routes until the initial exploration has provided results. Rhino Oil and Gas excluded the core hole drilling and seismic surveying from the proposed ‘early-phase exploration’ work for which they are seeking environmental authorisation. The current focus of the application for environmental authorisation and this EIA is now only on remote exploration.
2. Potential impacts of the proposed exploration

<table>
<thead>
<tr>
<th>Impact on ecology</th>
<th>The potential impacts of core hole drilling and seismic surveys have not been assessed in this EIA as they no longer form part of the proposed 'early-phase exploration' work for which Rhino Oil and Gas are seeking environmental authorisation. See Section 4.5.1.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Loss of or disturbance to vegetation and faunal habitats</td>
<td></td>
</tr>
<tr>
<td>&gt; Disturbance to and mortality of fauna</td>
<td></td>
</tr>
<tr>
<td>&gt; Enabling the establishment of alien and invasive species in disturbed areas</td>
<td></td>
</tr>
<tr>
<td>Impact to Groundwater</td>
<td>The aerial FTG surveys (see Section 4.5.5) included as part of the proposed 'early-phase exploration' would result in almost no interaction with the ground over which the survey is undertaken. Thus impacts on the majority environmental aspects could not occur. For this reason the issues were not considered further in this EIA. Should Rhino Oil and Gas propose to conduct ground-based exploration activities in the future, this would need to be informed by a further application to PASA and a separate environmental assessment and authorisation process.</td>
</tr>
<tr>
<td>&gt; Altered hydrogeological regime and groundwater availability</td>
<td></td>
</tr>
<tr>
<td>&gt; Contamination of groundwater resources</td>
<td></td>
</tr>
<tr>
<td>&gt; Water consumption</td>
<td></td>
</tr>
<tr>
<td>Impacts on surface water</td>
<td></td>
</tr>
<tr>
<td>&gt; Altered surface water hydrological regime</td>
<td></td>
</tr>
<tr>
<td>&gt; Contamination of surface water resources</td>
<td></td>
</tr>
<tr>
<td>&gt; Water consumption</td>
<td></td>
</tr>
<tr>
<td>Impacts on geology</td>
<td></td>
</tr>
<tr>
<td>&gt; Destabilisation of certain geologies</td>
<td></td>
</tr>
<tr>
<td>&gt; Risk to underground caverns or mine workings</td>
<td></td>
</tr>
<tr>
<td>Impact on soils</td>
<td></td>
</tr>
<tr>
<td>&gt; Physical impact on soils (increased erosion / compaction)</td>
<td></td>
</tr>
<tr>
<td>&gt; Potential contamination of soils</td>
<td></td>
</tr>
<tr>
<td>Impact on heritage resources</td>
<td></td>
</tr>
<tr>
<td>Impact on land tenure and access to private property</td>
<td></td>
</tr>
<tr>
<td>Impact on current land uses</td>
<td></td>
</tr>
<tr>
<td>Structural damage to infrastructure</td>
<td></td>
</tr>
<tr>
<td>&gt; Structural damage to infrastructure due to shock waves, air overpressure and ground vibration</td>
<td></td>
</tr>
<tr>
<td>&gt; Degradation or damage due to exploration vehicles and equipment</td>
<td></td>
</tr>
<tr>
<td>Impact on ambient air quality</td>
<td></td>
</tr>
<tr>
<td>&gt; Dust and vehicle emissions</td>
<td></td>
</tr>
<tr>
<td>&gt; Escape or release of gas from exploration boreholes</td>
<td></td>
</tr>
<tr>
<td>Safety and security</td>
<td></td>
</tr>
<tr>
<td>&gt; Public safety due to inter alia, increased traffic volumes, heavy machinery, explosives, hazardous materials, release of gas, etc.</td>
<td></td>
</tr>
<tr>
<td>&gt; Fires</td>
<td></td>
</tr>
<tr>
<td>&gt; Landowner security</td>
<td></td>
</tr>
<tr>
<td>Contribution or effect on the local economy</td>
<td></td>
</tr>
<tr>
<td>Compensation</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation and liability</td>
<td></td>
</tr>
<tr>
<td>Impact on ambient noise levels</td>
<td>Refer to Section 6.1</td>
</tr>
</tbody>
</table>

Techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey). Refer to section 4.5.1.
3.3 EIA Method

In accordance with Appendix 3 of GN No. R982, the objectives of the EIA are to:

- identify the relevant policies and legislation relevant to the activity;
- present the need and desirability of the proposed activity and its preferred location;
- identify feasible alternatives related to the project proposal;
- ensure that all potential key environmental issues and impacts that would result from the proposed project are identified;
- provide a reasonable opportunity for I&APs to be involved in the EIA process;
- assess potential impacts of the proposed project alternatives during the different phases of project development;
- present appropriate mitigation or optimisation measures to minimise potential impacts or enhance potential benefits, respectively; and
- through the above, to ensure informed, transparent and accountable decision-making by the relevant authorities.

As per the Plan of Study for EIA presented in the Scoping Report, the approach was to commission a number of specialist studies to inform this EIA. However, with the exclusion of core hole drilling and seismic survey activities from the scope of the EIA these studies were no longer applicable and the studies were not completed nor used to inform the EIA.

The identification and assessment of environmental impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with the proposed project. The process involves consideration of, inter alia: the purpose and need for the project; views and concerns of I&APs; social and political norms, and general public interest. SLR used an assessment methodology which considered: the intensity, extent, duration of impacts, the probability of the impact occurring, the reversibility and the degree to which the impacts can be mitigated.

The significance of environmental impacts was rated before and after the implementation of mitigation measures. The method applied to the assessment of environmental impacts was:

- Consequence is a function of intensity, spatial extent and duration;
- Significance is a result of the consequence and probability.

Any comments on the EIR received by SLR prior to 14 September 2016 were used to update the EIR where relevant. These comments and responses thereto are summarised in Table 3-5 and copies of each comment are included in Appendix 6.3 to the EIR. This includes the minutes of the public and stakeholder feedback meetings. Comments received from I&APs after the stated deadline will be forwarded to PASA as and when received.
The comments and response from I&APs on the EIR had the same overall theme as comments received during the Scoping phase. Despite the change in the proposed exploration work programme (to only include remote sensing activities), I&APS in general are opposed to the exploration for unconventional oil and gas in principal and in this ER application area in particular. The primary grounds for the I&APs opposition remains that the risks of future exploration and production activities that would follow successful exploration are too high and inappropriate given the environmental attributes of the application area.

4. Project Description

4.1 Introduction
Rhino Oil and Gas Exploration South Africa (Pty) Ltd is a South African registered subsidiary of Rhino Resources Ltd., an independent oil and gas exploration and development company focused on Africa. Rhino Resources is building a portfolio of both onshore and offshore oil and gas assets with a primary focus on West Africa, East Africa and Southern Africa. Rhino Oil and Gas’s BBBEE status has been provisionally agreed upon with another party and will comply with the Charter on empowering Historically Disadvantaged South Africans in the Petroleum and Liquid Fuels Industry. More information is available on http://www.rhinoresourcesltd.com.

4.2 Overview of exploration
The conditions necessary for petroleum reserves to have accumulated are complex and largely dependent on past geological history and present geological formations and structures. Discovering petroleum/gas reservoirs and estimating the likelihood of them containing oil and / or gas is a technically complex process consisting of a number of different stages, requiring a range of techniques. Exploration begins with the identification of target regions based on a general geological understanding. These areas are subjected to early-phase exploration that is focused on large-scale regional analysis. Exploration in areas identified as prospective would progress to the appraisal stage. This work is aimed at identifying and defining the extent of target areas with high potential for reserves of oil and / or gas. In order to fully define the commercial viability of an oil and / or gas resource a well drilling stage is generally undertaken. The type of wells and tests would depend entirely on the nature of the resource that has been identified. Exploration typically requires early-phase exploration, appraisal and well drilling stages, undertaken over a period of up to 10 years, to inform a decision on a production right application.

Rhino Oil and Gas is at the beginning of an oil and gas exploration process and at this stage is only seeking authorisation to undertake a portion of activities necessary to inform an early-phase exploration stage.

4.2 Need and Desirability
This section in the report aims to provide an overview of the need and desirability for the proposed project by firstly, highlighting the applications for the use of natural gas (particularly with reference to the
electricity generation sector) and, secondly, indicating how these applications are aligned within the strategic context of national policy and energy planning, broader societal needs and regional planning, as appropriate.

Use of Natural Gas
Natural gas is a fossil fuel, used globally as a source of energy for heating, cooking, and electricity generation, amongst others. The fastest growing use of natural gas is for the generation of electric power. Of the three fossil fuels used for electric power generation (coal, oil and natural gas), natural gas emits the least carbon dioxide per unit of energy produced. Burning natural gas also releases lower amounts of nitrogen oxides, sulphur dioxide, particulates and mercury when compared to coal and oil (Union of Concerned Scientists, n.d.).

As economic growth is dependent on the availability of electricity, ensuring a sustainable and reliable supply of electricity with sufficient capacity is a key aspect to growing the economy of South Africa. The electricity shortages experienced in South Africa over the past decade were a contributing factor to the significant slowdown in economic growth rate. In the context of the above, the use of natural gas for electricity generation is considered to have substantial benefits and is identified in national policy, together with renewable energy technologies, toward diversifying the domestic energy supply away from coal. The economic feasibility of using natural gas for domestic power generation is dependent on the availability of domestic reserves of natural gas, as well as the financial cost of importing natural gas.

At present, domestic resources are limited to offshore gas fields close to Mossel Bay (F-A field), which are understood to be in decline. The F-O offshore field (Project Ikhwezi) is envisioned to complement this supply in the short- to medium-term. Other proven offshore reserves include the Ibhubesi Gas Field off the West Coast of South Africa. The development of this field to supply gas to the existing Ankerlig Power Station is currently being considered. Neighbouring countries (Mozambique and Namibia) and regional African nations (Angola and Tanzania) have substantial gas reserves.

Although limited, gas infrastructure and consumption do exist in South Africa. Presently, gas is imported to South Africa through the Republic of Mozambique Pipeline Company (ROMPCO) pipeline from Mozambique. This gas is mostly used in Sasol’s coal-to-liquid (CTL) process in Secunda (Bischof-Niemz, et al., 2016). In Johannesburg, Egoli Gas supplies industry and households in some suburbs with reticulated natural gas that is sourced from Sasol. In 2013, the total natural gas supply in South Africa (domestic production and import) equated to approximately 2.5% of total primary energy supply for the country (Bischof-Niemz, et al., 2016). Thus, an increase in domestic natural gas reserves would enable South Africa to take steps to secure the countries’ energy supply (through diversification), assist in reducing the emissions of greenhouse gases (by reducing the country’s reliance on coal for electricity generation) and reduce the need for the importation of gas. As such, exploration for additional domestic
hydrocarbon reserves is considered important and supported by national policy, and any discoveries would be well received by the local market.

**National Policy and Planning Context**

An overview of the national policy and planning context relating to the promotion of economic development in general within South Africa, development of the energy sector (with specific reference to natural gas and renewable energy) and response to climate change is provided. The following documents were considered:

- National Gas Infrastructure Plan (2005)
- New Growth Path (2011)
- National Development Plan (2012)
- Gas Utilisation Master Plan (GUMP)
- Paris Agreement, United Nations Framework Convention on Climate Change
- National Climate Change Response White Paper

Consideration was also given to regional policy and planning context relating to development within the Eastern Cape in general. The municipal planning framework was identified but has limited relevance to the current remote sensing approach.

**4.3 Exploration Work Programme**

Rhino Oil and Gas proposes to undertake early-phase exploration for oil and gas resources which may be located within suitable geological strata. A three-year exploration work programme has been proposed.

The initial ER application area included ~200 properties over an area of ~120 000 ha. The applicant has reduced the extent of the ER application area through the exclusion of the Malekgalonyane (Ongeluksnek) Nature Reserve to an area of 109 292 ha. The ER application area excludes all land as identified in Section 48 (1) of the MPRDA.

As indicated previously, Rhino Oil and Gas has now excluded the core hole drilling and seismic surveying from the proposed ‘early-phase exploration’ work for which they are seeking environmental authorisation. The current focus of the application for environmental authorisation and this EIA is now only on remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey). If the revised application is approved, Rhino Oil and Gas would only be in a position to conduct remote exploration techniques and to develop a more detailed understanding of the potential oil and gas resources in the application area. Thereafter, should Rhino Oil and Gas propose to conduct ground based...
exploration activities this would need to be informed by a further application to PASA and a separate environmental assessment and authorisation process.

The initial exploration work would be desktop based and include the evaluation of geological data and the assessment of source-rock geochemistry. Full tensor gravity gradiometry ("FTG") surveys may be undertaken to provide information that would lead to the identification of target sites for core hole drilling and alignment of seismic survey routes. FTG is used by oil and gas companies to measure the density of the subsurface in order to assist in the building of geological models to aid exploration. FTG uses multiple pairs of accelerometers to measure the rate of change of the gravity field in three directions and render a detailed interpretation of subsurface geology. FTG surveys involve grid-based flights using a light fixed wing aircraft (fitted with the FTG equipment) at slow speeds (~ 130 knots) and at an altitude of between 80 and 300 m above ground. It is envisaged that up to a maximum of 4 000 km² could be surveyed with a spacing of between 2 and 6 km between lines. In good weather the survey would take less than 7 days to complete.

No ground-based exploration, appraisal or well drilling and future production forms part of the current ER application. Thus no extraction of hydrocarbons or water, no stimulation of wells or hydraulic fracturing (fracking) is proposed in the initial three-year exploration work programme for which approval is sought. If the early-phase exploration were to confirm the presence of a potential resource, then Rhino Oil and Gas would need to seek further authorisation/ approval from PASA for any additional exploration work required to appraise the resource. Any further approval would be subject to an additional environmental assessment (or environmental authorisation amendment) process with further public consultation and specialist input. Approvals are also likely to be required in terms of other legislation.

5. Description of the baseline environment
5.1 Biophysical Environment

Climate
The proposed ER area experiences a typical escarpment climate with warm summers and mild winter that includes periods of very cold conditions with snow. Mean annual precipitation varies between 700 mm in the east up to 1000 mm to the west, with a high proportion coming in summer through thunderstorms.

Geology
The geology of the proposed ER area comprises the Molteno, Elliot and Clarens Formations (from the Karoo Supergroup) and the Drakensberg Group.

The Molteno Formation is overlain by Elliot Formation with a maximum thickness of approximately 500 m in the south. The formation comprises an alternating sequence of greyish-red or less commonly greenish-grey mudstone and subordinate fine- to medium-coarse sandstone.
The Clarens Formation superimposes the Elliot Formation. This formation represents the final phase of Karoo sedimentation (Lurie, 2008). The Clarens Formation consists of fine- to very fine-grained sandstone and siltstone with subordinate mudstone and occasional chert and nodular limestone horizons (Johnson et al., 2006). The mudstones are generally pale-olive to pale-red in colour and the sandstones are usually very pale-orange, well sorted with sub-angular to sub-rounded grains (Karpeta and Johnson, 1979). The thickness of the Clarens Formation ranges between 200-250 m, however, the northern extent of the formation has a thickness of 100 m.

The Drakensberg Group forms the upper part of the Drakensberg Mountains. It is characterised by the dark-grey basaltic lavas with subordinate tuffs and occasional sandstones (Karpeta and Johnson, 1979). The basalts are made up of altercations of a tough and massive coarsely crystalline rock and easier-weathering vesicular varieties. The total thickness of Drakensberg Group is up to 700 m (Johnson et al., 2006). Dolerite dykes, also present in the area, are inclined sheets and sills that intruded the Karoo Sequence. Dolerite dykes are generally 3 - 10 m wide and 5 - 30 km long, although some can be followed for 80 km (Johnson et al, 2006). The inclined sheets and sills range from a few metres to 200 m or more in thickness. Quaternary deposits (<2 m in thickness) are generally limited in the study area and concentrate only along the upper Kinira River and its upper tributaries (Karpeta and Johnson, 1979).

The Southern African region is considered to be relatively stable from a seismic perspective. In general earth tremors and quakes are infrequent and generally of low magnitude. Within the ER, the Cedarville Fault is an active fault with associated recorded earthquake activity (in 1986 an earthquake of 5.15 was recorded at the town of Matatiele which is located near the fault).

Soils
The ER area consists of two main landforms including medium gradient hills and high gradient mountains. Six dominant soil classes were identified within the proposed ER area namely:

- Freely drained, structureless soils;
- Lithosols (shallow soils on hard or weathering rock);
- Undifferentiated clays;
- Undifferentiated poorly drained soils;
- Undifferentiated shallow soils; and
- Structureless and poorly drained soils.

The majority of the proposed ER area (61 633 ha) is considered to be non-arable for the purposes of crop cultivation and has moderate to low suitability as grazing land. A small section on the eastern portion of the proposed ER area (400 ha) has wilderness land capability and in terms of land capability class system should preferably only be used for wildlife and habitat conservation. The remaining areas, approximately 27 140 ha, are mapped to have a moderate potential for arable agriculture. These soils are
mainly located in valley bottoms where the slope gradients are less steep and pockets of arable land makes crop farming possible (typically in close proximity to villages).

Land Cover
According the National Land Cover Data Set (2013/2014), the great majority of the ER area comprises grasslands. Some of the larger river valleys have thicket/dense bush in the upper reaches. Much of this bush comprises stands of alien and invasive trees rather than indigenous vegetation (pers. obs). The flatter ground in the lower elevation areas has been largely transformed, either by rural housing and urbanisation or through various forms of cultivation (subsistence and commercial). Many of the valley bottoms contain wetland areas.

Hydrology
The proposed ER area falls within the Mzimvubu to Keiskamma Water Management Area (WMA) which has the highest mean annual runoff in South Africa, and equates to almost 15% of the total river flow in the country. At least 6 quaternary catchments occur. The source of rivers, including their associated tributaries, such as the Mosene River, Seeta River, Mabele River, Lekhetlane River, Marulane River and the Tinana Rivers are located within the proposed ER area.

Surface water use consists of a combination of domestic, livestock use and irrigation for crop production in the low lying areas. The municipalities estimate that 50% of households rely on water from rivers, springs and dams. It is estimated that around 1 million people derive water and a livelihood within the greater catchment (pers. comm. UCPP). The uMzimvubu Catchment Partnership Programme has been established to tackle degradation of the upper uMzimvubu landscape, and protect the livelihoods dependent upon it. Significant investment has been made in the landscape and its use through the UCPP to improve surface water quality and there is intent to have the region declared as a ‘water factory’.

Numerous wetlands are located within the proposed ER area. The upper section of the Umzimvubu catchment in the MLM hosts as much as 42 765 ha of wetland (email, UCPP). There are no major dams.

Groundwater
The exploration area is classified as a minor aquifer region. On a regional level, the hydrogeology of the proposed ER area comprises fractured and intergranular aquifers with yields in the range of 0.5 to 2 L/s. Aquifer types are related to the lithology but are typically fractured and intergranular. These aquifers are generally of ‘least’ or ‘moderate’ vulnerability, with a ‘low’ to ‘medium’ susceptibility.

Available data from the National Groundwater Archive indicates that groundwater levels range between 0.3 -108 m below ground level, with discharge rates varying between 0.01 - 9.6 L/s. Published information from the DWS indicates a mean depth to groundwater ranging between 15 - 20 mbgl and the recommended borehole drilling depth ranges between 20 – 30 m. Groundwater also surfaces at various
spring sites. These sites include dykes intersecting features, contacts of dolerite sill/sheets, basal contact of fractured sandstone with an underlying less permeable mudstone horizon and on weathered basins (usually weathered dolerite sheets). The anticipated electrical conductivity concentration of groundwater within the proposed ER area is between 0 and 70 mS/m, while Total Dissolved Solids are expected to range between 200 - 449 mg/L. Calcium and magnesium are dominant constituents of groundwater within the proposed ER area, however, groundwater with high fluoride content has been reported to the south.

According to records, there are as many as 537 registered boreholes in the larger area, however only 193 of these boreholes are still in use. Registered groundwater use in the area ranges between 1 505 m$^3$ and 50 000 m$^3$ per annum and is used mainly for drinking, livestock watering and irrigation purposes (DWAF, 2008). Stakeholders within the proposed ER area note that the Cedarville Fault is an important groundwater feature with regards to groundwater development and use. The town of Matatiele and farmers in the Cedarville Flats are also dependent on groundwater, most of which is likely to be derived from the catchment areas located within the ER application area.

**Biodiversity**

The proposed ER area is located within the grassland biome within the Sub-Escarpment Grassland Bioregion and the Drakensberg Grassland Bioregion, which is structurally simple and strongly dominated by grasses which are comprised of various vegetation units. Vegetation units that are associated with the proposed ER area include the Drakensberg Foothill Moist Grassland, the East Griqualand Grassland, the Lesotho Highland Basalt Grassland, the Mabela Sandy Grassland and the Southern Drakensberg Highland Grassland (Mucina and Rutherford, 2006). The Mabela Sandy Grassland and the East Griqualand Grassland vegetation units are listed as vulnerable ecosystems in terms of Section 52 of the National Environmental Management: Biodiversity Act, 2004.

The region was historically home to numerous faunal species. The lower slopes of the Drakensberg Mountains support a greater variety of faunal species to that of the high mountains, although these areas are also subject to more significant human use. The White-tailed Rat (*Mystromys albicaudatus*) is the only mammal species of conservation concern (endangered) that may occur in the area. It is widely distributed but not much is known about it habitat needs or current status. A number of bird species of conservation concern occur including all 3 crane species (Wattled, Grey Crowned and Blue) as well as the Bearded and Cape Vultures. Rudd's Lark (*Heteromirafra ruddi*) and Black Harrier (*Circus maurus*) may also be found where suitable habitat is present. Wetland and high altitude grasslands are the most important habitat for most of these species.

The Malekgalonyane (Ongeluksnek) Nature Reserve was located within the extent of the proposed ER area but has been removed. No areas declared in terms of the Biodiversity Act, 2004 (Act 10 of 2004); National Forests Act, 1998 (No. 84 of 1998) and Mountain Catchment Areas Act 1970 (No. 63 of 1970) were identified within the proposed ER area. Much of the proposed ER area overlaps with 'focus area'
from the National Protected Area Expansion Strategy. The planning domain of the Maloti Drakensburg Transfrontier Conservation Area extends from KZN to the Malekgalonyane (Ongeluksnek) Nature Reserve. The Matatiele Local Municipality have identified areas for protection through the declaration of stewardship areas under the Matatiele Water Factory project. The draft stewardship plan identifies all areas above 1750 m asl as stewardship targets. The National Freshwater Ecosystem Priority Areas project identifies numerous NFEPA rivers and wetlands within the proposed ER area. The Eastern Cape Biodiversity Conservation Plan (ECBCP) identified and mapped critical biodiversity areas (CBAs) in the Province. A large proportion of the proposed ER area is mapped as terrestrial CBA 1, with the balance being almost entirely CBA 2. The aquatic perspective is similar with a large proportion of the proposed ER area being mapped as aquatic CBA 1 and much of the balance being CBA 2. It is therefore evident that much of the proposed ER area is considered to be ecologically sensitive. It must however be noted that a significant amount subsistence agriculture is taking place in the lower lying area of the region. Many of the datasets do not give cognisance to this, or such use may have escalated in intensity. It is therefore likely that certain areas designated with conservation planning status may in reality be disturbed or cultivated.

**Air Quality**

The majority of the proposed ER area is rural in nature and is comprised mostly of small towns, isolated farmsteads, scattered communities and agricultural activities such as livestock grazing and crop cultivation. It follows that the ambient air quality is likely to be good. Air quality may be compromised at times near waste burning sites and informal brick makers and around concentrations of houses in winter when fuel burning is used as a source of warmth. Veld fires are also a major contributor to reduced air quality in winter.

5.2 Cultural Environment

The area is exceptionally rich in rock art occurrences. Numerous San and pastoralist rock art sites are located in rock shelters in the sandstone outcrops. Of the 60 heritage sites known in the area, 46 of these are rock art sites. It is highly likely that more sites are present in the area. Much of this art is unprotected and at risk from degradation of the rock-face as well as damage from humans and livestock using the shelters. The well-known Mariazelle Mission Station and the smaller Maria Linden Mission as well as the Ongeluksnek Mountain Pass are known historical features. There is very limited data on sites from the historical period, cultural landscape of living resources in the project area. Paleontological surveys of the area are also limited. The lower elevation sections of the proposed ER area are underlain by formations of high (Clarens Formation, Stormberg Subgroup, Karoo Supergroup) and very high sensitivity (Molteno and Elliot Formations). Taking the above into consideration there is a high likelihood of fossil occurrence within the proposed ER area.
5.3 Socio-Economic Environment

The proposed ER area is located largely within the Matatiele Local Municipality (MLM) with the southern portions in the Elundini Local Municipality (ELM). These municipal areas have population in excess of 325,000 people, with a high proportion of females. Unemployment is high. The majority of people reside in a largely rural setting, with a high proportion in dwellings made of traditional materials. Basic service provision is low with as much as 50% of households relying on water from rivers, springs and dams.

There are no major towns located within the proposed ER area. Matatiele to the east is the largest town in the region. Agricultural activities are limited to the lower lying areas where the topography, water and soils are suitable for agriculture. Agricultural activities include a combination of commercial and subsistence farming. Subsistence farming is mostly associated with villages (which are numerous) which undertake both subsistence and small scale commercial farming. The grasslands around most of the villages and rural settlements is heavily grazed by mixed herds of domestic livestock.

The region is well known for its scenic beauty (particularly views of the Drakensberg) and revenue is generated from numerous eco-tourism activities. Many of these activities are widely dispersed but focus points include the Mehloding hiking trail, Malekgalonyane (Ongeluksnek) Nature Reserve and mountain passes to Lesotho.

The DMR indicated that there are no other mineral rights holders with the proposed ER area. Chief Lebenya has a pending claim on a large number of the properties within the ER application area.

6. Impact Description and Assessment

Only those potential impacts associated with remote exploration techniques have been assessed. The potential impacts of core hole drilling and seismic surveys have not been assessed in this EIA as they do not form part of the proposed ‘early-phase exploration’ work for which Rhino Oil and Gas are seeking environmental authorisation.

6.1 Aerial FTG Surveys

Biophysical Impacts

The flying of a light aircraft to undertake an FTG survey is not anticipated to have any impact of significance on the biophysical environment. Overpass flights of light aircraft are not uncommon over the region, even protected areas. Other than a momentary flight response, it is estimated that the impact of noise on wildlife would be insignificant.

Cultural/Heritage Impacts

The flying of a light aircraft to undertake an FTG survey is not anticipated to have any impact of significance on the cultural or heritage environment. Any noise impact would be as described below.
Socio-economic: Noise Impacts

The noise generated by a light aircraft flying at a low altitude (approximately 100 m) could be a nuisance to or result in the localised disturbance of a receptor. No health impacts (such as loss of hearing or increased blood pressure) are anticipated based on the proposed FTG survey.

Based on a light aircraft (e.g. Cessna) flying at a low altitude of + 80 m, it is estimated that the maximum noise level would not exceed 70 dBA outdoors and 60 dBA indoors. The latter is similar to conversational speech measured at 1 m. At any one location the duration of the overflight would be tens of seconds. Indoors the noise generated would probably not be noticed. Although the survey would cover wide areas, the extent of the impact is localised for each receptor. Where there are no receptors there would be no impact. Thus, depending on the selected flight path, an impact is possible.

Although aircraft noise would increase noise levels in what are largely quiet rural and agricultural areas, only a slight disturbance or nuisance is anticipated (i.e. low intensity). Based on these considerations and the fact that disturbances from light aircraft are not uncommon with a multitude of light aircraft working in and traversing the region, the significance of this impact is considered to be very low before and after mitigation.

All planned survey flights should comply with local civil aviation rules. Flight paths must be pre-planned to avoid special nature reserves, national parks and world heritage sites. Where this is not possible, an altitude of 2 500 feet (762 m) should be maintained (as per Section 47(1) of NEMPRAA), unless permission is obtained from the management authority or in an emergency. Where flights are planned to occur over game farms, landowners should be notified of the survey programme prior to survey commencement.

6.2 Local limitations

As discussed in the preceding sections, the flying of a light aircraft to undertake an FTG survey would be unlikely to pose significant risk to the environment. As a result there are relatively few constraints arising from legislation, regulation, guidelines and best practice that would apply. The FTG survey would have no effect on water use or availability and could therefore be undertaken without regard for water related constraints and restrictions.

At the time of completion of the EIA report there was no indication of any change to the public or landowner position with regards the application. The majority opinion is opposed to exploration for unconventional gas or petroleum resources in the ER application area.
6.3 Granting of a Right

There is strong public opinion and I&APs refer to a significant body of evidence from around the world (not least that hydraulic fracturing is banned in a growing number of countries and territories), that late phase exploration and production of unconventional gas has huge risks to society and the environment. Such risks are borne by the landowners and local communities who do not participate in the economic benefits that accrue to the right holder and government. While there may be a consumer driven need for hydrocarbon extraction, the risks and costs to society and the environment far outweigh the benefits. The extraction of unconventional hydrocarbons is therefore not wanted in the Eastern Cape.

Even though early-phase exploration may have impacts of low significance, the public have raised concern that the granting of an exploration right would set in motion the development of a petroleum extraction project that would be extremely difficult to stop. Because the future process has unknown outcome and risk, this exploration right should not be approved.

The MPRDA provides that the State, as custodian of mineral and petroleum resources in South Africa, may issue mineral and petroleum rights to applicants. Such rights must enable the sustainable development of South Africa’s mineral and petroleum resources within a framework of national environmental policy, while promoting economic and social development.

The granting of a right has no effect on the presence or absence of a resource, merely on whom has the entitlement to that mineral (i.e. minerals and petroleum exist regardless of the holder). A mineral and/or petroleum right is only part of the regulatory approval required by a holder and in isolation does not enable the holder to access the subject mineral. A holder must also have obtained environmental authorisation in terms of Chapter 5 of the NEMA. Furthermore, a mineral and/or petroleum right and environmental authorisation do not provide blanket approval for any conceived operation, but are both particular to the specific activities that the holder has detailed in an application. The holder is also required to negotiate access with the land owner and determine payment of compensation for loss or damages due to the specific activities. It is therefore presented that the grant of a right over a parcel of land does provide the holder carte blanche with respect to the mineral and land in question. There is thus not necessarily a direct conflict with the land owners’ right to use the surface. It would in fact be the undertaking of specified activities that could result in an impact on or conflict between the land owner and the mineral and/or petroleum rights holder (if any). Such specified activities would have been subject to approval through an environmental authorisation process. In the case of this application by Rhino Oil and Gas, only remote sensing activities are included which have been shown not to have any impact on the environment.

Any further exploration (beyond what may be approved in an environmental authorisation) would have to be subject to the requisite environmental assessment and authorisation process under the NEMA and an amendment to the ER in terms of the MPRDA. Such processes assess the merits of an application in light
of the principles of sustainable development as set out in Section 2 of NEMA. An environmental authorisation process would not grant approval for the undertaking of activities resulting in impacts of unacceptable significance. Each of the petroleum right approval sections in the MPRDA (80 and 84) set out that such rights may only be granted if the activity will not result in unacceptable pollution, ecological degradation or damage to the environment. Thus a decision to grant the current ER application by Rhino Oil and Gas (for remote sensing activities only) does not presuppose that future applications for further exploration or production would be approved.

It is also noted that the specified activities associated with a mineral and/or petroleum right may also be subject to approval requirements under other legislation. The need for such authorisations (e.g. water use licence, land use planning permission etc.) provide further permitting frameworks for impact assessment and management.

6.4 No-go Alternative

The positive implications of not going ahead with the proposed exploration are:

- no impacts resulting from the FTG survey within the exploration right area;
- no (reduced) chance of any risks arising from further exploration or future production; and
- allayment of the current majority opposition from the public.

The negative implications of not going ahead with the proposed exploration are as follows:

- South Africa would lose the opportunity to further establish the extent of indigenous oil or gas reserves in the Eastern Cape;
- lost economic opportunities related to sunken costs (i.e. costs already incurred) of initial desktop investigations in the proposed exploration licence area;
- if economic oil and gas reserves do exist and are not developed, South Africa / Rhino Oil and Gas would lose the opportunity to maximise the use of its own indigenous oil and gas reserves; and
- other sources of energy would need to be identified and developed in order to meet the growing demand in South Africa.

The great majority of I&APs that have participated in the EIA process have expressed their opposition to all forms of oil and gas exploration in the Eastern Cape and to this application in particular. Thus the “no-go” alternative would alleviate much of the anxiety and concerns related to potential future shale gas development should reserves be identified for further exploration and/or future production.

Given the wide array of unknown facts regarding the potential for economic growth and the potential for environmental impacts arising from unconventional gas production, as well as the unknown facts of the future energy mix in the absence of gas, the overall impact associated with the “no-go” alternative is considered to be of unknown significance.
6.5 Cumulative Impact

Given that the assessed impacts of the aerial FTG surveys and other remote sensing methods are considered to be of very low significance, there is no chance of cumulative impacts of any significance.

I&APs continue to request that the impacts of potential further exploration and future production be assessed in this EIA order for them to have a complete understanding of the risk of the eventual oil or gas production project (given that the purpose of exploration is to get to extraction). Rhino Oil and Gas maintains that it cannot yet, without conducting the early-phase exploration work, know what the future options entail. Without information on the scope, extent, duration and location of future activities proposed by an applicant it is not possible for an EAP to undertake a reliable assessment of future impacts.

7. Conclusions and Recommendations

SLR, as the environmental assessment practitioner appointed by Rhino Oil and Gas, has undertaken a Scoping and EIA process in terms of the EIA Regulations 2014 to inform an authority decision on the application made for environmental authorisation under the NEMA. The current ER application only includes remote exploration techniques, restricted to analysis of existing data and an aerial full tensor gravimetry gravity survey. If the application is approved Rhino Oil and Gas would be in a position to conduct the remote exploration techniques. Thereafter, should Rhino Oil and Gas propose to conduct ground based exploration activities (core boreholes and seismic surveys) this would necessitate a further application to PASA and a separate environmental assessment and authorisation process in terms of NEMA.

The key finding of the EIA is of a contrast between very low significance impacts resulting from an exploration work programme which is limited to desktop and remote sensing methods and extremely strong public opposition to all forms of exploration for onshore unconventional gas.

The assessment concluded that the impacts of proposed exploration activities would be extremely limited in extent, widely dispersed, of very short duration and very low intensity and would there have very low significance. On the simple merits of the application there is therefore no environmental reason why the exploration activities should not be approved. All of the ER application area would be suitable for the undertaking of the remote sensing exploration methods as proposed. It is noted however that the proposed activities are likely to be the first in a series of exploration stages comprising activities that would likely increase in impact significance (if exploration was successful and the project proceeded to the following stages). The intensity and duration of such impacts would likely increase with each subsequent phase, but would likely become confined to increasingly limited target areas.
The public opposition to the exploration right application has been strongly voiced and have been received almost unanimously from all the sectors of society that have participated in the EIA. I&AP opposition to the proposed exploration has largely remained, even after the removal of the ground-based activities from the exploration work programme. It is evident however that the majority of the opposition is not directly against the merits of exploration activities as proposed, but rather against the anticipated outcome and risks that, if exploration is successful, could result from production. The public perception is interpreted to be that issuing of an exploration right could lead to successful exploration; that would ultimately result in an application for production with the potential use of hydraulic fracturing. It is further perceived that this could lead to widespread impacts on water and land causing devastation to local livelihoods. The perception is informed by the widely publicised, purported negative effects of hydraulic fracturing and the decisions taken by many governing bodies from around the world to suspend such activities. The related concern is that once an exploration right is granted, it will be nearly impossible to stop the process later, even if the environmental risks to local receptors outweigh the benefits. This is seen to arise from a mistrust and or misunderstanding of the governance framework that is in place to regulate petroleum exploration and production; concern as to whether government can balance the needs and interests of local people against such development, and an expectation that enforcement of compliance with environmental management obligations would be poor. For these reasons the public approach is to ‘close the door on exploration before it opens’, thereby preventing any future risk, or potential benefit, from resulting.

It is the opinion of SLR in terms of the sustainability criteria described and the nature and extent of the proposed early-phase exploration programme (remote sensing only), that the generally very low significance of the impacts, with the implementation of the proposed mitigation measures, should support a positive decision being made by the Minister of Mineral Resources (or delegated authority) in this regard. The applicant requests that that Environmental Authorisation (should it be granted) remain valid for a period of three years or more.

The estimated cost for management and / or rehabilitation of potential negative environmental impacts that might be incurred during the proposed remote sensing exploration activities is nil.

In spite of the recommendation for a positive environmental authorisation of the current exploration work programme, the following key points with likely applicability to potential future applications and activities are noted by the EAP:

- parts of the exploration right application area have environmental attributes that may not be compatible with development (including ground-based exploration or production activities);
- restrictions imposed by current regulations would render parts of the exploration right application area unavailable to certain ground-based exploration and production activities; and
- I&APs in general are strongly opposed to all forms of onshore exploration and extraction of unconventional oil and gas and this is unlikely to change for future applications or operations.
The applicant and authority have been informed about this and advised that current planning and decision-making should as much as possible take cognizance of the above.

8. Environmental Management Programme

The EMPR, once approved by the competent authority, is a legal document and Rhino Oil and Gas is overall accountable and responsible for the implementation thereof. The EMPR is set out to provide environmental management i) objectives, ii) outcomes and iii) actions for the planning and design, undertaking of exploration; and rehabilitation and post closure phases.
ENVIRONMENTAL IMPACT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME FOR AN EXPLORATION RIGHT APPLICATION FOR PETROLEUM PRODUCTS ON VARIOUS FARMS IN THE MAGISTERIAL DISTRICTS OF MATATIELE AND MT FLETCHER, EASTERN CAPE (12/3/295 ER)

CONTENTS

EXECUTIVE SUMMARY ................................................................. III

1 INTRODUCTION ........................................................................... 1-1
  1.1 PURPOSE OF THIS REPORT AND OPPORTUNITY TO COMMENT .......... 1-1
  1.2 PROJECT BACKGROUND ......................................................... 1-1
  1.3 SUMMARY OF AUTHORISATION REQUIREMENTS ............................ 1-3
  1.4 TERMS OF REFERENCE ......................................................... 1-6
    1.4.1 STRUCTURE OF THE REPORT .................................. 1-7
  1.5 OPPORTUNITY TO COMMENT .................................................. 1-8

2 LEGISLATIVE REQUIREMENTS .................................................. 2-1
  2.1 OVERVIEW OF THE “ONE ENVIRONMENTAL SYSTEM” ................. 2-1
  2.2 MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 ... 2-2
    2.2.1 CONSULTATION BY AUTHORITY ................................... 2-2
    2.2.2 LEGAL NATURE AND LIMITATIONS ON AN EXPLORATION RIGHT... 2-2
  2.3 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 .................... 2-3
    2.3.1 EIA REGULATIONS 2014 .............................................. 2-3
  2.4 OTHER LEGISLATION CONSIDERED IN THE PREPARATION OF THE EIR .. 2-4
  2.5 GUIDELINES AND POLICIES .................................................. 2-6
    2.5.1 NEMA Public Participation Guideline ................................ 2-6
    2.5.2 NEMA Needs and Desirability Guideline ........................... 2-6
    2.5.3 PSA Public Participation Guideline ................................ 2-6
    2.5.4 MUNICIPAL IDP AND SDF ........................................... 2-7
    2.5.5 STRATEGIC ENVIRONMENTAL ASSESSMENT FOR SHALE GAS DEVELOPMENT ........................................... 2-7
    2.5.6 MINING AND Biodiversity Guidelines .............................. 2-7

3 STUDY METHODOLOGY ......................................................... 3-1
  3.1 DETAILS OF THE EIA PROJECT TEAM .................................... 3-1
    3.1.1 QUALIFICATIONS AND EXPERIENCE OF THE EAP ............. 3-1
  3.2 SCOPING PHASE ............................................................... 3-2
    3.3 EIA PHASE .................................................................... 3-4
      3.3.1 EIA OBJECTIVES ..................................................... 3-4
      3.3.2 ASSUMPTIONS AND LIMITATIONS ................................ 3-4
      3.3.3 SPECIALIST STUDIES ............................................. 3-7
      3.3.4 IMPACT ASSESSMENT METHOD ................................ 3-7
      3.3.5 WAY FORWARD IN THE EIA PROCESS ......................... 3-10
    3.4 COMMENTS ON THE EIR .................................................. 3-17

4 PROJECT DESCRIPTION .......................................................... 4-1
  4.1 GENERAL PROJECT INFORMATION ....................................... 4-1
    4.1.1 APPLICANT DETAILS ................................................ 4-1
    4.1.2 APPLICANT BACKGROUND ........................................ 4-1
  4.2 GENERAL OVERVIEW OF THE EXPLORATION PROCESS ................. 4-3
  4.3 NEED AND DESIRABILITY OF THE PROPOSED PROJECT .................. 4-5
4.3.1 USE OF NATURAL GAS ................................................................. 4-6
4.3.2 NATIONAL POLICY AND PLANNING CONTEXT ...................... 4-7
4.3.3 REGIONAL POLICY AND PLANNING CONTEXT ......................... 4-12
4.3.4 SUMMARY OF NATIONAL AND REGIONAL POLICY AND PLANNING .. 4-16
4.3.5 CONSISTENCY WITH NEMA PRINCIPLES .................................. 4-16
4.4 APPLICATION AREA AND REGIONAL SETTING ................................ 4-19
4.4.1 LEGAL EXCLUSIONS FROM THE RIGHT AREA .............................. 4-20
4.4.2 SCREENING TO DEFINE FUTURE TARGET AREAS ....................... 4-20
4.5 PROPOSED THREE-YEAR EXPLORATION WORK PROGRAMME .............. 4-21
4.5.1 REVISED EXPLORATION WORK PROGRAMME ............................... 4-21
4.5.2 INTRODUCTION ......................................................................... 4-22
4.5.3 EVALUATION OF GEOLOGICAL DATA ....................................... 4-23
4.5.4 SOURCE ROCK GEOCHEMISTRY DATABASE ................................. 4-24
4.5.5 FULL TENSOR GRADIOMETRY GRAVITY SURVEY .......................... 4-24
4.5.6 CORE BOREHOLE DRILLING .................................................... 4-25
4.5.7 SEISMIC DATA ACQUISITION .................................................. 4-26
4.5.8 SUPPORTING INFRASTRUCTURE .............................................. 4-27
4.5.9 REHABILITATION ..................................................................... 4-27
4.6 FURTHER APPRAISAL, WELL DRILLING OR FUTURE PRODUCTION ...... 4-27
4.7 DETAILS OF ALL ALTERNATIVES CONSIDERED IN THE EIA PROCESS 4-28
4.7.1 PROPERTY OR LOCALITY ALTERNATIVES ................................ 4-28
4.7.2 DESIGN OR LAYOUT ALTERNATIVES ....................................... 4-30
4.7.3 TYPE OF ACTIVITY ................................................................... 4-31
4.7.4 TECHNOLOGY ALTERNATIVES ............................................... 4-31
4.7.5 THE "NO-GO" ALTERNATIVE ................................................... 4-31
5 DESCRIPTION OF THE BASELINE ENVIRONMENT ......................... 5-1
5.1 BIOPHYSICAL ENVIRONMENT ....................................................... 5-1
5.1.1 CLIMATE .................................................................................. 5-1
5.1.2 GEOLOGY ................................................................................ 5-1
5.1.3 SEISMICITY ............................................................................. 5-5
5.1.4 SOILS ........................................................................................ 5-6
5.1.5 LAND COVER ........................................................................... 5-10
5.1.6 HYDROLOGY ........................................................................... 5-10
5.1.7 GROUNDWATER ...................................................................... 5-12
5.1.8 BIODIVERSITY ......................................................................... 5-16
5.1.9 AIR QUALITY ............................................................................ 5-27
5.2 CULTURAL ENVIRONMENT .............................................................. 5-27
5.2.1 HERITAGE/CULTURAL RESOURCES ......................................... 5-27
5.2.2 PALEONTOLOGICAL RESOURCES ............................................. 5-28
5.3 SOCIO-ECONOMIC ENVIRONMENT .............................................. 5-29
5.3.1 POPULATION ............................................................................ 5-29
5.3.2 EMPLOYMENT .......................................................................... 5-29
5.3.3 HOUSEHOLDS .......................................................................... 5-29
5.3.4 BASIC SERVICES ....................................................................... 5-30
5.3.5 EDUCATION ............................................................................... 5-30
5.3.6 CURRENT LAND COVER AND USES ....................................... 5-30
6 IMPACT DESCRIPTION AND ASSESSMENT ...................................... 6-1
6.1 AIRBORNE FULL TENSOR GRADIOMETRY .................................... 6-1
6.1.1 BIOPHYSICAL IMPACTS ........................................................... 6-1
6.1.2 CULTURAL/HISTORIC IMPACTS .............................................. 6-1
6.1.3 SOCIO-ECONOMIC IMPACTS ................................................... 6-1
6.2 LOCAL LIMITATIONS TO EXPLORATION .................................... 6-3
6.3 EFFECT OF GRANTING OF AN EXPLORATION RIGHT ..................... 6-3
6.4 "NO-GO" ALTERNATIVE IMPACTS ............................................... 6-5
6.5 CUMULATIVE IMPACTS ............................................................... 6-6
7 CONCLUSIONS AND RECOMMENDATIONS ......................................................... 7-1
  7.1 SUMMARY OF SPECIALIST FINDINGS .................................................. 7-1
  7.2 ENVIRONMENTAL IMPACT STATEMENT ............................................... 7-2
  7.2.1 KEY FINDINGS .............................................................................. 7-2
  7.2.2 SUMMARY OF IMPACTS ................................................................. 7-3
  7.3 IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES ....................... 7-6
  7.4 FINAL PROJECT ALTERNATIVES ......................................................... 7-6
  7.5 RECOMMENDATION / OPINION OF ENVIRONMENTAL ASSESSMENT PRACTITIONER ................................................................. 7-7
  7.6 FINANCIAL PROVISION ...................................................................... 7-8
  7.7 DEVIATIONS FROM SCOPING ............................................................... 7-8

8 REFERENCES ............................................................................................... 8-1

9 ENVIRONMENTAL MANAGEMENT PROGRAMME ....................................... 9-1
  9.1 INTRODUCTION .................................................................................. 9-1
  9.2 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY COVERED BY THE EMPR ................................................................. 9-1
  9.3 DETAILS OF THE EAP .................................................................... 9-1
  9.4 RESPONSIBLE PERSONS .................................................................. 9-1
  9.5 STRUCTURE OF THE EMPR ............................................................... 9-2
  9.6 IMPACT MANAGEMENT OBJECTIVES .............................................. 9-2
    9.6.1 PLANNING AND DESIGN ............................................................ 9-2
    9.6.2 Undertaking of Exploration ......................................................... 9-3
    9.6.3 Rehabilitation and post closure ................................................... 9-3
  9.7 IMPACT MANAGEMENT OUTCOMES ............................................... 9-3
    9.7.1 PLANNING AND DESIGN ............................................................ 9-3
    9.7.2 Undertaking of Exploration ......................................................... 9-3
    9.7.3 Rehabilitation and post closure ................................................... 9-4
  9.8 IMPACT MANAGEMENT ACTIONS .................................................... 9-4
    9.8.1 PLANNING AND DESIGN ............................................................ 9-4
    9.8.2 Undertaking of Exploration ......................................................... 9-6
    9.8.3 Rehabilitation and post closure ................................................... 9-10
  9.9 MONITORING IMPLEMENTATION OF ACTIONS ................................ 9-10
  9.10 REPORTING ON EMPR COMPLIANCE ............................................ 9-10
  9.11 ENVIRONMENTAL AWARENESS PLAN ......................................... 9-10

10 APPENDICES ............................................................................................. A

LIST OF FIGURES

FIGURE 1-1: REVISED REGIONAL SETTING OF THE EXPLORATION RIGHT APPLICATION AREA .................. 5
FIGURE 3-1: FLOW DIAGRAM SHOWING THE SCOPING AND EIA PROCESS (INCLUDING PRE- APPLICATION PHASE) ................................................................. 6
FIGURE 4-1: OVERVIEW OF THE EXPLORATION PROCESS ........................................................................ 4-5
FIGURE 4-2: TYPICAL FTG EQUIPMENT AND RESULTS ........................................................................... 4-25
FIGURE 4-3: TYPICAL CORE BOREHOLE EQUIPMENT ............................................................................. 4-26
FIGURE 4-4: SCHEMATIC OF TYPICAL SEISMIC SURVEY USING A VIBRATOR TRUCK ............................. 4-27
FIGURE 4-5: EXCERPT FROM PASA HUBMAP ......................................................................................... 4-29
FIGURE 5-1: SIMPLIFIED GEOLOGY OF THE KAROO BASINS ................................................................. 5-2
FIGURE 5-2: GEOLOGY OF THE EXPLORATION RIGHT AREA .................................................................... 5-3
FIGURE 5-3: SOIL CLASSES IDENTIFIED WITHIN THE EXPLORATION RIGHT AREA ................................ 5-7
FIGURE 5-4: LAND CAPABILITY MAP OF THE EXPLORATION RIGHT AREA ........................................... 5-9
FIGURE 5-5: DEGRADED LAND WITHIN THE EXPLORATION RIGHT AREA ........................................... 5-9
FIGURE 5-6: SURFACE WATER FEATURES WITHIN PROPOSED ER AREA, WITH QUATERNARY CATCHMENTS ........................................................................................................... 5-11
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STRUCTURE OF THE EIR</td>
</tr>
<tr>
<td>2</td>
<td>LOCATIONS WITH HARD COPIES OF THE EIR</td>
</tr>
<tr>
<td>3</td>
<td>LISTED ACTIVITIES APPLIED FOR AS PART OF THE PROPOSED PROJECT</td>
</tr>
<tr>
<td>4</td>
<td>LEGAL FRAMEWORK</td>
</tr>
<tr>
<td>5</td>
<td>KEY ISSUES IDENTIFIED DURING THE SCOPING PHASE</td>
</tr>
<tr>
<td>6</td>
<td>CRITERIA FOR ASSESSING IMPACTS</td>
</tr>
<tr>
<td>7</td>
<td>REQUIREMENTS OF AN EIR IN TERMS OF THE EIA REGULATIONS 2014</td>
</tr>
<tr>
<td>8</td>
<td>COMMENTS AND RESPONSES POST SCOPING BUT BEFORE REVIEW OF THE EIR</td>
</tr>
<tr>
<td>9</td>
<td>CONSIDERATION OF THE NEMA PRINCIPLES IN RELATION TO THE PROPOSED PROJECT</td>
</tr>
<tr>
<td>10</td>
<td>THREE-YEAR EXPLORATION WORK PROGRAMME</td>
</tr>
<tr>
<td>11</td>
<td>SOIL CLASSES AND THEIR PROPERTIES WITHIN THE PROPOSED ER AREA</td>
</tr>
<tr>
<td>12</td>
<td>LAND CAPABILITY CLASSES IDENTIFIED WITHIN THE PROPOSED ER AREA</td>
</tr>
<tr>
<td>13</td>
<td>QUATERNARY CATCHMENT CHARACTERISTICS (WR 2005)</td>
</tr>
<tr>
<td>14</td>
<td>FAUNAL SPECIES OF CONSERVATION CONCERN POSSIBLY OCCURRING WITHIN THE PROPOSED ER AREA</td>
</tr>
<tr>
<td>15</td>
<td>WARDS AND ASSOCIATED VILLAGES (DEMARCATION BOARD)</td>
</tr>
<tr>
<td>16</td>
<td>IMPACT OF FTG AIRCRAFT ON NOISE</td>
</tr>
<tr>
<td>17</td>
<td>ENVIRONMENTAL ACTIONS DURING EXPLORATION</td>
</tr>
</tbody>
</table>

LIST OF BOXES

<table>
<thead>
<tr>
<th>BOX</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ACCEPTANCE OF SCOPING</td>
</tr>
<tr>
<td>2</td>
<td>NOTE ON THE SCOPE OF THE EIA</td>
</tr>
<tr>
<td>3</td>
<td>SUBMIT YOUR COMMENTS ON THE EIR TO</td>
</tr>
<tr>
<td>4</td>
<td>TASKS UNDERTAKEN DURING THE SCOPING PHASE</td>
</tr>
<tr>
<td>5</td>
<td>TASKS UNDERTAKEN DURING THE EIR REVIEW PHASE</td>
</tr>
</tbody>
</table>

LIST OF APPENDICES

<table>
<thead>
<tr>
<th>APPENDIX</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CO-ORDINATES OF THE EXPLORATION RIGHT AREA</td>
</tr>
<tr>
<td>2</td>
<td>PROPERTIES INCLUDED IN THE EXPLORATION RIGHT APPLICATION AREA</td>
</tr>
<tr>
<td>3</td>
<td>EAP UNDERTAKING</td>
</tr>
<tr>
<td>4</td>
<td>PROOF OF REGISTRATIONS OF THE PRACTITIONERS</td>
</tr>
<tr>
<td>5</td>
<td>CURRICULA VITAE OF THE PROJECT TEAM</td>
</tr>
<tr>
<td>6</td>
<td>PUBLIC PARTICIPATION PROCESS</td>
</tr>
</tbody>
</table>
**ACRONYMS AND ABBREVIATIONS**

Below is a list of acronyms and abbreviations used in this report.

<table>
<thead>
<tr>
<th>Acronyms / Abbreviations</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D</td>
<td>Two-dimensional</td>
</tr>
<tr>
<td>3D</td>
<td>Three-dimensional</td>
</tr>
<tr>
<td>ANDM</td>
<td>Alfred Nzo District Municipality</td>
</tr>
<tr>
<td>ARI</td>
<td>Advanced Resources International</td>
</tr>
<tr>
<td>Bcf</td>
<td>Billion cubic feet</td>
</tr>
<tr>
<td>BBBEE</td>
<td>Broad Base Black Economic empowerment</td>
</tr>
<tr>
<td>BGIS</td>
<td>Biodiversity Geographic Information System</td>
</tr>
<tr>
<td>BID</td>
<td>Background information document</td>
</tr>
<tr>
<td>CBAs</td>
<td>Critical Biodiversity Areas</td>
</tr>
<tr>
<td>CBM</td>
<td>Coalbed Methane</td>
</tr>
<tr>
<td>CTL</td>
<td>Coal to liquid</td>
</tr>
<tr>
<td>CSR</td>
<td>Corporate Social Responsibility</td>
</tr>
<tr>
<td>DAFF</td>
<td>Department of Agriculture, Forestry and Fisheries</td>
</tr>
<tr>
<td>dBa</td>
<td>A-weighted decibel</td>
</tr>
<tr>
<td>DEA</td>
<td>Department of Environmental Affairs</td>
</tr>
<tr>
<td>DEDEA</td>
<td>Department of Economic Development and Environment Affairs</td>
</tr>
<tr>
<td>DM</td>
<td>District Municipality</td>
</tr>
<tr>
<td>DMR</td>
<td>Department of Mineral Resources</td>
</tr>
<tr>
<td>DTI</td>
<td>Department of Trade and Industry</td>
</tr>
<tr>
<td>DWAF</td>
<td>Department of Water Affairs and Forestry (former)</td>
</tr>
<tr>
<td>DWS</td>
<td>Department of Water and Sanitation</td>
</tr>
<tr>
<td>EAP</td>
<td>Environmental Assessment Practitioner</td>
</tr>
<tr>
<td>ECBCP</td>
<td>Eastern Cape Biodiversity Conservation Plan</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EIR</td>
<td>Environmental Impact Report</td>
</tr>
<tr>
<td>ELM</td>
<td>Elundini Local Municipality</td>
</tr>
<tr>
<td>EMPPr</td>
<td>Environmental Management Programme</td>
</tr>
<tr>
<td>ER</td>
<td>Exploration Right, as contemplated in Section 79 of the MPRDA</td>
</tr>
<tr>
<td>FEPA</td>
<td>Freshwater Ecosystem Priority Area</td>
</tr>
<tr>
<td>FTG</td>
<td>Full tensor gravity gradiometry</td>
</tr>
<tr>
<td>GA</td>
<td>General Authorisation, in terms of the NWA</td>
</tr>
<tr>
<td>GGI</td>
<td>Gravity gradient instrument</td>
</tr>
<tr>
<td>GN</td>
<td>Government Notice</td>
</tr>
<tr>
<td>GUMP</td>
<td>Gas Utilisation Master Plan</td>
</tr>
<tr>
<td>Ha</td>
<td>Hectares</td>
</tr>
<tr>
<td>HAPs</td>
<td>Hazardous air pollutants</td>
</tr>
<tr>
<td>I&amp;AP</td>
<td>Interested and/or Affected Party</td>
</tr>
<tr>
<td>IBAs</td>
<td>Important Bird Areas</td>
</tr>
<tr>
<td>IDPs</td>
<td>Integrated Development Plans</td>
</tr>
<tr>
<td>IEP</td>
<td>Integrated Energy Plan (2013)</td>
</tr>
<tr>
<td>IES</td>
<td>Independent environmental scientist</td>
</tr>
<tr>
<td>JRP</td>
<td>Integrated Resource Plan</td>
</tr>
<tr>
<td>IUCN</td>
<td>International Union for Conservation of Nature</td>
</tr>
<tr>
<td>JGDM</td>
<td>Joe Gqabi District Municipality</td>
</tr>
<tr>
<td>Km</td>
<td>Kilometres</td>
</tr>
<tr>
<td>km²</td>
<td>Square kilometres</td>
</tr>
<tr>
<td>L</td>
<td>Litres</td>
</tr>
<tr>
<td>L/s</td>
<td>Litres per second</td>
</tr>
<tr>
<td>M</td>
<td>Meters</td>
</tr>
<tr>
<td>Acronyms / Abbreviations</td>
<td>Definition</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>m³</td>
<td>Cubic metres</td>
</tr>
<tr>
<td>Mamsl</td>
<td>Metres above mean sea level</td>
</tr>
<tr>
<td>Mbl</td>
<td>Metres below ground level</td>
</tr>
<tr>
<td>Mm</td>
<td>Million cubic metres</td>
</tr>
<tr>
<td>MDTFCA</td>
<td>Maloti Drakensburg Transfrontier Conservation and Development Area</td>
</tr>
<tr>
<td>MLM</td>
<td>Matatiele Local Municipality</td>
</tr>
<tr>
<td>Mm</td>
<td>Millimetres</td>
</tr>
<tr>
<td>MPRDA</td>
<td>Mineral and Petroleum Resources Development Act, 2002</td>
</tr>
<tr>
<td>MSDS</td>
<td>Material Safety Data Sheet</td>
</tr>
<tr>
<td>mS/m</td>
<td>Millisiemens/meter</td>
</tr>
<tr>
<td>NDP</td>
<td>National Development Plan, 2012</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Environmental Management Act, 1998</td>
</tr>
<tr>
<td>NEMAQA</td>
<td>National Environmental Management Air Quality Act, 2004</td>
</tr>
<tr>
<td>NEMBA</td>
<td>National Environmental Management: Biodiversity Act, 2004</td>
</tr>
<tr>
<td>NEMPRAA</td>
<td>National Environmental Management Protected Areas Act, 2003</td>
</tr>
<tr>
<td>NEWMWA</td>
<td>National Environmental Management: Waste Management Act, 2008</td>
</tr>
<tr>
<td>NEFEPA</td>
<td>National Freshwater Ecosystem Priority Area</td>
</tr>
<tr>
<td>NGA</td>
<td>National Groundwater Archive</td>
</tr>
<tr>
<td>NHRA</td>
<td>National Heritage Resources Act, 1999</td>
</tr>
<tr>
<td>NPAES</td>
<td>National Protected Area Expansion Strategy</td>
</tr>
<tr>
<td>NWA</td>
<td>National Water Act, 1998</td>
</tr>
<tr>
<td>NWRs</td>
<td>National Water Resource Strategy</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organisation</td>
</tr>
<tr>
<td>PASA</td>
<td>Petroleum Agency of South Africa</td>
</tr>
<tr>
<td>PASA</td>
<td>Petroleum Agency of South Africa (Pty) Ltd</td>
</tr>
<tr>
<td>RE IPP</td>
<td>Renewable Energy Independent Power Producers</td>
</tr>
<tr>
<td>ROMPCO</td>
<td>Republic of Mozambique Pipeline Company</td>
</tr>
<tr>
<td>SABS</td>
<td>South African Bureau of Standards</td>
</tr>
<tr>
<td>SACNASP</td>
<td>South African Council for Natural Scientific Professionals</td>
</tr>
<tr>
<td>SAHRA</td>
<td>South African Heritage Resources Agency</td>
</tr>
<tr>
<td>SAHIRIS</td>
<td>South African Heritage Resource Information System</td>
</tr>
<tr>
<td>SANBI</td>
<td>South African National Biodiversity Institute</td>
</tr>
<tr>
<td>SANS</td>
<td>South African National Standards</td>
</tr>
<tr>
<td>SDFs</td>
<td>Spatial Development Frameworks</td>
</tr>
<tr>
<td>SEA</td>
<td>Strategic Environmental Assessment</td>
</tr>
<tr>
<td>SLR</td>
<td>SLR Consulting (South Africa) (Pty) Ltd</td>
</tr>
<tr>
<td>SMS</td>
<td>Short Message Service</td>
</tr>
<tr>
<td>SOTER</td>
<td>Soil and Terrain Database</td>
</tr>
<tr>
<td>Tcl</td>
<td>Trillion Cubic Feet</td>
</tr>
<tr>
<td>TCP</td>
<td>Technical Co-operation Permit, as contemplated in Section 76 of the MPRDA</td>
</tr>
<tr>
<td>TDS</td>
<td>Total Dissolved Solids</td>
</tr>
<tr>
<td>UCPPP</td>
<td>uMzimvubu Catchment Partnership Programme</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile organic compounds</td>
</tr>
<tr>
<td>WMA</td>
<td>Water Management Area</td>
</tr>
<tr>
<td>WR</td>
<td>Water Resources</td>
</tr>
<tr>
<td>WUL(A)</td>
<td>Water Use License (Application)</td>
</tr>
</tbody>
</table>
ENVIRONMENTAL IMPACT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME FOR AN EXPLORATION RIGHT APPLICATION FOR PETROLEUM PRODUCTS ON VARIOUS FARMS IN THE MAGISTERIAL DISTRICTS OF MATATIELE AND MT FLETCHER, EASTERN CAPE (12/3/295 ER)

1 INTRODUCTION

This section describes the purpose of this report, outlined the opportunity for comment, provides a brief description of the project background, summarises the legislative authorisation requirements and terms of reference, and describes the structure of the report.

1.1 PURPOSE OF THIS REPORT AND OPPORTUNITY TO COMMENT

This Environmental Impact Report ("EIR") and Environmental Management Programme ("EMP") have been compiled and were distributed for review and comment as part of the Scoping and Environmental Impact Assessment (hereafter collectively referred to as "EIA") process that is being undertaken for the proposal by Rhino Oil & Gas Exploration South Africa (Pty) Ltd (hereafter referred to as "Rhino Oil and Gas") to apply for an Exploration Right ("ER") to explore for various petroleum products on various farms in the magisterial districts of Matatiele and Mount Fletcher, Eastern Cape, South Africa (12/3/295 ER).

This EIR summarises the EIA process followed to date and provides an overview of the proposed project and the affected environment. It also provides an assessment of the impacts of the proposed project and sets out the recommend management measures. Interested and Affected Parties ("I&APs") were provided with opportunity to comment on the EIA and EMP (see Section 1.6). The document was then updated to a final report, with due consideration of the comments received, and has been submitted to the Petroleum Agency of South Africa ("PASA"), the designated agency responsible for the administration of petroleum related minerals, for decision-making.

1.2 PROJECT BACKGROUND

In early 2015, Rhino Oil and Gas lodged an application for an ER to explore for various petroleum products (including oil, gas, condensate, coal bed methane, helium and biogenic gas) with PASA in terms of Section 79 of the Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA), as amended. PASA accepted the ER application on 22 May 2015 (Ref: 12/3/295 ER).

The purpose of exploration is to identify the existence of any commercially viable reserves of oil and / or gas, which may be located within suitable geological strata. The primary target of the proposed exploration programme are various forms of petroleum located in deep underground rock formations or that are associated with other hydrocarbon reservoirs such as coal beds. The conditions necessary for
petroleum reserves to have accumulated are complex and largely dependent on past geological history and present geological formations and structures. For deposits to occur, particular combinations of potential source and reservoir rocks together with migration pathways and trap structures are required. Exploration is a technically complex and iterative process consisting of a number of stages typically termed i) early-phase exploration, ii) appraisal and iii) well drilling. Data from each stage improves the knowledge and understanding of the resource, and informs the following stage, which is only undertaken if results are positive. Exploration techniques may include, inter alia, aero-magnetic/gravity surveys, deep and shallow geophysical (seismic) surveys, shallow drilling and coring, and appraisal and exploration drilling (DTI, 2001). Exploration can require a period of up to 10 years, in order to arrive at a point where an informed decision can be made on a production right application.

The initial ER application area was approximately 120 000 ha in extent and covered approximately 200 properties (farms and portions) (see Figure 1-1 for the regional setting of the project). The proposed ‘early-phase exploration’ activities as included in the initial ER application were:

- various non-invasive and remote exploration techniques (including analysis of existing data and full tensor gradiometry gravity survey);
- the drilling of up to 10 core boreholes; and
- 125 km of seismic survey acquisition.

Subsequent to the acceptance of the Scoping Report, Rhino Oil and Gas reduced the extent of the ER application area through the exclusion of the Malekgalonyane (Ongeluksnek) Nature Reserve thus reducing the number of properties included in the ER application to approximately 175 properties (farms and portions) over an area of 109 292 ha. Refer to Section 4.4 for further detail. In addition, and also subsequent to the acceptance of the Scoping Report, Rhino Oil and Gas has excluded the ground-based core hole drilling and seismic surveys from proposed ‘early-phase exploration’ work for which they are seeking environmental authorisation. Thus the current focus of the application and the related environmental assessment work is now only related to the proposed remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey).

If the application is approved, Rhino Oil and Gas would be in a position to conduct the remote exploration techniques and to develop a more detailed understanding of the potential oil and gas resources in the ER area. Thereafter, should Rhino Oil and Gas propose to conduct ground-based exploration activities this would need to be informed by a further application to PASA and a separate environmental assessment and authorisation process. A benefit of this revised approach is that any future application for ground-based exploration activities will be focussed on specified sites, thereby enabling I&APs to have a better understanding of where Rhino Oil and Gas proposes to access land and conduct ground-based exploration activities. This addresses some of the concerns raised by I&APs relating to where the proposed ground-based exploration activities may be located. Refer to Section 4.5.1 for further detail.
The approval being sought as part of this application does not include any activities relating to the appraisal or well drilling phases that comprise a commercial viability assessment of a possible resource. Thus no wells, permeability testing, pressure testing or hydraulic fracturing (commonly referred to as “fracking”) is proposed as part of the initial three-year exploration programme. If a resource is identified for more advanced exploration, then further authorisation / approvals and associated application processes would be required before these activities could be undertaken (refer to Section 4.6 for further information in this regard).

1.3 SUMMARY OF AUTHORISATION REQUIREMENTS

An application for an exploration right requires statutory approval in terms of both the MPRDA and the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), as amended. These two regulatory processes are summarised below and presented in more detail in Section 2. All legislation and guidelines that have been considered in the preparation of the EIR are documented in Section 2.

In terms of section 79 of the MPRDA an exploration right is required from the Minister of Mineral Resources (or delegated authority) prior to the commencement of any exploration activities. A requirement for obtaining an ER is that an applicant must comply with Chapter 5 of NEMA with regards to consultation and reporting.

In terms of the Environmental Impact Assessment Regulations 2014, promulgated in terms of Chapter 5 of NEMA, any activity which requires an exploration right under the MPRDA may not commence without Environmental Authorisation from the competent authority, the Minister of Mineral Resources (or delegated authority), to carry out the proposed exploration programme. In order for PASA, as the delegated authority, to consider an application for Environmental Authorisation and make a recommendation to the Minister of Mineral Resources (or delegated authority), a Scoping and EIA process must be undertaken.

Rhino Oil and Gas has appointed SLR Consulting (South Africa) (Pty) Ltd (hereafter referred to as “SLR”) as the independent environmental assessment practitioner (“EAP”) responsible for undertaking the required EIA and conducting the public participation process to meet the relevant requirements of the MPRDA, NEMA and Regulations thereto.
BOX 1: ACCEPTANCE OF SCOPING

A Scoping process, in terms of the EIA Regulations 2014, was undertaken between October 2015 and April 2016 to inform the application for environmental authorisation. A Scoping Report was prepared to document the findings of the Scoping process. The Scoping Report was accepted by PASA on 10 June 2016, with permission being granted to undertake the EIA in terms of the Plan of Study for EIA described in the Scoping Report (see Appendix 6.1) and the conditions included in the acceptance. All registered I&APs were notified that PASA accepted the Scoping Report.
FIGURE 1-1: REVISED REGIONAL SETTING OF THE EXPLORATION RIGHT APPLICATION AREA
Separate electronic file
1.4 TERMS OF REFERENCE

The terms of reference for the EIA are as follows:

- Ensure the EIA is undertaken in accordance with the requirements of NEMA and the EIA Regulations 2014 (GN No. R982, 4 December 2014);
- Ensure the EIA is undertaken in an open, participatory manner to ensure that all potential impacts are identified;
- Undertake a formal public participation process, which specifically addresses the distribution of information to I&APs and provides the opportunity for I&APs to raise any concerns/issues, as well as an opportunity to comment on all EIA documentation;
- Commission specialist studies to assess key issues and concerns identified during the scoping process; and
- Integrate all the information, including the findings of the specialist studies and other relevant information, into an EIR to allow an informed decision to be taken on the proposed project.

BOX 2: NOTE ON THE SCOPE OF THE EIA

The scope of the current EIA process is aligned specifically to the early-phase exploration work programme as described in Section 4.5.

The reader is advised that, subsequent to the acceptance of the Scoping Report, Rhino Oil and Gas has excluded the ground based core hole drilling and seismic survey activities from the application. The current focus of the application for environmental authorisation and the related environmental assessment work is now only on remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey).

The assessment of further ground-based exploration including core hole drilling, seismic surveys, appraisal or well drilling activities for exploration or future production falls outside of the scope of this EIA process. If such work were to be proposed by Rhino Oil and Gas then it would be required to seek further approval from PASA in terms of the MPRDA and NEMA. Any further approval would be subject to an additional environmental assessment process with further public consultation as is required by NEMA.
1.4.1 STRUCTURE OF THE REPORT

This EIR has been prepared in compliance with Appendix 3 of the EIA Regulations 2014 and is divided into various chapters and appendices, the contents of which are outlined below.

### TABLE 1-1: STRUCTURE OF THE EIR

<table>
<thead>
<tr>
<th>Section</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Summary</td>
<td>Provides a summary of the EIR.</td>
</tr>
<tr>
<td><strong>Chapter 1</strong></td>
<td><strong>Introduction</strong></td>
</tr>
<tr>
<td></td>
<td>Describes the purpose of this report, provides a brief description of the project background, summarises the legislative authorisation requirements, presents the terms of reference of the EIA, and describes the structure of the report and the opportunity for comment.</td>
</tr>
<tr>
<td><strong>Chapter 2</strong></td>
<td><strong>Legislative requirements</strong></td>
</tr>
<tr>
<td></td>
<td>Outlines the key legislative requirements applicable to the proposed exploration activities.</td>
</tr>
<tr>
<td><strong>Chapter 3</strong></td>
<td><strong>Study Method</strong></td>
</tr>
<tr>
<td></td>
<td>Outlines the methodology for the assessment and consultation process undertaken in the EIA. Also includes a summary of the consultation undertaken during scoping and the results thereof.</td>
</tr>
<tr>
<td><strong>Chapter 4</strong></td>
<td><strong>Project overview</strong></td>
</tr>
<tr>
<td></td>
<td>Describes the need and desirability for the proposed project, provides general project information, an overview of the exploration process and the proposed initial three-year exploration work programme and a description of the project alternatives.</td>
</tr>
<tr>
<td><strong>Chapter 5</strong></td>
<td><strong>Description of the affected environment</strong></td>
</tr>
<tr>
<td></td>
<td>Describes the existing biophysical and social environment that could potentially be affected by the proposed project.</td>
</tr>
<tr>
<td><strong>Chapter 6</strong></td>
<td><strong>Impact description and assessment</strong></td>
</tr>
<tr>
<td></td>
<td>Describes and assesses the potential impacts of the proposed project on the affected environment. It also presents mitigation or optimisation measures that could be used to reduce the significance of any negative impacts or enhance any benefits, respectively.</td>
</tr>
<tr>
<td><strong>Chapter 7</strong></td>
<td><strong>Conclusion and recommendations</strong></td>
</tr>
<tr>
<td></td>
<td>Provides conclusions to the EIA and summarises the recommendations for the proposed project.</td>
</tr>
<tr>
<td><strong>Chapter 8</strong></td>
<td><strong>References</strong></td>
</tr>
<tr>
<td></td>
<td>Provides a list of the references used in compiling this report.</td>
</tr>
<tr>
<td><strong>Chapter 9</strong></td>
<td><strong>Environmental Management Programme</strong></td>
</tr>
<tr>
<td></td>
<td>Provides an Environmental Management Programme report for the proposed exploration activities.</td>
</tr>
<tr>
<td><strong>Chapter 10</strong></td>
<td><strong>Appendix 1:</strong> Co-ordinates of the revised Exploration Right application area</td>
</tr>
<tr>
<td></td>
<td><strong>Appendix 2:</strong> Properties included in the revised Exploration Right application area</td>
</tr>
<tr>
<td></td>
<td><strong>Appendix 3:</strong> EAP Undertaking</td>
</tr>
<tr>
<td></td>
<td><strong>Appendix 4:</strong> Proof of registrations of the EAP</td>
</tr>
<tr>
<td></td>
<td><strong>Appendix 5:</strong> Curricula Vitae of the Project Team</td>
</tr>
<tr>
<td></td>
<td><strong>Appendix 6:</strong> Public Participation Process</td>
</tr>
<tr>
<td></td>
<td><strong>Appendix 6.1:</strong> Authority Correspondence since submission of the Scoping Report</td>
</tr>
<tr>
<td></td>
<td>- Scoping Report approval</td>
</tr>
<tr>
<td></td>
<td>- Comments on EIR</td>
</tr>
<tr>
<td></td>
<td><strong>Appendix 6.2:</strong> &amp;AP database</td>
</tr>
<tr>
<td></td>
<td><strong>Appendix 6.3:</strong> &amp;AP Submissions post completion of Scoping Report</td>
</tr>
<tr>
<td></td>
<td>- Comments since Scoping Report submission</td>
</tr>
<tr>
<td></td>
<td>- Minutes of EIA feedback meetings</td>
</tr>
<tr>
<td></td>
<td>- Comments on EIR review</td>
</tr>
<tr>
<td></td>
<td><strong>Appendix 6.4:</strong> Land Claimant information</td>
</tr>
<tr>
<td></td>
<td><strong>Appendix 6.5:</strong> &amp;AP correspondence since submission of the Scoping Report</td>
</tr>
<tr>
<td></td>
<td>- Notice on PASA decision on Scoping Report (post, email &amp; SMS)</td>
</tr>
<tr>
<td></td>
<td>- Notice of EIR Review (advert, post, email &amp; SMS)</td>
</tr>
<tr>
<td></td>
<td>- Presentation made at feedback meetings</td>
</tr>
<tr>
<td></td>
<td>- Reminder of EIR Comments deadline (email &amp; SMS)</td>
</tr>
</tbody>
</table>
1.5 OPPORTUNITY TO COMMENT

This EIR was distributed for a 30-day comment period from 12 August to 13 September 2016 in order to provide I&APs with opportunity to comment on any aspect of the proposed project and the findings of the EIA process. Copies of the full report were made available for download from the SLR website (go to: http://www.ccaenvironmental.co.za/sub-oil-gas-minerals/) and were available at the locations described in Table 1-2.

An electronic copy of the EIR could be emailed or provided on CD on request. The EIR Executive Summary was also translated into Sesotho and isiXhosa and was available for download from the SLR website or could be emailed on request.

<table>
<thead>
<tr>
<th>Location name</th>
<th>Physical Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matatiele Public Library</td>
<td>102 Main Street, Matatiele, 4730</td>
</tr>
<tr>
<td>Maluti Magistrate Offices</td>
<td>101 Main Street, Matatiele, 4730</td>
</tr>
<tr>
<td>Mount Fletcher Public Library</td>
<td>Enkululekweni Location, Mount Fletcher</td>
</tr>
<tr>
<td>Elundini Local Municipality (Mount Fletcher Offices)</td>
<td>272 Back Street, Mount Fletcher</td>
</tr>
<tr>
<td>Maclear Public Library</td>
<td>Van Riebeeck Street, Maclear, 5480</td>
</tr>
<tr>
<td>Bakoena Traditional Council</td>
<td>Chief Moshoeshoe’s Office, Queen’s Mercy</td>
</tr>
<tr>
<td>Ramohlakoana Traditional Council</td>
<td>Queen Sibi’s Office, Hebron</td>
</tr>
<tr>
<td>Bakoena Traditional Council</td>
<td>Chief Lebenya’s Office, Seqhobong</td>
</tr>
<tr>
<td>Amahlubi Traditional Council</td>
<td>Chief Zibi’s Office, Ezingonyameni, Kwa Dzingwa</td>
</tr>
</tbody>
</table>

BOX 3: SUBMIT YOUR COMMENTS ON THE EIR TO:

SLR Consulting (Pty) Ltd
Attention: Matthew Hemming

PO Box 1596, CRAMERVIEW, 2060
Unit 7, Fourways Manor Office Park, Corner Roos and Macbeth Streets, Fourways, Johannesburg
Tel: (011) 467 0945
Fax: (011) 467 0978
E-mail: mhemming@slrconsulting.com OR smoeketse@slrconsulting.com

For comments to be included in the updated EIR they should reach SLR by no later than 13 September 2016

Comments on the EIR distributed for review, received by SLR prior to 14 September 2016 were used to update the EIR where relevant. The comments and the project responses thereto are summarised in Table 3-5 and copies of each comment are included in Appendix 6.3.
Comments that were received post completion of the Scoping Report but prior to the distribution of the EIR, and responses thereto, are documented in Table 3.6. Copies of each comment are included in Appendix 6.3.
2 LEGISLATIVE REQUIREMENTS

This chapter outlines the key legislative requirements applicable to the proposed exploration activities.

2.1 OVERVIEW OF THE “ONE ENVIRONMENTAL SYSTEM”

The “One Environmental System” commenced on 8 December 2014 removing the environmental regulation of prospecting, mining, exploration and production and related activities from the MPRDA and transferring it to NEMA. Under the “One Environmental System”, the Minister of Mineral Resources (or delegated authority) is the competent authority responsible for issuing Environmental Authorisations in terms of NEMA for mining and petroleum related activities. The Minister of Environmental Affairs, however, remains the appeal authority for these authorisations.

2.2 MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002

The MPRDA provides that the mineral and petroleum resources are the common heritage of all South Africans and the State is the custodian thereof for the benefit of all South Africans. The state is entitled to issue rights to ensure the sustainable development of South Africa’s mineral and petroleum resources within a framework of national environmental policy, while promoting economic and social development.

In terms of the MPRDA, an ER must be obtained prior to the commencement of any exploration activities. A requirement for obtaining an ER is that an applicant must submit an application in terms of Section 79(1) of the MPRDA to the designated agency, and they must accept the application within 14 days if, inter alia, no other person holds a Technical Co-operation Permit, ER or Production Right for petroleum over any part of the proposed licence area. If the application for an ER is accepted, the designated agency must request that the applicant comply with Chapter 5 of NEMA with regards to consultation and reporting (see Section 2.1.3 below). The Minister (or delegated authority) may only grant the ER if an Environmental Authorisation is issued.

As mentioned in the introduction, Rhino lodged an application for an ER with PASA, the designated agency in terms of Section 79 of the MPRDA. PASA accepted the application on 22 May 2015 (Ref: 12/3/295 ER, see Appendix 6.1) and requested that, inter alia,

- an application for Environmental Authorisation be submitted to them in terms of Regulation 16 of the EIA Regulations 2014;
- a scoping report as contemplated in Regulation 21(1) of the EIA Regulations 2014 and which has been subjected to public participation be submitted;
- consultation be undertaken with landowners, lawful occupiers and any other I&APs and the results be included in the Scoping and EIR.; and
- further to submit all outstanding title deeds.
2.2.1 CONSULTATION BY AUTHORITY

Section 10 of the MPRDA requires that the designated agency (i.e. PASA), within 14 days after accepting an application for a right, and in the prescribed manner must:
- make known that an application for a right has been accepted in respect of the land in question; and
- call upon interested and affected persons to submit their comments regarding the application within 30 days from the date of the notice.

The prescribed manner for the designated agency (i.e. PASA) to give notice in terms of Section 10 of the MPRDA is set out in Regulation 3 of the MPRD Regulations (GN R 527 of April 2004). PASA has confirmed to SLR that, in respect of this application, they placed a notice on a notice board at their office and in the Magistrate’s Court in the magisterial district applicable to the land in question.

2.2.2 LEGAL NATURE AND LIMITATIONS ON AN EXPLORATION RIGHT

Any right granted under the MPRDA is a limited real right in respect of the mineral or petroleum and the land to which such right relates. The holder of a right is entitled to the rights referred to in Section 5 of the MPRDA and such other rights as may be granted to, acquired by or conferred upon such holder under the MPRDA or any other law. Mineral rights are also specific and have limitations.

The ER that Rhino Oil and Gas has applied for is specific and limited to:
- The minerals being: oil, gas, condensate, coal bed methane, helium and biogenic gas;
- The proposed ER area as defined by the co-ordinates presented in Appendix 1 (revised since acceptance of the Scoping Report);
- The properties as listed in Appendix 2 (revised since acceptance of the Scoping Report);
- The proposed exploration work programme (revised since acceptance of the Scoping Report) as detailed in Section 4.5; and
- A three-year time frame from the granting of the right.

Any change to the scope of the ER, further exploration or future production activities would need to be subject to additional authorisation/ approval in terms of the MPRDA and NEMA. Each of these would require a separate environmental assessment (or Environmental Authorisation amendment) process, which would include a further public participation process and an environmental assessment (potentially including specialist studies) of all project-related activities/ issues. Refer to Section 4.6 for further information in this regard.
2.3 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998

Section 2 of NEMA sets out a range of environmental principles that are to be applied by all organs of state when taking decisions that significantly affect the environment. Included amongst the key principles is that all development must be socially, economically and environmentally sustainable and that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. NEMA also provides for the participation of I&APs and stipulates that decisions must take into account the interests, needs and values of all I&APs.

Chapter 5 of NEMA outlines the general objectives and implementation of Integrated Environmental Management (IEM), which provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for granting of Environmental Authorisations. In order to give effect to the general objectives of IEM, the potential impacts on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority. Section 24(4) provides the minimum requirements for procedures for the investigation, assessment and communication of the potential impact of activities.

2.3.1 EIA REGULATIONS 2014

The EIA Regulations 2014 promulgated in terms of Chapter 5 of NEMA, and published in Government Notice (GN) R982, provides for the control of certain listed activities. These activities are listed in GN R983 (Listing Notice 1), R984 (Listing Notice 2) and R985 (Listing Notice 3) of 4 December 2014, and are prohibited until Environmental Authorisation has been obtained from the competent authority. Although the administration of applications for Environmental Authorisations has been delegated to PASA, the Minister of Mineral Resources (or delegated authority) remains responsible the granting of Environmental Authorisation in term of NEMA where the listed or specified activity is directly related to prospecting or exploration of a mineral or petroleum resource (refer to Section 24C(2A) of NEMA).

Environmental Authorisation, which may be granted subject to conditions, will only be considered once there has been compliance with GN R982. This notice sets out the procedures and documentation that need to be complied with when applying for Environmental Authorisation. A Basic Assessment process must be applied to an application if the authorisation applied for is in respect of an activity(ies) listed in Listing Notice 1 and/ or 3 and an EIA process must be applied to an application if the authorisation applied for is in respect of an activity(ies) listed in Listing Notice 2.

The proposed exploration right application triggers Activity 18 contained in Listing Notice 2 (see Table 2-1), thus a Scoping and EIA process must be undertaken in order for PASA to consider the application in terms of NEMA and make a recommendation to the Minister of Mineral Resources. Rhino Oil and Gas
made application to PASA for environmental authorisation of the ER on 12 October 2015 and this was accepted by PASA on 19 October 2015 (see Appendix 6.1).

### TABLE 2.1: LISTED ACTIVITIES APPLIED FOR AS PART OF THE PROPOSED PROJECT

<table>
<thead>
<tr>
<th>ACTIVITY NO.</th>
<th>ACTIVITY DESCRIPTION</th>
<th>DESCRIPTION OF ACTIVITY IN RELATION TO THE PROPOSED PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Listing Notice 2 GN R984</td>
<td>Any activity including the operation of that activity which requires an Exploration Right as contemplated in Section 79 of the MPRDA, including associated infrastructure, structures and earthworks.</td>
<td>The proposed exploration activities require an Exploration Right and an application has been submitted to PASA. The proposed exploration activities associated with the Exploration Right application are described in Chapter 3.</td>
</tr>
<tr>
<td>N/A</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### 2.4 OTHER LEGISLATION CONSIDERED IN THE PREPARATION OF THE EIR

In accordance with the EIA Regulations 2014, all legislation and guidelines that have been considered in the preparation of the EIR must be documented. Table 2-2 below provides a summary of the applicable legislative context and policy.

### TABLE 2-2: LEGAL FRAMEWORK

<table>
<thead>
<tr>
<th>APPLICABLE LEGISLATION AND GUIDELINES</th>
<th>RELEVANCE OR REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPRDA and associated regulations (GN No. R 527)</td>
<td>Refer to Section 2.2.</td>
</tr>
<tr>
<td>Regulations on Petroleum Exploration and Production (GN R 466, July 2015)</td>
<td>The Regulations augment the MPRDA Regulations, so as to prescribe standards and practices to ensure the safe exploration and production of petroleum. Section 122 of the Regulations prescribes no go areas for wells and hydraulic fracturing sites in relation to water resources. The applicant has not, at this stage proposed any activities to which the Regulations apply.</td>
</tr>
<tr>
<td>Mine Health and Safety Act Regulations (GN R 93 of 1997)</td>
<td>Exploration must be undertaken in terms of the relevant provisions of the Regulations. The applicant has not, at this stage proposed any activities to which the Regulations apply.</td>
</tr>
<tr>
<td>NEMA</td>
<td>Refer to Section 2.3.</td>
</tr>
<tr>
<td>EIA Regulations 2014 (GN No. R982) and Listing Notice 2 (GN No. R984)</td>
<td>Refer to Section 2.3.1. The EIR and EMP report have been compiled in accordance with Appendix 3 and 4 of the EIA Regulations 2014, respectively. Exploration is an activity listed in Listing Notice 2 and therefore requires a Scoping and EIA process to inform the environmental authorisation.</td>
</tr>
<tr>
<td>Listing Notice 1 (GN No. R983), and Listing Notice 3 (GN No. R985)</td>
<td>No other activities are being proposed that trigger the need for an environmental authorisation.</td>
</tr>
<tr>
<td>Financial Provision Regulations, 2015 (GN R No 1147)</td>
<td>These regulations set the requirements for financial provision as contemplated in the Act for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts of prospecting, exploration, mining or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future. See Section 7.6.</td>
</tr>
<tr>
<td>National Environmental Management Waste Act, 2008</td>
<td>NEMWA regulates all aspects of waste management and has an emphasis on waste avoidance and minimisation. NEMWA creates a system for listing</td>
</tr>
<tr>
<td>APPLICABLE LEGISLATION AND GUIDELINES</td>
<td>RELEVANCE OR REFERENCE</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>(No. 59 of 2008) (NEMWA) and associated regulations.</td>
<td>and licensing waste management activities. Listed waste management activities above certain thresholds are subject to a process of impact assessment and licensing. Activities listed in Category A require a Basic Assessment process, while activities listed in Category B require an EIA process. The applicant has not, at this stage proposed any activities that trigger the need for a Waste Management Licence.</td>
</tr>
<tr>
<td>Regulations Regarding the Planning and Management of Residue Stockpiles and Residue Deposits, 2015 (GN R 632).</td>
<td>The applicant has not, at this stage proposed any activities to which the Regulations apply.</td>
</tr>
<tr>
<td>National Environmental Management Air Quality Act, 2004 (No. 57 of 2003) (NEMQA).</td>
<td>The NEMQA regulates all aspects of air quality, including prevention of pollution, providing for national norms and standards and including a requirement for an Atmospheric Emissions Licence for listed activities, which result in atmospheric emissions and have or may have a significant detrimental effect on the environment. In terms of Section 22 no person may conduct a listed activity without an Atmospheric Emissions Licence. The applicant has not, at this stage proposed any activities that trigger the need for an Atmospheric Emissions Licence.</td>
</tr>
<tr>
<td>National Water Act, 1998 (No. 36 of 1989) (NWA)</td>
<td>NWA provides a legal framework for the effective and sustainable management of water resources in South Africa. It serves to protect, use, develop, conserve, manage and control water resources as a whole, promoting the integrated management of water resources with the participation of all stakeholders. This Act also provides national norms and standards, and the requirement for authorisation of uses listed in Section 21. The applicant has not, at this stage proposed any activities that trigger the need for a Water Use Licence.</td>
</tr>
<tr>
<td>Regulations on use of water for mining and related activities aimed at the protection of water resources (GN R704)</td>
<td>These Regulations, promulgated under the NWA, were made in respect of the use of water for mining and related activities, and are aimed at the protection of water resources. Regulation 4 (b) sets out that no person in charge of an activity may &quot;carry on any underground or opencast mining, prospecting or any other operation or activity under or within the 1:50 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, whichever is the greatest. The applicant has not, at this stage proposed any activities to which the Regulations apply.</td>
</tr>
<tr>
<td>General Authorisation for taking water from a resource (GN R 399, 2004)</td>
<td>The General Authorisation permitted in terms of the Schedule replaces the need for a water user to apply for a licence in terms of the National Water Act for the taking or storage of water from a water resource, provided that the taking or storage is within the limits and conditions set out in this authorisation. The GA includes specific limitations for the taking of surface and groundwater per catchment per property. The applicant has not, at this stage proposed any activities to which the General Authorisation applies.</td>
</tr>
<tr>
<td>National Heritage Resources Act, 1999 (No. 25 of 1999) (NHRA)</td>
<td>NHRA provides for the protection of all archaeological and palaeontological sites and meteorites. Under the general protection provisions, no person may alter, demolish, destroy or remove any of these resources without a permit issued by the relevant provincial resources authority. In addition, any person who in the course of an activity discovers archaeological, palaeontological, meteorological material or burial grounds or graves, must immediately cease the activity and notify the responsible heritage resources authority. Section 38 (1) of the Act defines the categories of development for which the responsible heritage resources authority must be notified. Amongst others, under Section 38(c) &quot;any development or other activity which will change the character of a site- (i) exceeding 5 000 m²&quot; the responsible heritage authority must be informed of a development larger than 0.5 ha. The applicant has not, at this stage proposed any activities that trigger the need for heritage permission. However an application has been submitted to the provincial heritage body in order to access the most up to date heritage datasets.</td>
</tr>
<tr>
<td>National Environmental Management and Planning Regs A (NEMPRAA)</td>
<td>NEMPRAA provides for protection and conservation of ecologically viable...</td>
</tr>
</tbody>
</table>
**APPLICABLE LEGISLATION AND GUIDELINES**

| Management: Protected Areas Act, 2003 (No. 57 of 2003) (NEMPRAA) | areas representative of South Africa’s biological diversity and its natural landscapes and seascapes. Section 48 of this Act restricts certain activities (incl. exploration) within protected areas. The ER application area excludes all areas protected in terms of NEMPRAA. |
| National Environmental Management Biodiversity Act (NEMBA) 10 of 2004. | The objectives of NEMBA are to provide for the management and conservation of biological diversity within South Africa. NEMBA does not place any obligations on the proposed exploration. Threatened ecosystems and species of conservation concern, as listed by NEMBA, have been given consideration in the EIA. |
| National Forests Act (No 84 of 1998) | Provides for the sustainable management and development of forests for the benefit of all, including to provide special measures for the protection of certain forests and trees. Licensing is required for the destruction of certain indigenous trees. The applicant has not, at this stage proposed any activities to which the Act applies. |
| Mountain Catchment Areas Act (No 63 of 1970) | Provides for the conservation, use, management and control of land situated in mountain catchment areas. The applicant has not, at this stage proposed any activities to which the Act applies. |
| Spatial-Planning and Land Use Management Act (No. 16 of 2013) | Provides a framework for spatial planning and land use management. Given that no permanent infrastructure is proposed, and therefore no change in land use or the zoning thereof, there is no requirement for approval under this legislation. The applicant has not, at this stage proposed any activities to which the Act applies. |

### 2.5 GUIDELINES AND POLICIES

The guidelines and policies listed below have been taken into account during the EIA.

#### 2.5.1 NEMA PUBLIC PARTICIPATION GUIDELINE

The Department of Environmental Affairs (DEA) published a Public Participation Guideline in the EIA Process Guideline (2010) as part of the Integrated Environmental Management Guideline series. It provides guidance on the procedure and the provisions of the public participation process in terms of NEMA and the EIA Regulations, as well as other relevant legislation.

#### 2.5.2 NEMA NEEDS AND DESIRABILITY GUIDELINE

The Department of Environmental Affairs published a Guideline on Need and Desirability in 2010 as part of the Integrated Environmental Management Guideline Series 9. The guideline has to be read together with the NEMA and the EIA Regulations.

#### 2.5.3 PASA PUBLIC PARTICIPATION GUIDELINE

PASA prepared guidelines for consultation with I&APs (December 2011). PASA developed these guidelines as a tool to assist applicants to undertake a comprehensive consultation process as prescribed by the MPRDA.
2.5.4 MUNICIPAL IDP AND SDF

The Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs) of the Local and District municipalities have been reviewed and relevant details are presented in Section 4.3.3.

2.5.5 STRATEGIC ENVIRONMENTAL ASSESSMENT FOR SHALE GAS DEVELOPMENT

The Department of Environmental Affairs commissioned a Strategic Environmental Assessment (SEA) for shale gas development (SGD) in South Africa to address the lack of evidence with regards to the apparent trade-off required between economic opportunity and environmental protection in potentially developing a large shale gas resource in the Karoo Basin. The SEA has been coordinated by the Council for Scientific and Industrial Research (CSIR). To date (July 2016) the SEA has produced a draft scientific assessment that includes 18 Chapters.

While the SEA has some relevance to the application by Rhino Oil and Gas, there are a number of factors that limit the direct applicability. These include:

- The geographic scope of the SEA is limited to the Central Karoo and is distinct from the Rhino Oil and Gas ER application area geologically and ecologically;
- The SEA is focussed on Shale Gas, and does not consider other conventional or unconventional forms of petroleum;
- The SEA considers impacts associated with the shale gas industry across its entire lifecycle (up to 40 years), and
- The exploration phase (scenario 1) postulated in the SEA includes the full array of techniques that may occur over the life of an exploration project (including those for the exploration, appraisal and development stages), whereas the Rhino Oil and Gas ER application is for early-phase exploration over an initial 3-year period.

The SEA does not include any consideration or assessment of aerial surveys such as FTG.

2.5.6 MINING AND BIODIVERSITY GUIDELINES

The South African National Biodiversity Institute (SANBI) and partners produced a Mining and Biodiversity Guideline (2013) to provide practical guidance to the mining sector on how to address biodiversity issues in the South African context. This guideline provides a tool to facilitate the sustainable development of South Africa’s mineral resources in a way that enables regulators, industry and practitioners to minimise the impact of mining on the country’s biodiversity and ecosystem services.

The Guideline distinguishes between four categories of biodiversity priority areas in relation to their importance from a biodiversity and ecosystem service point of view as well as the implications for mining in these areas. These include areas designated as: 1) Legally Protected, 2) Highest Biodiversity
Importance, 3) High Biodiversity Importance, and 4) Moderate Biodiversity Importance. The ‘Highest Biodiversity Importance’ category is based on the mapped extent of Critically Endangered and Endangered ecosystems, Critical Biodiversity Areas (CBAs), river and wetland Freshwater Ecosystem Priority Areas (FEPAs) with a 1 km buffer and Ramsar sites.

The Guidelines indicates that if the presence of biodiversity features, leading to the categorisation as a ‘Highest Biodiversity Importance’ area, are confirmed then this could be a fatal flaw or pose significant limitations for new mining projects. An environmental assessment should inform whether or not mining is acceptable, including potentially limiting specific types of prospecting or mining which may be deemed not acceptable due to the impact on biodiversity and associated ecosystem services found in the priority area. Mining in such areas may be considered out of place and authorisations may well not be granted. If granted, the authorisation may set limits on allowed activities and methods, the extent thereof and impacts.
3 STUDY METHODOLOGY

This chapter outlines the assessment methodology and I&AP consultation process followed in the EIA process.

3.1 DETAILS OF THE EIA PROJECT TEAM

The details of the EAPs that were involved in the preparation of this EIR are provided in Table 3-1.

### TABLE 3-1: DETAILS OF THE EAP

<table>
<thead>
<tr>
<th>NAME</th>
<th>QUALIFICATIONS</th>
<th>PROFESSIONAL REGISTRATION</th>
<th>EXPERIENCE (YEARS)</th>
<th>TASKS AND ROLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jonathan Crowther</td>
<td>M.Sc. (Env. Sci.), University of Cape Town</td>
<td>Pr.Sci.Nat., CEAPSA</td>
<td>27</td>
<td>Project Director - Report and process review</td>
</tr>
<tr>
<td>Matthew Hemming</td>
<td>M.Sc. (Conservation Biology), University of Cape Town</td>
<td>Member IAIAsa and IWMSA</td>
<td>10</td>
<td>Project Manager - Management of the EIA process, including process review, specialist study review and report compilation</td>
</tr>
<tr>
<td>Stella Moeketse</td>
<td>M.Soc.Sc. (Environmental and Geographical Studies), University of Cape Town</td>
<td>Member IAIAsa</td>
<td>7 years</td>
<td>Public Participation Manager - Management of the public participation process, including I&amp;AP database, notices and communication and assimilation of comments.</td>
</tr>
</tbody>
</table>

SLR has no vested interest in the proposed project other than fair payment for consulting services rendered as part of the EIA process and has declared its independence as required by the EIA Regulations 2014. An undertaking by the EAP is provided in Appendix 3.

3.1.1 Qualifications and Experience of the EAP

Jonathan Crowther is a manager at SLR, has over 27 years of relevant experience and is registered as an environmental assessment practitioner with the interim certification board and as an Environmental Scientist with the South African Council for Natural Scientific Professions (SACNASP). Matthew Hemming holds a Masters Degree in Conservation Biology, has over 10 years of relevant experience in the assessment of impacts associated with mining and exploration operations.

Both Jonathan and Matthew have been involved in multiple impact assessment for large scale mining development in Southern Africa as well as onshore and offshore oil and gas exploration and production.
projects. Proof of registrations of the practitioners is provided in Appendix 4 and relevant curricula vitae are attached in Appendix 5.

3.2 SCOPING PHASE

The Scoping phase complied with the requirements of NEMA and the EIA Regulations 2014, as set out in GN R982. This involved a process of notifying I&APs of the proposed project and EIA process and providing them with the opportunity to make comment in order to ensure that all potential key environmental impacts, including those requiring further investigation, were identified.

The Scoping phase included a pre-application public participation process. Although this is not a legislated requirement of the EIA Regulations 2014, it provided an opportunity to notify I&APs of the proposed project and to raise any initial issues or concerns regarding the proposed exploration activities. The steps/tasks undertaken for public participation during the pre-application and Scoping phases are summarised in Box 4.

The key issues and concerns identified by the project team, with I&AP input, during the Scoping Phase are summarised in Table 3-2. This information provided forms the basis on which the Plan of Study for EIA and terms of reference for specialist studies were determined.

The Scoping Report was accepted by PASA on 10 June 2016 (see Appendix 6.1). PASA’s acceptance of the Scoping Report confirmed that the EIA phase may proceed as outlined in the Plan of Study for EIA as submitted and in accordance with Appendix 4 to the EIA Regulations 2014. Specific conditions to the acceptance prescribed by PASA include the following:

- Ensure that various State Departments be consulted and their comments incorporated in the EIR;
- Identification and consultation with all affected landowners must be carried out;
- Where desktop studies are used the data must be authenticated by physical site assessment by the EAP and specialists; and
- The potential environmental liabilities associated with the proposed activity must be quantified by a specialist and the method of provision must be indicated, in line with the Financial Provision Regulations, 2015 (GN R No 1147).

**BOX 4: Tasks undertaken during the Scoping Phase**

1. Pre-application public participation process

The pre-application public participation process involved the following:

- Competent authority consultation: A pre-application meeting was held with PASA on 31 July 2015. The purpose of the meeting was to discuss the legislative requirements and the approach to the
EIA process to ensure agreement and compliance.

- **Landowner identification**: The applicant identified all properties included as part of the exploration right application (see Appendix 2). The properties included in the application were searched against the Deeds Office records by a land surveyor to identify landowners. Further Deeds Office, CIPRO and other internet searches were undertaken to obtain contact details for land owners. At the time of distribution of this report a minimum of 93% (42 of 45) of the land owners have been notified. This includes 32 of 35 private individuals, all 7 of the Companies / Government entities / Churches and all of the 3Trusts.

- **I&AP identification**: In addition to landowners, a preliminary I&AP database of authorities (including State Departments with jurisdiction in the area, municipal offices, ward councillors and traditional authorities), Organs of State, Non-Governmental Organisations, Community-based Organisations and other key stakeholders (including farmers’ unions) with a potential interest in the ER application was compiled. Additional I&APs were added to the database based on responses to the advertisements and notification letter, and attendees at the Information-sharing Meetings (see bullets below). The database of registered I&APs is included in Appendix 6.2.

  It is recorded that the following State departments, as a minimum, have been notified and afforded opportunity to comment: SAHRA/Provincial Heritage Resources Authority; Provincial Environmental Department, Department of Agriculture, Forestry and Fisheries, Department of Water & Sanitation, Department of Land Affairs, district and local municipalities.

- **Distribution of an initial Background Information Document (BID)**: All identified landowners and I&APs were notified of the application and EIA process by means of a notification letter and BID. The BID (in English and isiZulu) was compiled to provide introductory information on the project, to encourage people to register on the I&APs database and to provide an initial opportunity to comment. The BID was distributed from September 2015.

- **Site notices and advertisements**: Site notices (in English and isiZulu) were placed at multiple locations in Matatiele and a number of rural localities in the ER application area. Press advertisements providing notification of the ER application and EIA process were placed in the following newspapers/ websites:
  > Daily Herald on the 18th of September 2015 in English;
  > Pondo on the 18th of September 2015, in isiXhosa; and
  > East Griqualand Fever in English, Sotho and isiXhosa on 30 October 2015.
  > A notice was placed in the Government Gazette (4 March 2016) in English and Sesotho.

- **Initial information-sharing meetings**: The following information-sharing meetings were held during November 2015:
  > Local leadership (traditional leaders from Matatiele and Elundini Local Municipality) and ward councillors (Matatiele Local Municipality) on 29th of September 2015 at Nokhwezi Community Hall.
Public scoping meeting was held in November 2015 at Nokhwezi Community Hall.

At these meetings Rhino Oil and Gas and SLR provided a basic overview of the project proposal and EIA process, respectively, and provided stakeholders the opportunity to raise any issues or concerns.

BOX 4 cont.

- **Public response:** The response from the public was that the great majority of I&APs are strongly opposed to all forms of oil and gas exploration in the region. There was a demand for additional time within the scoping process to allow for improved public consultation given the large application area and contentious nature of the project.

2. **Project registration**

In October 2015, Rhino Oil and Gas submitted an application for Environmental Authorisation to PASA for the proposed exploration activities and associated listed activity. PASA accepted the application and confirmed that a Scoping and EIA process was required.

3. **Pre-Scoping Report public participation process**

- **Competent authority consultation:** A further meeting was held with PASA in November 2015 to discuss the EIA process and the key issues raised by I&APs. Based on this meeting and subsequent motivation for an extension of time, PASA granted (in December 2015) an extension for the scoping process in order to allow SLR to incorporate further public interaction and investigation to augment the Scoping process.

- **Distribution of a revised BID:** A revised BID (in English, Sesotho and isiXhosa) was distributed for a further comment period from January 2016. The purpose of the BID was to convey information on the proposed project, to invite I&APs to register on the project database and to provide a further opportunity to comment.

- **Follow-up information-sharing meetings:** Follow-up information-sharing meetings were held during January 2016. These meetings included:
  > Ward councilors of the included areas of the Elundini Local Municipality in January 2016.
  > Council meeting of the Matatiele Local Municipality in January 2016;
  > Meetings with the Amahlubi, Moshesh and Sibi Traditional Authorities in January 2016.

  Chief Lebenya was not available.

  As for the previous meetings, Rhino Oil and Gas and SLR provided a basic overview of the project proposal and EIA process, respectively, and provided stakeholders the opportunity to raise any issues or concerns regarding the proposed project.

4. **Compilation and review of Scoping Report**

A Scoping Report was prepared in compliance with Appendix 2 of the EIA Regulations 2014 and was informed by comments received during the initial public participation process. The Scoping Report was initially distributed for a 30-day review and comment period from 21 October 2015.
After the time extension a revised Scoping Report was distributed for a 30-day review and comment period from 7 March 2016. Tasks that were undertaken included:

- **Scoping Report availability:** Copies of the Scoping Report were made available on the SLR ftp site and at the following locations for the duration of the review and comment period:
  > Matatiele Public Library
  > Maclear Public Library
  > Elundini Municipality: Public Library
  > Maluti Magistrate's Court

  Copies of the Scoping Report were sent directly to a number of key stakeholders, including the four Traditional Authority Chiefs, the UCPP and various other commenting authorities.

- **I&AP notification:** A notification letter was sent to all I&APs registered on the project database. The letter informed them of the release of the Scoping Report and where the report could be reviewed. To facilitate the commenting process, a copy of the Executive Summary and a Comment Form were enclosed with each letter.

**BOX 4 cont.**

- **Radio notice:** Project notifications were aired on the Alfred Nzo Community Radio Station (in both Xhosa and Sotho) during the period 8 to 10 March 2016. There were 15 airings per day at different time slots over the three day period. The notice provided introductory information on the application and EIA process; provided details of how to contact SLR for further information and informed I&APs of the Scoping Report availability.

5. **Revise Scoping Report and submission to PASA for acceptance**

The preparation of the final Scoping Report was informed by comments received on the draft report. All comments were collated and responded to in an updated Comments and Responses Table, which was appended to the Scoping Report. As indicated in Section 2.3.4, the Scoping Report was accepted by PASA on 10 June 2016 (see Appendix 6.1).

**Note:** Copies of all supporting documents and inputs received during the public participation conducted during the Scoping phase were included with the Scoping Report (up to 22 April 2016). Copies of these documents have not been provided in the EIR.

All relevant supporting documents and inputs received post submission of the Scoping Report are included in the EIR.
### TABLE 3-2: KEY ISSUES IDENTIFIED DURING THE SCOPING PHASE

<table>
<thead>
<tr>
<th>Key issues identified by the project team, with I&amp;APs input</th>
<th>Indication of the manner in which the issues were incorporated, or the reasons for not including them</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3. Procedural Issues</strong></td>
<td></td>
</tr>
<tr>
<td>There is strong opposition to the proposed exploration right application. The major themes of the public opposition are the following:</td>
<td>The level of public opposition to the project has been documented in the Scoping and EIA Reports. Where people have registered their opposition to the project, this has been recorded. All objections received have been recorded. The EIA report has attempted to present accurate project information and a realistic assessment of impacts in order that I&amp;APs can make an informed judgement.</td>
</tr>
<tr>
<td>- Concern, even fear, of the future risks that might arise from production should a resource be found;</td>
<td>Applications for mineral rights are made in terms of the MPRDA through a regulated process (Section 79 for exploration rights). The decision requirements in the legislation include that the applicant must have financial resources and the technical ability, Rhino Oil and Gas maintain that they comply with these requirements. It is evident that much of the opposition is not directly against the merits of exploration activities as proposed, but rather against the anticipated outcome and risks that, if successful, could result from exploration. No attempt has been made to address issues and objections that are based on concerns that relating to further exploration or future production activities.</td>
</tr>
<tr>
<td>- Concern that given the money involved, if any hydrocarbon resource is found, it will not be possible to stop production regardless of what the future EIA processes may indicate in terms of risk. Thus the only way to avoid such risks is to not open the door to such projects;</td>
<td>NEMA does not specifically provide a mechanism to address objections raised in the EIA process. Under the MPRDA unresolved objections would be table before the Regional Mining Development and Environmental Committee.</td>
</tr>
<tr>
<td>- Hydrocarbon based energy is a flawed concept and countries are moving away from new hydrocarbons in favour of a renewable energy system;</td>
<td></td>
</tr>
<tr>
<td>- A deep mistrust of government institutions and the true motives and people behind such an application;</td>
<td></td>
</tr>
<tr>
<td>- Significant doubt over government’s ability to enforce compliance to the legislation;</td>
<td></td>
</tr>
<tr>
<td>- South Africa does not understand unconventional hydrocarbon extraction risks and the necessary legislative framework to protect the environment is not in place; and</td>
<td></td>
</tr>
<tr>
<td>- Lack of understanding of how an exploration programme is undertaken and what is actually being authorised.</td>
<td></td>
</tr>
<tr>
<td>Numerous objections have been made to the project and EIA process.</td>
<td></td>
</tr>
<tr>
<td>The EIA should assess the potential future exploration and production related impacts (including hydraulic fracturing)</td>
<td>The scope of the EIA is aligned with the early-phase exploration as proposed by Rhino Oil and Gas. Should Rhino Oil and Gas propose to conduct exploration activities outside of this scope, this would need to be informed by a further application to PASA and a separate environmental assessment and authorisation process.</td>
</tr>
<tr>
<td>The Strategic Environmental Assessment (SEA) for Shale Gas Development in the Karoo should be extended to cover this area/application or at least inform current EIA process. Or the findings of the SEA applied to this EIA</td>
<td>The scope and terms of the SEA were finalized by the DEA and is limited to Shale Gas Development in the geographic Karoo. Refer to section 2.5.5.</td>
</tr>
<tr>
<td>Time available for I&amp;AP consultation and participation is insufficient;</td>
<td>An extension of time for public consultation in the Scoping phase was secured.</td>
</tr>
<tr>
<td>The adequacy of the public participation process / methodology was challenged, particularly with regards informing rural communities.</td>
<td>Additional efforts were undertaken in order to address this. Refer to section 5.2 of the Scoping report as well as Box 4 in the EIA.</td>
</tr>
<tr>
<td>Protected area or other areas incompatible with exploration should be excluded. Cognisance should be given to restrictions imposed by legislation and regulation, particularly the Petroleum Regulations</td>
<td>The extent of the proposed ER has been adjusted to exclude protected areas. The scope of the EIA is aligned with the early-phase exploration as proposed by Rhino Oil and Gas. Restrictions relating to future exploration or production activities have not been detailed in this EIA.</td>
</tr>
</tbody>
</table>

*SLR Project 723.18034.00005*  
*Rhino Oil and Gas - Exploration Right Application: EIA and EMP report*  
*September 2016*
Provide a detailed baseline description of the affected environment, desktop assessment is not adequate. Refer to Section 5 of the EIR. The large size of the application area, information constraints of the exploration process and the nature of the early-phase exploration did not allow for, nor warrant, detailed baseline assessments of the whole application area. However, it is noted that the databases that were utilized generally have good coverage, providing adequately accurate representation of the field conditions.

Confirm the location of the exploration sites and assess impacts at these sites. The nature of exploration is such that the applicant cannot confirm the location of core hole drilling sites or seismic survey routes until the initial exploration has provided results. Rhino Oil and Gas excluded the core hole drilling and seismic surveying from the proposed ‘early-phase exploration’ work for which they are seeking environmental authorisation. The current focus of the application for environmental authorisation and this EIA is now only on remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey). Refer to section 4.5.1.

### 4. Potential Impacts of the Proposed Exploration

#### Impact on Ecology
- Loss of or disturbance to vegetation and fauna habitats
- Disturbance to and mortality of fauna
- Enabling the establishment of alien and invasive species in disturbed areas

#### Impact on Groundwater
- Altered hydrogeological regime and groundwater availability
- Contamination of groundwater resources
- Water consumption

#### Impacts on Surface Water
- Altered surface water hydrological regime
- Contamination of surface water resources
- Water consumption

#### Impacts on Geology
- Destabilisation of certain geologies
- Risk to underground caverns or mine workings

#### Impact on Soils
- Physical impact on soils (increased erosion / compaction)
- Potential contamination of soils

#### Impact on Heritage Resources

#### Impact on Land Tenure and Access to Private Property

#### Impact on Current Land Uses

#### Structural Damage to Infrastructure

The potential impacts of core hole drilling and seismic surveys have not been assessed in this EIA as they do not form part of the proposed ‘early-phase exploration’ work for which Rhino Oil and Gas are seeking environmental authorisation. See Section 4.5.1. The aerial FTG surveys (see Section 4.5.5) included as part of the proposed ‘early-phase exploration’ would result in almost no interaction with the ground over which the survey is undertaken. Thus impacts on the majority environmental aspects could not occur. For this reason the issues were not considered further.
<table>
<thead>
<tr>
<th>Impact on ambient air quality</th>
<th>Safety and security</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Structural damage to infrastructure due to shock waves, air overpressure and ground vibration</td>
<td>&gt; Public safety due to inter alia, increased traffic volumes, heavy machinery, explosives, hazardous materials, release of gas, etc.</td>
</tr>
<tr>
<td>&gt; Degradation or damage due to exploration vehicles and equipment</td>
<td>&gt; Fires</td>
</tr>
<tr>
<td>&gt; Dust and vehicle emissions</td>
<td>&gt; Landowner security</td>
</tr>
<tr>
<td>&gt; Escape or release of gas from exploration boreholes</td>
<td></td>
</tr>
</tbody>
</table>

**Impact on ambient noise levels**  
Refer to Section 6.1
3.3 EIA PHASE

3.3.1 EIA OBJECTIVES

In accordance with Appendix 3 of GN. R982, the objectives of the EIA are to:

- identify the relevant policies and legislation relevant to the activity;
- present the need and desirability of the proposed activity and its preferred location;
- identify feasible alternatives related to the project proposal;
- ensure that all potential key environmental issues and impacts that would result from the proposed project are identified;
- provide a reasonable opportunity for I&APs to be involved in the EIA process;
- assess potential impacts of the proposed project alternatives during the different phases of project development;
- present appropriate mitigation or optimisation measures to minimise potential impacts or enhance potential benefits, respectively; and
- through the above, to ensure informed, transparent and accountable decision-making by the relevant authorities.

The EIA process consists of a series of steps to ensure compliance with these objectives and the EIA Regulations 2014 as set out in GN No. R982. The process involves an open, participatory approach to ensure that all impacts are identified and that decision-making takes place in an informed, transparent and accountable manner. A flowchart indicating the legislated EIA process is presented in Figure 3-1.

This EIR has been prepared in compliance with Appendix 3 of the EIA Regulations 2014 (see Table 2-5). The report aims to present all information in a clear and understandable format, suitable for easy interpretation by I&APs and authorities, and to provide an opportunity for I&APs to comment on the proposed project and findings of the EIA process.

3.3.2 ASSUMPTIONS AND LIMITATIONS

The assumptions and limitations pertaining to this EIA are listed below:

- The assessment assumes that SLR has been provided with all relevant project information and that it was correct and valid at the time it was provided;
- The assessment is based, to some extent, on a generic description of the proposed exploration activities, as specific details would be dependent on the specific contractor employed to undertake each activity. However, it is assumed that parameters provided (or range thereof) are equivalent to the actual activity;
There will be no significant changes to the project description or surrounding environment between the completion of the EIA process and implementation of the proposed project that could substantially influence findings, recommendations with respect to mitigation and management, etc.;

The Public Participation Process has been undertaken in terms of Chapter 6 of the EIA Regulations 2014. Refer to Box 4;

As a result of large number of landowners and occupiers in the application area and the availability of accurate title deed, land owner and occupier contact information, identification of and consultation with every owner of and occupier at included properties was not achieved. A minimum of 93% of land owners have been notified. Much effort was made to make potentially affected parties aware through various other means (Refer to Box 4);

The large size of the application area, information constraints of the exploration process and the nature of the early-phase exploration did not allow for, nor warrant, detailed baseline assessments of the whole application area. However, it is noted that the databases that were utilised generally have good coverage, providing adequately accurate representation of the field conditions.

The exact extent of the Malekgalonyane (Ongeluksnek) Nature Reserve is uncertain as the cadastral descriptions taken from the National and Provincial databases are inconsistent.

Although PASA required, in their conditions of acceptance of the Scoping Report, the undertaking of physical site assessments to authenticate data used in the EIA, this has not been undertaken. With the exclusion of core hole drilling and seismic survey activities from the scope of the proposed exploration activities, and thus the scope of the EIA there was no merit in undertaking such work. For any future ground-based exploration activities detailed investigations of target sites will need to be undertaken during the environmental assessment and authorisation application process.

Negotiations with landowners with respect to agreements for access to land to conduct exploration falls outside of the scope of this EIA and will be undertaken by the applicant during the proposed exploration programme.
FIGURE 3-1: FLOW DIAGRAM SHOWING THE SCOPING AND EIA PROCESS (INCLUDING PRE-APPLICATION PHASE)
3.3.3 SPECIALIST STUDIES

As per the Plan of Study for EIA presented in the Scoping Report, six specialist studies were commissioned to inform this EIA. Their work was desktop based, interrogating the respective databases available for the environmental attributes, because of the large extent of the ER application area and the fact the locations for core holes and seismic surveys could not be determined at this stage in the exploration programme.

However, with the exclusion of core hole drilling and seismic survey activities from the scope of the EIA (see Section 4.5.1) these studies are no longer applicable, and the studies were not completed nor used to inform the EIA. Detailed investigations of target sites would need to be undertaken during the environmental assessment and authorisation application process for future ground-based exploration activities.

3.3.4 IMPACT ASSESSMENT METHOD

The identification and assessment of environmental impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with the proposed project. The process involves consideration of, inter alia: the purpose and need for the project; views and concerns of I&APs; social and political norms, and general public interest.

Identified impacts are described in terms of the nature of the impact, compliance with legislation and accepted standards, receptor sensitivity and the significance of the predicted environmental change (before and after mitigation). The significance of environmental impacts is rated before and after the implementation of mitigation measures. These mitigation measures may be existing measures or additional measures that were identified through the impact assessment and associated specialist input. The impact rating system considers the confidence level that can be placed on the successful implementation of mitigation. The method for the assessment of environmental impacts is set out in the table below. This assessment methodology considers the following rating scales when assessing potential impacts (before and after mitigation):

- consequence, which is a function of:
  - the intensity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources);
  - the extent of the impact;
  - the duration of the impact;
- probability of the impact occurring;
- reversibility of the impact; and
- the degree to which the impact can be mitigated.
TABLE 3-3: CRITERIA FOR ASSESSING IMPACTS

Note: Part A provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D.

<table>
<thead>
<tr>
<th>PART A: DEFINITION AND CRITERIA</th>
<th>Definition of SIGNIFICANCE</th>
<th>Significance = consequence x probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of CONSEQUENCE</td>
<td>Consequence is a function of intensity, spatial extent and duration</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria for ranking of the INTENSITY of environmental impacts</th>
<th>VH</th>
<th>H</th>
<th>M</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe change, disturbance or degradation. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required. Vigorous/widespread community mobilization against project can be expected. May result in legal action if impact occurs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prominent change, disturbance or degradation. Associated with real and substantial consequences. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Will definitely require intervention. Threats of community action. Regular complaints can be expected when the impact takes place.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate change, disturbance or discomfort. Associated with real but not substantial consequences. Targets, limits and thresholds of concern may occasionally be exceeded. Likely to require some intervention. Occasional complaints can be expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor (Slight) change, disturbance or nuisance. Associated with minor consequences or deterioration. Targets, limits and thresholds of concern rarely exceeded. Require only minor interventions or clean-up actions. Sporadic complaints could be expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negligible change, disturbance or nuisance. Associated with very minor consequences or deterioration. Targets, limits and thresholds of concern never exceeded. No interventions or clean-up actions required. No complaints anticipated.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negligible change or improvement. Almost no benefits. Change not measurable/will remain in the current range.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor change or improvement. Minor benefits. Change not measurable/will remain in the current range. Few people will experience benefits.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than the current conditions. Small number of people will experience benefits.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substantial, large-scale change or improvement. Considerable and widespread benefit. Will be much better than the current conditions. Favourable publicity and/or widespread support expected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria for ranking the DURATION of impacts</th>
<th>VL</th>
<th>L</th>
<th>M</th>
<th>H</th>
<th>VH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very short, a few days or always less than a month.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-term, occurs for more than a month, but less than 1 year.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium-term, 1 to 3 years.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long term, between 3 and 10 years.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very long, permanent, +10 years (Irreversible. Beyond closure)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria for ranking the EXTENT of impacts</th>
<th>VL</th>
<th>L</th>
<th>M</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>A portion of the site.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole site.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beyond the site boundary, affecting immediate neighbours</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local area, extending far beyond site boundary.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional/National</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PART B: DETERMINING CONSEQUENCE</th>
<th>INTENSITY = VL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DURATION</td>
<td>Very long</td>
</tr>
<tr>
<td>Long term</td>
<td>H</td>
</tr>
<tr>
<td>Medium term</td>
<td>M</td>
</tr>
<tr>
<td>Short term</td>
<td>L</td>
</tr>
<tr>
<td>Very short</td>
<td>VL</td>
</tr>
</tbody>
</table>

SLR Project 723.18034.00005 Rhino Oil and Gas - Exploration Right Application: EIA and EMP report No.3 September 2016
### INTENSITY = L

<table>
<thead>
<tr>
<th>DURATION</th>
<th>Very long</th>
<th>VH</th>
<th>Medium</th>
<th>High</th>
<th>High</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long term</td>
<td>H</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Medium term</td>
<td>M</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Short term</td>
<td>L</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>

### INTENSITY = M

<table>
<thead>
<tr>
<th>DURATION</th>
<th>Very long</th>
<th>VH</th>
<th>Medium</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long term</td>
<td>H</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td>Medium term</td>
<td>M</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td>Short term</td>
<td>L</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Very High</td>
</tr>
</tbody>
</table>

### INTENSITY = H

<table>
<thead>
<tr>
<th>DURATION</th>
<th>Very long</th>
<th>VH</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>Very High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long term</td>
<td>H</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Very High</td>
<td>Very High</td>
<td></td>
</tr>
<tr>
<td>Medium term</td>
<td>M</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Very High</td>
<td>Very High</td>
<td></td>
</tr>
<tr>
<td>Short term</td>
<td>L</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Very High</td>
</tr>
</tbody>
</table>

### INTENSITY = VH

<table>
<thead>
<tr>
<th>DURATION</th>
<th>Very long</th>
<th>VH</th>
<th>High</th>
<th>High</th>
<th>Very High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long term</td>
<td>H</td>
<td>High</td>
<td>High</td>
<td>Very High</td>
<td>Very High</td>
<td></td>
</tr>
</tbody>
</table>

#### EXTENT

- **A portion of the site**
- **Whole site**
- **Beyond the site boundary, affecting immediate neighbours**
- **Local area, extending far beyond site boundary.**
- **Regional/National**

### PART C: DETERMINING SIGNIFICANCE

<table>
<thead>
<tr>
<th>PROBABILITY (of exposure to impacts)</th>
<th>Definite/Continuous</th>
<th>VH</th>
<th>Medium</th>
<th>High</th>
<th>Very High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probable</td>
<td>H</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Very High</td>
<td></td>
</tr>
<tr>
<td>Possible/frequent</td>
<td>M</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td>Conceivable</td>
<td>L</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Unlikely/improbable</td>
<td>VL</td>
<td>Very low</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
</tbody>
</table>

### PART D: INTERPRETATION OF SIGNIFICANCE

<table>
<thead>
<tr>
<th>Significance</th>
<th>Decision guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Very High</strong></td>
<td>Potential fatal flaw unless mitigated to lower significance.</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>It must have an influence on the decision. Substantial mitigation will be required.</td>
</tr>
<tr>
<td><strong>Medium</strong></td>
<td>It should have an influence on the decision. Mitigation will be required.</td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>Unlikely that it will have a real influence on the decision. Limited mitigation is likely to be required.</td>
</tr>
<tr>
<td><strong>Very Low</strong></td>
<td>It will not have an influence on the decision. Does not require any mitigation</td>
</tr>
</tbody>
</table>

*VH = very high, H = high, M = medium, L = low and VL = very low and + denotes a positive impact.*
3.3.5 Way forward in the EIA process

The following steps are envisaged for the remainder of the EIA process (see Figure 2.1):

- notification to I&APs and commenting authorities of the change in scope, availability of the EIR for review and public meetings;
- host public meeting/open day (August 24th in Matatiele);
- key stakeholder meetings (Moshoeshoe, Sibi, Amahlubi and Lebenya Traditional Authorities);
- after closure of the EIR comment period (refer to Section 1.5), all comments received will be incorporated and responded to in a Comments and Responses Report. The EIR will then be updated into a final report, to which the Comments and Responses Report will be appended;
- the revised EIR will be submitted to PASA for consideration and decision-making by the Minister of Mineral Resources (or delegated authority);
- after the Minister of Mineral Resources (or delegated authority) has reached a decision on the environmental authorisation, all I&APs on the project database will be notified of the outcome of the application and the reasons for the decision; and
- a statutory appeal period in terms of the National Appeal Regulations, 2014 (GN No. R993) will follow the issuing of the decision.
TABLE 3-4: REQUIREMENTS OF AN EIR IN TERMS OF THE EIA REGULATIONS 2014

<table>
<thead>
<tr>
<th>APPENDIX 3</th>
<th>CONTENT OF AN EIR</th>
<th>COMPLETED (Y/N OR N/A)</th>
<th>LOCATION IN REPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(a)</td>
<td>(i &amp; ii) Details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the report.</td>
<td>Y</td>
<td>3.1</td>
</tr>
<tr>
<td>(b)</td>
<td>The location of the activity, including:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(i) The 21 digit Surveyor General code of each cadastral land parcel;</td>
<td>Y</td>
<td>Appendix 1</td>
</tr>
<tr>
<td></td>
<td>(ii) Where available, the physical address and farm name; and</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(iii) Where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c)</td>
<td>A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is:</td>
<td>N</td>
<td>Refer to Section 4.5.1</td>
</tr>
<tr>
<td></td>
<td>(i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>(d)</td>
<td>A description of the scope of the proposed activity, including:</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(i) All listed and specified activities triggered and being applied for;</td>
<td>Y</td>
<td>Section 1.4</td>
</tr>
<tr>
<td></td>
<td>(ii) A description of the associated structures and infrastructure related to the development.</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>(e)</td>
<td>A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.</td>
<td>Y</td>
<td>Section 2</td>
</tr>
<tr>
<td>(f)</td>
<td>A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.</td>
<td>Y</td>
<td>Section 4.3</td>
</tr>
<tr>
<td>(g)</td>
<td>A motivation for the preferred development footprint within the approved site.</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>(h)</td>
<td>A full description of the process followed to reach the proposed development footprint within the approved site, including:</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(i) Details of the development footprint alternatives considered;</td>
<td></td>
<td>Section 4.7</td>
</tr>
<tr>
<td></td>
<td>(ii) Details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;</td>
<td></td>
<td>Box 4</td>
</tr>
<tr>
<td></td>
<td>(iii) A summary of the issues raised by I&amp;APs, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;</td>
<td></td>
<td>Table 3-2</td>
</tr>
<tr>
<td></td>
<td>(iv) The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>(v)</td>
<td>The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts:</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(aa) can be reversed;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(bb) may cause irreplaceable loss of resources; and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(cc) can be avoided, managed or mitigated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi)</td>
<td>The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;</td>
<td></td>
<td>Section 3.3.5</td>
</tr>
<tr>
<td>(vii)</td>
<td>Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>(viii)</td>
<td>The possible mitigation measures that could be applied and level of residual risk;</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>(ix)</td>
<td>If no alternative development locations for the activity were investigated, the motivation for not considering such;</td>
<td>NA</td>
<td>Section 4.7</td>
</tr>
<tr>
<td>(x)</td>
<td>A concluding statement indicating the preferred alternative development location within the approved site:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>A full description of the process undertaken to identify, assess and rank the impacts the activity and associated infrastructure will impose on the</td>
<td>Y</td>
<td>3.3.49-3.49.3.8</td>
</tr>
</tbody>
</table>

SLR Project 723.18034.00005 Rhino Oil and Gas - Exploration Right Application: EIA and EMP report September 2016
<table>
<thead>
<tr>
<th>APPENDIX 3</th>
<th>CONTENT OF AN EIR</th>
<th>COMPLETED (Y/N OR N/A)</th>
<th>LOCATION IN REPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>preferred location through the life of the activity, including:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) A description of all environmental issues and risks that were identified during the EIA process; and</td>
<td>Y</td>
<td>Table 3-2</td>
<td></td>
</tr>
<tr>
<td>(ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.</td>
<td>Y</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>(i) An assessment of each identified significant impact and risk, including:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Cumulative impacts;</td>
<td>Y</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>(ii) The nature, significance and consequence of the impact and risk;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) The extent and duration of the impact and risk;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) The probability of the impact occurring;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) The degree to which the impact and risk can be reversed;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vii) The degree to which the impact and risk can be mitigated.</td>
<td>Y</td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td>(k) Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.</td>
<td>Y</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td>(l) An environmental impact statement which contains:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) A summary of the key findings of the EIA;</td>
<td>Y</td>
<td>7.2.1</td>
<td></td>
</tr>
<tr>
<td>(ii) A map at an appropriate scale which superimposes the activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) A summary of the positive and negative impacts of the proposed activity and identified alternatives.</td>
<td>Y</td>
<td>7.2.2</td>
<td></td>
</tr>
<tr>
<td>(m) Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.</td>
<td>Y</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>(n) The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.</td>
<td>Y</td>
<td>7.4</td>
<td></td>
</tr>
<tr>
<td>(o) Any aspects which were conditional to the findings of the assessment either by the EAP or at the discretion of a PAs which are to be included as conditions of authorisation.</td>
<td>Y</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>(p) A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.</td>
<td>Y</td>
<td>Section 3.3.2</td>
<td></td>
</tr>
<tr>
<td>(q) A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.</td>
<td>Y</td>
<td>Section 7.5</td>
<td></td>
</tr>
<tr>
<td>(r) Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised.</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(s) An undertaking under oath or affirmation by the EAP in relation:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) The correctness of the information provided in the report;</td>
<td>Y</td>
<td>Appendix 3</td>
<td></td>
</tr>
<tr>
<td>(ii) The inclusion of comments and inputs from stakeholders and I&amp;APs;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) Any information provided by the EAP to I&amp;APs and any responses by the EAP to comments or inputs made by I&amp;APs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPENDIX 3</td>
<td>CONTENT OF AN EIR</td>
<td>COMPLETED (Y/N OR N/A)</td>
<td>LOCATION IN REPORT</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------</td>
<td>------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>(l)</td>
<td>Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.</td>
<td>Y</td>
<td>Section 7.6</td>
</tr>
</tbody>
</table>
| (u) | An indication of any deviation from the approved Scoping Report, including the plan of study, including:  
   (i) Any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and  
   (ii) A motivation for the deviation. | Y | Section 7.7 |
| (v) | Any specific information that may be required by the competent authority.  
   PASA listed information requirements in their Letter of Acceptance of the Scoping Report. Information included:  
   1. Consultation with various State Departments | Y | Box 4 |
| | 2. Identification and consultation with all affected landowners | Y | Box 4 |
| | 3. Physical site assessment to authenticate data derived from desktop studies | Y | Section 3.3.5 |
| | 4. Financial Provision in terms of the Regulations | Y | Section 7.6 |
| (m) | Any other matter required in terms of section 24(4)(a) and (b) of the Act. | NA |
3.3.6 COMMENTS FROM I&APs

Relatively few comments have been received from I&APs since the review period of the Scoping Report. All comments received subsequent to the completion of the Scoping Report and prior to the distribution of the EIR are recorded in Appendix 6.3. The comments and the EAP responses thereto are summarised in Table 3-6.

### BOX 5: Tasks undertaken during the EIR Review Phase

The EIR was completed and distributed (hand delivery or courier) to the locations detailed in Table 1-2 on or before 11 August 2016. Copies of the report were made available for download from the SLR website.

1. **Notice To I&APs of Scoping Report Acceptance**

A notification letter was sent to all I&APs registered on the project database (by email, fax or post) on 14 June 2016. The letter informed them of PASA’s acceptance of the Scoping Report and advised that the EIA would continue in terms of the Plan of Study for EIA and PASA’s acceptance conditions. I&APs who requested it were provided with a copy of the final Scoping Report as submitted to PASA.

2. **Notice to I&APs of Scope Changes, EIR review and Public Feedback meeting**

A notification letter was sent to all I&APs registered on the project database (by email, fax or post) on 5 August 2016. The letter informed them of the release of the Environmental Impact Report (from 12 August) and advised where the report could be reviewed. The letter also contained an update on the scope changes as well as an invitation to the public feedback meeting to be held in Matatiele. To facilitate the commenting process, a copy of the Executive Summary of the EIR was enclosed with each letter. An electronic copy of the EIR or executive summary (in English, Sesotho or isiXhosa) was posted or emailed to I&APs on request.

An advertisement was published in the East Griqualand Fever on 5 August 2016 giving notice of the availability of the EIR for review; an update on the scope changes and inviting the public to the EIA open day and feedback meeting.

3. **Public Feedback Meetings**

An open day and public feedback meeting were held at the Nokwezi Community Hall in Matatiele on the 24th of August 2016. Members of the SLR and Rhino teams were available at the open day to answer questions. No I&APs attended the open day.

The public feedback meeting was attended by approximately 37 I&APs. A presentation was made on the Scoping and EIA process for the Exploration Right application, including the results of the impact
assessment. The issues that were raised by I&APs in the meeting and the responses given are documented in the minutes of the meeting (see Appendix 6.3). These comments have also been documented in the Comments and Response table (see Table 3-5 below).

4. Stakeholder Feedback Meetings

Stakeholder feedback meetings were also arranged with the Matatiele and Elundini Local Municipalities as well as with the Chiefs of the affected communities (including the Bakoena, Amahlubi and Mahlakoana).

Box 5 cont.

The schedule for the stakeholder feedback meetings was as follows:

<table>
<thead>
<tr>
<th>Traditional Authority/ Council</th>
<th>Location</th>
<th>Date</th>
<th>*</th>
</tr>
</thead>
</table>
| Moshoeshoe Traditional Authority/ Council | Queen's Mercy | Monday | *
| Sibo Traditional Authority/ Council | Traditional Offices and Community Hall | Tuesday | 10h00 |
| Matatiele Local and District Municipalities and General Councillor | Municipal Boardroom or Council Chambers | Tuesday | 14h00 |
| Matatiele Public Meeting | Nokwezi Community Hall | Wednesday | Open day from 13h00 Meeting from 15h00 |
| Elundini Local and District Municipalities and General Councillor | Municipal Boardroom or Council Chambers | Thursday | 09h00 |
| Amahlubi Traditional Authority/ Council | Traditional Offices and Community Hall | Thursday | 12h00 |
| Lebenya Traditional Authority/ Council | Skobong | Friday | 09h00 |

* Chief Moshoeshoe and his council declined to attend the feedback meeting despite arrangements having been confirmed.

A presentation was made on the Scoping and EIA process for the Exploration Right application, including the results of the impact assessment. The issues that were raised in the meetings and the responses given are documented in the minutes of the meetings (see Appendix 6.3). These comments have also been documented in the Comments and Response table (see Table 3-5 below).

SLR was advised of a 5th potential Traditional Authority during the EIA process. It is understood that Mr Tyali is an acting Chief and not officially appointed. No direct consultation has been undertaken with Mt Tyali.

5. Receipt of I&AP comments

Comments on the EIR were received from I&APs through electronic and written submissions as well as through the question and answer session held at each feedback meeting. All comments were collated and responded to in an updated Comments and Responses Table (Table 3-5). Copies of all comments
6. **Revise Environmental Impact Report and submission to PASA for decision making**

The preparation of the final Environmental Impact Report was informed by comments received on the draft report.
3.4 COMMENTS ON THE EIR

The Table below provides a summary of the issues and concerns raised by I&APs on the review of the Environmental Impact Report. These have been received through completed response forms and direct submission, as well as from the minutes of the feedback meetings. Also included in the Table are responses to the question or issue. Where necessary the issue or concern was carried through into the content of the Environmental Impact Report. Copies of all written comments received from I&APs are included in Appendix 6.3.

It is noted that comments continue to be received from I&APs. Those that were received after the (20 September 2016) are not included in this report but will be forwarded to PASA as and when received.

TABLE 3-5: COMMENTS AND RESPONSE SPECIFICALLY ON REVIEW OF THE EIR
(as received up to 20 September 2016)

<table>
<thead>
<tr>
<th>No.</th>
<th>Categories</th>
<th>Procedural Related Issues: Process</th>
<th>Names, mode of communication and date</th>
<th>Response provided (as adapted for the purpose of the scoping report)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.1.1</td>
<td>Regulatory Authorities Comments</td>
<td>Tebogo Motloung, PASA, Email, 13 September 2016</td>
<td>Thank you for the comments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The draft EIR and EMPr received by this office on 11 August 2016 refer.</td>
<td></td>
<td>The EIR has been updated to reflect the information available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attached is a letter with comments on the draft Environmental Impact Report and Environmental Management Programme for your consideration.</td>
<td></td>
<td>The exclusion of the Malekgalonyane (Ongelusnek) Nature Reserve has resulted in some challenges to defining the included properties as various organisations (PASA, SANBI and ECPTA) have different interpretations of the cadastral boundary of the Malekgalonyane (Ongelusnek) Nature Reserve. The most recent version has been provided to the applicant’s surveyors to confirm the properties included in the ER application area and such will be provided to PASA once completed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The agency has undertaken the review of the submitted document and would like to bring the following to your attention:</td>
<td></td>
<td>All comments received from I&amp;APs during the DEIR comment period (of which the public and stakeholder feedback meetings formed part of), and up until 14 September 2016 are included in</td>
</tr>
<tr>
<td>1.2.1 Commenting Authorities</td>
<td>Shané October on behalf of Eastern Cape Parks and Tourism Agency, Email, 08 August 2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td>A shapefile of the revised ER application area was provided to the Eastern Cape Parks and Tourism Agency.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our telecom of earlier refers.</td>
<td>The ER area has been adjusted to exclude the protected areas (as per Section 48 of the NEMPAA) which we are aware of. As discussed, we have noted variability in which properties are proclaimed as part of the Malekgalonyane (Ongeluksnek) Nature Reserve. The various sources from BGIS, PASA and ECPTA have differences, which make accurate representation difficult.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have noted that the EIA application has been amended to exclude Malekgalonyane (Ongeluksnek) Nature Reserve from the study area. However, it seems like the amended application area is bordering ONR's boundary. As discussed, can you please forward us a shapefile or similar file of the project area so that we can confirm the proximity of the amended project area to ONR?</td>
<td>If you could provide a SLR with a correct shapefile based on the ONR proclamation that would be most helpful. We can then advise the applicant to update the ER application area appropriately.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The ER application area is directly adjacent to the Malekgalonyane (Ongeluksnek) Nature Reserve boundary. Given that only remote survey techniques are included there will be no effect on the ground surface within 5km of the ONR. Does the Malekgalonyane (Ongeluksnek) Nature Reserve have a management plan which we could review for the buffer zone policies? (SLR, Email, 15 August 2016).</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.2.2 Please find attached shapefile for ONR as well as a list of all the farms within the Nature Reserve’s boundaries. The coordinate reference system is EPSG:4326 - WGS 84.</th>
<th>Shané October on behalf of Eastern Cape Parks and Tourism Agency, Email, 12 September 2016</th>
</tr>
</thead>
</table>
| | ECPTA provided a shapefile of the ONR to SLR. This delineation of the ONR was different from the data available on BGIS or held by PASA. The ECPTA version was provided to Rhino Oil and Gas for their surveyors to redraw the plan of the ER application area. This will be provided to PASA.

---

SLR Project 723.18034.00005  Rhino Oil and Gas - Exploration Right Application: EIA and EMP report  September 2016
<table>
<thead>
<tr>
<th>SLR Project 723.18034.00005</th>
<th>Rhino Oil and Gas - Exploration Right Application: EIA and EMP report</th>
<th>September 2016</th>
</tr>
</thead>
</table>

1.2.3 This Office acknowledges receipt of the hard copy version of the environmental impact report (EIR) as per the notification in the contents of the electronic mail sent by yourself (Stella) on the 05 August 2016. The hard copy (disc) was received yesterday 17 August 2016. The EIR will be reviewed and comments will be provided on or before 13 September 2016 as indicated.

Siyabulela B Mtonjeni, on behalf of Department of Environmental Affairs, Alfred Nzo Region, Email, 18 August 2016

| Noted. |

1.2.4 Elundini Local Municipality would like to take the opportunity to forward the comments made below from the Town Planning Unit, more comments may follow from other units in the institution as these units are still busy with the document.

- The Mount Fletcher area is an area that has planned for its Economic Development to be in the Agricultural Sector: the Municipality is in the final stages of producing an Agri-Tourism strategy that will have a huge effect in Mount Fletcher, the IDP of the municipality which is a document compiled with the community clearly states and makes an emphasis on Agricultural activities. The report highlights the national importance of energy and the energy crises which is valid however the country is also facing a food security crisis and additional to this there is a direct positive long term impact on the community with using Agriculture as an LED strategy rather than Mining.

- It has been made clear that activity is not wanted now the consultants have tweaked their scope for the next 3 years so as to not involve drilling. This can be viewed as a way to simply get the foot in the door and get the ball rolling for future approvals and this does not sit well with the municipality as the capacity for monitoring activities is non-existent.

- There is great concern with the lack of commentary from Departments that are directly involved with such reports and such activities, the explanation of a report was sent and there was no response does not sit well and there was help offered by local authority officials.

Zamazulu Nonkulu on behalf of Elundini Local Municipality, Email, 05 September 2016

| Thank you for this information. |

Impacts of future activities would have to be assessed through the required assessment processes if this applicant reached a point where they proposed to undertake such activities. It is not a given that tourism and farming would suffer. Those potential impacts would require detailed consideration if the applicant gets to the point where they can propose and define more detailed exploration work.

The applicant revised the activities included in the proposed exploration work programme because of the public concern that the application was for approval of ground-based activities at unknown sites. I&APs and the EIA process could not have meaningfully understood impacts without knowledge of the target site locality.

The EIA Regulations under which this process is administered place an obligation on I&APS, including State Departments, to participate in the process and to comment on reports when prompted to do so. As the EIA practitioner we can do no more than notify an authority of the opportunity to comment. It is up to an authority to formally partake in the EIA process. EIA Regulation (3(4)) provides that if comments are not received within the regulated 30-day comment period then it will be regarded that there are no comments.

SLR continues to engage with the municipality to facilitate...
to assist in gaining attendance of such departments with one last stakeholder engagement.

- The is a strong emphasis on the national benefit of the activity with complete silence of the devastating effect of the activity to the environment and the community.

### 1.2.5

<table>
<thead>
<tr>
<th>Dean Ricketts on behalf of Department of Environmental Affairs, Alfred Nzo Region, Email, 13 September 2016</th>
</tr>
</thead>
</table>

I don’t have any major concerns for the first Phase of the Exploration process. Although I do not see this Phase of the exploration as potentially causing any significant impact on the environment, my concern is if any of the correct strata is identified, this will lead to the next phase of exploration, which I find very invasive and damaging to the environment.

A concern I have, is the fact that avian fauna may be effected by low slow flying planes. The area is host to many vulnerable, rare and endangered bird species, such as the three different cranes species, ground hornbill, Cape vulture, Bearded Vulture, Stanley’s Bustards and others. I'm not sure how this will have an effect on avian fauna but I believe this needs to be considered, especially the aspects of how the aerial survey will effect vultures at the roost and breeding sites and adult cranes looking after their chicks. Consideration also need to be taken in respects to low and slowing flying plans over or near to the Malatstele and Ongeluksket Nature Reserve, in terms of the Protected Areas Act and Civil Aviation Act.

Thank you for the comments. As indicated in the EIR, if the early-phase exploration were to confirm the presence of a potential resource, then Rhino Oil and Gas would need to seek further authorisation / approval from PASA for any additional exploration work required to appraise the resource. Any further approval would be subject to an additional environmental assessment (or environmental authorisation amendment) process with further public consultation and specialist input. Approvals are also likely to be required in terms of other legislation. Such processes assess the merits of an application in light of the principles of sustainable development as set out in Section 2 of NEMA. An environmental authorisation process would not grant approval for the undertaking of activities resulting in impacts of unacceptable significance.

The FTG aircraft would not be significantly different from any of the other light aircraft that traverse these areas. Other than civil aviation rules there are no restrictions to the flying of such other planes. Aircraft could potentially cause a short-term disturbance to birds, animals and people. As indicated in the EIR there would be short-term disturbances to sensitive receptors due to the noise, but these are unlikely to result in an impact of lasting significance. Such noise is not anticipated to cause anything greater than a short-term flight response from sensitive or surprised receptors. There may be merit in planning FTG flight paths with consideration for avoidance of nesting and roosting sites of the avian species of conservation concern.

As indicated in the EMPs, all planned survey flights should comply with local civil aviation rules. Furthermore, flight paths must be pre-planned to avoid national parks, nature reserves and world heritage sites. Where this is not possible, an altitude of 2 500 feet (762 m) should be maintained (as per Section 47(1) of NEMPRAA), unless permission is obtained from the
1.2.6 Will this generate any dust? Dust regulations need to be considered. Impact of wind caused by the light aircraft to the birds and their nests need to be considered since it is mentioned that there are three crane species that occur in that area.

Andiswa Qinisile on behalf of Department of Environmental Affairs, Joe Gqabi Region, Email, 13 September 2016

No, the FTG surveys will not generate any dust as the flights would be well beyond the distance where wind from the plane affects ground airflow.

The FTG aircraft would not be significantly different from any of the other light aircraft that traverse these areas. Other than civil aviation rules there are no restrictions to the flying of such other planes. Aircraft could potentially cause a short-term disturbance to birds, animals and people. As indicated in the EIR, there would be short-term disturbances to sensitive receptors due to the noise, but these are unlikely to result in an impact of lasting significance. Such noise is not anticipated to cause anything greater than a short-term flight response from sensitive or surprised receptors. There may be merit in planning FTG flight paths with consideration for avoidance of nesting and roosting sites of the avian species of conservation concern.

1.2.7 As the Leader of the Bakoena Traditional Council, and in consultation with my council, people and members of the Umzimvubu Catchment, we strongly oppose any activities which may in the future lead to the extraction of oil and gas from our landscape. We understand that should exploration reveal feasible underground sources of oil and gas, that a process called hydraulic fracturing may be used to extract these sources. We understand this process to be risky for the residents of this landscape and our water security, as we are not convinced that the regulatory mechanisms for ensuring compliance are sufficiently in place. Our landscape currently sustains thousands of people deriving a living from grazing, agriculture and ecotourism, which will be compromised if the land use is changed to any form of invasive mining.

Chief G. K. Lebenya, Email, 13 September 2016

Your strong opposition to activities that may result in future gas extraction is noted.

Your concern specifically relates to the production phase which is not part of the scope of work for this project. This project relates to exploration activities only. As per the revised project scope, the only exploration method to be used to gather information for this phase will involve aerial surveys. There will be no ground-based activities for this phase of the project. And thus no effect on the state of the land, grazing, agriculture and ecotourism.

Rhino Oil and Gas would be required to undertake another EIA process should they want to apply for further exploration activities or a production right. The issues you have highlighted would need to be assessed should Rhino Oil and Gas propose to continue with ground based investigations.

The State provides that anyone, regardless of the fact that they may be foreign, may apply for exploration rights.
<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.8 Will you meet with some of the people who had submitted comments on the project?</td>
<td>Sello Ntai, Matatiele Local Municipality, Feedback Meeting, 23 August 2016</td>
</tr>
<tr>
<td>1.2.9 The Matatiele Local Municipality is currently still busy with inauguration of councillors and appointment of the mayor and speaker processes. As a result, I am also concerned that you have not met with our councillors and give them the feedback form the EIA process. While I am here as a representative of the Municipality and I understand the EIA process, I am not mandated to represent all of the other departments of the municipality. There are definitely other sections that should be making comments.</td>
<td>Sello Ntai, Matatiele Local Municipality, Feedback Meeting, 23 August 2016</td>
</tr>
<tr>
<td>1.2.10 Mr Sello Ntai can assist with arrangements for SLR to meet with at least the affected ward councillors if the timeframes for the project do not allow to have a meeting with the entire municipal council.</td>
<td>M. Matika, Matatiele Local Municipality, Feedback Meeting, 23 August 2016</td>
</tr>
<tr>
<td>1.2.11 How will this project affect our land? Currently the state of the land is that of decay and I am concerned that this project might exacerbate the current situation.</td>
<td>Sello Ntai, Matatiele Local Municipality, Feedback Meeting, 23 August 2016</td>
</tr>
<tr>
<td>1.2.12 Was there any consultation done with local municipalities prior to the EIA phase?</td>
<td>Rose Jule, Environmental Officer DEA, Elundini and Joe Gqabi Municipalities, Feedback</td>
</tr>
</tbody>
</table>
Meeting, 23 August 2016

1.2.13 The legend in the regional locality setting map does not show enough detail. The map in the presentation does not match the regional locality map in the Draft EIR. I suggest that you highlight protected areas in the legend and the map.

Rose Jule, Environmental Officer, DEA, Elundini and Joe Gqabi Municipalities, Feedback Meeting, 23 August 2016

Protected areas are shown in Figure 5-10 in the EIR. The ONR is the only protected area adjacent to the ER application area and is shown in the map.

1.2.14 No reference has been made to the Water Act and the Disaster Management Act, despite the hazard that this project is creating in terms of water contamination and depletion.

Patrick Moko, HOC: Disaster Management, Elundini and Joe Gqabi Municipalities, Feedback Meeting, 23 August 2016

The current ER application does not include any ground-based exploration activities nor any production. As such there will not be any impacts on water resources and thus no requirement for approval under the NWA. Your concern specifically relates to the production phase which is not part of the scope of work for this project or current application. If it reached that phase Rhino Oil and Gas would need to undertake another EIA process should they apply for a production right (Rhino Oil and Gas). Consideration and approvals under the applicable legislation would need to be made at the time.

1.2.15 We agree that development is good however it should not come at the expense of the community’s wellbeing.

Mfundo Mekuto, Disaster Satellite Officer, Elundini and Joe Gqabi Municipalities, Feedback Meeting, 23 August 2016

Your comment has been noted.

1.2.16 This should not be a tick box exercise that is done for the sake of compliance.

1.2.17 All the relevant departmental officials should gather in one venue for a more integrated approach to weighing out the benefits, risks and losses. We would like to be of more assistance in terms of organising the meetings. This has received input form Elundini Local Municipality and we’re uncertain as to whether the correct information is being forwarded to or received by the relevant people.

SLR also held a scoping meeting with the relevant ward councillors and traditional leaders within the project (Matatiele and Elundini Local Municipalities) on 29 September 2015. A public scoping meeting was also held on 09 November 2015 where all interested and affected parties including ward councillors, traditional leaders and municipalities were invited. Furthermore, SLR also held additional meetings with the traditional leaders and ward councillors from the above-mentioned local municipalities from 25 to 29 of January 2016.
been our first encounter with you and we have not been given the opportunity to understand and to apply our minds to what this project is about. and not receiving any feedback from authorities after multiple attempts to consult. It must be further noted that EIA processes are regulated processes with strict timeframes associated with them and it is SLR’s responsibility to adhere to those timelines.

| 1.2.18 | Will there be another opportunity to consult with the Chiefs and departmental and municipal authorities. | Zamazulu Nonkula, Town Planner, Elundini and Joe Gqabi Municipalities, Feedback Meeting, 23 August 2016 | Unfortunately the meetings with IAPs and authorities are planned according to the legal timeframes we receive from the Department of Mineral Resources (DMR). The EIA processes are regulated processes with strict timeframes associated with them and it is SLR’s responsibility to adhere to those timelines. There have been a number of meetings held with the relevant stakeholders. |
| 1.2.19 | If you are not getting through to the authorities you’re your approach to notifying and consulting with them needs to change. | | Your comment has been noted. |
| 1.2.20 | There is very strong opposition from the community because as soon as production commences, the tourism and farming industries will suffer. | Zamazulu Nonkula, Town Planner, Elundini and Joe Gqabi Municipalities, Feedback Meeting, 23 August 2016 | We acknowledge that there is strong opposition. All concerns have been recorded and included in our reports. They are then delivered to the Petroleum Agency of South Africa (PASA) which makes the final decision. The communities’ concerns are not disregarded. It is not a given that tourism and farming would suffer. Those potential impacts would require detailed consideration if the applicant gets to the point where they can propose and define more detailed exploration work. The current authorisation process is specifically limited to the aerial surveys proposed. |
| 1.2.21 | I acknowledge that there has been a reduction of scope, however the end goal is still to frack. | Zamazulu Nonkula, Town Planner, Elundini and Joe Gqabi Municipalities, Feedback Meeting, 23 August 2016 | The proposed project and related process are not about fracking but about early-phase exploration activities (an investigatory exercise). It must be noted that your concern specifically relates to the production phase which is not part of the scope of work for this project. This project relates to exploration activities and not production phase. Rhino Oil and Gas would need to undertake another EIA process should they apply for a production right. It is important to note that production techniques differ with different minerals depending on their quality, quantity and depth. Therefore, it is not factual generalise and assume that only one method will be used in the production phase. |
| 1.2.22 | I have an issue with the following statement from the DEIR “The purpose of exploration is to identify the existence of any commercially viable reserves of oil and/ or gas”. The report seems to be putting the company’s triple bottom line. | Zamazulu Nonkula, Town Planner, Elundini and Joe Gqabi Municipalities, Feedback Meeting, 23 August 2016 | That is the purpose of exploration. Companies that explore do not make money out their research and exploration studies. It is only companies that are involved in the production phase that make money from their activities. These companies have
<table>
<thead>
<tr>
<th>Section</th>
<th>Details</th>
</tr>
</thead>
</table>
| **1.2.23** | The report should include the planning and vision for the community. Only the IDP has been drafted, no further planning has been quoted in the report.  
Zamazulu  
Norkula, Town Planner, Elundini and Joe Gqabi Municipalities, Feedback Meeting, 23 August 2016  
The EIR has considered the main municipal planning instruments in the context of the activities that are proposed and where these are available. If the project were to proceed to further phases with ground-based activities then much more consideration would be required of other legislation and planning instruments. This will form a part of the future EIA process that would be required if further activities are proposed.  
Municipalities are requested to participate in the EIA process such that the relevant information can be provided for consideration in the EIA. We welcome the provision of such information from the municipalities. |
| **1.2.24** | There is lack of governance. Why is there a continuation of this when there are other pressing issues?  
Patrick Moko, HOC: Disaster Management, Elundini and Joe Gqabi Municipalities, Feedback Meeting, 23 August 2016  
Importing oil is very expensive. If we manage to produce our own oil, it will be of a great financial benefit and may hopefully alleviate some of the economic challenges we face as a country. It must be noted that the government has earmarked exploration activities as a priority in fast-tracking economic development in the country. We also envision working with the communities to possibly alleviate some issues they face (Rhino Oil and Gas). |
| **1.2.25** | What is going to happen to all our heritage sites and resources?  
Mfundo Mekuto, Disaster Satellite Officer, Elundini and Joe Gqabi Municipalities, Feedback Meeting, 23 August 2016  
Part of an EIA is to assess heritage resources. A process of elimination follows and then exploration can only be undertaken thereafter at sites that won’t negatively impact heritage (as required by law). The change of scope reduces the potential impacts that may have resulted from exploration. The aerial survey will have very minimal impacts and in the case that no oil or gas resources are found, we will cease to continue further work in that specific area (Rhino Oil and Gas).  
The EIA also includes a mitigation plan to manage potential...
1.2.26 The environmental Impact Report compiled by SLR Consulting (Pty) Ltd dated August 2016 was assessed and comments refer. The Department has no objection towards the proposed activity applied for by the applicant however, the following comments should be noted and complied with:

1. It is noted that the scope for the Environmental Impact Assessment Report submitted for listed activities triggered by the exploration right application in terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) only applies for conducting remote exploration techniques and to develop a more detailed understanding of the potential oil and gas resources in the application area.

2. It is further noted no invasive studies will take place which will require core borehole drilling and seismic survey activities.

3. The application must not deviate from what the applicant has applied for which is mostly desktop related studies.

4. No drilling must take place in any form to assess the source rock geochemistry as it is not part of this application and it clearly states that rock samples will be taken from surface outcrops.

5. No wells, permeability testing, pressure testing or hydraulic (commonly referred to as “fracking”) will be conducted.

6. It should be noted that the proposed exploration right area has sensitive wetlands and water courses that are of priority in terms of conservation in the area.

7. The applicant must apply for any activity that may impact on the water courses, (digging trenches, access routes and stream crossings) which are within the 1:100 year flood line of the watercourse and within 500m radius from the boundary of the wetlands.

Lonwabo Mni on behalf of the Department of Water and Sanitation, Email, 12 September 2016

Thank you for the comments, this is noted. The current exploration work programme proposed by the applicant does not result in any impact to water resources.
| 1.2.27 | It is required by the Department that all activities on the above site(s) are carried out in accordance with the requirements of the National Water Act. Please note that any use of water (as stipulated under Section 21) without any authorisation from this Department is a contravention of Section 151 of the National Water Act, 1998 (act 36 of 1998). | Lonwabo Mini on behalf of the Department of Water and Sanitation, Email, 12 September 2016 | Thank you for the comments, this is noted. The current exploration work programme proposed by the applicant does not require any water use. |
| 1.2.28 | The subject above has reference, 1. Environmental Impact Report (EIR) dates August 2016 was scrutinised. 2. The Department would like to highlight the following for your attention. 2.1 The exclusion of the Ongeluksneek nature reserve in the proposed exploration area is noted. 2.2 The exclusion of ground-based exploration activities in the early phase exploration exercise (proposed) means that: a) No significant negative impacts to the environment are anticipated for the early phase activities, should these be approved as proposed. b) The environmental assessment practitioner (EAP), yourselves, considered feasible alternatives (including both site and activity alternatives). 2.3 The South African Avian Authority may however have conditions in relation to the air-based proposed early phase exploration activities, should these be approved as proposed. | Siyabulela.B Mtonjeni on behalf of Department of Environmental Affairs, Alfred Nzo Region, Fax 13 September 2016 | The comments are noted. |
| 1.2.29 | 2.4 The next phase of the exploration, which shall depend on whether or not a viable resource was found during the first early phase exploration and be subject to a stand-alone application for environmental authorisation is the one that the Department presumes shall have significant negative impacts on the environment. 2.5 It is noted that the first, early phase exploration, shall inform the next phase and that phase informing the next, etcetera. 2.6 It is also noted that: a) Rhino Oil and Gas were unable to focus their attention on specific sites as at this stage it is unknown whether a resource exists or not and, if yes, the exact location of this, b) The early phase exploration, should it be approved and | Siyabulela.B Mtonjeni on behalf of Department of Environmental Affairs, Alfred Nzo Region, Fax 13 September 2016 | That is correct. The potential impacts of future activities would require detailed consideration if the applicant gets to the point where they can propose and define more detailed exploration work. Rhino Oil and Gas would need to undertake another environmental assessment process should they apply for the |
go ahead as proposed, shall assist Rhino Oil and Gas to know the exact location of the resource exists or not and, of yes, the exact location of this,
b) The early phase exploration, should it be approved and go-ahead as proposed, shall assist Rhino Oil and Gas to know the exact location of the resource and apply for environmental authorisation to further explore the resource which was found (if any) at the exact location/s.
c) The implication of this is then that the exact affected/likely affected areas shall be known and
d) The next application for environmental authorisation (if required depending if a resource was found) shall be limited to those specific sites at which the resource was found (if found);
e) Interested and affected parties were mostly against the proposal by Rhino Oil and Gas, despite comments being on a broader scale than specific.

1.2.30

2.7 This Office does not foresee that the objections received to the application for the bigger area shall not be received on the application for the specific sites.
2.8 The environmental impact assessment for the next phase exploration right application, including public participation, shall have to consider:
i) The specialist studies that were excluded in this early phase environmental impact assessment and environmental impact report detailed public participation, although land owner consent may not be necessary as per regulation 39 (2) of the environmental impact assessment (EIA) Regulations, 2014, concerns shall have to be addressed.

Siyabulela B Mtonjeni on behalf of Department of Environmental Affairs, Alfred Nzo Region, Fax 13 September 2016

It is very possible that any application for further exploration activities or a production right would receive similar objections. The applicant and authority have been advised of the present opposition to current and future activities.
Agreed. Rhino Oil and Gas would need to undertake another environmental assessment process should they apply for the undertaking of further exploration activities or a production right. Such process would have to comply with the EIA Regulations 2014.

1.2.31

3. It is noted that this EIA and EIR was not necessarily in terms of the pre-approved plan of study (PoS) for EIA (as part of the accepted scoping report).
4. Should the Petroleum Agency of South Africa (PASA) grant environmental authorisation for this early phase exploration and the exploration indicate commodities viable for Rhino Oil and Gas to further explore, will the next phase environmental impact assessment not rely on the accepted scoping report and PoSEIA?
5. If that is to be the case, SLR shall have to be cautious not to leave out new information that may be critical in

Siyabulela B Mtonjeni on behalf of Department of Environmental Affairs, Alfred Nzo Region, Fax 13 September 2016

Any further application for the undertaking of further exploration activities or a production right. Would have to be informed by an assessment process as required by the MPRDA and in terms of NEMA.
Such future process would be independent of the current EIA, although would likely draw on information compiled during the current EIA. The future environmental assessment process would need to comply with the legislative requirements in its own right.

The applicant and authority have been advised that large parts...
of the area have environmental properties that may not be compatible with further exploration or future production activities and the expected risks associated with these. Current decisions and planning should take cognizance of this in as much as it is currently possible.

1.2.32

6. The Department would like to highlight that the need and desirability assessment fell short to highlight whether the proposal is supported by the Matatiele Local Municipality Integrated Development Plan (IDP) of the Spatial Development Framework (SDF) thereof, as it did those of the District Municipality. Commencement of a listed activity without prior environmental authorisation is illegal in terms of section 24 F of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

Siyabulela B. Mtonjeni on behalf of Department of Environmental Affairs, Alfred Nzo Region, Fax 13 September 2016

The IDP and SDF were identified as documents that require consideration by the applicant should they propose future ground-based exploration activities. As the current exploration work programme only includes remote sensing methods these locality specific plans prepared by the municipality do not yet have significant relevance.

1.2.33

The department raises an objection on the above proposal due to concerns raised below.

1. The development of oil and gas facilities would change the character of the landscape from a rural to a more industrialized setting. Existing land use would be affected by intrusive impacts such as increased traffic, noise, dust, and human activity, as well as by changes in the visual landscape. In particular, these impacts could affect recreational opportunities in a relatively pristine landscape.

2. Farmers could be affected by loss of available grazing or crop lands, potential for the introduction of invasive and noxious plants that could affect livestock forage availability, and possible increases in livestock/vehicle collisions.

3. During development, water quality can be affected by:
   - Activities that cause soil erosion or dust that can be washed into water bodies;
   - Weathering of newly exposed soils, causing leaching and oxidation that can release chemicals into the water;
   - Discharges of waste or sanitary water;
   - Use of herbicide and dust suppressants (e.g., magnesium chloride); and contaminant spills.

Ms. Dibuseng Leeu on behalf of Matatiele Local Municipality, Email, 20 September 2016

The objection is recorded.

The current authorisation process is specifically limited to the aerial surveys proposed. The assessment has concluded that none of the impacts you describe would arise.

The potential impacts of future activities would require detailed consideration if the applicant gets to the point where they can propose and define more detailed exploration work.

Rhino Oil and Gas would need to undertake another environmental assessment process should they apply for the undertaking of further exploration activities or a production right.
| 1.2.34 | Thank you for providing the Eastern Cape Parks and Tourism Agency (ECPTA) with the opportunity to review and comment on the Environmental Impact Report (EIR) and Environmental Management Programme (EMP) in support to obtain an Environmental Authorisation (EA) for an Exploration Right (ER) for petroleum products on various farms in the magisterial districts of Mafatlane and Mf Fletcher in Eastern Cape. The ECPTA notes that the project scope of the initial ER application has been amended with the following two changes:
To utilise exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey) as opposed to ground-based core hole drilling and seismic surveys for the "early-phase exploration" and
The extent of the ER application area have been reduced to exclude (but will definitely border) Malekgalonyane (Ongeluksnek) Nature Reserve.

The ECPTA understands the motivation of the project to secure improved supply of energy resources to South Africa as well as the socio-economic possibilities that an entity of this scale may offer however despite the abovementioned amenities the ECPTA cannot support this application and we retain the option that the potential negative impacts are too severe should petroleum products be found within the ER application area. An EA should not be granted for the reasons set out below.

Duyani Dayimani
on behalf of Eastern Cape Parks and Tourism Agency
Email from Bev Geach, 22 September 2016

The objection is recorded.

| 1.2.35 | 1. Malekgalonyane (Ongeluksnek) Nature Reserve
As noted the amended project scope have excluded Malekgalonyane (Ongeluksnek) Nature Reserve from the ER application area as per Section 48 of the National Environmental Management: Protected Areas (Act No 57 of 2003). Despite this amended it is clear that a portion (to be specific Farm 100) of the Nature Reserve is still included in the ER application area.
- It should also be noted that on page 5-21 of the EIR it is stated that the "Malekgalonyane (Ongeluksnek) Nature Reserve is located within the extent of the proposed ER area (see Figure 5-10)." This statement is contracting to the amended scope. Please confirm is included or not from the ER application area.

ECPTA provided a shapefile of the ONR to SLR on 12 September 2016. This delineation of the ONR was different from the data available on BGIS and as provided by PASA.
The ECPTA version was provided to Rhino Oil and Gas and their surveyors have been advised to update the application area plan and farm list.
The text in the EIR has been updated.
The current authorisation process is specifically limited to the aerial surveys proposed. The assessment has concluded that no impacts to the ONR would arise.
The potential impacts of future activities within the ONR buffer...
The project area is directly adjacent to north-eastern and south-eastern boundaries of Nature Reserve and also falls within 5km buffer zone of the Reserve. The proximity of the project are to the Nature Reserve is totally unacceptable as the impacts of mining will be negative on the Nature Reserve should any minerals be found next to the boundaries.

Rhino Oil and Gas would need to undertake another environmental assessment process should they apply for the undertaking of further exploration activities or a production right.

1.2.36

2. Biodiversity

There are numerous red-flags for this project area as it is a national and international biodiversity priority area.

- The area forms part of the internationally recognised Drakensberg-Alpine centre of endemism, as such, the area is home to some of the rarest endemic animals and plants in the country and it is a global biodiversity hotspot (Maputaland-Pondoland-Albany biodiversity hotspot). Also, based on the Eastern Cape Biodiversity Conservation Plan (Berliner and Desmet, 2007) almost the entire project area falls within a Critical Biodiversity Area (CBA) 1 and partly within CBA 2 which area critical for conserving biodiversity and maintaining ecosystems functioning.

- In relation to the amended exploration methods, we are concerned about the avifaunal impacts of the light aircraft. The area is a home to a number of bird species including the endangered Bearded Vultures. Flying over vulture colonies is a concern to the ECPTA as most of the airspace in the area is used by these birds.

- Furthermore, the catchments around this area are extremely important from a water provision perspective especially for the eastern part of the Province. South Africa being one of the water scarce countries, retaining the remaining water source areas is essential and priority.

- Also the water sources within the project area are crucial for the maintenance of the highly sensitive biodiversity areas mentioned above.

1.2.37

3. Stewardship

As the delegated authority responsible for developing and managing biodiversity in the protected areas in the zone would require detailed consideration if the applicant gets to the point where they propose and define more detailed exploration work.

The environmental descriptors that you refer to are documented in the EIR (refer to section 5.1.8).

The applicant and authority have been advised that large parts of the area have environmental properties that may not be compatible with further exploration or future production activities and the expected risks associated with these. Current decisions and planning should take cognizance of this in as much as it is currently possible.

The FTG aircraft would not be significantly different from any of the other light aircraft that traverse these areas. Other than civil aviation rules there are no restrictions to the flying of such other planes. Aircraft could potentially cause a short-term disturbance to birds, animals and people. As indicated in the EIR there would be short-term disturbances to sensitive receptors due to the noise, but these are unlikely to result in an impact of lasting significance. Such noise is not anticipated to cause anything greater than a short-term flight response from sensitive or surprised receptors. There may be merit in planning FTG flight paths with consideration for avoidance of nesting and roosting sites of the avian species of conservation concern.

The current authorisation process is specifically limited to the aerial surveys proposed. The assessment has concluded that no impacts to the biodiversity or water resources would arise.

This is acknowledged.

The applicant and authority have been advised that large parts of the area have environmental properties that may not be
Eastern Cape Province, the ECPTA is mandated to ensure protected area expansion in the province. The 2012 Eastern Cape Protected Area Expansion Strategy (ECPAES) have identified the globally-important high-altitude North East Cape Grasslands with a high prioritisation and in need of formal protection. The ER application area includes a major portion of the North East Cape Grasslands identified for protection. Due to the sensitivity for a biodiversity, landscape and water-provision perspective as noted above, parts of the project area have been earmarked by the ECPAES are priority areas for inclusion into the ONR. compatible with further exploration or future production activities and the expected risks associated with these. Current decisions and planning should take cognizance of this in as much as it is currently possible.

<table>
<thead>
<tr>
<th>1.2.38</th>
<th>4. Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>The impacts on biodiversity and ecosystems services are of most concern to ECPTA whilst we acknowledge the need to contribute to strengthening the security of energy supply as well as the socio-economic benefits of the project. However, as the designated Protected Area Management Agency for the Eastern Cape, our perspective needs to be wider than these opportunities as the project will have significant negative impact on the environment. It is recommend that further other energy source alternatives are investigated such as renewable energy. Best practice dictates that the energy production with the lowest environmental impact should be selected. The ECPTA reserves the right to revise initial comments and request further information based on any additional information that may be received. It would be appreciated if ECPTA could be included in all future correspondence relating to this application.</td>
<td></td>
</tr>
<tr>
<td>Thank you for the comments.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.3.1 I&amp;APs</th>
</tr>
</thead>
<tbody>
<tr>
<td>We are surrounded by beautiful mountains which also have valuable minerals that we are aware of. Now, what will happen to those additional minerals within your project area as you explore for the oil and gas? Experience has taught us that consultants and other companies gather information about our areas for their own benefit and never share the results/findings with the local people.</td>
</tr>
<tr>
<td>Mangena Leonard Mbolekwa, Bahlakoana Traditional Authority, Meeting, 23 August 2016</td>
</tr>
<tr>
<td>The law that guide all mining and related activities, the Mineral and Petroleum Resources Development Act (MPRDA) requires one to apply for specific minerals. The holder of that right or permit is only allowed to work with and/or on the minerals listed on their right or permit. Rhino Oil and Gas (Rhino Oil and Gas) will only explore for oil and gas, and nothing more. Various exploration technologies are applicable to various minerals and/or resources. The technology that Rhino Oil and Gas is proposing to use is designed specifically to gather information on oil and gas. All information gathered will be provided to the Department of Minerals Resources (DMR) and would be</td>
</tr>
</tbody>
</table>

---
### 1.3.2
Will there be any other company also exploring for oil and gas in our area?

<table>
<thead>
<tr>
<th>Letsatsi Moma, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>The law only allows one applicant at a time to explore or prospect for specific minerals within a specified area. No other applicant will be allowed to explore for the same minerals in the same area.</td>
</tr>
</tbody>
</table>

### 1.3.4
I understand that communities do not make decisions on such projects but that the government does. What does this mean to us as the community?

<table>
<thead>
<tr>
<th>Mamokhesi Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>The government’s role is to weigh-up both the negative and positive impacts of the project which informs the decision it takes on a project. It is unlikely to grant a right if it assessed that there are more (and serious) negative impacts than positive impacts or benefits from the project. One of the roles of the EIA process is to document the public position on the projects and the reasons therefor. It must be noted that one approval does not guarantee approval of future applications and amendments.</td>
</tr>
</tbody>
</table>

### 1.3.5
What do you mean you are here to give us feedback when we have not met with you before?

<table>
<thead>
<tr>
<th>Santo Boe, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>This was not the first time SLR is meeting with this community. We were here earlier in the year for a scoping meeting and Queen Sibi and members of the traditional council can confirm that. In that meeting, SLR indicated that they will be back later to give feedback on the findings of the EIA process and this meeting serves that purpose.</td>
</tr>
</tbody>
</table>

### 1.3.6
I have a major distrust about this project.

<table>
<thead>
<tr>
<th>Busi Sibi Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your comments have been noted and will be considered as part of the engagement process going forward.</td>
</tr>
</tbody>
</table>

### 1.3.7
In order to have these kind of meetings more meaningful and effective, I strongly suggest that communities are educated about the project technologies, benefits and potential risks before public meetings are held. Some of the information is quite technical especially if you are hearing it for the first time.

<table>
<thead>
<tr>
<th>Santo Boe, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your comment has been noted. If Rhino Oil and Gas were to advance the project to a point where access was required for their activities, then they would engage directly with the landowners to agree terms before accessing any land in the area.</td>
</tr>
</tbody>
</table>

### 1.3.8
We, the people from the Sibi area do not approve this project and will not grant any access to land until we have met with you in a formal setting where we can discuss our terms and conditions.

<table>
<thead>
<tr>
<th>Santo Boe, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.9</td>
</tr>
<tr>
<td>1.3.10</td>
</tr>
<tr>
<td>1.3.11</td>
</tr>
<tr>
<td>1.3.12</td>
</tr>
<tr>
<td>1.3.13</td>
</tr>
<tr>
<td>1.3.14</td>
</tr>
<tr>
<td>1.3.15</td>
</tr>
<tr>
<td>1.3.16</td>
</tr>
<tr>
<td>1.3.17</td>
</tr>
<tr>
<td>1.3.18</td>
</tr>
<tr>
<td>1.3.18</td>
</tr>
</tbody>
</table>
### 1.3.19
The community does not know anything about this project. No initiatives were done to educate them and allow them to make more informed decisions and ideas about the importance and potential impacts of the project. It is hard to formulate ideas about things that we do not understand because we fear the unknown. Initiatives to educate the people should be done at the grassroots level.

### 1.3.20
Do you think the project will progress and become a success despite its undesirability in our area?

This EIA process is a part of the initial phase of the project and serves in part to inform people of the project before it happens. The process has included a BID, meetings, a scoping Report and EIR all of which have provided information for I&APs to learn about the project and the process. Your suggestion has been noted and will be considered by Rhino Oil and Gas in future engagement processes.

We are unable to give an answer to your question as the decision making of whether the project goes ahead or not lies solely with the competent authority. The EIA process has documented and reported on the objections from the public. Refer to Section 7.5 of the EIR.

### 1.3.21
Is there anything that we can use to protect ourselves? Our government still follows old laws and we are still being oppressed. A bill should have been established to ensure that we are protected from being oppressed and exploited. For instance, the law regarding the ownership of minerals should be changed, if someone refuses to grant mining companies access to their land in the fear that their livelihood and health will be endangered then that process should be stopped. We will have to approach our legal advisors to submit something to the competent authority on our behalf.

Moeletsi Lebenya, Bakoena Traditional Authority Feedback Meeting, 25 August 2016

We have noted your concerns and they will be incorporated into our report, we also respect your decision to seek legal advice.

---

**2. Categories**  
**Process Related Issues: Objections**

### 2.1. Objection
Thank you for getting in touch with Rhino and obtaining this response, I think this has been something of a mystery to everyone. However, it appears from this that, contrary to what was advanced at public meetings we attended, Rhino are definitely looking at unconventional hydrocarbon resources (which would very likely be accessed via fracking), despite their avoiding or refusing to discuss this possibility at these meetings, even when specifically asked to do so. We as affected communities believe that we are not being ‘heard’ - all we receive is evasive communications from the applicants in these matters.

As regards Travis’ comment along the lines of what ‘would be more digestible to the public’, I wish to point out that for most of us in areas that may be affected by oil and gas

Bronwyn & Jock Tame, Email, 15 August 2016

RE: COMMENTS ON SCOPING REPORT: RHINO OIL & GAS 12/3/317 and other applications

Rhino Oil and Gas has always stated publically that its long-term objective is to locate and develop a commercially viable petroleum resource. However, the current application(s) for an exploration right and related environmental authorisation is limited to exploration activities only, and specifically early-phase exploration as detailed in the Scoping Report prepared for each application. Rhino Oil and Gas’ are exploring for all forms of oil and gas resources.

The motivation for the current exploration right application is for Rhino Oil and Gas to be allowed to obtain the data required to clearly define geological structures across the exploration right application area. This would enable Rhino Oil and Gas to determine the existence of a resource that may or may not warrant further exploration. The result may equally be that there is no evidence of a resource and further exploration is not
exploration and subsequent extraction, the entire situation is completely "indigestible" - to use his phrasing. We are concerned at impacts on our increasingly scarce and fragile water resources, both in terms of unsustainable abstraction and pollution, including groundwater, particularly with regards to climate change and uncertain weather impacts that we are all experiencing, especially in KZN. We are concerned about potential negative impacts on existing rural livelihoods, such as ecotourism, agriculture, small-scale farming and so on (thank you for mentioning that in the Scoping Report you sent to PASA, much appreciated). We are concerned about our air quality and potential negative impacts on human health. Mining, in our experience, rarely creates jobs, especially for unskilled labour, on the scale required in areas such as ours and also creates boom and bust economies rather than long-term economic and social sustainability.

All we are asking for, as affected communities, is that Rhino guarantees that there will be no significant environmental impacts that will reduce the long-term sustainability of our land and water as a result of their exploration and exploitation activities. We have meetings, we have discussions, we have so much interaction but we do not have any guarantees and this is what we require. It is our opinion that Rhino is side-lining the real issues with a great deal of technical jargon; we require guarantees that our existing environment and livelihoods will not be compromised.

warranted.

The nature of the exploration process, around the world, is that it is an iterative process with data acquired from a prior stage required to improve knowledge and understanding of the resource. Decisions on whether to proceed with more work, how to proceed and what methods would be used to extract a resource (if it existed) can only be made once the prior stages are completed. (Please refer to Section 1.3 of the Scoping Report).

Rhino Oil and Gas has also maintained that they do not have details on how further exploration or future production might proceed, because they simply do not have access to appropriate information to inform such decisions. Nor does PASA. Undertaking the early phases of exploration is the only way to acquire the data required to inform such decisions.

As the proponent cannot define the future activities, an environmental consultant cannot reliably attempt to assess the potential impacts of a possible future project of unknown scope, location, extent and duration. To do so would be completely speculative and of little value. For this reason the scope of a Scoping and EIA process is aligned to a proposed project scope as provided by the proponent. Any future addition or change to a project would need to be subject to the requisite assessment and approval process before commencement. With regards to exploration and production, the approach to environmental impact assessment is mirrored in both the MPRDA and the EIA Regulations 2014 which separate out the application processes for exploration and production rights.

For the Rhino Oil and Gas projects, it is acknowledged, and documented in the Scoping Reports prepared for the various applications, that the public are generally strongly opposed to the proposed exploration activities and indeed the very granting of an exploration right. The sensitivity of the potential receiving environments, in relation to the proposed activities, has also been documented and is being investigated further in the EIA process. The purpose of the Scoping and EIA process is to consider and evaluate these risks so that the responsible
2.2. We fully endorse and echo what Bronwyn has so very clearly articulated below. These are also the primary concerns with respect to the Eastern Cape application: whether initial exploration takes the form of aerial survey only, or ground-based seismic testing and core drilling, the ultimate impacts on livelihoods and landscapes through intended hydrocarbon abstraction (c’mon, why else is Rhino exploring?) must be proven beyond any reasonable doubt, and Rhino provide a guarantee that human and ecosystem health will NOT BE COMPROMISED, otherwise a risk averse and precautionary approach of a no-go alternative would be the only safe recommendation.

We trust as a fellow EAP that SLR will do the right thing in the greater context of affected lives, and not just in the interests of the client and the state’s oblivious pursuit of fossil-based energy.

Nicki McLeod for Umzimvubu Catchment partners, Email, 16 August 2016

RE: COMMENTS ON SCOPING REPORT: RHINO OIL & GAS 12/3/317 and other applications

The scope of the EIA process is aligned with the current exploration work programme as proposed by the applicant. The assessment concludes that the proposed exploration work programme could be undertaken without significant impact to human and ecosystem health.

If the applicant were to apply for the undertaking of further exploration activities or a production right then the potential impacts of the activities would require detailed consideration and assessment. Rhino Oil and Gas would need to undertake another environmental assessment process to inform decisions on such applications. The findings of future assessment could well highlight significant impacts associated with the proposed activity. In this case the authority, as indicated below, would have to take careful consideration of such issues before making a decision.

Such processes assess the merits of an application in light of the principles of sustainable development as set out in Section 2 of NEMA. An environmental authorisation process would not grant approval for the undertaking of activities resulting in impacts of unacceptable significance. The decision could be to not approve the authorisation if unacceptable impacts were predicted as a result of the specified activities.

2.3 To whom it may concern:

I would like to forward my comment to this application as follows:

- For the second time the people of Matatiele, who are

Lebohang B Parkies, Email, 12 September 2016

Your strong objection is recorded.

The application and EIA processes are provided for in law. One of the roles of the EIA process is to document the public position...
concerned about the future of this area, have rejected any prospecting for mining.
- Just as we are saying NO to this application, we were saying NO to the consultation.
- During the consultation Rhino could not respond convincingly to the question posed.
- The second time around Rhino comes with a change of plan, from digging to flying aeroplanes, and we are still saying No.
- What we DON’T want in our area is Mining which will result in pollution of our below surface water reserves because due to this drought that water is our only hope since.
- It must be clear that we are not only saying NO from nowhere but we have done our homework to come to this rejection.
- We understand what Consultation means, what Prospecting is as well as what EIA is all about.
- So thinking that we would say NO during Consultation and change our minds during the EIA presentation is an insult to our intelligence.
- We do not want any Oil Mining in our area together with everything it comes from or even with.
- We like our area as it is and with our lives we will protect it from anything that will disturb it especially that will pollute our waters.
- Rhino must just look somewhere else to mine oil NOT anywhere in Matatiele.

2.4

I request that the following comments on this application are recorded in the Scoping report.
- Section 2 of NEMA requires that the activity proposed MUST be socially, economically and ENVIRONMENTALLY SUSTAINABLE.
- Evidence from Canada and the United States of America, for example, shows that fracking is environmentally destructive of the farmland and causes multiple earth tremors as in Ohio.
- Aerial photos of fracking sites show the devastation caused by multiple drilling sites. Rhino cannot tell me that they will drill only one hole at a suitable site.

Dr. A.W.P. Coleby,
Email, 12 September 2016

This application does not include fracking.

If the applicant were to apply for the undertaking of further exploration activities or a production right then the potential impacts of the activities would require detailed consideration. Rhino Oil and Gas would need to undertake further environmental assessment process to inform decisions on such applications.

Such processes assess the merits of an application in light of the principles of sustainable development as set out in Section 2 of NEMA. An environmental authorisation process would not
When the gas in that hole runs out in one or five years, they WILL be drilling more holes in that area in order to try and extract all of the FINITE SUPPLY of gas. Once the gas is finished Rhino will disappear and we farmers WILL be left with the mess and unable to use that land. In addition the toxic waste water will be major hazard to humans and livestock as well as the wildlife that used to thrive on that land. Proof of this statement is in the gold mining area around Johannesburg over 120 years later.

- The amount of gas or oil in any of these sites is FINITE therefore environmentally UNSUSTAINABLE. The poverty left in “boom” mining towns like Marikana show that this type of “development” is socially and economically destructive. If Rhino were putting this effort into development of improved electrical energy production from wind, sun or the ocean instead of gas we would support such an application.
- Any claim that Rhino “is not looking to do any Fracking” but only doing an aerial survey” is an insult to our intelligence.

### 2.5

I object most strongly to any steps that could lead to fracking in the Matatiele or any other area in Kwazulu-Natal.

M A Abbott
Wedderburn
Email, 12 September 2016

Your objection is recorded.

### 2.6

As a concerned citizen of South Africa, I believe that no exploration for oil and gas should be undertaken in the Matatiele area. Fracking and or exploration in many other countries has been banned as it has caused widespread contamination of underground water systems and surface areas have been affected by leaking chemicals as well. This is a practice that should be banned in all countries. Rhino Oil and Gas should be investing their time, money and efforts into sustainable ventures that do no poison the environment.

Ashley Crookes
Email, 12 September 2016

Your objection is recorded.

### 2.7

I write this in my individual capacity as a pastor of a church and concerned citizen of Matatiele, East Griqualand, South Africa and the planet as a whole. My views are my own and not those of my church.

Bruce Templeton
Email, 12 September 2016

Your strong opposition is noted and recorded.

The scope of the EIA process is aligned with the current exploration work programme as proposed by the applicant.
• I am strongly opposed to the planned exploration of petroleum products in the Matatiele and Mt Fletcher districts (and any others for that matter). For me it must not be allowed to go ahead and must be stopped at all costs. Even by entertaining this supposed “low key” investigation could spell ultimate disaster for the area and the communities and its future sustainability.

• God commissioned us to be custodians of the earth — not exploiters! This is God’s instruction in Genesis 1 – significant that it is in the very first chapter of the Bible and therefore, no doubt, of paramount important and concern to our glorious Creator. But we have defied God’s command and exploited the earth dramatically, always in the name of power and greed. It must not continue.

• Pollution levels on this planet are at a dramatically dangerous level already. Much evidence points to the fact that these pollution levels have a serious impact on the environment, climate changes and illnesses, to mention but a few. We need to sustain our beautiful earth, not destroy it as we are presently doing at an alarming rate. Each new project, with a potential risk to the planet, is just another nail in the coffin for Earth! Let’s leave something of value and beauty to future generations.

• Of great concern to me is that there is much evidence pointing to the horrific social, economic and environmental impact for the areas affected by fracking. Your presentations to us have acknowledged this high risk potential. I therefore, find it “mind boggling” that, given such risk, Rhino still wish to continue down this path. It defies logic! Do you all not care for the future of our planet and its sustainability? It is also significant for me that so many countries and regions have banned fracking as a way to extract gases & fuels. Why then do Rhino wish to continue with separation of applications for exploration from production is provided for in the MPRDA and NEMA.

The assessment concludes that the proposed exploration work programme could be undertaken without significant impact to human and ecosystem health.

If the applicant were to apply for the undertaking of further exploration activities or a production right then the potential impacts of the activities would require detailed consideration and assessment. Rhino Oil and Gas would need to undertake another environmental assessment process to inform decisions on such applications. The findings of future assessment could well highlight significant impacts associated with the proposed activity. In this case the authority, as indicated below, would have to take careful consideration of such issues before making a decision.

Such processes assess the merits of an application in light of the principles of sustainable development as set out in Section 2 of NEMA. An environmental authorisation process would not grant approval for the undertaking of activities resulting in impacts of unacceptable significance. The decision could be to not approve the authorisation if unacceptable impacts were predicted as a result of the specified activities.

As provided for in the MPRDA, any entity that meets the criteria is entitled to apply for a mineral right as Rhino Oil and Gas has chosen to do. The MPRDA requires that an environmental assessment of the activity be undertaken in terms of the NEMA.
| 2.8 | I object strongly to fracking of any kind. Our water, which will be contaminated, is worth much more than the money you are going to make. | Christie Exall, Email, 12 September 2016 | Your objection is recorded. |
| 2.9 | With reference to your application to survey for shale gas in the Umzimvubu Catchment area we hereby register our strong disapproval for the following reasons: We are a noted region of seismic activities (Matatiele cluster) and have recently experienced a 4.7 magnitude earthquake. It is potentially dangerous to interfere with the geology of the area. Further to that, this is a major water catchment area. As a consequence of these two factors, we feel that you should pursue your interests elsewhere and outside the country. | Amohelang Kosene on behalf of Staff at KEHS, Email, 13 September 2016 | Your objection is recorded. |
| 2.10 | **Context for objection:**  
- We hereby provide without prejudice, our response as a collective of interested and affected parties living and working in the Matatiele area for which application to explore has been submitted. We also attached a petition signed by over 500 local residents and school children to this effect.  
- We strongly object to the application, albeit it is in a revised form; our objections are based on both need and desirability, as well as cumulative impacts, and we support the no-go alternative mentioned in item 6.4 of the Executive Summary.  
- We believe that both our Constitution and the National Environmental Management Act make | Sinegugu Zukulu and Nicky McLeod on behalf of UCPP, Email, 13 September 2016 | Your strong objection is recorded. |

All comments and objections received during the EIA process are recorded in the reports and submitted to the authorities for consideration in their decision making process.

The Constitution and the legislation arising therefrom also established the application and decision making governance procedures under which this application has been made, is being assessed and will be decided upon.

Noted. This has been previously documented in the Scoping Report.
provision for our concerns to be not just heard, but taken seriously, based on the spirit of good governance and the right to a healthy environment for all citizens.

- We also make reference to our previous submissions made during the scoping phase, upon which this submission is based.
- We make this submission based on the content of the draft EIR executive summary, and information provided at a public reporting session held on 24 August 2016 in Matatiele. Due to the immense size of the report (a full lever arch file) and the limited capacity of most of us to properly assess, digest or comment effectively on the technical nature of this report, we consider this to be a strategic prejudice to our effective participation as directly affected parties.

2.11

- We understand that the exploration activities have been reduced to remote and aerial-based techniques including full tensor gradiometry gravity survey (which no-one here fully understands and is understandably therefore suspicious of), and that no core drilling or seismic exploration are proposed as part of this application. While we appreciate this, we still maintain that the exploration should be withdrawn as there is no suitable manner in which any below ground resources can be safely exploited in a water catchment area such as the upper Umzimvubu. The risks remain too high, based on retrospective evidence emerging from the Marcellus shale belt in the USA, as well the risks of sound groundwater capacity in our country.
- As mentioned in our response to the Scoping report, we also maintain that it is unfair and prejudice upon us as affected people whose very lives and livelihoods depend upon the land and its resources which the applicant intends to explore and exploit.

The content (and thus the size) of the Scoping and EIR reports is regulated by the requirements of the EIA Regulations. The majority of the reports volume is in fact copies of the significant comment that has been submitted. There is absolutely no strategy to make large reports so as to prejudice I&APs.

The EIA process and application for environmental authorisation are aligned to the exploration work programme as specified. This assessment concludes that the current exploration work programme could be undertaken without significant risk to the environment.

If the applicant were to apply for the undertaking of further if the applicant were to apply for the undertaking of further exploration activities or a production right then the potential impacts of the activities would require detailed consideration and assessment. Rhino Oil and Gas would need to undertake another environmental assessment process to inform decisions on such applications. The findings of future assessment could well highlight significant impacts associated with the proposed activity. In this case the authority, as indicated below, would have to take careful consideration of such issues before making a decision.

Such processes assess the merits of an application in light of the principles of sustainable development as set out in Section 2 of NEMA. An environmental authorisation process would not grant approval for the undertaking of activities resulting in impacts of unacceptable significance. The decision could be to not approve the authorisation if unacceptable impacts were
• To have wade through understand and comment on such a dense and complex report, in our spare time and we reserve the right to submit further comment as the need arises. SLR Consulting may be paid for their time to compile this report but we as affected people are already being negatively impacted upon through having to give up productive time to reading this voluminous and complicated report in the time permitted within the public consultation timeframe.

2.12 Need and desirability
The application needs to be seen in the wider context of national energy, environmental and climate change mitigation plans. Rhino is only including limited convenient context to justify its needs.

2.13 Desirability is frankly questioned here: The draft Integrated Energy Plan, Renewable Energy White Paper and Roadmap, numerous COP agreements, National Climate Change Response, Green Economy strategy etc all refer here. Coal bed-sourced methane (NH4) is indicated as afar as more problematic greenhouse gas than CO2 (Bill McKibben, Global Possibilities, 25 March 2016). In the light of South Africa’s commitment to reducing carbon emissions, the pursuit of unconventional gas extraction a prudent strategy? In the spirit of NEMA, this brings the need and desirability of the proposed activity starkly into question. We request a full motivation with costings in the EIA phase of why the pursuit of fossil fuels (shale gas and coal bed methane) is more feasible and sustainable over renewable energy sources, with the costings including long term socio-economic and ecological elements.

2.14 We frankly question who this application is desirable for, and for how long: an offshore based company? Related state interest? Or the people of South Africa who must bear the consequences of damaged groundwater and related health impacts in production areas? The Bill on Preservation and Development of Agricultural

The applicant and authority have been advised that large parts of the area have environmental properties that may not be compatible with further exploration or future production activities and the expected risks associated with these. Current decisions and planning should take cognizance of this in as much as it is currently possible.

Please refer to Section 4.3 of the EIR for this.

South Africa currently has policy papers/strategies etc supporting the development of domestic oil and gas and as you have indicated a similar number of policy papers/strategies that promote a move away from hydrocarbons.

A full costing/feasibility study on the pursuit of fossil fuels in relation to renewable energy sources is outside the scope of any single EIA process.

Rhino Oil and Gas is a South African registered company. The company has no state interest.

The current exploration work programme and the scope of the EIA is limited to the remote sensing activities. The proposed application is needed in order to improve the level of information and understanding on what is potentially a mineral resource of
Land proposes that it will prevail over any other national acts where valuable range and agricultural land exists (section 4.1 (a) and (c), and that when another organ of state makes a decision regarding agricultural land, of which most of the ER 295 ER exists, it must have regard to conditions made under this Act (section 31 (a).

Obviously when the Bill is enacted, the primary land use in the target area is for subsistence and emerging commercial agriculture, and we maintain that this exploration application is in direct conflict with this current agricultural land use.

The scope of the EIA process is aligned with the current exploration work programme as proposed by the applicant.

Rhino Oil and Gas maintains that it cannot yet, without conducting the early-phase exploration work, know what the future options entail. Without information on the scope, extent, duration and location of future activities it is not possible to undertake a reliable assessment of future impacts.

Given that the assessed impacts of the aerial FTG surveys and other remote sensing methods are considered be of very low significance, there is no chance of cumulative impacts of any significance.

See the response above.

The risks posed by cumulative impacts MUST be considered, and not fobbed off for the next phase of EIA related to prospecting or production.

Exploration requires a broad approach in order to obtain the regional information necessary to understand potential resource.

The applicant and authority have been advised that large parts of the area have environmental properties that may not be compatible with further exploration or future production activities and the expected risks associated with these. Current decisions and planning should take cognizance of this in as much as it is necessary.
2.18 The upper Umzimvubu landscape in the target area consists of valuable ecological infrastructure and agricultural land, providing water, grazing, livelihoods, cultural and recreational resources for thousands of thousands of often-vulnerable people who have no other livelihood opportunities. It is an important area of resilience to climate change unknowns, and tampering with both surface and below ground ecological architecture will compromise its ability to buffer the rest of the catchment against such unknowns. These environmental properties are documented in the EIR.

2.19 We have grave concerns that should any potential resources be identified during aerial survey, that no legislation will prevent our sadly corrupt and frankly untrustworthy legal system from protecting our rights, and on these grounds that NO EXPLORATION SHOULD OCCUR. Any further exploration would have to be subject to the requisite environmental assessment and authorisation process under the NEMA and an amendment to the ER in terms of the MPRDA. Such processes assess the merits of an application in light of the principles of sustainable development as set out in Section 2 of NEMA. An environmental authorisation process would not grant approval for the undertaking of activities resulting in impacts of unacceptable significance. A decision could include a refusal of the authorisation if unacceptable impacts were predicted as a result of the specified activities.

2.20 We submit that the state should be exploring alternative bundles of energy options, including renewables and the phasing out oil and gas based products to meet its national demand, reducing the huge reliance on fossil fuels and imports, and developing the local economic sector which can be grown through production and development of these cleaner renewable options and opportunities. This view is recorded.

2.21 In summary, we object to the application to explore, on the grounds of it complete undesirability and incompatibility with this landscape, and through the extreme prejudice to and disrespect for the inhabitants of the Matatiele area, their livelihoods and their way of life. Your objection is recorded.

2.22 We request that the application be withdrawn as a no-go activity, with no satisfactory justification for its need or desirability as it is places an un-mitigatable risk upon the integrity of the ecological resources and livelihoods dependent upon the upper Umzimvubu catchment which is currently possible. This view is recorded. The applicant and authority have been informed of these points and are advised that current planning and decision-making should take cognizance of the above in as much as it is currently possible.
| 2.23 | I strongly object to the proposed exploration of the Matatiele and Umzimvubu catchment by Rhino Oil and Gas Exploration South Africa (Pty) Ltd. I understand that exploration for oil and gas could be the precursor to fracking. I understand that there will be serious environmental costs. The risk to soil and water health from gas exploration is unacceptable. It threatens the future of our children and grandchildren. I support alternatives to the fossil fuel economy. I ask that a full Strategic Environmental Assessment for any possible exploration area be completed. | Petition signed by approximately 500 local residents and school children from affected and adjacent areas. Refer to Appendix 6.3 | Your objection is recorded. |
| 2.24 | The Endangered Wildlife Trust has taken note of the document entitled: ENVIRONMENTAL IMPACT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME FOR AN EXPLORATION RIGHT APPLICATION FOR PETROLEUM PRODUCTS ON VARIOUS FARMS IN THE MAGISTERIAL DISTRICTS OF MATATIELE AND MT FLETCHER, EASTERN CAPE 912/3/295 ER) emailed to stakeholders on 05 August 2016 for comment. While we have noted the change in approach in respect of your planned activities, the Endangered Wildlife Trust wishes to reiterate its position in respect of Hydraulic Fracturing in general and prospecting of any kind for this ultimate purpose. For your convenience, I have attached our position statement which is also applicable in this instance. | Cobus Theron on behalf of Endangered Wildlife Trust, Email, 13 September 2016 | Thank you for these comments. I confirm receipt. The EWT position Statement is noted and has been included below. |
| 2.25 | Please also refer to our earlier submission to the consultant. Assessment of the biodiversity, ecosystem system services and opportunities available for natural resource based compatible livelihoods in the proposed exploration area only serves to underscore our stance that any exploration for shale gas deposits and the resultant harvesting of those will not result in favourable long-term environmental, social or economic outcomes. | | Noted. The environmental attributes of the ER application area are documented in Section 5 of the EIR. The applicant and authority have been advised that large parts of the area have environmental properties that may not be compatible with further exploration or future production activities and the expected risks associated with these. Current decisions and planning should take cognizance of this in as much as it is currently possible. |
| 2.26 | We therefore request that the application should be withdrawn in its entirety as the “no-go alternative”. | | This view is recorded. |
represents the only viable and prudent at this stage. Please also note submitted comments from the Umzimvubu Catchment Partnership Programme with whom we are aligned.

| 2.27 | **Endangered Wildlife Trust: Position statement on South Africa’s unconventional shale gas exploration and extraction (July 2016)**
What is Hydraulic Fracturing?
According to the Strategic Environmental Assessment (SEA) report commissioned by the Department of Environmental Affairs (DEA), hydraulic fracturing (or fracturing as it is commonly known) is a process to extract an “unconventional resources”, namely methane gas that is trapped in shale or other geological deposits that have low permeability. Hydraulic fracturing is the process used to harvest the gas from these deposits. The Geological Society of America describes this process as the injection of water, sand and chemicals into a well drilled into gas bearing rock under high pressure. This action causes cracks in the rock formation thereby releasing gas which can then be harvested. For more information see here.

Hydraulic fracturing is of concern to the Endangered Wildlife Trust (EWT) due to the fact that its impacts on the environment are relatively poorly understood. As a scalable activity, it has the potential to pollute water resources and lead to significant habitat transformation and fragmentation. Inadequate regulation and poor compliance monitoring will exacerbate the likelihood of these impacts.

| 2.28 | **Our Position**
The EWT’s mission is to conserve threatened species and ecosystems in Southern Africa to the benefit of all people. The extraction of unconventional shale gas come under scrutiny due to the potential environmental risks associated with the process. Although the successful extraction of shale gas would clearly increase South Africa’s energy resources, the EWT believes that the potential economic benefit does not outweigh the environmental risks and other associated negative impacts.

|  | Cobus Theron on behalf of Endangered Wildlife Trust, Email, 13 September 2016 | The views expressed in the EWT Position Statement are noted. |
The EWT encourages the use of a more diverse mix of energy sources than South Africa presently employs, particularly one that reduces our reliance on local and reduces our carbon footprint. In saying that, we recognise that there are multiple risks and impacts associated with large-scale fracking on the environment, water and livelihoods and that there is lack of confidence with respect to the South African government’s ability to mitigate the risks associated with fracking. Given these circumstances, the EWT does not support the exploration for or production of shale gas in South Africa, including the use of hydraulic fracturing (fracking) in the attaining a more diverse mix of energy sources.

The EWT supports the precautionary principle (as defined in the National Environmental Management Act No. 107 of 1998) when dealing with uncertainty around impacts and risks associated with shale gas mining and associated techniques, such as fracking in South Africa. We are not convinced that this principle has been adequately integrated into decision making with respect to hydraulic fracturing.

Given the close ties between energy, water and food security and the urgent requirements to protect the resilience of our ecosystems, natural capital and ecological infrastructure in an era of uncertain climate scenarios, we argue that the country can and should develop alternative energy vision that excludes the use of shale gas.

Please refer to Annexure 1 for further technical details and supporting documentation.

<table>
<thead>
<tr>
<th>2.29</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Environmental Risks</td>
</tr>
<tr>
<td>• Claims that shale gas (natural gas that is trapped within shale formations) represents a lower-carbon fossil fuel than coal cannot be proven without full life-cycle evaluation. This would, for example, include incidental emissions that may occur because of low-</td>
</tr>
</tbody>
</table>
levels of methane leakage levels during hydraulic fracturing operations (the process used to extract shale gas) and may nullify any emission advantage over coal.

- The combustion of natural/shale gas is still high-carbon compared to renewable sources of energy.

| 2.30 | The demonstrated negative impacts associated with unconventional shale gas exploration and exploitation and its ancillary activities may pose unacceptably high risks to people and the environment. These impacts include, but are not limited to air and water pollution, aquifer contamination, lowering of water table, habitat loss, disruption of ecosystem services and loss of natural resources. |
| 2.31 | South Africa's freshwater resources cannot sustain the high water demands of shale gas exploration and exploitation, even during non-drought years. This will be exacerbated in the light of increasing climate change impacts. |
| 2.32 | There is no long term data available on the cumulative effects of hydraulic fracturing over large areas (such as habitat fragmentation, lowering of the water table levels and long term impacts on livelihoods on communities). |
| 2.33 | There is a paucity of inputs for establishing a sufficiently comprehensive baseline of resources and biodiversity. This severely hampers the capacity for the state and other role players to scientifically monitor and evaluate the impacts of the industry's operation. |
| 2.34 | There is no strategic environmental risk assessment or cost-benefit analysis for those exploratory prospecting applications outside the Karoo. The situation is both concerning and confusing. |
| 2.35 | There is insufficient capacity especially in rural areas to deal with the waste generated as a result of hydraulic fracturing and wastewater treatment. This presents major challenges to |
### Economic Considerations
- The economic benefits of shale gas are poorly understood. As such, an inclusion of economic benefits in documents supporting fracking can only be regarded as unsustainable.
- Through investments into shale gas, the country is inhibiting and delaying progress towards more sustainable forms of energy.
- The opportunity costs of this activity have not been sufficiently explored in the South African context. An example can be found in the chapter on tourism in the SEA report recently commissioned by the CSIR which acknowledges the importance of tourism as a major and growing economic activity in the Karoo. However, the SEA does not explore tourism as an alternative development opportunity to hydraulic fracturing, subject to the same investment scenario.

### Legislative and Regulatory Framework
- South Africa’s current regulatory framework is insufficient to mitigate the high risks and uncertainties associated with shale gas exploration. This is particularly pertinent when the use of hydraulic technology is employed. The EWT holds that the Regulations for Petroleum Exploration and Production, as published in Government Notice R466 in Government Gazette 38855, 2015 (hereafter the “Fracking Regulations”), are not stringent enough and do not provide adequate checks and balances to ensure sustainable development of the shale gas resource.
- The EWT notes its concerns that the Fracking Regulations may be unlawful, due to the enabling provisions in the Mineral and Petroleum Resources Development Act (Act 28 of 2002) (MPRDA), which provided the of the Department of Mineral Resources (DMR) with the power...
create regulations having been repealed before the Fracking Regulations were created.

- The EWT notes further that uncertainty (and alleged unlawfulness) of certain provisions of the MPRDA and the regulations promulgated thereto, which are being used to govern shale gas exploration applications are inadequate in terms of addressing and mitigating the cumulative impacts of shale gas exploration processes.
- The inadequate investment of state resources into the existing fracking SEA in the Karoo limits the value of the outcomes to appropriately inform policy and shale gas governance. In fact, the SEA is undermined by the approval of shale gas exploration rights prior to its completion. Consequently, the results of the SEA will not govern these exploratory activities, which will take place over vast areas of the Karoo and elsewhere.

2.38

- Claims that shale gas is an interim or “bridge” fossil fuel are unfounded. There are no policy documents or legislative provisions in place to ensure that extracting shale gas will reduce the extraction of other fossil fuels such as coal.
- Even with stringent regulations in place, there is a high probability of cumulative negative impacts. These impacts include increasing habitat fragmentation and biodiversity impacts regionally bearing in mind that fracking takes place over a vast area. This will result in unavoidable negative ecosystem and community livelihood impacts beyond the local level which could be both long term and irreversible.

2.39

The Precautionary Principle

- The EWT supports the precautionary principle and as such, we are opposed to hydraulic fracturing. The onus should be further placed on authorities and proponents of the activity to:
- Provide clarity on how an increasing shift towards gas will meet South Africa’s emissions reduction targets.
targets.

- Address the fact that South Africa does not need unconventional gas to meet the increasing energy demand in South Africa as we have other viable and renewable energy options.
- Address the gaps in the existing oil and gas policies and regulations in water governance legislation and policies, waste management governance and other relevant legislative frameworks.
- Provide a fully transparent, inclusive, scientifically robust and well-resources SEA for exploratory prospecting applications outside the Karoo.
- Undertake an overdue Integrated Energy Plan review (in draft) to include the assessment of the most environmentally friendly energy mix for the country.
- Engage in real meaningful public participation with an emphasis on transparency—above and beyond the limited legislative requirements in this regard, ensure that affected party’s needs and concerns are legitimised, fully addressed and integrated into decision-making frameworks such as the SEA.
- Provide evidence to civil society of the capacity and resources the state will provide to ensure the effective enforcement and compliance of the oil and gas industry.

2.40

- Provide a guarantee that threatened species sensitive habitats and ecosystems and critical natural resources supporting livelihoods will be protected at all costs. The EWT maintains that sensitive and protected ecosystems must be considered as well-buffered excluded areas and these areas should be regularly monitored by relevant authorities who are equipped and have capacity to undertake such monitoring.
- Provide greater resources to all existing baseline and ongoing monitoring programmes in shale areas including for biodiversity monitoring, civilian science.
monitoring and impact monitoring and resource new monitoring programmes where there are still baseline gaps.

- Refer to Chapter 2 of the Constitution of the Republic of South Africa (Bill of Rights) in the absence of hard facts, where the fundamental rights of all South Africans are enshrined.

2.41 This is to register objection to the above application in the Matatiele region of the Eastern Cape.

- The manner in which this has been applied for remains disingenuous, in that there is no true presentation of fact: to do with the provenance and management of the company making the application so that one cannot trust their financial and technical abilities.
- No true public participation, given the demographics and geography of the area - and the very careless and bumptious presentations by the exploration company.
- No true representation of the outcome of exploration being fracking, and the outcome of fracking being harm to the entire environment.
- Harm to agricultural land, to water resources, to conservation of biodiversity. And the bill to be picked up by struggling rural municipalities once the mining company has taken the resources and run back to where they came from. It is sickening in the extreme that the exploration company is persisting with this application in the face of the clear will of the people of the land.

Margaret Neunborn, Email, 14 September 2016

Your objection is recorded.

The registration and ownership details of Rhino Oil and Gas Exploration South Africa (Pty) Ltd are provided in Section 4.1.1 of the EIA and on their website.

Refer to the Scoping and EIR reports for details of the public participation that was undertaken.

Rhino Oil and Gas has always stated publicly that its long-term objective is to locate and develop a commercially viable petroleum resource. However, the current application(s) for an exploration right and related environmental authorisation is limited to exploration activities only, and specifically early-phase exploration as detailed in the Report prepared for each application. Their search would be for all forms of oil and gas resources. Rhino Oil and Gas cannot yet, without conducting the early-phase exploration work, know what the future extraction options would entail.

2.42 Further to my appeal to include the issues arising from the Karoo Shale Gas SEA, much of the documentation we are being asked to read and on which we have to comment remains lacking in depth and superficial. We understand that this is the way these processes are run – a whole lot of boxes are ticked and submitted for approval, which is seldom denied. However, this issue in which you have chosen to become involved has the potential to change our country and society for the worse and it is imperative that you approach it in a way that protects us from

Judy Bell on behalf of FrackFree SA, Email, 15 September 2016

This view is noted.

As the EAP SLR has carried out an environmental impact assessment in terms of the requirements of the EIA Regulations 2014, the application for environmental authorisation and EIA process are aligned to the exploration work programme as specified. No ground-based exploration is included. This assessment
harm. This is your mandate as an Environmental Assessment Practitioner – to represent the environment!

Please would you ensure that the following is included in your Scoping and EIA processes (including in the comments registers) to make sure the issues arising from the SA Human Rights Commission on the socio-economic issues facing mining communities are addressed in your assessments. This Commission is underway at the moment. These excerpts came from Media24 and BDLive articles available on the internet.

This assessment concludes that the current exploration work programme proposed by Rhino Oil and Gas could be undertaken without significant risk to the environment.

The findings of the SA Human Rights Commission, once available, would require due consideration should Rhino Oil and Gas obtain an exploration right and reach a point where ground-based exploration is being considered.

The potentially significant social issues associated with mineral extraction are acknowledged. This assessment concludes that the current exploration work programme proposed by Rhino Oil and Gas could be undertaken without significant risk to the socio-economic environment.

If the applicant were to apply for the undertaking of further exploration activities or a production right then the potential impacts of the activities would require detailed consideration. Rhino Oil and Gas would need to undertake further environmental assessment process to inform decisions on such applications. The relevant socio-economic impacts would require to be assessed during these processes.

These views are noted.

2.43

The SAHRC is conducting two days of public hearings on the socioeconomic issues facing mining communities, ranging from water quality to the economic implications of the industry. Submissions on Wednesday included from multiple departments involved in ensuring decent housing and infrastructure around mining towns, as well as health. Squalid conditions around mines have been identified as one of the key drivers of labour instability, including in the run-up to the Marikana massacre in 2012. Also, failure to provide alternative local economies that could survive “the end of money” has led to attempts to revitalise mining towns in various stages of economic distress.

Judy Bell on behalf of FrackFree SA, Email, 15 September 2016

These views are noted.

2.44

Quotables:
- Bongani Pearce, chairperson of the Mpukuryeni Community Property Association in Mtubatuba, KwaZulu-Natal, said residents in that area were worse off since a coal mine had started operating there nine years ago.
- “Sustainable farming had also been negatively affected by the condition of the land since the mine began operations.”
- “We’ve got a high level of air pollution because of the dust that goes up.”
- “We have had the fatalities of our livestock, we slaughter a lot of cattle [and] when you dissect

Judy Bell on behalf of FrackFree SA, Email, 15 September 2016
<p>| 2.45 | I am reading the Motuoane Energy Scoping Report which has a list of specialist reports limited to Ecology and Wetlands, Geohydrology and Heritage. You cannot expect informed decision-making when providing such a superficial smear of information. You all need to get to the nub of the issue – is there a need for unconventional gas when there are alternatives – civil society understands the answer is NO WAY, so please be honest in the process of applying for something that should not be authorised, if all the facts are provided. | Judy Bell on behalf of FrackFree SA, Email, 15 September 2016 | SLR has no comment on the Scoping Reports produced for other applicants. The application for environmental authorisation and this EIA process is aligned to the exploration work programme as specified by Rhino Oil and Gas. Processes and studies on the feasibility of gas and the comparison to renewables in the national context are outside the scope of any single EIA process. |
| 2.46 | Please note that I have a strong objection against this project. This is mainly because it will cause major dewatering in our area which has been experiencing serious scarcity of water due to nature and traditional reasons. | Jackson Siwa, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016 | Your objection has been noted. Your objection has been noted. The current ER application does not include any invasive exploration activities nor any production. As such there will not be any impacts on water resources. If the project reached those future phases, Rhino Oil and Gas would need to undertake another EIA process to apply for the future activities. Consideration and approvals under the applicable legislation would need to be made at the time. These may not be granted if the impacts of the activity on water resources (for example) were considered to be too severe. |
| 2.47 | We do not want you here! You come here to tell us that there will be potential risks and benefits yet we have made it clear that we do not want this project? Please note that we, the people of Matatiele do not want this project in our area. We have the strongest objection against the project that will lead to fracking. | Lebohang Phakisi, Matatiele Public Feedback Meeting, 24 August 2016 | Your objection is recorded. Your objection is recorded. We run a legal process that takes all raised comments into consideration and also submit them to the competent regulatory authority for decision making. The response to the project and the objections by many I&amp;APs are documented. The EIR documents and highlights the significant objection by I&amp;APs. On the simple merits of the application there is therefore no environmental reason why the exploration activities should not be approved. |
| 2.48 | We told you before that we do not want you here (SLR and Rhino). So, why have you (SLR) called us here to inform us that you are considering the approval of this project? Your slides clearly states that it is your intention to have this project approved. | Lebohang Phakisi, Matatiele Public Feedback Meeting, 24 August 2016 | The response to the project and the objections by many I&amp;APs are documented. The EIR documents and highlights the significant objection by I&amp;APs. On the simple merits of the application there is therefore no environmental reason why the exploration activities should not be approved. |
| 2.49 | Leave us alone! We do not want to see you here again talking about oil and gas. Stay away from Matatiele! | Nicky McLeod, Matatiele Public Feedback Meeting, 24 August 2016 | We run a legal process that takes all raised comments, including yours, into consideration. We also submit the comments to the competent regulatory authority for decision making. The EIA process is necessary in order to document the objections and other responses and for these comments to reach the decision makers for consideration. |
| 2.50 | Where do stay, Philip? What would you say if I proposed the same project where you live? | Sinegugu Zukulu, Matatiele Public Feedback Meeting, 24 August 2016 | I will not have a problem with having this kind of a project in my own backyard for as long as it carried out in a safe and sound manner. (Rhino Oil and Gas) |
| 2.51 | If exploration in the Karoo with sparsely scattered population was considered as a serious issue, what more about densely populated areas like ours? | Lebohang Phakisi, Matatiele Public Feedback Meeting, 24 August 2016 | Your comments have been noted. It is proposed that ground-based activities were to be proposed for future phases of the project then the risks and impacts of those activities, in light of the local conditions, would have to be given consideration in the assessment process. |
| 2.52 | We do not want your project! What you are doing to us is simply forcing yourselves onto us and we do not appreciate it. We do not want the potential end product of your project (FRACKING)! | Bruce Templeton | Interested and affected parties (I&amp;APs) have the right to raise concerns and comments on projects however, I&amp;APs do not make decisions/approve projects. The decision making process is carried out by the competent regulatory authority (PASA). PASA is required to give consideration to the application with regards to the legal framework and the findings of the studies that are required. PASA would not issue a right if the findings show that there are more and serious negative impacts than positive impacts of the project. |
| 2.53 | It is very disrespectful of Rhino and Phillip to say there is no resounding objection against the project when we told you a while ago that we do not want your project in our area. | Georgie Rowlands | Your objections have been recorded. |
| 2.54 | We are here to protect and conserve our area for the future of our kids and grandchildren. We brought these kids and students to this meeting so that they can see that we care about them and want to protect them. We say NO to this project! | Gordon Harrison | The purpose of the meeting is not to convince you to agree with the project but to inform you about the progress of our environmental impact assessment process; to record and address your issues and concerns and the include them in the final report. We therefore welcome any views you may have and our role is to record them. |
| 2.55 | Do you mean to tell us that there are people who said Yes to this project? We say NO! | Georgie Rowlands | |
| 2.56 | Please record a resound NO against this project! | Gordon Harrison | |
| 2.57 | We brought these kids to this meeting to show them that we do not want this project. How would Phillip if we contaminated his water through the same project? We do not want your project and we do not want fracking! | Gordon Harrison | |
| 2.58 | We love our pristine area in Matatiele and there is no value that can be attached to it! We say NO to your project! | Gordon Harrison | |</p>
<table>
<thead>
<tr>
<th>Section</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.59</td>
<td>There are plans to develop prospective farms for our agri-tourism industry in October—which will create jobs. The community strongly objects your project because it may interfere with the preparations. The community does not want this Rhino project. M. W. Makora, Bakoena Traditional Authority, 26 August 2016.</td>
</tr>
<tr>
<td>2.60</td>
<td>Our community does not want this project to go ahead. M. W. Makora, Bakoena Traditional Authority, 26 August 2016. We will record your concerns and strong objection to the project but please understand that the final decision is not made by us, the community or tribal authorities. The decision lies with the competent authority (PASA).</td>
</tr>
<tr>
<td>2.61</td>
<td>Please would you ensure that the following is included in your Scoping and EIA processes (including in the comments registers) to make sure these areas and the associated buffers are excluded from the exploration areas with which you are all currently working on applications to PASA for authorisation for oil and gas. This is an item that remains outstanding and all your exploration maps merely exclude the formally protected areas. This is essential for the IAPs to be able to participate meaningfully. Judy Bell on behalf of FrackFree SA, Email, 14 September 2016. Exclusion areas as defined by legislation and relevant to the current application have been implemented for the ER application area.</td>
</tr>
<tr>
<td>2.62</td>
<td>Please also note that the issue of sacred waters has not been dealt with in any of your documentation, despite it being raised in many of the public meetings. An article is attached for information. Noting that we are in Heritage month, we need to ensure that these living waters are protected as they &quot;are dependent on correct human ritual relations to maintain their vitality&quot;. Water resources — as per the definition in the Water Act includes a watercourse, surface water, estuary, or aquifer. As you know, a watercourse is defined as: (a) a river or spring; (b) a natural channel in which water flows regularly or intermittently; (c) a wetland, lake or dam into which, or from which, water flows. It is not only the water resources, but also the ecosystems that support them that have to be protected in our water scarce country. This means that you will also need to make sure that mountain catchments, high water yield areas and the National Fresh Water Priority Areas are. Judy Bell on behalf of FrackFree SA, Email, 14 September 2016. The water resources of the region, including Mountain Catchments and NFEPA are documented in Section 5 of the EIR. There is no legal requirement to exclude water resources from an ER application area. The assessment concludes that the proposed exploration work programme could be undertaken without significant impact to the water resources (inclusive of sacred waters).</td>
</tr>
</tbody>
</table>
effectively delineated. Have a look at the WWF document to assist you with this process. 

### 3. Categories

#### 3.1 Technical Related Issues

<table>
<thead>
<tr>
<th>3.1.1 Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question:</strong> Will this project be restricted to the whole of Matatiele or only Chieftainess Sibi’s area and what is the usefulness of oil and gas?</td>
</tr>
<tr>
<td><strong>Mamokhesi, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016</strong></td>
</tr>
<tr>
<td><strong>Response:</strong> The town of Matatiele is actually outside the project area as indicated on the locality map. The project area comprises areas of Chieftainess Sibi, Chief Moshoeshoe, Chief Lebenya and Chief Zibi. This was pointed out to the audience on the map. This type of oil and gas can be used for cooking; as a fuel for cars; and at the factories and industries. However, many studies need to be undertaken before the production phase and that will include assessing whether production will be economically viable or not.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.1.2 Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question:</strong> Why has Rhino Oil and Gas decided to explore in the Matatiele area?</td>
</tr>
<tr>
<td><strong>Nduduzi Khoza, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016</strong></td>
</tr>
<tr>
<td><strong>Response:</strong> Rhino Oil and Gas has made use of historical information and geological maps to identify areas with high potential for existence of oil and gas. The Matatiele area was identified as a potential area for oil and gas.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.2 Methodology to be used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question:</strong> Will there be a community representative who will accompany the project team whilst Rhino is undertaking the aerial surveys within Sibi’s area? It is important there is a representative as part of the project team to protect the interest of the community.</td>
</tr>
<tr>
<td><strong>Teboho Sesheea, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016</strong></td>
</tr>
<tr>
<td><strong>Response:</strong> No community representatives will be required to accompany the project team during conducting the aerial surveys. Rhino Oil and Gas will contract a trained, experienced and qualified company to undertake the aerial surveys. No person other than the trained people will be allowed to be in the plane. All gathered information will be submitted to the DMR for the record of the government. It is not in Rhino Oil and Gas’s interest to misinform the community.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.2.2 Methodology to be used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question:</strong> What chemicals will you use for your project? We have asked you before and you could not answer the question. Follow up comment after the response: This is out of scope of work? That is unacceptable. We want to understand the final product of this project.</td>
</tr>
<tr>
<td><strong>Gordon Harrison, Matatiele Public Feedback Meeting, 24 August 2016</strong></td>
</tr>
<tr>
<td><strong>Response:</strong> This aspect is now out of scope of work for this phase of the project. As a result we cannot provide you with an accurate response. This project will only entail exploration using an aerial survey (Rhino Oil and Gas). If drilling were to be proposed for future phases of the project then the nature of the drilling fluids to be used would be disclosed and the impacts thereof given consideration in the assessment process.</td>
</tr>
</tbody>
</table>
### 3.2.3 How will you extract the resources?

Nicky McLeod

The extraction aspect is out of scope of work for this phase of the project. This project relates to exploration activities and not production phase. Rhino Oil and Gas would need to undertake another EIA process should they apply for a production right. It must be noted that one approval does not guarantee approval of future applications.

### 3.3.1 Cumulative Impacts

What are the cumulative impacts of your project?

For the revised scope of work, the nuisance of noise from the flight is the main problem linked with the proposed project. However, the noise will not pose any health or safety risks to the community both in the short term and cumulatively. While the future phases of the project may have impacts these cannot reasonably be assessed. The applicant cannot yet, without conducting the early-phase exploration work, know what the future options entail. Without information on the scope, extent, duration and location of future activities it is not possible to undertake a reliable assessment of future impacts.

### 4. Categories

#### Water Related Issues

#### 4.1.1 Contamination of water

Malengolo Lengolo, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016

Your concern has been noted. However it must be noted that your concern specifically relates to the production phase which is not part of the scope of work for this project. This project relates only to early-phase exploration activities and not production phase. Rhino Oil and Gas would need to undertake another EIA process should they apply for further ground-based exploration activities or a production right. It is important to note that production techniques differ with different minerals depending on their quality, quantity and depth. Therefore, it is not factual generalise and assume that only one method will be used in the production phase.

#### 4.1.2 What will happen after the completion of the aerial survey? Are you not going to contaminate the scarce water in our area?

Nduduzu Khoza, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016

The next phase of the project would be dependent on the findings and results of the first exploration phase. The next phase might comprise an application to drill core boreholes and undertake seismic studies within specified areas in order to gain more knowledge. Rhino Oil and Gas cannot confirm anything until aerial surveys have been completed.

#### 4.1.3 Will the water not mix with oil?

Bobo Mngomeni, Bahlakoana Traditional Authority

Your concern specifically relates to the production phase which is not part of the scope of work for this project. There is a possibility that the two might mix in future drilling phases. Gas boreholes have to be designed in order to minimise such risks to
### 4.1.4 The community is concerned about agriculture as we do not have enough land and water. There are also concerns around the contamination of water resources by exploration and fracking.

<table>
<thead>
<tr>
<th>Feedback</th>
<th>Meeting, 23 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teba Mafasa, Royal Bakoena Trust, Bakoena Traditional Authority, 26 August 2016</td>
<td></td>
</tr>
</tbody>
</table>

**Your comments have been noted.**

The assessment concludes that the proposed exploration work programme could be undertaken without significant impact to the agricultural and water resources.

### 4.1.5 The potential impacts of drilling could cause groundwater to become contaminated, which will impact those using groundwater as well as posing a threat to the ecosystem. What safety and/or mitigation measures will be put in place to insure groundwater does not become contaminated?

<table>
<thead>
<tr>
<th>Feedback</th>
<th>Meeting, 24 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niyaaz Isaacs, Email, 16 September 2016</td>
<td></td>
</tr>
</tbody>
</table>

### 4.2.1 Dewatering

We live in a water scarce area and this project has a potential to negatively affect our catchment that is being used for both domestic and farming activities.

<table>
<thead>
<tr>
<th>Feedback</th>
<th>Meeting, 24 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mafuza Nkomo, Matalele Public Feedback Meeting, 24 August 2016</td>
<td></td>
</tr>
</tbody>
</table>

This aspect is now out of scope of work for this phase of the project. A groundwater study would be undertaken later on if the project proceeded to the following phases, in order to assess the impacts in detail.

### 4.3.1 Research

We are happy to hear and learn about your project. We are also aware that your project deals with underground studies that are of great interest to us. There is serious scarcity of water in our area and as a result, we would like to know if it will be possible for Rhino to also identify areas with pockets of water within our area as they are undertaking their own studies and explorations activities?

<table>
<thead>
<tr>
<th>Feedback</th>
<th>Meeting, 23 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoffman Molibeli, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016</td>
<td></td>
</tr>
</tbody>
</table>

The proposed aerial survey by Rhino Oil and Gas is not able to provide accurate information relating to water or any other minerals except oil and gas. This is mainly because the study and equipment to be used for the study is specifically designed to provide information on oil and gas. Moreover, Rhino Oil and Gas will only be legally allowed to undertake studies on oil and gas and no other minerals or any other substances of potential interest. (Rhino Oil and Gas)

### 4. Categories

#### 4.1.1 Negative impacts

**Why did you exclude Ongeluksnek from the project area?**

Does it mean the project had a potential to harm it?

<table>
<thead>
<tr>
<th>Feedback</th>
<th>Meeting, 23 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teboho Sesheea, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016</td>
<td></td>
</tr>
</tbody>
</table>

There are laws and guidelines in the country, which state that no mineral exploration or development can take place in and/or around a specific distance from protected areas. As a result, Rhino Oil and Gas has excluded all protected areas from the application.

#### 4.1.2 What potential impacts will the activities taking place at the seismic and drill sites have on the biodiversity of the area?

<table>
<thead>
<tr>
<th>Feedback</th>
<th>Meeting, 23 August 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niyaaz Isaacs, Email, 16 September 2016</td>
<td></td>
</tr>
</tbody>
</table>

Ground-based activities no longer form part of the current application.
<table>
<thead>
<tr>
<th>4.1.3</th>
<th>How severe will this be on the environment?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1.4</td>
<td>What mitigation measures will be put in place to?</td>
</tr>
</tbody>
</table>

5. Categories | Air Quality Related Issues |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1.1</td>
<td>Pollution</td>
</tr>
<tr>
<td>With regards to air pollution, the release of gas from boreholes should be managed accordingly.</td>
<td>Nyaaz Isaacs, Email, 16 September 2016</td>
</tr>
<tr>
<td>No boreholes are included in the current exploration work programme for which environmental authorisation is sought.</td>
<td></td>
</tr>
</tbody>
</table>

6. Categories | Heritage and Paleontological Related Issues |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1.1</td>
<td>With respect to the EIA for Rhino application, how do you propose flying at 300m above ground when most of the area under survey comprises nature reserves and world heritage sites which have a flight height restriction in excess of 700m?</td>
</tr>
<tr>
<td>Furthermore, it is a very dangerous place to fly given the thermals and wind shears against the mountains.</td>
<td>Gordon Harrison, Email, 12 September 2016</td>
</tr>
<tr>
<td>Thank you for the comments Mr Harrison. The exploration right application area does not include any protected areas as defined in terms of the National Environmental Management Protected Areas Act. We are aware of, and have documented, the Local Municipalities' intent to have certain further areas in the region declared with biodiversity status. The EMP included in the document also sets out the commitment that 'Flight paths must be pre-planned to avoid national parks, nature reserves and world heritage sites. Where this is not possible, an altitude of 2 500 feet (762 m) should be maintained (as per Section 47(1) of NEMPAA), unless permission is obtained from the management authority or in an emergency'. The person flying a plane would be a qualified pilot, trained to deal with atmospheric conditions that they may encounter. SLR, Email 13 September 2016</td>
<td></td>
</tr>
</tbody>
</table>

6.1.2 | We do not want you to disturb our environment including the areas we use for traditional and cultural practices such as initiation schools. What if your aeroplane flies over these areas? There are rules that guide these practices. |
| Lebohang Phakisi, Matatiele Public Feedback Meeting, 24 August 2016 |
| Your comment has been noted. The flights are ultimately not any different from the other light aircraft that traverse the area occasionally. If information on the locality of these areas and the timing of the initiation schools are provided then it is likely that the surveys could be planned to avoid these. |

7. Categories | Socio-economic Related Issues: Health and Safety |
|--------------|---------------------------------------------|
### 7.1.1 Safety

Gas is very dangerous and explosive. Now, what is going to happen when you expose it uncontrolled aboveground? It really sounds like Rhino wants to put our lives at risk and only for their own benefit and profit.

**Ntsenyeho Ngobo, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016**

Your concern has been noted. However, it must be noted that your concern specifically relates to the production phase which is not part of the scope of work for this project. This project relates to exploration activities and not production phase. Rhino Oil and Gas will need to undertake another EIA process should they apply for a production right.

There are existing mechanisms for handling gas in a safe manner already. LPG is widely used commercially and domestically. It is also important to note that companies that explore do not make money out their research studies. It is only companies that are involved in the production phase that make money from their activities. These companies have guidelines that they have to comply with such as paying tax and developing social labour plans (SLP) for local communities.

### 7.1.2

If your research study shows that there is oil and gas will you extract it? We do not want Rhino to benefit at our cost.

**Ntsenyeho Ngobo, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016**

If oil and gas are discovered, Rhino Oil and Gas would need to assess its quality and quantity and determine if it is economically viable to extract it or not. More EIA processes will have to be undertaken before a production right is granted. The government will not issue a production right if it assessed that there are more and serious negative impacts than positive impacts resulting from the project.

### 7.1.3

What are the risks associated with the proposed project?

**Letatsi Moma, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016**

For the new scope of work, the nuisance of noise from the aeroplane is the main problem linked with the proposed project. However, the noise will not pose any health or safety risks to the community.

### 8. Categories

#### 8.1 Socio-economic Related Issues: Resettlement

**M.J. Sefoloko, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016**

Your concern has been noted. However, it must be noted that your concern specifically relates to the production phase which is not part of the scope of work for this project. This project relates to exploration activities and not production phase. Rhino Oil and Gas will need to undertake another EIA process should they apply for a production right.

South Africa has a lot of laws and regulations regarding health and safety of the people including resettlement related process.
9. Categories | Socio-economic Related Issues: land use, properties and daily activities/ livelihood
---|---
9.1.1 Livelihood | We rely on animals for our livelihoods and therefore, we feel this project threatens our livelihoods.
Matsuza Nkomo, Matatiele Public Feedback Meeting, 24 August 2016

For the revised scope of work, the nuisance of noise from the flight is the main problem linked with the proposed project. However, the noise will not pose any health or safety risks to the community or their livestock.
The flights are ultimately not any different from the other light aircraft that traverse the area occasionally.

9.1.2 | The impacts of fracking were demonstrated to us (and the community) by a group of people on the 23rd September 2016. As a result, the community is under the impression that the project will degrade our land, water and livestock.
Teba Mafasa, Royal Bakoena Trust, Bakoena Traditional Authority, 26 August 2016

I am not in a position to comment on the demonstration that was done for the community but this particular application pertains to the aerial survey only. If Rhino Oil and Gas would like to apply for other activities, a separate EIA process will be undertaken which would have to conclude an assessment of the activities that are being proposed.

The mineral legislation provides that decisions to approve rights can only be made if the applicant has obtained an environmental authorisation in terms of the NEMA. The environmental authorisation process requires the authority to assess the merits of an application in light of the principles of sustainable development as set out in Section 2 of NEMA. Approval could not be granted for the undertaking of activities resulting in impacts of unacceptable significance.

---|---
10.1.1 Benefits | Have you done this kind of a project before and what do you normally do for your communities?
Ntsenyeho Nqoboko, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016

Yes, Rhino Oil and Gas has carried out a number of aerial surveys before in other countries. Rhino Oil and Gas has always been committed to cooperating with communities in which they operate in. It must be noted though that an aerial survey is short lived study and that no oil and gas will be extracted. (Rhino Oil and Gas)

10.1.2 | What will the community benefit from this project?
Mpho Sibi, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016

South African laws dictate that all minerals to the government and that anyone who legally owns land within the projects needs to give the exploring company consent to access the land. This exercise often leads to compensation to the landowner from direct negotiations with Rhino Oil and Gas.
It is also important to note that companies that explore do not make money out of their research studies. It is only companies that are involved in the production phase that make money from their activities. These companies have guidelines that they have to comply with such as paying tax and developing SLPs for local communities.

10.1.3 How can the community be involved and how will they benefit from this?

Chief Thozama Zibi, Amahlubi Traditional Authority, 25 August 2016

The project is still in its early stages. We are essentially busy with research work at the moment but as time goes by (and if the project gets approved, direct and indirect jobs may be created. (Rhino Oil and Gas)

Progress will be communicated to all relevant stakeholders through this and future EIA processes and through any community liaison mechanism that Rhino Oil and Gas may establish in future.

11. Categories Socio-Economic Related Issues: Employment and Procurement Opportunities

11.1.1 Will there be any job opportunities for the local people?

Johannes Kolsang, Bahlakoana Traditional Authority, Feedback Meeting, 23 August 2016

For this phase of the project, there will none to very unlimited job opportunities. The aerial surveys will be undertaken by a trained, experienced and qualified people to operate the plane and gather relevant information. (Rhino Oil and Gas).

12 Categories Fracking

12.1 Fracking

Matatiele, we hereby register our stance against oil & gas exploration in our area and surrounds. We fully support the facts that such activities will damage our unique eco-system, which is the heritage of the Matatiele people and not the right of some Oil company to abuse. Matatiele is our home, and it is un-spoilt, clean and safe, we want to keep it that way. Further, we cannot allow that any activity put at risk our water supply and our health and the well-being of our children. To put it boldly, we are against Fracking! We are against Oil & Gas Exploration! We stand together with the people of Matatiele when we say you are not welcome here.

Resthaven Guesthouse, Email, 12 September 2016

Your objection is recorded
| 12.2 | I, Jutta Moxham and my family strongly object to fracking in East Griqualand as we as a family don’t believe fracking does not serve any benefits whatsoever! Fracking is now banned in major European countries, and the places they have fracked in the USA is now damaged beyond repair! On these grounds I suggest strongly that you f.r.a.c.k. Off! | Jutta Moxham, Email, 13 September 2016 | Your objection is recorded |
The Table below provides a summary of the issues and concerns raised by I&APs in the period between completion of the Scoping Report and prior to the distribution of the Environmental Impact Report for review. Also included in the Table are responses to the question or issue. The majority of these issues were addressed in the Scoping Report response to similar comments. Where necessary the issue or concern was carried through into the content of the Environmental Impact Report. Copies of all of these comments are included in Appendix 6.3.

**TABLE 3-6: COMMENTS AND RESPONSES POST SCOPING BUT BEFORE REVIEW OF THE EIR**
(as received between 19 April and up to 02 August 2016)

<table>
<thead>
<tr>
<th>No.</th>
<th>Categories</th>
<th>Procedural Related Issues: Process</th>
<th>Names, mode of communication and date</th>
<th>Response provided (as adapted for the purpose of the scoping report)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regulatory Authorities Comments</td>
<td>We acknowledge receipt of your final scoping report dated 26 April 2016. Please be advised that the scoping report in question is currently being reviewed and we will respond in due course.</td>
<td>T Motloung, Petroleum Agency SA, Email, 28 April 2016</td>
<td>Thank you.</td>
</tr>
<tr>
<td>1.1</td>
<td>The Final Scoping Report (FSR) and plan of study for the Environmental Impact Assessment received by this office on 26 April 2016 has reference.</td>
<td>T Motloung, Petroleum Agency SA, Email, 10 June 2016</td>
<td>The comments have been addressed in the EIA, where relevant. The change in the scope of the exploration work programme to only remote exploration techniques limited the need to address some of these items. Refer to Sections</td>
<td></td>
</tr>
</tbody>
</table>
3. Please ensure that various state departments are consulted during the EIA process and their comments incorporated in the Environmental Impact Assessment Report (EIR) before submission to the Agency. State Departments/Agencies to be consulted must include amongst others the Provincial Heritage Resources Authority/ South African Heritage Resources Agency, Provincial Environmental Department, Department of Agriculture, Forestry and Fisheries (DAFF), Department of Water and Sanitation (DWS), Department of Land Affairs (DLA) district and local municipalities. Should you be unable to obtain comments, proof of attempts made to obtain comments should be submitted to the Agency.

4. Identification and consultation with all affected land owners must be carried out during the EIA process.

5. The implementation of the plan of study for the EIA must be taken into consideration the following:
   a) Where desktop studies are used during the environmental assessments, they must be authenticated by physical assessment in order to provide definite characteristics of the proposed exploration area. In this regard, you and the specialists are required to undertake physical site assessments of the application area and present the results thereof in the EIR.
   b) Section 24P of the NEMA requires that an applicant for an environmental authorisation relating to prospecting, exploration, mining or production must before the Minister responsible for mineral resources issues the environmental authorisation, comply with the prescribed financial provision for the rehabilitation,
closure and ongoing post decommissioning management of negative environmental impacts. You are therefore reminded to quantify the method of financial provision in line with the requirements of the National Environmental Management Act; Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations, 2015. The said must be carried out by a specialist.

6. Please ensure that the EIR includes the A3 size locality and layout maps of the application area.

7. You are requested to submit three (3) hardcopies of the EIR and EMP r and at least one electronic copy (USB/CD) of the EIR and EMP r to the Agency on or before 05 of October 2016.

1.2.1 Commenting Authorities

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>If the area under investigation for your application extends over National Roads, it falls under SANRAL’s jurisdiction. Should the application be successful, SANRAL will not allow any new access roads off its National Road and SANRAL must be advised on which existing accesses will be used to gain entry to the proposed areas. If any activity falls within SANRAL’s area of jurisdiction which is defined in SA National Roads Act as being within 500m of any intersection with the National Road and within any 60m of any national road reserve, formal application must be made with this office via normal or couriered mail.</td>
<td>Noted. There are no National Roads within the exploration Right Application area.</td>
</tr>
</tbody>
</table>

1.2.2 I would like to add that the Elundini Local Municipal Council has strongly objected to the proposed activity. A formal signed letter from the Council will be forwarded on the 30th of June 2016. During the process you have initiated you made it as difficult as possible to interact and to obtain relevant information, we were assisted to obtain the relevant information and we are aware of the local community.

<table>
<thead>
<tr>
<th>Comments</th>
<th>Charles Coetser, Elundini Local Municipality, Email, 17 June 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>The EIA process was carried out in terms of the EIA Regulations 2014. SLR has made relevant information available in multiple formats and responded to all requests for information. Copies of all of the EIA related documents were provided directly to the Elundini Local Municipality.</td>
<td>Your objection has been recorded. We will await the formal letter.</td>
</tr>
</tbody>
</table>

SLR Project 723.18034.00005 Rhino Oil and Gas - Exploration Right Application: EIA and EMP report September 2016
1.3.1 **I&APs**

The Department of Minerals Resources (DMR) should come with Rhino to introduce them to the community and explain that Rhino have made an application to look for oil and gas. If they do find something then they will have to make more applications before they can take anything out and if there is extraction then there will be benefits for the community. If the company such as Rhino goes to the community without the government they could experience problems because the community will think they have just come to take their land.

**Mr Vukile Matyeni, Elundini Municipality’s Affected Ward Councillors Scoping Meeting, 25 January 2016**

It would be better if the government came in before-hand to make the community aware of such projects but unfortunately that is not their role and they don’t have the capacity/ people to do that. Instead, the applicant is supposed to inform the community and other interested parties of the proposed project(s) throughout the environmental impact assessment (EIA) process. These tasks have to be undertaken and facilitated by an independent EIA consultant.

1.3.2

I concur with Mr Matyeni that Government should be the one informing the community about the role of Rhino. In addition, the local Traditional Authorities are suspicious of foreign companies. Their main concern is that some of these companies exploit the land and just leave without benefitting the community.

**Clr Ntombizanele Gloria Ntaopane, Elundini Municipality’s Affected Ward Councillors Scoping Meeting, 25 January 2016**

The technical terms used in the BID are difficult to translate into Sesotho and isiXhosa because there are no equivalent words in these languages. As a result, the translations usually take a whole sentence to describe one word which might be difficult to understand for some community members. The educated members of the community usually explain these documents to other members of the community.

1.3.4

The translated versions of the background information document (BID) are not difficult to understand.

**Scoping Meeting, 25 January 2016**

1.3.5

We are not against what Rhino is proposing but there should be proper participation from the local traditional authorities as the project unfolds. Rhino should find out if the traditional leaders want to be BBBEE stakeholder beneficiaries in the venture because normally what happens is that government people become the BBBEE partners and the local people do not benefit. These are the kind of things that Rhino needs to think about to ensure that the local people really benefit from the project.

**Nkosi Thozama Zibi, Elundini Municipality’s Affected Ward Councillors Scoping Meeting, 25 January 2016**

SLR has facilitated two rounds of meetings with the four traditional leaders represented in the ER application area. Rhino Oil and Gas will take all these comments into consideration.

1.3.6

The consultants should be careful when dealing with traditional leaders because there was an awkward situation the previous day when the consultants came to me and it was found that they had been dealing with your comment has been noted.

**It is understood that contact has been made with the correct Chief Zibi.**
1.3.7
The presentation did not make mention of the involvement of traditional leaders in the process. The process followed by the consultants is different to that followed by the DMR. While it is true that DMR says that any minerals below the surface belong to the state and not the land owners, when minerals are identified in an area by a company through the Council for Geoscience, DMR goes to the traditional leader for that area and explains that such and such a mineral could be present under their land and they introduce the company and explain that they will do prospecting in the area to see if those minerals are in fact present. DMR shows the copy of the prospecting license to the traditional leadership and explains the whole process to them. If the traditional leadership agrees with what is proposed then they will call the community to a meeting and say to them that this process is good for the community because of X, Y and Z. The process followed by SLR did not follow this approach and it will fail because as soon as you come to the politicians first then you will get derailed by vested interests and politicians who want to get involved to make money. If the councillor goes to the community and says that the project is no good they will tell him that the chief supports it and they will tell him to go away. The politicians have both a political and administrative role and these are not always the same. The traditional leaders need to be informed first before the politicians otherwise there will be problems.

| *Chief Zibi* through no fault of their own. They had been dealing with a headman appointed by the MEC who claims to be the chief so it is important to make sure you are dealing with the real traditional leadership otherwise it could lead to a legal challenge further down the line.
| Councillors Scoping Meeting, 25 January 2016 |
| Clr Jackie Bosman Magangana, Matatiele Municipality’s Affected Ward Councillors |
| In terms of the DMR, mineral prospecting and oil and gas exploration are both governed by the same legislation. The difference in the process relates to whether a company already has a prospecting or exploration right or whether they are still applying for that right. At the moment Rhino Oil and Gas are applying for the exploration right and once they have that right they can then go to the land owner and discuss what they want to do. As part of the exploration application process, an EIA must be done and there is a requirement for consultation as part of the EIA. The traditional leaders are being consulted in the current EIA process. Some of the traditional authorities were consulted in October and November last year and others will be consulted during the course of this week. The councillors are the elected representatives of the people, the traditional authorities are also leaders in the traditional areas, and therefore, both sets of authorities will be consulted in the EIA process. |

| 1.3.8
It appears that this project has created a situation where the rich are opposing each other. Ms Mcleod and her people are against Rhino. She has been spreading all this negativity about this project and telling the councillors and traditional leaders that they shouldn’t |
| Clr Jackie Bosman Magangana, Matatiele Municipality’s |
| Most of the people opposing the project do not want their lifestyles to change but at the same time everybody wants the economy to improve. They want change in the economy but do not consider what kind of industries could make that happen. This project will create jobs at a later stage should any minerals be found beneath |
| 1.3.9 | It appears that those who are against this project are concerned more with maintaining their comfortable lifestyle than seeing the economy of Matatiele grow. When we wanted to build a mall in Matatiele they went to court to stop it while at the same time renovating all their buildings in town to accommodate the shops that wanted to go to the mall. | Councillors Scoping Meeting, 25 January 2016 | Your comment has been noted. |
| 1.3.10 | Rhino must give a presentation to the full council meeting on Friday 29 January 2016 so that all the councillors and traditional leaders can be properly informed about this project. You must write a letter to the municipal manager requesting to be put on the agenda and I will then give you a slot for your presentation and a question and answer session. | Councillors Scoping Meeting, 29 January 2016 | We will write a letter to the municipal manager requesting to be put on the agenda. SLR facilitated a number of meetings with the Matatiele Municipality. |
| 1.3.11 | We are happy that Rhino have come to our community to inform us about such a project but looking at map we cannot find the area we live in so how are we affected by this project? | Unidentified IAP Moshoeshoe Traditional Authority Scoping Meeting, 26 January 2016 | Most of the Moshoeshoe Traditional Authority area and the wards you reside in are within the exploration right application area and that is why the whole community has been notified of this project even if not everybody resides in the affected area. |
| 1.3.12 | How will the community know when it has commenced? | Most of the Moshoeshoe Traditional Authority area and the wards you reside in are within the exploration right application area and that is why the whole community has been notified of this project even if not everybody resides in the affected area. | All registered I&APs will be informed of the decision made on the application to PASA once it has been issued. |
| 1.3.13 | Have you been to other tribal authorities to give a presentation on the project? | Mofumahadi RIP Sibi, Sibi Traditional Authority Scoping Meeting, 26 January 2016 | From information obtained from COGTA there are four traditional authorities within the Exploration Right application area. A very small part of the Sibi Traditional Authority area falls within the application area. It is located to the south east side of the application area within wards 4 and 8 of Matatiele Municipality. The Amahlubi Traditional Authority occupies a small area on the south west side of the application area within Elundini Municipality and the major part of the application area falls within the Moshesh and Bakoena traditional authority areas. The project team are currently busy meeting with the Traditional authorities during the week. There will be another meeting this morning with the Moshesh Traditional Authority and there will also a meeting arranged with the Amahlubi Traditional Authority on Thursday. Follow-up meetings with the four Traditional Authorities were held in August 2016 following completion of the EIR. SLR was advised of a 5th potential Traditional Authority during the EIA process. It is understood that MrTyali is an acting Chief and not officially appointed. No direct consultation has been undertaken with Mt Tyali. |
| 1.3.14 | Why is it necessary for Rhino to meet with the Sibi traditional authority if there is only a small part of their land within the application area. | | It is important to consult with everybody who is potentially affected by the project. Even if the affected area within the Sibi traditional authority was only the size of a football field they would still be consulted about the project so that they were properly informed. |
| 1.3.15 | Can we look at a date for a full community meeting to present the project to the community. | Mofumahadi RIP Sibi, Sibi Traditional Authority Scoping Meeting, 26 January 2016 | We will look at our schedule and see when everybody is available and then we will liaise with you. We will also have to come when we have more than one meeting in the area because it is a long way for everybody to come for just one meeting. It must be noted that the suggested meeting will be catering specifically for community members from the affected area rather than the whole of the Sibi Traditional Authority area. This is because those people who are not from the affected area might get concerned when in fact they will not be affected. |
| 1.3.16 | Everything is fine. We understood your presentation and we look forward to you coming again to present to the community and we think and hope that the community will understand you too. | Rev Mhlauli, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016 | The comments were noted. |
| 1.3.17 | I suggest that we hear the presentation first then maybe after we can discuss it because now we might miss the presentation. So please give the presentation first then after we can have the questions and comments because this will delay us. | | |
| 1.3.18 | Sorry, please excuse me, I'm a civil engineer and when I'm here I need to know everything that is being said. When you say we must stop talking before I get to ask questions I will not know everything. Everything that I write down now, I will verify it later on the computer using the internet. I will check their background to see how they work. So what I'm doing is to ensure that we do not sit here for nothing. Sometimes if you wait until after the presentation you forget the questions you wanted to ask. I just wanted to clear that up. | Paulos Mayekiso, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016 |
| 1.3.18 | There must be contracts in place for this project. When the signing of contracts has been completed by all parties then there will be an agreement. We must have the contracts because we cannot do anything without signatures. They confirm that we give you permission to do what you want to do. This is why I say this cannot take five minutes. It is only us who can speed up the process. | Paulos Mayekiso, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016 |
| 1.3.18 | There are no contracts to be signed for now because the application is to the government. Contracts will be signed with the landowners once (if) the government has approved Rhino’s application and the exact locations of the drill sites have been identified and confirmed by Rhino. (Rhino) | |
| 1.3.19 | This land belongs to the chief and if the chief and his council gives you permission to proceed with your exploration in this area then there should be something written on paper that says the chief has given you permission to do this and this and this. Everybody should know that you are allowed to be here, even the people walking on the streets must know. People might ask you where you’re coming from or what are you doing here but if you have that agreement you will be able to produce it. | C.M. Mlonenyi, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016 |
| 1.3.19 | All that we are trying to make you understand is that we are only at the very beginning and we are still applying for the exploration right. We have to first consult with all the chiefs and councillors, the municipalities and other land owners and discuss the project. The project is still right at the beginning so we still need to get permission first from government and get the exploration right so that we can do work for the first two years to determine where are the best places to drill our 10 core holes. If we decide that we must come to this valley then we will have to come and speak to the chief responsible for this valley and get permission from him and his council. At the moment we do not know where all the work is going to done because that is still too far ahead. We are still consulting with affected parties for the EIA. When we reach a certain point and we know where we are going to drill our core holes then we will return and sign an agreement and pay rent for the area we are going to use. (Rhino) | |
| 1.3.20 | Are there any other meetings that will take place after this one? I ask this because most the people are not aware of this meeting and maybe next time we will let the others know that there is something like this that is taking place. | W.P. Dzingwa, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016 |
| 1.3.20 | This is still the beginning of the project and we are still meeting with the communities and unfortunately most of the people did not make it. Once we have completed the EIA report we will still consult with the relevant areas and give feedback meetings in terms of the studies that were done. Hopefully the public will be able to attend those feedback meetings. (SLR) | |
| 1.3.21 | This is my third meeting with you. We would like to thank you as the Amahlubi and myself on behalf of the Amahlubi. One would have expected a better turn out than this but hopefully there will be more people next time. Human nature has it that when bad news appears in the headlines on television or the newspapers, everybody wants to know. When we talk about things that affect the nation people are not as keen because they have been sensitised about the good in what we have been discussing. I think with time it will come that people will want to pick up a piece of paper and read. With time we will get there. At some stage we will find people participating in such matters. When meetings are called we do not attend and then decisions are made and we complain. This is not negative or a product of despair but a product of hope. I thank you. | Nikosi Thozama Zibi, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016 |
| 1.3.22 | The presentation has given an overview of the project in the limited time available. When the Scoping Report is available I would like to propose that the service provider be invited to a Strategic Planning session to present the report so that we can discuss the project in more detail and make a decision from a more informed position. | Cllr L E Stuurman, Matatiele Municipality’s Council Scoping Meeting, 26 January 2016 |
| 1.3.23 | The situation we are in now we are facing a drought which is affecting the whole country and it would be difficult for us to allow this kind of business to take place. We don’t really have time to dwell on this resolution here today and I support Cllr Stuurman’s proposal that this presentation must be taken to our Strategic Planning session so that we have time to consider it properly. | Cllr R T Mnika, Matatiele Municipality’s Council Scoping Meeting, 25 January 2016 |
| 1.3.24 | Cllr Mnika you must use I when you give your views and not we or us because those are your personal views and not those of the council. | Cllr J Bosman-Magangana, Matatiele Municipality’s Council Scoping Meeting, 25 January 2016 |
| 1.3.25 | The proposal to invite Rhino Oil and Gas to the Strategic Planning session is seconded and we will extend an invitation to them to attend our Strategic Planning session from 7 to 11 February. | A representative from Rhino Oil and Gas attended the Provincial Strategic Planning session. |
1.3.26 From the presentation I have seen that they have visited the Amahlubi and Bakoena areas and I would just advise that they go and meet with the leaders of those areas. They can go to the Strategic Planning session after they have agreed with those people in those areas because those areas are going to lead us on this matter.


Traditional council meetings were held with the Amahlubi, Sib and Moshoeshoe traditional authorities in February 2016 (see Box 4). A representative from Rhino Oil and Gas attended the Provincial Strategic Planning session.

1.3.27 In the presentation it did say that they had consulted with the traditional leaders but I think it is proper to remind them to do it more so that we go to the Strategic Planning session with an informed decision from our traditional leaders.


A representative from Rhino Oil and Gas attended the Provincial Strategic Planning session.

1.4.1 Additional comments

When will this project start?

Unidentified IAP, Moshoeshoe Traditional Authority Scoping Meeting, 26 January 2016

Rhino Oil and Gas will have to get the exploration right prior to commencement with the proposed exploration activities. Rhino Oil and Gas has applied for the exploration right and this meeting is held as part of the application consultation process. The application usually takes about a year before the right is granted, so exploration might commence next year or later this year.

1.4.2 Is the Exploration Right application process an NGO or government process.

Motumahadi RJP Sib, Sib Traditional Authority Scoping Meeting, 26 January 2016

The EIA and exploration Right application processes are conducted in terms of government legislation and these processes have nothing to do with NGOs except that they form an important group of stakeholders in the consultation process. The NGOs are trying to stop the application because they are against change in the area but what they are actually doing is preventing the possibility of economic development in the future should a viable oil or gas resource be found in the area through the exploration process. The NGOs emphasise some of the negative issues related to fracking but never mention any of the positive benefits associated with the production of oil or gas because they are trying to prevent the application being approved. They don’t want anybody to receive balanced and unbiased information about the project so that they can make up their own minds on whether they want the project or not which is not really fair on those people that do not necessarily share their views.

It is up to the traditional authority and the community to decide whether they want the project or not and it is important for them to hear both sides of the story. Rhino Oil and Gas cannot force you to support the project and we are merely requesting the opportunity to present the full information about the project to you.
so that you can make up your own minds. Rhino Oil and Gas is not hiding anything from anybody and is presenting the facts about the project so that the people who are potentially affected by the project are fully informed and can reach their own decision on whether or not they support the project. It is true that there could be some negative risks associated with the project if it is not carried out properly and in a responsible manner but Rhino oil and gas have a reputation to uphold and it is not in their interest to do things in an irresponsible way.

| 1.4.3 | What happens if you find something in the area that is located outside the application area that you have applied for? | C.M. Mlonweni, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016 | Rhino Oil and Gas is only looking for permission within the area that is demarcated on the map. Therefore, Rhino Oil and Gas will not be allowed to touch the area outside their application area even if they believe there might be something worth investigating. It would be illegal for Rhino Oil and Gas to do so. It's a bit like mining. If two mines are mining next to each other the one mine cannot work on the area applied for by the other mine. The exploration for oil and gas is totally different for example to exploring for gravel. With the exploration for gravel you drill many holes but not as deep as for oil and gas. With gravel you drill an average depth of maybe 50 meters but for oil and gas they cannot be so shallow. The core holes will be about 2 km into the ground using a specialised drill. You have to collect samples which will be boxed and sent to the laboratory for testing. This is to minimise the impact on the environment. We have to use specialised equipment for the exploration stage and even further down the line. We will be tendering to see who has got the best expertise to do this work both in terms of safety and operationally. (Rhino) |
| 1.4.4 | Is it government who is sending you to explore for oil? Who is sending you to explore for oil? | Paulos Mayekiso, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016 | The government did not send Rhino Oil and Gas to explore for oil and gas. As an independent company Rhino, thinks there could be a possibility that there is oil and gas in the area. However, because you have the land rights and the government has the mineral rights, Rhino Oil and Gas has to apply for the mineral rights from the government and also get permission from you (landowners) in order to access the land. (Rhino) |
| 1.4.5 | That is why I’m saying that in order to get permission to explore on our land it has to be put on paper because we cannot do anything if it’s not on paper. At the moment I’m building a mall in Lesotho. The chief approached me and asked me to build a mall and before I could start the investors did not give me any money until everything was signed in the presence of | Your comment has been noted. (Rhino) |
### 1.4.6 Where are we on that map?

Paulos Mayekiso, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016

Where we are now at Ezingonyameni is outside the exploration right application area but some of the Amahlubi area falls within the application area where Rhino Oil and Gas want to do exploration work. The demarcated area is the application area and when we do the EIA we identify all the land owners in that area. Where we are meeting is not necessarily where we are going to drill because this is where the traditional council meets. The application area is only the area coloured in orange. That is why we are consulting with the Amahlubi Traditional Authority because a part of the application area falls within the Amahlubi area. (SLR)

---

### 1.4.7 I was thinking about writing my comments on this Rhino Scoping Report and then decided, you know what, no more wasting precious time and energy!

Judy Bell on behalf of Frack Free SA, Email 17 July 2016

Thanks for your comments. I have forwarded these to PASA. I understand your position.

The reasons for the applicant not being able identifying the target sites for the physical exploration are explained in the Scoping Report (specifically Sections 1.3, 2.3.1 ad 2.3.10). I reiterate that the scope of the EIA is aligned with the early-phase exploration as proposed by Rhino Oil and Gas. SLR is assessing the impacts of the proposed early-phase exploration work programme as provided to us. We have acknowledged the limitations of this in the Scoping Report. (SLR via Email, 19 July 2016).

Subsequent to the acceptance of the Scoping Report, Rhino Oil and Gas has excluded the ground-based core hole drilling and seismic surveys from proposed ‘early-phase exploration’ work for which they are seeking environmental authorisation. Thus the current focus of the application and the related environmental assessment work is now only related to the proposed remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey). A benefit of this revised approach is that any future application for ground-based exploration activities will be focussed on specified sites, thereby enabling I&APs to know where Rhino Oil and Gas proposes to access land and conduct ground-based exploration activities.
1.4.8 | I echo Judy’s articulation (see item 1.4.7): while we understand that the EIA process has to focus in through specialist studies on the target areas for exploration drilling, we have also, from the outset of this process, asked for exclusion zones which would, on the basis of biodiversity and water security criteria, preclude any exploratory core drilling, and thus be excluded from any assessment as no-go zones. These are not clear in the scoping report, and we would request that these no-go zones be made a priority during the EIA phase, so that the final EIR is not vague regarding ‘potential’ exploration sites.

We have been told in response to concerns about WHY exploration is being applied for that it won’t involve hydraulic fracturing, but we reiterate again that it would be a likely outcome (what’s the purpose of the exploration?), and that consideration of target exploration drill sites MUST closely consider cumulative impacts of future activities. This affects the criteria used for exclusion zones, and again we submit that the target areas form essential water source catchments (in the case of EC ER295 with which I am more familiar, as well as most of the KZN application) which cannot be compromised through incompatible activities, and that the application should be withdrawn on this basis, without wasting further expense, time and anxiety on the part of the ‘victims’ in the target landscapes.

| Nicky McLeod on behalf of UCPP, Email, 18 July 2016 | THANKS FOR YOUR COMMENTS. I HAVE FORWARDED THESE TO PASA.

As indicated in the Scoping Report, specifically the sections describing each specialist study, there will be various exclusion and restriction zones for on-the-ground exploration activities that are identified as the outcome of the EIA process. These will be derived from a variety of biophysical criteria as well as legislative, technical and practical considerations. Some of the criteria will be implemented as no-go zones with others resulting in various levels of restriction to activities. The determination and application of such criteria requires thorough investigation and interrogation and are therefore an outcome of the EIA rather than a scoping level finding.

With regards your second point, I reiterate that the scope of the EIA is aligned with the early-phase exploration as proposed by Rhino Oil and Gas. SLR is assessing the impacts of the proposed early-phase exploration work programme. Thus the exclusion and restriction zones will be determined for the current exploration work programme.

As I’m sure you are aware, both the MPRDA and the NEMA provide for the separation of the exploration and production right applications and related environmental impact assessment processes. The same approach is applied to prospecting and mining rights. Any change to the scope of the current ER, or further exploration or future production activities would need to be subject to additional authorisation in terms of the MPRDA and thus NEMA. Each of these would require a separate EIA (or environmental authorisation amendment) process, which would include a further public participation process and in-depth assessment (potentially including specialist studies) of all project-related activities / issues. (SLR via Email, 19 July 2016)

Subsequent to the acceptance of the Scoping Report, Rhino Oil and Gas has excluded the ground-based core hole drilling and seismic surveys from proposed ‘early-phase exploration’ work for which they are seeking environmental authorisation. Thus the current focus of the application and the related environmental assessment work is now only related to the proposed remote exploration techniques (including analysis...
| 1.4.9 | I have done some research into this and it appears that PASA has geological information, including seismic survey data and core hole data, provided as a result of the exploration work done by Soekor, the precursor to Petro SA which is now PASA, in the 1960s and 1970s. This exploration seems to have been quite widespread throughout the Karoo Basin area. I am of the opinion that this former prospecting work should at least give current wannabe explorers some idea as to where resources are likely to be; PASA’s website indicates that this information is available at their offices in Cape Town for explorers, geologists, etc. I have also spoken to geologists in our area and it is my understanding that the locations of some of the larger deposits at any rate are known, so I am not sure as to why Rhino is saying that it is unable to give us any idea whatsoever at this stage of the locations where they intend prospecting for and possibly exploiting oil and/or gas resources. Surely they must have some idea of where prospecting is likely to take place, as well as the nature of the resource - i.e. whether they would do conventional drilling or need to use techniques such as fracking? We would appreciate receiving clarification on this issue. | Bronwyn & Jock Tame, Email, 02 August 2016. COMMENTS ON SCOPING REPORT: RHINO OIL & GAS 12/3/317 and other applications “Prospecting in the northern Karoo was done in the early 1960’s and 1970’s with the intention of finding conventional oil and gas resources. Many of the coreholes were drilled only into overlying reservoir rocks with little consideration given to the source rocks, as is defined in the reports that we have been able to gain access to. The exploration was also focused on conventional trapping mechanisms such as anticalinal features where oil is known to accumulate if a sufficient seal rock is in place and has not been ruptured by further deformation. Further structural and stratigraphic features, with the help in better resolution technologies, now warrant the case for further exploration to take place in delineating additional areas of interest. Data is available at PASA (the state regulator of oil and gas activities in South Africa) and is not available from PetroSA (the state owned oil company with the mandate to explore and produce hydrocarbons) given that the two entities are completely separate both in function and name. Upon the granting of an exploration right, the oil company would then have access to additional geological data from PASA and thus would be able to define the areas that have been sufficiently aliased versus those which would need additional core hole drilling or other exploration techniques. Given that Rhino Oil and Gas Exploration South Africa is looking for oil and gas, as well as a number of other hydrocarbon derivatives, the largest coverage of data within the exploration right areas is imperative and thus further value is added by additional drilling and/or exploration techniques.” |
| 1.5 | Strategic Environmental Assessment | Judy Bell, Frack Free SA, Email, 12 July 2016 Thank you for the comments. We are reviewing and will give consideration to the draft SEA chapters as appropriate. We note that the Scenario 1 considered in the SEA is for exploration. However, the context of exploration considered in Scenario 1 is firstly for Shale Gas and more importantly includes the full range of the various exploration phases that could be |
Unconventional gas reserves may exist in other areas of the South African onshore and offshore territory, and would need separate consideration if their development was considered.

While I understand that your work is not limited to shale gas, the following are the items I feel should be addressed in your EIA processes and documentation for exploration applications for oil and unconventional gas. Please Note that exploration is one of the four scenarios considered in the SEA – namely Scenario 1.

necessary to take a project from conceptualisation to production ready. This includes all of the exploration, appraisal and development phases (refer to Figure 1.19 in Chapter 1).

As noted in Section 2.3.6 of the Scoping Report, exploration is an iterative process where data acquired from a prior stage is required to improve the knowledge and understanding of the resource, which may then be subject to a later stage of more intensive exploration.

Rhino Oil and Gas is at the beginning of an oil and gas exploration process and is only seeking authorisation to undertake early-phase exploration activities. It is not possible to provide an informed assessment of potential future impacts where the proponent has no idea of the project plan, the methodology or the locality. The scope of the current EIA is, therefore, limited to the early-phase exploration work programme only. PASA has confirmed that the current EIA should be aligned with the proposed exploration work programme submitted with the exploration right application.

The proposed exploration work programme is designed to improve the understanding of the regional geology and inform of the potential for the occurrence of an oil and / or gas resource. What can be stated categorically is that further detailed exploration and future production do not form part of the current exploration right application. No exploration / appraisal wells, extraction of hydrocarbons or water, or stimulation of wells (hydraulic fracturing) are proposed in the 3-year exploration work programme for which approval is sought.

If a resource were to be identified for more advanced exploration based on the initial early-phase exploration programme, Rhino Oil and Gas would need to seek further approval from PASA in terms of the MPRDA and NEMA for the additional exploration work required to appraise the resource. Any further approval would be subject to an additional environmental assessment process with further public consultation. The assessment would be based on the known details of the work as proposed by the applicant. It is also expected that if/when this phase commences that the Karoo SEA for Shale Gas will be complete and will provide a sound basis on which to undertake an assessment of future exploration work.

Subsequent to the acceptance of the Scoping Report, Rhino Oil and Gas has excluded the ground-based core hole drilling
and seismic surveys from proposed ‘early-phase exploration’ work for which they are seeking environmental authorisation. Thus the current focus of the application and the related environmental assessment work is now only related to the proposed remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey).

| 1.5.2 | Further exploration or future production activities | All sites are rehabilitated, wells permanently plugged and monitoring of abandoned wells is implemented.
- In all the documents we have seen, there has been no mention of these post exploration activities, but perhaps we have short memories, overloaded with all this bump.
- For those not abandoned, that is for the wells where sufficient gas is discovered, they therefore become permanent and thus exploration leads to production.
- We believe that this means that extraction cannot be excluded from your assessments! A precedent was set in the Netherlands where a judge made exactly this ruling. | Judy Bell, Frack Free South Africa, Sent via email on 12 July 2016 | Refer to Response 1.5.1 with regard to potential future exploration or production phases.
No exploration wells are proposed as part of the early-phase exploration work programme. Only ten core boreholes are proposed with the purpose of obtaining information pertaining to specific geological, structural and stratigraphic information that might lead towards the discovery of petroleum with no intent to produce from such holes.
As noted in Section 2.3.6 of the Scoping Report, all boreholes would be capped or sealed. Rehabilitation would be undertaken to re-establish pre-exploration land use. |

| 1.5.3 | Further exploration or future production activities | Exploration is the first stage of the shale gas development cycle. It is concentrated in the initial 2-3 years of the development cycle, but is undertaken throughout the life of the development to inform the location of additional drilling and production operations. In our minds, this also adds to the requirement that exploration assessments deal with the production phase impacts. | Judy Bell, Frack Free South Africa, via email, 12 July 2016 | Refer to Response 1.5.1 with regard to potential future exploration or production phases.
This EIA is aligned with the work proposed for the first 3 years of early-phase exploration. The exploration phase can extend beyond three years. In terms of the MPRDA, an exploration right is only valid for the period specified in the right, which may not exceed three years. An exploration right may be renewed for a maximum of three periods not exceeding two years each (see Figure 1.1). Thus, the exploration phase could be up to a maximum of nine years in duration. |

| 1.5.4 | Further exploration or future production activities | The appraisal stage follows exploration, and for a single campaign typically lasts about 2-3 years. It involves the drilling of appraisal wells, which are vertical wells with horizontal sections to ascertain potential yields of shale gas within the target formation, following test fracking. Drilling, fracking and other equipment and materials and waste receiving facilities are contained on the well pad. An area of similar extent to the well pads is developed for temporary accommodation of drilling crews in the region. If, during the exploration or appraisal phase, is revealed | Judy Bell, Frack Free South Africa, via email, 12 July 2016 | Refer to Response 1.5.1 with regard to potential future exploration or production phases. |
that technically recoverable reserves cannot be economically exploited, decommissioning is implemented.

- In the documentation SLR and EIMS has provided us so far, no mention of the test fracking is made, in fact they have specified that it will not take place. At which phase will this be done, if the SEA shows it is part of the Exploration activities?
- This means that the social assessment and other missing specialist studies is critical for completion during exploration phase EIA, as by the Appraisal stage it is too late – the damage to the social fabric of communities and municipalities will already be done!
- How is the activity monitored for compliance for example in terms of buffers, if the wells can be angled in all directions? How is it possible to check where it went?
- Fracking or flowback liquids – will the sand requirements mean more mining of our rivers and rural land? How will this issue be managed in view of the resulting erosion, destruction of riparian zones and loss of sand in terms of coastal sand budgets?
- The table below shows the exploration scenario impacts and activities. Does this align with the information provided by SLR and EIMS? If not, does this need to be reviewed?

<table>
<thead>
<tr>
<th>Activity</th>
<th>1. Exploration Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of wells pads</td>
<td>30</td>
</tr>
<tr>
<td>[2 or more]</td>
<td></td>
</tr>
<tr>
<td>New roads (km)</td>
<td>30</td>
</tr>
<tr>
<td>[5 or more]</td>
<td></td>
</tr>
<tr>
<td>Total area of well pads and roads (ha)</td>
<td>25</td>
</tr>
<tr>
<td>Number of fracking sites</td>
<td>20</td>
</tr>
<tr>
<td>Alberta water (m³)</td>
<td>389</td>
</tr>
<tr>
<td>Measuring reverse field (m³)</td>
<td>89,250</td>
</tr>
<tr>
<td>Fracking water (m³)</td>
<td>10,110</td>
</tr>
<tr>
<td>Flowback water (m³)</td>
<td>10,400</td>
</tr>
<tr>
<td>[Rheology water]</td>
<td></td>
</tr>
<tr>
<td>Other hazardous waste (e.g. oil, grease, etc.)</td>
<td>94</td>
</tr>
<tr>
<td>Worker domestic water (L/d)</td>
<td>144</td>
</tr>
<tr>
<td>Worker sanitary waste (L/d)</td>
<td>36,932</td>
</tr>
<tr>
<td>1.5.5</td>
<td>Air quality</td>
</tr>
<tr>
<td>1.5.6</td>
<td>Climate Change and Greenhouse Gas (GHG) Emissions</td>
</tr>
<tr>
<td>1.5.7</td>
<td>Tremors &amp; Earthquakes</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
demonstrate an increase in small earth tremors during hydraulic fracturing. The possibility that hydraulic fracturing will trigger damaging earthquakes (i.e. of magnitude 5 or greater) through interaction with natural faults cannot be excluded, but the risk is assessed as low because the study area very rarely experiences tremors and quakes.

- This shows that a study needs to be done in each area to assess the impact, especially in the vicinity of buildings and dam walls. The extent of the impact will be location specific and as we do not have any idea yet as to where the exploration will be done, how can this impact be assessed effectively? This aspect needs to be monitored prior to exploration too.

The elements of the study area most vulnerable to earthquakes are heritage buildings made of unbaked clay bricks, and poorly-constructed low-cost housing. A denser network of seismographs is needed in the region prior to the commencement of hydraulic fracturing. The seismograph would need to function throughout operations and after closure until seismicity decays near to background levels.

<table>
<thead>
<tr>
<th>1.5.8 Water</th>
<th>Water – both surface and groundwater</th>
<th>Judy Bell, Frack Free South Africa, via email, 12 July 2016</th>
<th>Refer to Response 1.5.1 with regard to potential future exploration or production phases. The water requirement for the proposed exploration work programme is presented in Section 2.3.8 of the Scoping Report. It is acknowledged that any changes to the quality or quantity of water in near surface resources or aquifers may affect users who rely on these resources for domestic, agricultural and industrial use. The potential impacts on the quality or quantity of surface and groundwater will be assessed in the next phase of the EIA (see Section 5.4.8, 5.4.9, 6.1.3 and 7.5.2 of the Scoping Report).</th>
</tr>
</thead>
</table>

Water availability in the study area is already severely constrained, and thus the capacity to supply water for SGD from existing local sources is very limited. Surface water availability is generally low. Most streams are non-perennial, episodic and ephemeral, with very high interannual variability. The surface water resources in the study area are already stressed (and in many areas over-allocated) to meet the demand of existing users. Central karoo landowners are mainly reliant on groundwater resources for domestic and stock water supplies.

Groundwater recharge is typically low and sporadic. The development of groundwater resources to meet shortfalls in surface supplies is increasing, particularly during drought years, and in many areas already supplies 100% of the demand. The availability of potable groundwater resources in the study area to meet the additional demand of development plans not involving SGD – such
as irrigated agriculture, tourism or mining - is seriously constrained.

- We are reeling from the effects of a drought which has been exacerbated by Climate Change driven by emissions from the use of fossil fuels. Who will have to go with less or without water, so that exploration and then extraction requirements can be met? This question has not been answered by either EAP so far.
- Groundwater has to be considered a future resource, even if it is not being used presently and the quality is not of drinking water standard.
- Groundwater can daylight and flow into surface water resources. This needs to be acknowledged and taken into consideration when dealing with water issues.

| 1.5.9 Water | Surface spills on-site and along transport networks are the most likely source of water resource contamination resulting from SGD. SGD-related activities such as hydraulic fracturing, road building and workforce accommodation will place an additional demand on water resources and present a risk of contamination. Non-SGD activities such as uranium exploration and mining will compound this demand and pose additional contamination risks. The impacts on water quantity and quality are cumulative. Impacts following the completion of SGD (e.g. from failed well linings or capping structures on spent production wells) are a cumulative and inevitable legacy issue far into the future.

SGD must not proceed before a comprehensive set of baseline water resource data for the study area has been established. This must include surface water availability and verification of existing use (including the water resources needed to meet environmental requirements, the "Reserve"). The baseline must also include quantification of the quality of surface water and groundwater. Ongoing water resource quality monitoring including general and SGD-specific determinants is essential during and after SGD. | Judy Bell, Frack Free South Africa, via email, 12 July 2016 | See Response 1.5.8. |
There is currently a deficit of laboratories in South Africa to undertake the necessary analysis for water chemistry monitoring in relation to SGD. Although most accredited local (South African) laboratories are equipped to carry out routine water analyses (e.g. major cations and anions), none are presently capable of analysing for determinants such as $^{11}B$, $^{36}Cl/Cl$, $^{4}H$, $^{3}H/^{4}H$, and $CH_4$. Sufficient lead-in time must be allowed for such facilities to be set up prior to SGD; baseline establishment in the immediate term may require the use of internationally-accredited laboratories.

- These requirements need to be stated in the Exploration documentation, so that they can be assessed and plans put in place to implement.

| 1.5.10 | Water | Current lack of infrastructure and institutional capacity for water management is a constraint in the Karoo. Insufficient institutional and human resource capacity is a severe constraint to the implementation and execution of a robust and effective water resource monitoring and management programme for SGD. This constraint will apply to regulatory authorities, who often lack the necessary skills and the will to exert enforcement, and less so to the SGD industry, which it is expected will mobilize the necessary resources to meet regulatory requirements in this regard. This constraint is particularly relevant to independent monitoring and evaluation activities directed at ensuring compliance of the SGD industry with the regulatory requirements. The likelihood of environmental non-compliance is increased by poorly capacitated regulators.

- This is relevant to all areas under threat of exploration. The lack of planning and capacity is especially noticeable with the deepening drought. For example, the KZN Mvoti WaterWorks is only able to treat 13% of capacity as there is no further water available from the river and the dam is perilously low. They are now drilling for groundwater in the river.

- Industry in Richards Bay is already reeling from the downturn in the global economy and has had to cut... |

| Judy Bell, Frack Free South Africa, via email, 12 July 2016 |

See Response 1.5.8.
production to meet the ever-reducing water allocations.

- We already have mining companies in N. KZN allegedly stealing water from farm dams and other resources.

1.5.11 Waste Management

SGD will generate substantial volumes and new types of waste in the study area. These include liquid wastes such as flowback fluids, solid mining wastes such as bore fragments and cuttings, industrial wastes such as used machinery and supplies, as well as more conventional wastes such as sewage, domestic water and construction waste.

The existing legislated waste management provisions are adequate to reduce the waste-related risks of SGD to low, if rigorously enforced. Currently, no hazardous waste sites are licensed for the disposal in the study area. This means that any hazardous waste would need to be transported and disposed of outside the study area.

Mining-related waste, including that from SGD, is currently classified as hazardous, thus requiring specialized disposal sites and procedures. If this were to change with respect to SGD, wastes could legally be disposed in municipal landfills, which are currently completely inadequate for this purpose and could have health impacts if people are exposed to it. Technologies employed at municipal landfills are inappropriate to deal with the quality of the waste water generated by SGD and the design capacities of these facilities are also insufficient to deal with additional volumes.

Leach management and treatment is a pre-requisite for disposal of shale waste to landfill due to the presence of a range of toxic chemical additives and potential radioactivity and salinity in flowback water (leachable Naturally Occurring Radioactive Materials (NORMS)). These substances require particular handling for safe disposal. The institutional capacity, skills and knowledge to implement and enforce waste regulations, norms and standards is limited, especially at local implementation level and will therefore have to be strengthened before SGD is approved.
### 1.5.12 Biodiversity & Ecological Impacts

**Biodiversity & Ecological Impacts**

The study area includes relatively high levels of biodiversity, including highly sensitive and unique ecosystems and species. Seven different biomes and 58 vegetation types, 119 endemic or near endemic plant species, and threatened animal species have been recorded from the study area. Areas identified in this assessment as being of very high ecological importance and sensitivity are irreplaceable if substantively damaged. Widespread impacts in these areas would undermine the ecological integrity of the study area (and more broadly, the Karoo). Any activities, including but not restricted to SGD, in these areas are assessed as very high risk. The very high and high ecological importance and sensitivity areas make up an estimated 55% of the study area. Only 5% of the study area is formally protected in National or Provincial reserves. The primary mitigation for SGD with respect to biodiversity is securing the areas of very high and high ecological importance and sensitivity. This effectively frees up medium-low and low areas for development. The Karoo is an arid ecosystem characterised by ecological processes that operate over extensive areas. Mitigation of ecological and biodiversity impacts must take place primarily at the landscape scale rather than solely on the physically-disturbed footprint. Impacts on species, ecosystems and ecological processes extend well beyond the physical footprint of the activity. For many species the impacts of noise, pollution, erosion and disturbance can extend for hundreds of metres or kilometres from the source. A major concern is that the roads, pipelines and powerlines associated with SGD will result in fragmentation of the landscape. Loss of connectivity, edge effects and disruption of ecological processes associated with a dense network of linear structures could undermine the biodiversity integrity of the study area. Impacts on species and ecological processes are likely to have cascading effects on other species and processes.

**Judy Bell, Frack Free South Africa, via email, 12 July 2016**

Refer to Response 1.5.1 with regard to potential future exploration or production phases. With regard to the proposed exploration work programme, impacts to the ecology could include:

- Loss of or disturbance to vegetation, including species of conservation concern, from vehicles traversing areas or on-site activities;
- Loss or disturbances to faunal habitats as a result of on-site activities;
- Disturbances to or motility of fauna, particularly species of conservation concern, as a result of on-site activities; and
- Enabling the establishment of alien and invasive species in disturbed areas.

These impacts will be further investigated and assessed in the next phase of the EIA (see Sections 5.4.7, 6.2 and 7.5.1 of the Scoping Report). The potential impact on water resources is discussed in Response 1.5.8.
cumulative and unforeseen impacts of SGD on biodiversity, as well as effectiveness of mitigation, must be monitored. The outcomes of the monitoring programme need to dynamically inform ongoing strategic and regional level decisions on SGD:

- It is not acceptable to just count species and provide their status as is the usual way of assessing these impacts.
- EAPs have to do better than provide the usual fare dished up in the reports we usually review, to ensure that biodiversity is properly studied so that the impacts can be effectively predicted and assessed.

1.5.13 Agriculture Impacts on Agriculture

The biggest potential threat of SGD to agricultural production in the study area relates to the use and availability of water resources. SGD poses potential risks to both the quantity and agricultural usability of surface and groundwater resources. Opportunities may exist to use water produced through the SGD process for agricultural production purposes, should it be of an acceptable quality or amenable to purification. SGD will not have a significant impact on agricultural productivity in the long term if the threat to ground water resources is adequately addressed. Any intervention that destroys current land-based livelihoods is likely to have a long-term impact on the resilience of both the area and its land users. Local land users draw on profound local knowledge to sustainably use these vulnerable land-based resources. Fragmentation of the landscape to accommodate SGD must be carefully planned to minimize the negative impacts on the viability of agricultural enterprises.

- We need a sensitivity index map for the areas where exploration is proposed.
- The EAPs also need to quantify the amount of land that is deemed agriculturally sensitive as a % of the target area. In terms of water and food security, this is essential to have.
- Existing livelihoods must be respected in terms of

Judy Bell, Frack Free South Africa, via email, 12 July 2016

Refer to Response 1.5.1 with regard to potential future exploration or production phases. With regard to the proposed exploration work programme, potential impacts on existing land uses (see Sections 5.4.14 and 6.3.1.2) and the potential for loss of income by agricultural users (see Section 5.4.19 and 6.3.1.7 of the Scoping Report) will be considered in the next phase of the EIA. The potential impact on water resources is discussed in Response 1.5.8.

In the next phase of the EIA, a sensitivity plan will be developed in order to identify potential ecological and socio-economic constraints. This plan, which will be based on specialist input (see Section 7.5), will consider, inter alia:

- Biodiversity features (including geology, soil, vegetation and surface water resources);
- Sensitive habitat types (such as ridges, wetlands and rivers);
- Threatened ecosystems;
- Protected areas;
- Groundwater resources / aquifer;
- Heritage resources (including archaeology, palaeontology and cultural heritage); and
- Soil resources / land use.
### 1.5.14 Access – Privacy, Safety and Security

**Access – Privacy, Safety and Security**

Shale gas exploration and exploitation will put the protection of the privacy and security of land users at risk. Currently land users enjoy high levels of control over the farm-based resources, resulting in minimal losses of livestock and other property, and good levels of overall safety and security of rural communities, including land users, farm workers and their families. This is in part a result of minimal through-traffic on most farms, and relatively stable local populations. The anticipated influx of staff of shale gas companies and the situating of SGD operations on farm land will expose farm property, for example livestock, to theft and increase vulnerability of local communities to farm attacks and violence. Long-term monitoring and evaluation is essential to measure the effectiveness and efficiency of mitigation measures applicable to agriculture under all scenarios of SGD. The outcomes of these monitoring and evaluation processes must be fed back to relevant stakeholders to ensure continuous improvement.

- In view of the increasing crime rates in rural areas, the safety and security aspects must be effectively addressed prior to exploration.
- This cannot be left to local police stations and municipalities to bear the load in terms of already stretched and scarce resources.

---

**Judy Bell, Frack Free South Africa, via email, 12 July 2016**

Refer to Response 1.5.1 with regard to potential future exploration or production phases.

With regard to the proposed exploration work programme, potential impacts on landowner safety and security will be considered in the next phase of the EIA (see Sections 5.4.18 and 6.3.1.5 of the Scoping Report).

---

### 1.5.15 Tourism

**Tourism**

Tourism is a growing economic sector with the capacity to drive growth and upliftment in rural areas. Tourism has become the largest economic sector in the study area in terms of number of enterprises. All study area towns are reliant on tourism, some more so than others. The rural landscape is an important resource for specialised tourism niches, such as ecotourism, agritourism, hunting and adventure tourism. This has dispersed tourism activities into the rural areas of the study area. Tourism is the fastest growing sector in most Karoo towns, thus its importance in the study area is expected to further.

---

**Judy Bell, Frack Free South Africa, via email, 12 July 2016**

Refer to Response 1.2.1 with regard to potential future exploration or production phases.

With regard to the proposed exploration work programme, the potential impact on the local economy will be assessed in the next phase of the EIA (see Sections 5.4.19 and 6.3.1.6 of the Scoping Report). This assessment will not only consider the possible contribution to the local economy through the creation of direct employment opportunities and generation of direct revenues, but will also consider the possible impact on tourism and existing land uses.
The groups are: business tourists and those visiting friends and relatives (VFR); people travelling through the region; and niche tourists who actively seek out the Karoo as a destination in order to experience ecotourism, adventure tourism, agritourism, culinary tourism, hunting, stargazing, etc. Business and VFR tourism is expected to increase under SGD but might experience crowding out if shale gas workers use tourist facilities for accommodation in the towns of the N1, N6 and N9 routes. Tourists passing through the study area would experience traffic densification and possibly also crowding out in these towns. Niche tourists are most sensitive to disruption of peace and quiet and are also the most dependent on rural areas. They would be consequently the most sensitive to SGD.

The most likely negative impacts of SGD on tourism are expected to be traffic densification and its associated noise pollution. This results from slow moving trucks continuously ferrying materials needed for SGD, also through towns in the assessment area. Other impacts would include visual impacts, a loss of sense of place, potential pollution (especially water) and small earth tremors. All of these changes could impact on the value of the Karoo brand which is associated with an undeveloped rural landscape. Negative impacts on the tourism sector would increase the risk of losses of employment and value addition to local economies.

- This is one of the issues that is glossed over in the exploration documentation we have seen and should take into account how the SEA deals with it.
- Tourism is a significant driver of the local and regional economies and this is in all the IDP’s and SDF’s of local and district municipalities.
- Tourism is incompatible with mining and thus it is a significant issue to be raised and addressed.

<table>
<thead>
<tr>
<th>1.5.16</th>
<th>Economy</th>
<th>Impacts on the Economy</th>
<th>Judy Bell, Frack Free South Africa, via email, 12 July 2016</th>
<th>See Response 1.5.13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shale gas development could deliver highly significant economic opportunities, but the extractive nature of SGD also brings economic risks. In both respects it is a little</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See Response 1.5.13. Impacts will be managed through the implementation of the EMP (see Section 7.7 of the Scoping Report). The EMP will provide recommendations on how to select, establish, operate, maintain...
different to other types of mining. The opportunities include an increase in the national and local economic activity and employment. The principal risks relate to the 'boom and bust' nature of extractive industries, and to the effects of large new inward investments on increasing the value of the South African Rand, which would make exports less competitive. Shale gas development would increase employment opportunities. The 'Big Gas' scenario would be associated with approximately 2,575 direct operational jobs in drilling, trucking and power generation with residents of the study area probably able to fill 15% to 35% of these positions, increasing over time as training proceeds. It should not be assumed that indirect and induced impacts in terms of jobs in the study area would reach the same level as direct impacts. The risk that SGD could 'crowd out' other economic sectors in the study area, such as agriculture and tourism, by causing rises in the prices of labour and other inputs, is generally low for the scenarios considered. An important proviso is that shale gas development should not seriously compete with local water users or pollute local water supplies. Local government finances are likely to be put under significant strain particularly for the large scale development scenario. Appropriate mechanisms will be needed to effectively alleviate this strain.

There is a risk that the residual costs associated with SGD become the responsibility of society. Financial mechanisms will be needed to ensure that developers make adequate financial provisions to allow the state to deal with remediating remaining impacts in the event of premature closure and longer term risks associated with the post-closure period. Adequate and unambiguous compensation mechanisms will be needed for landowners to cover the use of their land, and for other affected parties where environmental and other damages cannot be mitigated. Property values on farms near where drilling occurs are likely to decrease. This applies to places exposed to water supply or quality deterioration, and to places whose amenity value is reduced by visual, noise, traffic or security risks. This loss can be balanced and close the exploration activities through all relevant phases of the project life. The aim of the EMP will be to ensure that the project activities are managed to avoid or reduce potential negative environmental impacts, and enhance potential positive environmental impacts. The EMP will detail the impact management objectives, outcomes and actions as required, the responsibility for implementation and the schedule and timeframe. Requirements for monitoring of environmental aspects as well as compliance monitoring and reporting will also be detailed.
by adequate compensation. Property values in towns, on the other hand, are likely to increase due to increased economic activity assuming key externalities such as those associated with increased truck traffic can be managed.

- This issue is merely presented as a positive impact – all the jobs (over-estimated somewhat?), knock on effects for entrepreneurs and municipal coffers – you name it. However, if mining were such a money-spinner to so many, why did the Marikana Massacre occur and why are all the mining towns having so many service delivery protests?
- So much to be managed and mitigated… By whom and with what funds?

<table>
<thead>
<tr>
<th>1.5.17 Social</th>
<th>The Social Fabric</th>
<th>Judy Bell, Frack Free South Africa, via email, 12 July 2016</th>
<th>See Response 1.5.14.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large investments in small-town areas create boomtown conditions in the local economy. SGD under the Small Gas scenario, and especially Big Gas scenario, will create a significant mining sector in the study area. This will be associated with increases in construction, trade (wholesale and retail) and business services, which are likely to have extensive multiplier effects in the local economy, as well as job creation in these sectors. However, any threat to water quality and quantity would have significant and rapid negative consequences for local boomtown economies. Actual or anticipated large investments in small towns will stimulate rapid in-migration of workers and work-seekers, some of them with families, which will challenge the often already-stressed capacity to deliver services. SGD will place pressure on housing, guest houses, hotels, caravan parks, and retail services. Housing demand is likely to overflow into informal settlements. Municipal planning and infrastructure provision typically has a fairly long lead time. Demands on water reticulation, electricity, sewerage, schools, clinics and local roads are likely to exceed capacity at least in the medium-term, even under intensive exploration (Scenario 1) and Small Gas. Rapid development is associated with disruption of the social fabric and feelings of insecurity. The in-migration of people typically experienced in boomtowns leads to an...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5.18</td>
<td>Health</td>
<td>Judy Bell, Frack</td>
<td>Refer to Response 1.5.1 with regard to potential future exploration or production phases. SLR is of the opinion that the need for a baseline health assessment would only need to be considered, as part of a future environmental assessment process, if a resource were to be identified for possible production. With regard to the proposed exploration work programme, the potential impact related to increased noise levels will be assessed in the next phase of the EIA (see Sections 5.4.16, 6.3.1.3 and 7.5.5 of the Scoping Report). The potential impact on air quality is discussed in Response 1.5.3. The potential impact on water resources is discussed in Response 1.5.8.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Increase in undesirable social outcomes such as teenage pregnancies, alcohol and drug abuse, property crime and violent crime. This puts pressure on the police, social welfare and health services. The challenge to local people’s sense of identity and the feeling of accelerating and out-of-control change from the status quo increases the sense of insecurity and threat to the social and moral fibre of the community among local people, which could result in conflict with in-migrants and xenophobia. SGD, while anticipated to raise the mean social welfare at national and local level, may perversely simultaneously accentuate social inequalities and schisms. Governance processes and institutions need to be strengthened to minimize such unintended outcomes.</td>
<td></td>
<td>Ditto above comments!</td>
<td></td>
</tr>
<tr>
<td>Health impact on health</td>
<td>Free South Africa, via email, 12 July 2016</td>
<td>The health status of the present local population in the study area is below national average, making them more vulnerable to adverse human health effects from SGD. This is despite the perception of the Karoo as a healthy environment, and is largely related to poverty, inadequate housing, unsafe water and sanitation, and insufficient health infrastructure. Investment in health infrastructure and improving socio-economic status, arising from SGD or other sources, would improve the health outcomes in the communities. People living close to shale gas infrastructure (well-pads and roads) can anticipate negative health impacts through air, water and noise pollution. Through mitigation and exclusion zones the anticipated human health impacts on communities can be reduced. SGD workers are potentially directly exposed to toxic substances for extended periods. Short-term dermal and respiratory symptoms are common among SGD workers. Some cases of death have been reported in countries with a history of SGD. Airborne silica exposure at the well-pad is an important cause of respiratory issues. Mitigation options, such as engineering solutions and personal protective equipment, can substantially reduce the workers’ exposure. Baseline monitoring is crucial to attribute a future</td>
<td></td>
</tr>
</tbody>
</table>
negative or positive impact of SGD on human health in the study area. Currently the available information on health issues in the study area is inadequate to form a baseline. Metrics such as incidence of asthma and other respiratory problems, dermal irritation (rashes), cardiac cancer, birth weights, birth defects, APOGAR scales, kidney and liver, infertility, neurological impairment need to be monitored. Uncertainties in the chemicals to be used and evidence of the health impacts that might be expected are the major restriction in the health impact section of this study. The assessment is based on international data and experience. Many of the chemicals used in SGD do not have sufficient health data associated with them to make an assessment. Since the activity of hydraulic fracturing is relatively new in relation to the time needed to assess long-term health effects as well as trans-generational effects, scientific evidence that can be used with certainty is scant, but some of the chemicals used are known to have long-term and trans-generational health effects. Detection of health impacts resulting from SGD will require baseline and ongoing monitoring for air and water quality, and health, especially for health symptoms associated with SGD. This will need to be carried out prior to initiating the activity to enable ascribing any future health effects to a specific cause. Health issues should be recommended for inclusion in the Regulations for Petroleum Exploration and Production, which currently do not consider them directly.

- The poor will get poorer in every which way!
- Who will do the baseline health assessment, where and by when?

### 1.5.19 Sense of Place

<table>
<thead>
<tr>
<th>Sense of Place Values</th>
<th>Judy Bell, Frack Free South Africa, via email, 12 July 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is insufficient underlying research and documented evidence for this assessment to adequately evaluate the issue of sense of place. There is not one, but are several, “senses of place” in the Karoo. Some of have local significance, while others are sensed by people living outside the area (for instance, by tourists), and perhaps never visiting the area (for instance, the senses of place resulting from elements of scientific significance).</td>
<td></td>
</tr>
</tbody>
</table>

Refer to Response 1.5.1 with regard to potential future exploration or production phases. With regard to the proposed exploration work programme, activities would of short duration, limited extent and localised such that no real change to the land or sense of place would occur. Unlike with mining there would not be disturbance or sterilisation of large areas of land. As such a change in the sense of place is highly unlikely.
The multiplicity of senses of place has been identified from publicly available literature or media and potential areas of conflict or sensitivity highlighted. Shale gas development in the Karoo will affect values associated with sense of place in some cases positively, and in others negatively, and in some cases irreversibly. Sense of Place values are seldom adequately addressed in public participation processes in EIAs and development processes, although they often turn out to be major issues. For them to be adequately addressed would require detailed empirical research to elucidate the specific sense of place values in particular contexts. One way to fill this critical gap would be to include such investigations in studies such as EIAs, Spatial Development Frameworks (SDFs) and Environmental Management Frameworks (EMFs). It is recommended that both quantitative (Likert type surveys) and qualitative (ethnographic type interviews) be applied to gauge sense of place. The results of this research should become public and made part of the processes which inform decision-making on specific SGD applications.

1.5.20 Visual

Visual, Aesthetic and Scenic Resources

SGD and its associated secondary developments, without mitigation, is likely to lead to the visual fragmentation of Karoo landscapes, and transformation of its pastoral or wilderness character to an industrial connotation in the affected areas. The visual impacts of SGD must be considered in conjunction with visual impacts resulting from other developments, for instance the possible uranium mining and the roll out of wind and solar energy in the study area. Mitigation consists primarily of restricting SGD activities in visually sensitive locations. A number of scenic ‘hotspots’ in the karoo could be affected by SGD. These need to be taken into account in EIAs and other permitting processes. Currently, visual resources have no specific legal protection in South Africa.

Judy Bell, Frack Free South Africa, via email, 12 July 2016

Refer to Response 1.5.1 with regard to potential future exploration or production phases. With regard to the proposed exploration work programme, activities would of short duration, limited extent and localised such that no real change to the land or aesthetics would occur. The primary mitigation to limit environmental impacts and risks would be the appropriate siting of any exploration activity at a locality that is of low sensitivity. It is recommended that the final site location should, if necessary, be adjusted to avoid identified sensitivities and the final site plan should be submitted to PASA for approval. These specific requirements for such detailed site assessments would be identified in the EIA phase and included in the EMP (see Section 5.10 of the Scoping Report).
Africa, except under the definition of the National Estate in the National Heritage Resources Act. It is advisable that national, provincial and local authorities enact legislation or by-laws to prepare for the effects of possible shale gas activities on visual resources. There is no standard approach to mapping or rating the value of scenic resources in South Africa. The scenic resources identified in this assessment correlate closely with areas of biodiversity and heritage significance as described in other sections. The escarpment is a particularly sensitive feature of the study area, although impacts of varying significance could occur anywhere.

- The assessments so far have not shown which areas are sensitive from this point of view!

1.5.21 Heritage Impact on Heritage Resources

The risk to heritage resources from SGD varies markedly from place to place within the study area. It depends on the type of heritage resource, the specific locations of well pads, access roads and related infrastructure, and the amount of induced seismic activity that occurs. There is no part of the study area where there is no risk to heritage resources. The impacts on heritage from the small and large SGD scenarios could be high, but are typically confined to particular areas. There is a potential for extensive but low intensity impacts from SGD exploration. Care in the exact positioning of the infrastructure and the implementation of management and mitigation measures during all phases, as required by legislation, will help to reduce the significance of the impacts that would be experienced. The cultural landscape is the most difficult aspect to deal with in terms of mitigation. Minimising the amount of landscape scarring that takes place and effective closure phase rehabilitation are key aspects of heritage impact mitigation.

Current institutional capacity in terms of application of the National Heritage Resources Act (NHRA) is limited and a marked improvement will be required before SGD commences. The National Heritage Resources Act outlines procedural due diligence for heritage.

Judy Bell, Frack Free South Africa, via email, 12 July 2016

Refer to Response 1.5.1 with regard to potential future exploration or production phases.

With regard to the proposed exploration work programme, the potential impact on heritage resources will be considered in the next phase of the EIA (see Sections 5.4.12, 6.3.1.1 and 7.5.3 of the Scoping Report). Since the exact location of a site is flexible and can be adjusted to accommodate environmental sensitivities, impacts on heritage resources can generally be avoided with the placement of activities on sites that do not have any heritage resources.
management and development. The status quo shows that many provincial and local authorities have yet to comply with the provisions of the NHRA. The functionality of the single national and three provincial heritage authorities overseeing the study area is highly variable and this will affect the quality of decision-making and commenting. The South African Heritage Resources Agency, as the national authority, should take responsibility for all applications related to shale gas development and source comment from relevant provincial and local authorities.

- We trust the Heritage Impact Assessment is done thoroughly and addresses all these issues effectively.

### 1.5.22 Noise

| Acoustic noise has a marked impact on the physical health of people and on their psychological wellbeing. The Karoo area is a quiet area. Residual day- and night-time noise levels are approximately 33 dBA and 25 dBA respectively (L[Aeq]). This is 10 dB below the typical levels published in standards for rural areas. This is a significant difference. Subjectively a change of 10 dB is perceived as a doubling of “loudness”. Exploration phase noise impact is likely to be localised and of short duration. Noise would be generated predominantly by trucks, and would only be noticeable in the immediate vicinity of exploration activities, for the duration of the activities. The construction, operation and decommissioning phases of SGD will likely cause noise impacts for humans and animals on sites within about 5 km of the sites. Noisy activities during the operational phases are expected to run constantly (day and night) for 6–8 weeks at a time, repeated 15 every 6 months at every wellpad, for a period of a decade or two, with quieter activities between. Night time noise impacts are therefore most likely, when residual noise levels are at a minimum. There is additionally a risk of noise impacts emanating from the surrounding roads due to increased heavy goods vehicle road traffic, especially under a Big Gas scenario, and if the roads used are otherwise quiet and seldom used. Proposed sites of noise generating activities will need | Judy Bell, Frack Free South Africa, via email, 12 July 2016 | Refer to Response 1.5.1 with regard to potential future exploration or production phases. With regard to the proposed exploration work programme, the potential impact related to increased noise levels will be assessed in the next phase of the EIA (see Sections 5.4.16, 6.3.1.3 and 7.5.5 of the Scoping Report). |
individual Noise Impact Assessments in accordance with SANS 10328 to determine the likelihood and severity of these impacts. Noise control, attenuation and monitoring will likely be required for all sites. The extent of the required measures will be determined by the Noise Impact Assessment:

- This is a significant impact with really easily implementable requirements shown above.
- Remember that noise goes outwards and upwards from the source, so is locality specific! Hence the need to know where the target sites are and the assessments done there, not generally!

1.5.23 Planning

Towns in close proximity to SGD activities will experience growth exceeding projections based on past trends. Enhanced resource and institutional capacity to plan for, and address increased service delivery demand for housing, water provision, social services, electricity and roads will be required due to increase in demand by households and local enterprises (both because of new direct jobs and spin-off opportunities), as well as high probability of increased in-migration and expected increase in indigent population. The most significant direct impact on infrastructure is expected to result from the construction of a network of geographically scattered private local access roads and well pads. Even though most of this will probably be on private land, it will have implications for the need for scarce construction materials. This will have a major impact on availability and cost of scarce raw materials such as gravel and water. Action will be required to source construction material and identify and approve local sites for extraction of raw materials. This will be accompanied with the increase in number and complexity of land development applications and required expanded technical capacity development. 

- If water and building sand availability (and sand mining) is already causing environmental harm and conflict how will this be managed?
- Who will bear the cost – society or the applicants?

Judy Bell, Frack Free South Africa, via email, 12 July 2016

Towns are unlikely to experience growth based on the proposed exploration work programme. This is an issue that would need to be considered should a resource be identified for more advanced exploration or production (refer to Response 1.5.1).
### 1.5.24 Traffic and planning

<table>
<thead>
<tr>
<th>Date</th>
<th>Source</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 July 2016</td>
<td>Judy Bell, Frack, Free South Africa, via email</td>
<td>Refer to Response 1.5.1 with regard to potential future exploration or production phases. The proposed exploration work programme would result in a minimal increase in traffic volumes (see Sections 2.3.5 and 2.3.6 of the Scoping Report). None of the proposed exploration activities require the establishment of any permanent infrastructure (including roads). Sites would be accessed on existing roads or farm tracks as available. Potential impacts related to increased traffic volumes relating to noise (see Response 1.5.20), air quality (see Response 1.4.4), public / landowner safety and security (see Response 1.4.13), and damage to infrastructure, including roads (see Sections 5.4.15.2 and 6.1.4.2) will be assessed in the next stage of the EIA. The phased approach to exploration, which could be nine years in duration (see Response 1.5.3), should allow government sufficient time to consider implications of possible developments and projected growth and undertake the necessary pro-active planning, monitoring and control of impacts on land uses and activities.</td>
</tr>
</tbody>
</table>

The increase in traffic by heavy vehicles on regional roads will be substantial. This will require mitigation in terms of initial road rehabilitation to an adequate baseline and an increased cycle and quality of maintenance, avoidance of certain routes as well as development of expanded and enhanced law enforcement and safety and emergency response capacity. There may also be a need to develop pipelines and re-establish the rail infrastructure in the sub-region to reduce the pressure on the road infrastructure. There is thus a critical need to audit and establish the current baseline condition and usage of national, regional and local roads to inform mitigation responsibilities in future. Regulatory uncertainties and limited municipal capacity to facilitate an ongoing processes of land use and land development applications associated with shale gas exploration and development could pose risks to already limited municipal governance capacity and result in regulatory bottlenecks. This could impede effective decision-making and sustainable land development.

Challenges with the rolling out of the Spatial Planning and Land Use Management Act, 15 2013 (SPLUMA), includes: major capacity implications for municipalities; procedural uncertainty with regards to land use and land development applications; and differences in its application between the provinces, with the Western Cape Land Use Planning Act, 2014 (LUPA) applicable in Western Cape Province. Clarification of legal and implementation practices in the land use and land development regulatory framework, as well as provincial support to municipalities in development of appropriate municipal planning by laws, the update of spatial planning and land use management instruments, and the establishment of institutional capacity for municipal planning tribunals and compliance monitoring will be highly supportive. Integrated spatial planning will be essential to deal with the multi-scaled and intersectoral issues that result from activities of magnitude and duration of shale gas development and downstream development. Spatial Development Frameworks (SDFs) and Integrated Development Plans (IDPs) plans in the
area will require an update. Firstly, to ensure that they consider implications of possible developments and projected growth and facilitate participative visioning, planning, prioritisation, budgeting and mitigation across possible shale gas exploration and production periods and municipal planning cycles. Secondly, to fulfil new regulatory functions, provide guidance to a range of sector plans (i.e. integrated housing and transportation plans) and enable the infrastructure pipeline necessary to design, procure, construct and maintain infrastructure. Given a host of other activities in the area, the preparation of a Regional Spatial Development Framework (RSDF) (in terms of the Intergovernmental Relations Framework Act, 2005 (IGRFA), and the Spatial Planning and Land Use Management Act, 2013 (SPLUMA)) could contribute to pro-active intergovernmental planning between the respective local and district municipalities, provinces, relevant provincial and national sector departments and other role players (including local communities interest groups business, and state owned enterprises such as ESKOM and SANRAL). The governance capacity for coordinated and integrated spatial and infrastructure planning, investment and management to deal with the implementation of potential shale gas exploration and development is currently limited. Given the anticipated extended timeframes, geographic uncertainty and phased approach to shale gas exploration and production activities, the establishment of regional (cross provincial) spatial and integrated development planning capacity (supported by specific task teams) could enable a cost effective shared capacity to provide the necessary technical capacity to inter alia assess applications, assist with pro-active planning, monitoring and control of impacts on land uses and activities.

- How will these recommendations be implemented with these current applications?
### Categories: Process Related Issues: Objections

#### 2.1

Folks honestly, we don't want it in our country or province, for every reason complained about here and abroad, ROG are simply lying about all the pollution effects of Fracking. 
We the population really aren’t that stupid, only limited by the laws of our country which seem to look after big corps more than the little people hinder us from stopping your activities. 
Clearly you are not going to listen to our concerns, your mumbo jumbo pack of lies leaves us with no other view... 
Why not just leave our dear nature alone, we want none of your snake oil thanks... 
Please make sure ROG leave our province and country with due haste before they touch an inch of our soil!!

Dion van Zyl, Email, 19 April 2016

Your objection is recorded.

#### 2.2

Please note my objection to the abovementioned applications to explore for oil and gas and please register me as an interested or affected party in all applications; 
Issues and concerns: Environmental, Health, Community, Economic, Water, Climate Change. 
I reserve my right to elaborate and/or add to these issues and concerns at a later stage.

Jackie Nightingale, Email, 27 June 2016

Your objection is recorded.

#### 2.3

I reserve my right to elaborate and/or to add to these issues and concerns at a later stage.

Mark Gendall, Ben Yu, Munadiya, Shehzaahi, Strini Abrahams, Sharda Abrahams, David V, Kwenzoleohle, Justin Ward, Dane Anderson, Waseera, S Gumede, Shawn Gardali, Zandalee Mohunlal, Sophi Naidoo, Nazira, Ammara Khan, Patricia Nkonzo, Sanele Ntuli, Derrick Ramasamy, Sindi

Your objection is recorded.
<table>
<thead>
<tr>
<th>Categories</th>
<th>Technical Related Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.1 Commercial</td>
<td>Just for clarity, you say Rhino is an independent company. Is the parent company from Texas? Nikosi Thozama Zibi, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016</td>
</tr>
<tr>
<td>3.1.2</td>
<td>The parent company is in Texas, Rhino Oil and is a South African registered subsidiary or Rhino Resources Ltd. (Rhino)</td>
</tr>
<tr>
<td>3.1.3</td>
<td>We are Rhino Oil and Gas Exploration South Africa (Pty) Ltd. We are an independent exploration company which means we are not listed on the stock exchange. We are not affiliated to anyone else. (Rhino)</td>
</tr>
<tr>
<td>3.1.4</td>
<td>We are not listed on the stock exchange. We are not affiliated to anyone else. (Rhino)</td>
</tr>
<tr>
<td>3.1.5</td>
<td>Rhino is not operating in the Middle East. Independent or private company means we hold the company and public company means it is listed on the Johannesburg Stock Exchange. That is the difference between a private and public company.</td>
</tr>
<tr>
<td>3.1.6</td>
<td>If you look at a company like Royal Dutch Shell, it was initially stared by British and Dutch people and Statoil is owned by the Norwegians and Total is owned by the French. These are national oil companies that have now become major international companies. The independent companies are those that have no specific affiliation with any specific government. (Rhino)</td>
</tr>
<tr>
<td>3.1.7</td>
<td>Statoil is majority owned by the Norwegian government whereas Rhino Oil and Gas has no affiliation to the US government. (Rhino)</td>
</tr>
</tbody>
</table>

Nlovu, Alapha Mzak, Thembile Mhlongo, Anita, Khumalo Mzwandelile, Vanessa Kristan, Rehman Haffejer, Jerry Parmasiven, Mopie Mohunli, Email 28 June 2016 Melisizwe Zindela, Mr Mphahla, Maurice Sachse, Mr P Ramwaran, GP Jones, P R Andrews, Usha Naidoo, TT Dube, Mr Mphahla ZBI, Email 05 July 2016
<table>
<thead>
<tr>
<th>Section</th>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.5</td>
<td>Is Rhino Oil and Gas affiliated with to other company?</td>
<td>Rhino Oil and Gas is not affiliated with any other companies.</td>
</tr>
<tr>
<td>2.1.6</td>
<td>Are there any shareholders?</td>
<td>There are shareholders in place but all of that is private.</td>
</tr>
<tr>
<td>3.2.1</td>
<td>Other: How was the area for the exploration application identified?</td>
<td>Rhino Oil and Gas made use of geological maps from the Petroleum Agency who handle all the maps in the industry and decided that this area has potential because the maps look like other places that have shown potential. They are not always 100% correct and that is why we do exploration so that we can tell. Exploration starts with a big area and then it is narrowed down to the areas that show the most potential. In South Africa there are no experienced seismic or drilling crews which is why there need to be brought in from the United States and other parts of the world. Some work is tendered out to companies that are specialists in that particular field. This makes the operation safe and safety is very important to us. (Rhino)</td>
</tr>
<tr>
<td>3.2.2</td>
<td>What made you choose this particular area for exploration?</td>
<td>We have purchased all the maps that are relevant to the area and decided that this area has potential because the maps look like other places that have shown potential. They are not always 100% correct and that is why we do exploration so that we can tell. Exploration starts with a big area and then it is narrowed down to the areas that show the most potential. In South Africa there are no experienced seismic or drilling crews which is why there need to be brought in from the United States and other parts of the world. Some work is tendered out to companies that are specialists in that particular field. This makes the operation safe and safety is very important to us. (Rhino)</td>
</tr>
<tr>
<td>3.2.3</td>
<td>Which farms are affected, especially those owned by white farmers?</td>
<td>The farms which are affected are mainly in ward 7.</td>
</tr>
<tr>
<td>3.3.3</td>
<td>When we search for water it is done on the surface and there is no need for machines, How do you search for gas, how can you know where it is?</td>
<td>There isn’t only one machine that can show where gas is. We use a lot of machines for the process. It’s a process of elimination. It starts with aerial surveys, then core hole drilling and then seismic surveys so there isn’t only one special machine. The core holes that are drilled will tell you if there is water, gas, coal, sand-stone, mud etc. The core hole samples tell you everything about that area. (Rhino)</td>
</tr>
<tr>
<td>3.4.1</td>
<td>Monitoring and rehabilitation: Everything that is done during the exploration project must not be harmful and must benefit the local people because should anything happen that harms the environment or the local people the local leaders will be held responsible.</td>
<td>This is noted.</td>
</tr>
</tbody>
</table>

5. Categories

Seismic Related Issues
5.1.1 Safety

How safe are the vibrator trucks?

Cir Jackie Bosman, Magangana, Mataliele

The vibrations from the truck create acoustic energy which works in a similar way to a sonar scan of a pregnant woman to create a visual image of a baby in the womb. However, these vibrations do not cause the ground to shake. There are safety guidelines that stipulate how far the vibrator truck must be from different types of infrastructure and these will be included in the Environmental Management Programme so that Rhino Oil and Gas will have to observe the guidelines when it carries out the exploration work.

5.1.2 How far away must it be from the traditional mud houses so that it does not affect them?

With Councillors Scoping Meeting, 25 January 2016

5. Categories Drilling Related Issues

6.1 Chemicals to be used

Are the chemicals that will be used if the drilling for oil and gas is approved safe for the community?

Mofumahadi RIP Sibi, Sibi Traditional Authority Scoping Meeting, 26 January 2016

In the beginning, during the exploration process, no chemicals are used but further down the line if the exploration shows that there is potentially something worth investigating further then an exploration well will be drilled which would require the use of chemicals. The chemicals that are generally used are like a soap which make the drilling easier but they do not come into contact with the surrounding earth or groundwater because they are encased within a metal sleeve all the way down. The NGOs like to tell the people that we are coming to poison your drinking water but they are using examples of what happened 50 years ago and the technology has improved so much since then. The truth is that all the water and chemicals are pumped out again and the water can be cleaned so that it can be used again for agriculture or even drinking water. This is being done safely in the United States but like anything if it is not done properly then there can be problems with pollution but Rhino Oil and Gas will use the best and most safe technologies to ensure that the work is done safely and properly.

6.2 Drilling Activities

Is there a machine which can show us where the minerals are because we do have machines that can show us where the water is here in the villages. Some of the drilling we do takes about a week or a month depending on the type of rocks we encounter. When you take too long people will get frustrated because you are busy and they do not see anything that will benefit them. It is best you explain everything before doing anything because people are scared. You said it takes three years to do this exploration work. The problem is people come and give hope to the locals. Oil and gas exploration is very different from water drilling.

Paulos Mayekiso, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016

Amahlubi Traditional Authority Scoping Meeting, 26 January 2016

There is no one machine that can tell us what is there and we have to do a process of elimination. Even the biggest companies in the world do the same process, one after the other. The results will then tell you which area is better but the process takes approximately three years. It’s not like we will be drilling everywhere. We only require permission to drill ten holes in the area we have applied for so we can get an idea of where the minerals are. The information will be computerised and will give us an idea of what is there. Using geological information the scientists
and then they do not deliver. That is why they always ask the chief what will happen after this? The chief and I want to make sure that we have plans which can be shown to the people and you need to make sure that you provide regular feedback as you go on with your work.

are able to determine the areas with potential. If there is something we extract locally, there will be many side businesses that will benefit, for example security, transport, grocery stores, accommodation, etc. There are so many benefits that will come if something is found. If something is found in a smaller area Rhino Oil and Gas will have to reapply for a permit to explore in that smaller area. For now Rhino Oil and Gas has to work with a bigger area to determine where the oil and gas is. (Rhino)

## 7. Categories  Air Quality Related Issues

### 7.1.1 Pollution

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Source</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality</td>
<td>Cllr V M Mlandu, Matsatiele, Municipality’s Council Scoping Meeting, 25 January 2016</td>
<td>No significant air quality emissions are anticipated.</td>
</tr>
</tbody>
</table>

## 8. Categories  Heritage and Paleontological Related Issues

### 8.1.1 Medicinal herbs

<table>
<thead>
<tr>
<th>Herbs</th>
<th>Source</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicinal</td>
<td>Cllr Sarah, Nosindabantu Mdulazi, Elundini Municipality’s Affected Ward Councillors Scoping Meeting, 25 January 2016</td>
<td>The EIA process is undertaken to identify where there are sensitive areas. It is important that the local communities take part in the public participation meetings so that they can point out things like the places where they gather traditional medicines so that areas that have special significance are protected. For the proposed exploration, work there will be minimal impact because there will be a maximum of 10 core holes drilled in the whole study area and some seismic surveys.</td>
</tr>
</tbody>
</table>

## 9. Categories  Socio-economic Related Issues: land use, properties and daily activities/ livelihood

### 9.1.1 Land use

<table>
<thead>
<tr>
<th>Land use</th>
<th>Source</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Cllr Mlonenyi, Amahlubi Traditional Authority Scoping Meeting, 28 January 2018</td>
<td>Rhino Oil and Gas cannot work in a town or city. Rhino Oil and Gas will not poison the water because that will ruin the company’s reputation and the company will not be allowed to explore in any other area. Rhino Oil and Gas cannot vandalise people’s property and they will have to respect everyone. Rhino Oil and Gas wants to make it a respectable business so we can work with people in the future. (Rhino)</td>
</tr>
</tbody>
</table>


### 10.1.1 Access to land

<table>
<thead>
<tr>
<th>Access to land</th>
<th>Source</th>
<th>Status</th>
</tr>
</thead>
</table>
| Residential    | Cllr Mlonenyi, Amahlubi Traditional Authority Scoping Meeting, 28 January 2018 | Rhino Oil and Gas cannot explore in a residential area. If it is within farming areas then an exploration activity would have to...
### 11. Categories

#### 11.1.1 Benefits

**Mr Vukile Matyeni, Elundini Municipality’s Affected Ward Councillors Scoping Meeting, 25 January 2016**

During the exploration stage Rhino Oil and Gas will not be making a profit therefore the benefits for the people on the ground will be limited. It is only later when they start the production stage that there will be benefits and Rhino Oil and Gas will start paying royalties and tax to the Government and create employment. The first seven years Rhino Oil and Gas will only be spending money on exploration but should they find discover something that is commercially viable and receive a production right, the opportunities will come.

**Mr Vukile Matyeni, Elundini Municipality’s Affected Ward Councillors Scoping Meeting, 25 January 2016**

During the exploration stage Rhino Oil and Gas will not be making a profit therefore the benefits for the people on the ground will be limited. It is only later when they start the production stage that there will be benefits and Rhino Oil and Gas will start paying royalties and tax to the Government and create employment. The first seven years Rhino Oil and Gas will only be spending money on exploration but should they find discover something that is commercially viable and receive a production right, the opportunities will come.

**Nkosi Thozama Zibi, Elundini Municipality’s Affected Ward Councillors Scoping Meeting, 25 January 2016**

The MPRDA states that companies that hold production rights should have BBBEE participation and that they must also have a Social and Labour Plan that sets out how they will benefit the local community. At the moment Rhino Oil and Gas is still applying for an exploration right. If production commences companies must also pay taxes and royalties to the government and establish various community development programmes and partnerships with the local community. These programmes can only happen in the production phase when the company starts making money because in the exploration phase for the first 7 years or more the company is only spending money and not making any profit.

**Nkosi Thozama Zibi, Elundini Municipality’s Affected Ward Councillors Scoping Meeting, 25 January 2016**

The exploration phase is expensive and Rhino Oil and Gas could find nothing below the surface and then there would be no project. However, if Rhino Oil and Gas does discover oil or gas that can be extracted then there will be major benefits for the local community and the local economy which will be managed through social responsibility programme.

**Nkosi Thozama Zibi, Elundini Municipality’s Affected Ward Councillors Scoping Meeting, 25 January 2016**

During the exploration stage there are minimal impacts to the environment and few benefits for the local communities beyond Rhino Oil and Gas spending money in the local area. The exploration phase is expensive and Rhino Oil and Gas could find nothing below the surface and then there would be no project. However, if Rhino Oil and Gas does discover oil or gas that can be extracted then there will be major benefits for the local community and the local economy which will be managed through social responsibility programme.
| 11.1.4 | Should oil or gas be found beneath the surface, what other ways will the community benefit besides job creation? | Cir Shukumisa Albert, Matatiele Municipality’s Affected Ward Councillors, Scoping Meeting, 25 January 2016 | In terms of benefits these will vary through the different stages of the project. We don’t want to create the impression that there will be lots of jobs during the exploration stage because exploration is a highly technical field that requires skilled labour. The benefits during the exploration phase will mainly be the services and supplies that the drilling and seismic crews will need such as accommodation, food and materials. During exploration, the company will be spending money and not making a profit. The real benefits will only start coming should something be found and the project moves into the production phase. |
| 11.1.5 | If the real benefits will not come for 7 or more years then there will be problems with the community. The staff that will be brought in for the exploration stage should find accommodation in the local areas rather than in town so that the community benefits in the early stages of the project. Ms McLeod said that when the core holes are drilled during exploration they will be left open and unattended. | Clr Jackie Bosman, Magangana, Matatiele Municipality’s Affected Ward Councillors, Scoping Meeting, 25 January 2016 | The people who are against this project have said that Rhino Oil and Gas will come and promise everybody lots of jobs to win them over and we want to make it very clear that during the exploration phase there will not be a lot of benefits. The benefits will only happen if something is discovered and the project goes into production. At the same time the exploration work does not have much of an impact on the environment and local communities. Most of the problems that Ms McLeod has spoken about relate to the production phase and the worst case scenarios (if something goes wrong and the work is not done properly). If the drilling team is drilling say 40km from Matatiele then they would either build a camp or rent a local house rather than travel to town every day. There will be a maximum of 10 core holes drilled in the whole area and these core holes are about 8cm in diameter. Once the holes have been drilled they are closed off with steel and concrete so that no contamination can occur and nothing can fall in them. |
| 11.1.6 | How will this project help the community? When will the community start benefitting from this project proposed by Rhino. | George Moshoeshoe, Firewise SA, Moshoeshoe Traditional Authority Scoping Meeting, 26 January 2016 | This stage doesn’t have many opportunities for employment but should there be any minerals found, there will be another application for the rights to start production. When production is in place the communities will then start benefitting from the project because more labour will be needed at this stage. The production stage will create hundreds of direct and indirect jobs. |
| 11.1.7 | What are the positive and negative aspects of the project? | Mofumahadi RIP Sib, | In the beginning there will not a lot of direct benefits because... |
### 11.1.8

<table>
<thead>
<tr>
<th><strong>Project</strong></th>
<th><strong>Sibi Traditional Authority Scoping Meeting, 26 January 2016</strong></th>
<th><strong>Rhino Project?</strong> How will the community benefit from the exploration on their land?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>the drilling work for the core samples and carrying out the seismic survey are specialised tasks that will be done by people from outside the Matatiele area. However, there would be indirect benefits. For example, should it be decided to drill a core hole next to this village, we would need to hire a few local people for things like security and the drilling team would have to find accommodation and food from the local area and purchase all its supplies locally. The real benefits would only happen should Rhino Oil and Gas be fortunate enough to find a commercially viable resource of oil or gas in the area and the project proceeded into the production phase. If this happens then there would be direct jobs created for local people and a lot of supplies and services would also be sourced locally. In terms of the legislation if the project goes into production there would also be a requirement for Rhino Oil and Gas to have social responsibility programmes in the local communities.</td>
<td></td>
</tr>
</tbody>
</table>

#### 11.1.8 I understand that if Rhino finds oil or gas and start production then they will have programmes that benefit the community but is it not possible to have some smaller programmes for the community during the exploration phase.

| **Phomolo Sibi, Sibi Traditional Authority Scoping Meeting, 26 January 2016** | During the exploration phase Rhino Oil and Gas will only be spending money at their own risk and they will not be making any profit. They will only make money if they find something and then get a production right to extract oil or gas so it is only then that they can consider social programmes for the community. It must be noted that even if Rhino Oil and Gas drills a core hole in the Sibi area during the exploration phase the drilling only takes about a month so there is not much time spent in any one community. |

#### 18. Categories  
**Socio-Economic Related Issues: Employment and Procurement Opportunities**

<table>
<thead>
<tr>
<th><strong>18.1.1 Service providers</strong></th>
<th><strong>Paulos Mayekiso, Amahlubi Traditional Authority Scoping Meeting, 26 January 2016</strong></th>
<th><strong>When looking for water we know we must drill about 18 to 26 bore holes. We want malls and petrol stations to be built in the area but it is very difficult to build them if you say the land might have oil underneath. I want you to take my particulars so we can work with Rhino and make sure we tell people what is happening now because you said this might take three years. You must do your exploration work quickly so that we know what is underneath our land so we can develop our land.</strong></th>
</tr>
</thead>
</table>

---

*SLR Project 723.18034.00005  Rhino Oil and Gas - Exploration Right Application: EIA and EMP report  September 2016*
4 PROJECT DESCRIPTION

This chapter provides general project information; a general overview of exploration processes; describes the need and desirability for the proposed project; presents the proposed initial three-year exploration work programme and a description of the project alternatives.

4.1 GENERAL PROJECT INFORMATION

4.1.1 APPLICANT DETAILS

Address: Rhino Oil and Gas Exploration South Africa (Pty) Ltd
Icon Building, Suite 300
Corner of Long Street & Hans Strijdom Avenue
Cape Town, 8000

Vice President and COO: Phillip Steyn
Cell: +27 (0)79 716 1030
E-mail: psteyn@rhinoresourceltd.com
Website: www.rhinoresourceltd.com

4.1.2 APPLICANT BACKGROUND

Rhino Oil and Gas Exploration South Africa (Pty) Ltd is a South African registered subsidiary of Rhino Resources Ltd. Rhino Resources is an independent oil and gas exploration and development company focused on Africa. Rhino Resources is building a portfolio of both onshore and offshore oil and gas assets with a primary focus on West Africa, East Africa and Southern Africa. The company’s key strategic areas include the East African Continental Rift System, the Central African Rift System, the coastal margins of East Africa, the South Atlantic margin of West Africa and the eastern Karoo formations of South Africa.

South Africa has the eighth largest shale gas reserves in the world according to a recent United States Department of Energy report with estimates ranging from 30 trillion cubic feet (Tcf) to 390 Tcf for the Karoo Basin. Rhino Resources’ goal is to develop these natural resources with the benefit of enhanced prosperity for African host countries and local communities.

Rhino Oil and Gas is currently one of the largest applicants for both onshore and offshore oil and gas exploration rights in South Africa with a number of applications under consideration by PASA. Rhino Oil and Gas previously held a Technical Co-operation Permit (“TCP”) for the Eastern Cape 295 ER application area. The TCP was issued by PASA in terms of Section 77 of the MPRDA. The holder of a TCP has, subject to Section 79 of the MPRDA, the exclusive right to apply for and be
granted an ER in respect of the area to which the permit relates. Through the current application Rhino Oil and Gas intends to secure an ER. Rhino Oil and Gas as the applicant for the ER will also be the operator for the proposed early-phase exploration.

The directors and owners of Rhino Oil and Gas Exploration South Africa (Pty) Ltd are Mr P Mulligan (a US citizen) and Mr P Steyn (a South African). More information is available on http://www.rhinoresourcesltd.com/management.

4.1.2.1 BBBEE
Rhino Oil and Gas’s BBBEE status has been agreed upon with a BBEEE party and complies with all current requirements. Further shareholding within the party is still being finalized. Currently, the BBBEE requirement for upstream exploration is 9% according to the Charter for the South African Petroleum and Liquid Fuels Industry on empowering Historically Disadvantaged South Africans in the Petroleum and Liquid Fuels Industry.

4.1.2.2 Environmental Policy
Rhino Oil and Gas’s environmental policy is provided below:

“Rhino Resources commits to corporate social responsibility in order to promote sustainable development in the countries and communities where we work. We prioritize corporate citizenship as an ethical commitment as well as a strategic advantage that enhances our ability to operate in emerging markets. To realize this vision, Rhino Resources, Ltd. and our subsidiaries, adhere to the guiding principles of our Corporate Social Responsibility (CSR) Policy:

Environmental stewardship: We strive to promote environmental stewardship in areas where we work, and will take measures to minimize environmental impacts.

Human Rights: We believe that every human life has equal value and respect and promote internationally recognized human rights in all facets of our work.

Compliance: We comply with all relevant local, national and international laws and regulations in countries where we operate, and conduct our operations with honesty and integrity.

Transparency: We recognize the Foreign Corrupt Practices Act and the Extractive Industries Transparency Initiative, and support financial transparency and good governance practices in engaging with local and national authorities.

Community development: We work to accelerate social and economic development in the communities where we are privileged to work. In addition to contributing to national authorities and local employment,
the company supports dedicated initiatives in healthcare, education, and innovation to build a positive legacy in communities. Initiatives supported by Rhino Resources are designed and implemented in partnership with local NGOs, civil society, and national authorities and tailored for each context.

**Partners:** We strive to select business partners that uphold our vision for CSR. Rhino Resources Ltd. is committed to work cooperatively and responsibly with local communities and our partners in our host countries, and perform our obligations in a social, environmental, and ethical manner for all stakeholders over a sustained period of time to obtain real results and lasting change."

4.1.2.3 Insurance Policy

Rhino Oil and Gas abides by all government requirements. Rhino Oil and Gas would provide proof of all required guarantees and insurances to the Regulator prior to any form of exploration work being conducted.

4.2 **General Overview of the Exploration Process**

The purpose of exploration is to identify the existence of any commercially viable reserves of oil and / or gas. The conditions necessary for petroleum reserves to have accumulated are complex and largely dependent on past geological history and present geological formations and structures. For deposits to occur, particular combinations of potential source and reservoir rocks together with migration pathways and trap structures are required. Discovering such reservoirs and estimating the likelihood of them containing oil and / or gas is a technically complex process consisting of a number of different stages requiring the use of a range of techniques. Such techniques may include, *inter alia*, aero-magnetic/gravity surveys, deep and shallow geophysical (seismic) surveys, shallow drilling and coring, and exploration and appraisal drilling (DTI, 2001). Exploration is an iterative process with data acquired from a prior stage required to improve the knowledge and understanding of the resource, which may then be subject to a later stage of more intensive exploration.

Exploration begins with the identification of target areas. Based on a general geological understanding, often informed by publically available data, broad areas are initially identified as being prospective with the potential to contain reserves of oil and / or gas. These areas are then subjected to early-phase exploration that is focused on large-scale regional analysis. This is undertaken by integrating the regional surface and basin structure data derived from available legacy data. Prospective areas are further defined using a combination of surface / shallow mapping techniques and seismic surveys to aid understanding of deeper, subsurface geology. Aero-magnetic and gravity surveys, as well as core drilling, are also used to define the general geological structure such as sedimentary basins. The work in this early-phase exploration stage might identify potential areas of interest for follow up study, but do not typically enable the extent of areas with oil and gas to be defined. Through the course, or at the end, of
this stage the non-prospective areas would typically be relinquished by the applicant from the exploration right area.

Exploration in areas identified as prospective would then progress to the **appraisal stage**. Identified areas of potential interest are subjected to further seismic and lithological study, which may involve reinterpreting existing data or conducting new surveys. Such surveys would typically be conducted at higher resolution or with more accurate techniques to improve the confidence in the information. The purpose of these surveys is to delineate and evaluate the prospects of interest identified in the first phase of exploration. Exploration wells would then be planned to access the target stratigraphy for testing, which may include permeability testing, pressure testing and hydraulic fracturing. It is noted that the only reliable way to determine whether the identified formations contain hydrocarbons is to undertake exploration well drilling (DTI, 2001). This work is aimed at identifying and defining the extent of target areas with high potential for reserves of oil and / or gas, as well as whether or not the size of the resource warrants further study and drilling. At the end of this stage the non-prospective areas would typically be relinquished by the applicant from the exploration right area.

In order to fully define the commercial viability of an oil and / or gas resource a **well drilling stage** is generally undertaken. Exploration wells (in one or a variety of forms) would be drilled and subject to an array of trials and testing (possibly including permeability testing, pressure testing and hydraulic fracturing). The type of wells and tests would depend entirely on the nature of the resource that has been identified. The identified resource is then evaluated and tested. These wells would enable the geoscientists to gain the greatest level of understanding of the reservoir and its viability for production. Once it is determined that a field is commercially viable would an operator consider moving into the production phase. At the end of this stage the non-prospective areas would typically be relinquished by the applicant from the exploration right area.

Exploration typically requires the **early-phase exploration**, the **appraisal stage** and a **well drilling stage**, undertaken over a period of up to 10 years, in order to arrive at a point where an informed decision can be made on a production right application.

Rhino Oil and Gas is at the beginning of an oil and gas exploration process and at this stage is only seeking authorisation to undertake a portion of early-phase exploration activities (see Figure 3-1). The early-phase exploration programme is the second step in determining if there is a likely oil or gas resource in the exploration right area that would warrant further investigation (the first phase having been the technical study undertaken). The proposed exploration work programme is designed to improve the understanding of the regional geology and inform the potential for the occurrence of an oil and / or gas resource.
It is not known at this stage whether there are any oil and / or gas reserves. It is also not known at this stage what form the oil and / or gas might take. This will only be known after all the data from the initial three-year exploration work programme has been analysed. At the end of the current exploration work programme it would still not be possible to define the extent of a resource nor to determine if the resource was commercially viable.

As indicated in Sections 1.2 and 4.6, if a resource is identified for more advanced exploration, further authorisation / approvals would be required before these activities could be undertaken.

**FIGURE 4-1: OVERVIEW OF THE EXPLORATION PROCESS**

### 4.3 NEED AND DESIRABILITY OF THE PROPOSED PROJECT

The DEA guideline on need and desirability (GN R 891, 20 October 2014) notes that while addressing the growth of the national economy through the implementation of various national policies and strategies, it is also essential that these policies take cognisance of strategic concerns such as climate change, food security, as well as the sustainability in supply of natural resources and the status of our ecosystem services. Thus, the over-arching framework for considering the need and desirability of development in
The general is taken at the policy level through the identification and promotion of activities/industries/developments required by civil society as a whole. The DEA guideline further notes that at a project level (as part of an EIA process), the need and desirability of the project should take into consideration the content of regional and local plans, frameworks and strategies.

In light of the above, this section aims to provide an overview of the need and desirability for the proposed project by firstly, highlighting the applications for the use of natural gas (particularly with reference to the electricity generation sector) and, secondly, how these applications are aligned within the strategic context of national policy and energy planning, broader societal needs and regional planning, as appropriate.

4.3.1 USE OF NATURAL GAS

Natural gas is a fossil fuel, which is used globally as a source of energy for heating, cooking, and electricity generation. It is also used as fuel for vehicles and in the manufacturing of plastics and other commercially important chemicals. The fastest growing sector for the use of natural gas is for the generation of electric power (Union of Concerned Scientists, n.d.).

Natural gas power plants usually generate electricity in gas turbines, directly using the hot exhaust gases from the combustion of the gas (Union of Concerned Scientists, n.d.). Of the three fossil fuels used for electric power generation (coal, oil and natural gas), natural gas emits the least carbon dioxide per unit of energy produced. When burnt, natural gas emits 30% and 45% less carbon dioxide than burning oil and coal, respectively. Burning natural gas also releases lower amounts of nitrogen oxides, sulphur dioxide, particulates and mercury when compared to coal and oil (Union of Concerned Scientists, n.d.).

As economic growth is dependent on the availability of electricity, ensuring a sustainable and reliable supply of electricity with sufficient capacity is a key aspect to growing the economy of South Africa in the future. The electricity shortages experienced in South Africa over the past decade were a contributing factor to the significant slowdown in economic growth rate. To enable economic growth within the target rate of between 6% and 8% (Accelerated and Shared Growth Initiative, 2004) to be achieved, it will be necessary for Government to continue increasing electricity generating capacity in the country.

In the context of the above, the use of natural gas for electricity generation is considered to have substantial benefits going forward and is identified in national policy, together with renewable energy technologies, as an alternative in diversifying the domestic energy supply away from its current reliance on coal. The feasibility of using natural gas for domestic power generation is considered to be dependent on the extent of available domestic reserves of natural gas, as well as the financial cost of importing natural gas should those reserves be insufficient.
At present, domestic resources are limited to offshore gas fields close to Mossel Bay (F-A field), which are understood to be in decline. The F-O offshore field (Project Ikhwezi) is envisioned to complement this supply in the short- to medium-term. Other proven offshore reserves include the Ibhubesi Gas Field off the West Coast of South Africa. The development of this field to supply gas to the existing Ankerlig Power Station is currently being considered. Neighbouring countries (Mozambique and Namibia) and regional African nations (Angola and Tanzania) have substantial gas reserves. Presently, gas is imported to South Africa through the Republic of Mozambique Pipeline Company (ROMPCO) pipeline from Mozambique. This gas is mostly used for chemical processes in Sasol’s coal-to-liquid (CTL) process in Secunda (Bischof-Niemz, et al., 2016). In Johannesburg, Egoli Gas supplies industry and households in some suburbs with reticulated natural gas that is sourced from Sasol.

In 2013, the total natural gas supply in South Africa (domestic production and import) equated to approximately 2.5% of total primary energy supply for the country (Bischof-Niemz, et al., 2016). Thus, an increase in domestic natural gas reserves would enable South Africa to take steps to secure the countries energy supply (through diversification), assist in reducing the emissions of greenhouse gases (by reducing the country’s reliance on coal for electricity generation) and reduce the need for the importation of gas. As such, exploration for additional domestic hydrocarbon reserves is considered important and supported by national policy, and any discoveries would be well received by the local market.

4.3.2 NATIONAL POLICY AND PLANNING CONTEXT

This section aims to provide an overview of the national policy and planning context relating to the promotion of development in general within South Africa, developing the energy sector (with specific reference to natural gas and renewable energy) and response to climate change.


The White Paper on the Energy Policy (1998) is the overarching policy document which guides future policy and planning in the energy sector. The objectives of the policy included the stimulation of economic development, management of energy related environmental and health impacts and diversification of the country’s energy supply to ensure energy security.

It is stated that the government will, inter alia, “promote the development of South Africa’s oil and gas resources...” and “ensure private sector investment and expertise in the exploitation and development of the country’s oil and gas resources”. The successful exploitation of these natural resources would contribute to the growth of the economy and relieve pressure on the balance of payments. Before the development of the country’s oil and gas resources can take place, there is a need to undertake exploration activities to determine their extent and the feasibility of utilising these resources for production.

The White Paper on Renewable Energy is intended to supplement the White Paper on Energy Policy (described above) and sets out Government’s vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa. The position of the paper is based on the integrated resource planning criterion of “ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options”. The White Paper affirms Government’s commitment to develop a framework within which the renewable energy industry can operate, grow, and contribute positively to the South African economy and to the global environment. The White Paper indicated that due to the limited availability of gas reserves, gas was unlikely to form any major component of primary energy supply over any extended period when compared with coal, even though natural gas is considered to a “cleaner fuel” in comparison with coal and oil.

4.3.2.1 National Gas Infrastructure Plan (2005)

The National Gas Infrastructure Plan is Government’s strategy for the development of the natural gas industry in South Africa so as to meet the energy policy objectives set out in the White Paper on Energy Policy (1998). The plan sets out the outlook for gas consumption and production globally and within South Africa and aims to articulate Government’s broad policy and development aims. The plan outlines four main phases of gas infrastructure development (each with sub-phases) and following the completion of these projects, it is envisaged that there will be a fully integrated network linking the major economic centres to the upstream supplies of gas.

4.3.2.1 New Growth Path (2011)

The New Growth Path (NGP) reflects the commitment of Government to prioritise Employment creation in all economic policies and sets out the key drivers and sectors for Employment which will be the focus of Government. The sectors identified for prioritisation include infrastructure, agriculture, mining, manufacturing, tourism and the green economy.

Within the green economy sector, the NGP targets 300 000 additional direct jobs by 2020, with 80 000 in manufacturing and the rest in construction, operations and maintenance of new environmentally friendly infrastructure. It is envisaged that the additional jobs will be created by expanding the existing public Employment schemes to protect the environment and the production of biofuels. The NGP notes that renewable energy provides new opportunities for investment and Employment in manufacturing new energy technologies as well as in construction.

The NGP further identifies the need to develop macroeconomic strategies and microeconomic measures to achieve sustainable expansion of work opportunities and output. As part of the identified microeconomic measures, the NGP states that South Africa should be the driving force behind the development of regional energy, transport and telecommunications infrastructure. Priorities in this regard
include strengthening the regional integration of energy by undertaking urgent improvements in electricity interconnectors, and exploring other opportunities for enhancing clean energy across central and southern Africa, including natural gas.

4.3.2.2 National Development Plan (2012)
The National Development Plan (NDP) (2012) provides the context for all growth in South Africa, with the overarching aim of eradicating poverty and inequality between people in South Africa through the promotion of development. It is also acknowledged that environmental challenges are in conflict with some of these development initiatives. As such, it is emphasised that there is also a need to:

- protect the natural environment;
- enhance the resilience of people and the economy to climate change;
- extract natural resources to facilitate the improvement of living standards, skills and infrastructure in a sustainable manner; and
- reduce greenhouse gas emissions and improve energy efficiency.

The NDP identifies the need to develop the electricity generation sector in order to support the growth of the national economy and reach the stated developmental objectives. It is further acknowledged that emissions of carbon dioxide and other greenhouse gases potentially pose a significant cost on a global scale with respect to climate change. While South Africa contributes to these emissions, it is acknowledged that it is also particularly vulnerable to the effects of climate change. Thus, in conjunction with developing the electricity generation sector further, the NDP also aims to ensure that carbon emissions are reduced.

The NDP identifies the construction of infrastructure to import liquefied natural gas, increasing exploration for domestic gas feedstock (including investigating shale and coal bed methane reserves) and procuring at least 20 000 MW of renewable electricity by 2030 as priority investments (amongst others) needed to develop the electricity generation sector further.

4.3.2.3 Integrated Resource Plan for Electricity (2010 and updated in 2013)
The Integrated Resource Plan (IRP) for Electricity (2010 – 2030), initiated by the Department of Energy (DoE), is viewed as an outline of Government’s planned policy to meet the current and projected energy demands of the country for the foreseeable future. The IRP also defines a mix of generating technologies to ensure that the projected demand can be met.

The IRP was updated in 2013 to reflect changes in the electricity demand outlook from what was anticipated in 2010. The key recommendations of the updated IRP include delaying the decision on increasing the nuclear base-load, procuring a new set of fluidised bed combustion coal generators, making use of regional hydro-electric generation, continuing the Renewable Energy Independent Power
Producers (RE IPP) programme and undertaking further exploration of regional and domestic gas options.

**4.3.2.4 Draft Integrated Energy Plan (2013)**

The Draft Integrated Energy Plan (IEP) (2013) seeks to determine how current and future energy needs can be addressed efficiently. Key objectives outlined in the plan include security of supply, increased access to energy, diversity in supply sources and primary sources of energy, and minimising emissions. The plan indicates that projected demand for natural gas between 2010 and 2050 would be second only to petroleum products, primarily due to increased growth in the industrial sector.

The Draft IEP points out that given South Africa is a net importer of oil, the liquid fuels industry and its economy is vulnerable to fluctuations in the global oil market. It is noted that the current natural gas consumption exceeds production, with the majority of demand being met through imports from Mozambique.

The plan states that the use of natural gas as an alternative electricity generator must be considered in moderation due to limited proven reserves, but that it has significant potential both for power generation, as well as direct thermal uses. The use of natural gas for power generation is considered as an option to assist South Africa to move towards a low carbon future given that natural gas has a lower carbon content than coal.

The role of renewable energy to deliver the intended policy benefits of improved energy security and reduced greenhouse gas emissions is also acknowledged in the plan. The availability of untapped renewable energy resources within the country is highlighted. It is noted that the DoE had implemented the RE IPPs procurement process to increase the share of renewable energy technologies in the energy mix. The plan also highlights that storage remains the most important challenge to the widespread use of renewable energy. Due to the intermittent nature of renewable energy systems and the variability in electricity load requirements, the storage of the electricity generated when demand is low is considered to be critical. Thus the IEP notes that there is still a need to incorporate the use fossil fuels and nuclear power to ensure that there is both sufficient base-load electricity generating power to meet the minimum needs and peak-load power to meet the needs during peak periods.

**4.3.2.5 Gas Utilisation Master Plan (GUMP)**

The DoE is currently in the process of compiling a Gas Utilisation Master Plan (GUMP) for South Africa. The GUMP is intended to be a long-term (30-year) plan for the development of a gas industry within South Africa. One of the key objectives of the GUMP is to enable the development of indigenous gas resources and to create the opportunity to stimulate the introduction of a portfolio of gas supply options. The GUMP will inform a Gas Independent Power Producers Programme with the intent to bring gas demand and supply on stream at the same time.
4.3.2.6 Paris Agreement - United Nations Framework Convention on Climate Change

The Paris Agreement was adopted by South Africa on 12 December 2015 at the 21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC CoP21).

The Paris Agreement is a comprehensive framework which aims to guide international efforts to limit greenhouse gas emissions and to meet challenges posed by climate change. The main objective of the Paris Agreement is to limit the global temperature increase to below 2 °C. Each individual country is responsible for determining their contribution (referred to as the "nationally determined contribution") in reaching this goal. The Paris Agreement requires that these contributions should be "ambitious" and "represent a progression over time". The contributions should be reported every five years and are to be registered by the UNFCCC Secretariat. As a signatory to the Paris Agreement, South Africa will be required to adopt the agreement within its own legal systems, through ratification, acceptance, approval or accession.

“As a signatory to the Paris Agreement, South Africa would be required to investigate alternatives to existing industries which have high carbon-emissions. In this regard, it is anticipated that there will be a shift away from coal-based energy production within the energy sector and increased reliance on alternative energy sources. Given the fact that natural gas produces lower emissions and is a highly efficient source of energy when compared to coal, the increased use of natural gas can, in the short term, serve as bridge on the path to the carbon-neutral goal of the Paris Agreement” (Source: http://www.energylawexchange.com/the-paris-agreement-on-climate-change-implications-for-africa/).

The SEA for Shale Gas Development indicates that “Including more natural gas in South Africa’s energy mix would make the energy system more efficient, cheaper and more reliable. Natural gas, regardless of its source, has a desirable set of qualities that coal and oil do not possess. Gas can be used in almost all subsectors (e.g. power generation, heat, transport, manufacture of chemicals); is easily transported once gas infrastructure is in place; is supported by a growing international market; is a more consistent fuel than coal (thus more flexible and easier to handle); is less CO₂ intensive when burnt than coal (if leakage during production and transport is minimised); can be more efficiently used for power generation (more kWh per GJ); has high operational flexibility; and has an end-use cost structure that is capital- light and fuel-intensive, making it economically flexible” (Summary for Policy Makers, Page 12).

4.3.2.1 National Climate Change Response White Paper

The White Paper on the 4.3.2.1 National Climate Change Response presents the South African Government’s vision for an effective climate change response and the long-term, just transition to a climate-resilient and lower-carbon economy and society. South Africa’s response to climate change has two objectives:
- Effectively manage inevitable climate change impacts through interventions that build and sustain South Africa’s social, economic and environmental resilience and emergency response capacity.

- Make a fair contribution to the global effort to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

The Green Paper acknowledges that South Africa has relatively high emissions for a developing country. The energy intensity of the South African economy, largely due to the significance of mining and minerals processing in the economy and the coal-intensive energy system, means that South Africa is a significant emitter of GHGs. The majority of South Africa’s energy emissions arise from electricity generation.

The Green Paper sets out South Africa’s overall response strategy through strategic priorities, leading to a series of adaption, mitigation, response measures and priority flagship programmes. Policy decisions on new infrastructure investments must consider climate change impacts to avoid the lock-in of emissions-intensive technologies into the future. In the medium-term, the Green Paper indicates that a mitigation option with the biggest potential includes a shift to lower-carbon electricity generation options. The Renewable Energy Flagship Programme is identified as possible driver for the deployment of renewable energy technologies.

4.3.3 REGIONAL POLICY AND PLANNING CONTEXT

This section aims to provide an overview of the regional policy and planning context relating to development within the Eastern Cape in general.

4.3.3.1 Eastern Cape Vision 2030 Provincial Development Plan (2014)
The Eastern Cape Vision 2030 Provincial Development Plan (PDP) is based on the premise of the NDP (refer to Section 4.3.2). Like the NDP, the PDP identifies nine key challenges which include: unemployment, education, infrastructure, spatial patterns, health, public service levels, corruption, and inequality. In order to address these challenges, the PDP outlines five goals which aim to “encourage rural development to address the spatial and structural imbalances in the Eastern Cape.” The five goals are:

- Goal 1: A growing, inclusive and equitable economy;
- Goal 2: An educated, empowered and innovative citizenry;
- Goal 3: A healthy population;
- Goal 4: Vibrant, equitably enabled communities; and
- Goal 5: Capable, conscientious and accountable institutions.
For each of the above-mentioned goals, the PDP outlines a vision and key objectives. In order to realise the goals, various strategic objectives related to each goal have also been identified. In support of the identified strategic objectives, various strategic actions are also proposed. Strategic actions relevant to the proposed exploration activities include the following:

**Strategic action 1.1.6: Position the province as a key investment hub in the energy sector and ensure reliable energy supply to high-potential sectors**

The PDP notes that it is the intent of the Province to position itself as an investment hub in the energy sector through the promotion of wind farms, imported liquefied natural gas, shale-gas and nuclear energy. New investment in this sector is identified as a possible catalyst for provincial economic development, particularly if the regional and local benefits are maximised, and costs (including externalities) are minimised. The identified benefits accruing from new investment in the energy sector include:

- “Cheaper energy (fuel and electricity), leading to cheaper food and transport, and more competitive labour market;
- employment in the construction, operation and maintenance of new energy facilities;
- employment in the supply of manufactured components for the new energy facilities;
- downstream linkages (for example, in the petro-chemicals industry based on shale gas); and
- new rental collection systems to capture a portion of the surplus from these new investments.”

**Strategic action 1.5.2: Grow and develop the mining sector**

The main opportunity identified for the province is the development of Karoo shale-gas. The PDP acknowledges that the sector is currently at the exploration stage and that potential reserves could be significant. However, it is stressed that the environmental impact of exploiting these resources would need to be carefully managed. Additional benefits identified by the PDP include:

- “The development of a downstream petro-chemicals industry at Coega;
- water for the fracking process could be used for irrigation;
- increased construction activity; and
- coal and gas could be used for electricity generation.”

**Strategic action 1.5.4: Grow and develop manufacturing industry**

The PDP identifies nine manufacturing industries that have potential for expansion, including renewables (based on future planned wind-farms) and petro-chemicals (based on Karoo shale-gas and offshore resources).

**Strategic objective 4.3: Ensure universal access to adequate, reliable and basic infrastructure for all by 2030**

The PDP envisages that by 2030, water resources in the Eastern Cape will be allocated to support economic growth and all citizens will have access to adequate water services, while ensuring the...
protection and integrity of water bodies. In order to achieve this, various actions are proposed to be prioritised, including managing the quality and quantity of surface water and groundwater, and protecting habitats.

4.3.3.2 Alfred Nzo District Municipality Spatial Development Framework (2007)
The Alfred Nzo District Municipality Spatial Development Framework (SDF) is intended to guide all development activities within the district. The SDF highlights the fact that the natural environment is regard as a prime asset and resource base, and that sustainable utilisation of natural resources contributes to appropriate local economic and social development.

The SDF notes that key areas limiting growth in the district include limited and poorly developed internal accessibility and outside of urban areas there is poor access to safe water supplies and no supply of electricity. It is further stated that the severe topographic conditions create difficult preconditions for development within the district.

The suggested focus for development within the district includes: basic service provision, establishment of a functional hierarchy of nodes, improved internal and external linkage, more efficient agriculture, more structured rural and urban growth, and environmental management.

4.3.3.3 Joe Gqabi District Municipality SDF (2009)
The SDF of the Joe Gqabi District Municipality (formerly the Ukhahlamba District Municipality) identifies key spatial issues, as well as related spatial objectives and strategies to address these issues. The SDF notes that the district is made up of two varying and distinct settlement patterns associated with historical patterns of socio-economic development. The district predominately comprises privately owned, expansive tracts of land with low intensity land use, while the north-central and eastern parts of the district have scattered, fragmented and sprawling rural settlements with largely unmanaged land use.

From a natural resource perspective, the climate and soil conditions vary across the district, with conditions favourable to forestry and rain-fed agriculture being found more in the eastern sectors of the district (e.g. Elundini Municipality).

The SDF states that the economic development potential of the district appears to reside largely in the sectors of agriculture, tourism and trade, with the services sector (government) continuing to play a major role. Spatially, the development potential of these sectors is located within key urban settlements and areas of potential higher yields such as the eastern rural sectors (Elundini).

4.3.3.4 Elundini Local Municipality Integrated Development Plan 2015 -1 2016 (2015)
The Elundini Local Municipality IDP notes that eight “Priority Programmes” have been adopted to drive growth and development over the next five to ten years, namely: Agriculture, Forestry (Timber), Tourism,
Roads and Stormwater, Rural Electrification, Small Town Generation, Township Establishment and Governance.

The key development challenges identified in the IDP include a high rate of unemployment with decreasing levels of employment, low levels of skills development and literacy, limited access to basic household and community services; unsustainable developmental practices, as well as inadequate energy and water supply.

The IDP highlights the reliance of agriculture to the local economy and notes that there is a need to diversify the economy and increase its competitiveness. It is the intent of the Local Municipality to focus or target high growth markets with the objective of creating investment and export opportunities in the manufacturing sector, especially in forestry and agriculture value adding initiatives.

### 4.3.3.5 Matatiele Local Municipality Spatial Development Framework 2014/2015 (2014)

The primary aim of the SDF is to guide the spatial form and location of future developments within the municipality in order to achieve planning outcomes that facilitate restructuring of spatially inefficient settlements, promote sustainable use of land, channel resources to areas of greatest need and development potential and redress the inequitable historical treatment of marginalised areas.

The SDF notes that the municipality is located in an area that is characterised by relatively high level of environmental sensitivity, particularly wetland areas associated with the Umzimvubu River catchment. In addition, there are a large number of historical and heritage sites that should be considered for conservation. While local communities utilise natural resources in a manner that enables them to meet their immediate needs, this has led to several impacts. These impacts include soil erosion, loss of biodiversity, degradation of water quality and an increase in invasive species. Settlement in the region also continues to increase thus exerting more pressure on the already depleted natural resources.

It is highlighted that any future development within the municipality would need to take into account the following environmental aspects: ecosystems and resources in the target area (wetlands, perennial rivers etc); existing activities (e.g. communal grazing, conservation, tourism, industry) and associated outputs such as effluent, livestock production, jobs etc); and the presence of any threatened elements such as rare bird species or erodible soils. The SDF stipulates that if development takes place within sensitive areas, it should occur under carefully drafted environmental management guidelines or plans.

Provincial government (through Eastern Cape Parks and Tourism) and the Matatiele Local Municipality have identified areas for protection through the declaration of stewardship areas under the Matatiele Water Factory Project. The proposed declaration of stewardship areas aims to improve land management of the upper catchment landscape, enhance ecosystem services and build climate change resilience, which can generate sustainable livelihood benefits and enhance water security of the region.
The initial draft of the Matatiele stewardship process was adopted by the Matatiele Council in May 2015 (https://umzimvubu.org/projects/current-activities/).

The initial draft comprises a stewardship plan and priority maps for the entire Matatiele Local Municipality area which includes seven target protected areas (see Figure 5-10), based on the expansion of Eastern Cape protected areas along with key criteria such as freshwater and biodiversity priority areas as identified in the status quo research. The identified target areas are indicated to guide initial discussions and are considered to undergo further refinement and discussion over time (https://umzimvubu.files.wordpress.com/2014/10/matatiele-stewardship-process-outline-draft-1.pdf).

4.3.4 SUMMARY OF NATIONAL AND REGIONAL POLICY AND PLANNING

The previous sections have considered the various national and regional policies, plans, guidelines and conventions which are relevant to the proposed exploration activities. As highlighted above, there is a drive from national and provincial Government to stimulate development and grow the economy of South Africa. In order to facilitate this economic growth, there is a need to ensure that there is sufficient capacity in the country’s electricity supply by diversifying the primary energy sources within South Africa. One of the proposals to meet this aim is to develop the oil and gas sector within the country.

The proposed exploration activities would allow for the determination of whether or not petroleum resources are located within the proposed ER area. By gaining a better understanding of the extent, nature and economic feasibility of extracting these potential resources, the viability of developing indigenous gas resources would be better understood.

However, it is acknowledged that the promotion of the oil and gas sector could also be considered in contradiction with some of the other plans and policies, which identify the need to reduce the reliance on fossil fuels for electricity generation. Nevertheless, the current limitations of renewable energy technologies are such, that there is still a need to include fossil fuels within the energy mix of the country.

4.3.5 CONSISTENCY WITH NEMA PRINCIPLES

The national environmental management principles contained in NEMA serve as a guide for the interpretation, administration and implementation of NEMA and the EIA Regulations. In order to demonstrate consistency with the NEMA principles, a discussion of how these principles are taken into account during the EIA process is provided below.
### TABLE 4-1: CONSIDERATION OF THE NEMA PRINCIPLES IN RELATION TO THE PROPOSED PROJECT.

<table>
<thead>
<tr>
<th>National Environmental Management Principles</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.</td>
<td>The proposed project aims to determine the presence of petroleum resources within the Exploration Right area. Confirmation of the presence of such resources would enable the country to refine its long-term planning for the development of the oil and gas sector within the country. The gas sector is known to have significant economic benefits as well as environmental risk that need to be balanced.</td>
</tr>
<tr>
<td>(3) Development must be socially, environmentally and economically sustainable.</td>
<td>Government has indicated that there is a need for the country to reduce its reliance on coal-based electricity. The use of natural gas is being considered to assist in reaching this goal. By determining the presence (and extent) of such resources, the sustainability of developing the petroleum sector within the country can be better considered.</td>
</tr>
<tr>
<td>(4) Sustainable development requires the consideration of all relevant factors including the following:</td>
<td>The EIA process has considered potential social, economic, biophysical impacts that could and through the implementation of the proposed exploration activities.</td>
</tr>
<tr>
<td>(i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;</td>
<td>The EIA Report provides a list of areas which have been excluded from physical exploration (see Sections 4.4.1 and 4.4.2). By excluding these areas the disturbance of sensitive ecosystems and disturbance of cultural heritage resources is avoided as far as possible.</td>
</tr>
<tr>
<td>(4)(a)(ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;</td>
<td>The EIA Report also identifies measures to avoid, minimise and/or remedy pollution and/or degradation of the environment that may occur as a result of the proposed exploration activities (see Section 5).</td>
</tr>
<tr>
<td>(4)(a)(iii) that the disturbance of landscapes and sites that constitute the nation’s cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;</td>
<td>By determining the presence and extent of any natural gas reserves, it can be determined whether the possible future use of these non-renewable resources would be sustainable.</td>
</tr>
<tr>
<td>(4)(a)(iv) that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;</td>
<td></td>
</tr>
<tr>
<td>(4)(a)(v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;</td>
<td></td>
</tr>
<tr>
<td>(4)(a)(vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;</td>
<td></td>
</tr>
<tr>
<td>(4)(a)(vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and</td>
<td>Assumptions, uncertainties and limitations associated with the compilation of the EIR and EMPr are discussed in Section 3.3.2.</td>
</tr>
<tr>
<td>(4)(a)(viii) that negative impacts on the environment and on people’s environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.</td>
<td>The EIA process has considered and assessed the identified potential social, economic, biophysical impacts of the project (refer to Section 6). The EMPr provides the recommended management measures to mitigate the significance of these identified impacts.</td>
</tr>
<tr>
<td>(4)(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of</td>
<td>The EIA process that has been followed recognises that all elements of the environment are linked and interrelated. PASA, as the decision-making authority, will be responsible for taking all aspects of the environment,</td>
</tr>
</tbody>
</table>
### National Environmental Management Principles

<table>
<thead>
<tr>
<th>Principle</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4) (c)</td>
<td>Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.</td>
</tr>
<tr>
<td>(4) (d)</td>
<td>Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.</td>
</tr>
<tr>
<td>(4) (e)</td>
<td>Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.</td>
</tr>
<tr>
<td>(4) (f)</td>
<td>The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.</td>
</tr>
<tr>
<td>(4) (g)</td>
<td>Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.</td>
</tr>
<tr>
<td>(4) (h)</td>
<td>Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.</td>
</tr>
<tr>
<td>(4) (i)</td>
<td>The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.</td>
</tr>
<tr>
<td>(4) (j)</td>
<td>The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.</td>
</tr>
<tr>
<td>(4) (k)</td>
<td>Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.</td>
</tr>
<tr>
<td>(4) (l)</td>
<td>There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.</td>
</tr>
<tr>
<td>(4) (m)</td>
<td>Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.</td>
</tr>
</tbody>
</table>

The proposed exploration activities are not anticipated to limit access to environmental resources that meet basic human needs. The use of any land for exploration activities would have to be through an Access Agreement negotiated between the exploration right holder and the landowner/occupier.

Rhino is proposing to undertake a 3-year, early-phase exploration programme. The EMP report contains measures for the management of operational activities.

The public consultation process has been undertaken in accordance with the requirements of the EIA Regulations 2014. In addition to various public meetings held for the project, the Scoping and Environmental Impact Reports have also been distributed for public review and comment (see Box 3 and Section 1.5).

The EIA process has taken into the account the interests, needs and values of all interested and affected parties, through the submission of comments on the proposed project, during the Scoping and EIA phases of the project.

The Scoping Report and EIR prepared for the proposed project have been made available to communities for review and comment (refer to Box 3 and Section 1.5). Where necessary, the Executive Summaries have been translated into isiXhosa and Sotho.

The EIA process has considered the identified potential social, economic, biophysical impacts of the project in an integrated manner. The significance of these impacts has been assessed in Section 6.

During the undertaking of the exploration activities, Rhino and its appointed contractors would be required to comply with the requirements of the Mine Health and Safety Act. The Environmental Awareness Plan also requires that staff be informed about any aspects of their work that may pose a danger to the environment.

As mentioned previously, the public consultation process has been undertaken in accordance with the requirements of the EIA Regulations 2014 and have allowed for the distribution of the Scoping Report and EIR for public review and comment. This information has been provided in an open and transparent manner.

The public consultation process for the proposed project provides an opportunity for the other spheres of government to provide comment on the proposed project and address any potential conflicts between policies or other developmental proposals administered by other organs of state that may be in conflict with the proposed exploration activities before decision-making.
4.4 APPLICATION AREA AND REGIONAL SETTING

The initial ER application area for 295 ER was approximately 120 000 ha in extent and covered approximately 200 properties (farms and portions). As previously indicated the applicant has subsequently reduced the extent of the ER application area through the exclusion of the Malekgalonyane (Ongeluksnek) Nature Reserve. The 295 ER application area now includes approximately ~175 properties (farms and portions) over an area of 109 292 ha (see Figure 1 1). The boundary co-ordinates of the application area are provided in Appendix 1. A list of the properties (farm name, number and portion), with the 21 digit Surveyor General code, included in the exploration right application area is provided in Appendix 2.

In broad terms the exploration right application area lies in the northern region of the Eastern Cape. It is bound by the Lesotho boundary to the west, from near Qacha’s Nek to approximately 20 km north of Mt. Fletcher in the south. The area lies to the west of the R56 road between Matatiele and Mt. Fletcher with the Maria-Linden Mission being just inside the boundary.
Future ground-based exploration activities would not take place across all of the ER area but would be confined to strategic or target areas. At this early stage of exploration Rhino Oil and Gas is not able to specify exactly where within the ER application area future ground-based exploration activities would be undertaken. Exploration applications are typically made over large areas and as data from the initial non-invasive stages (in years 1 and 2) becomes available it is used to refine the exploration area and determine the sites for on-site exploration activities (e.g. core hole drilling and seismic survey lines). As early-phase exploration progresses the non-prospective areas would be relinquished (i.e. would be removed from the ER area). Refer to Section 4.2 for an overview on the exploration process.

4.4.1 **LEGAL EXCLUSIONS FROM THE RIGHT AREA**

Section 48 (1) of the MPRDA sets out the specific cases in which properties are excluded from the extent of a right application area. These include:

- as per Section 48 of the Protected Areas Act, 2003 (No. 57 of 2003): special nature reserves, national parks, nature reserves, protected areas or protected environments (including world heritage sites, marine protected areas, specially protected forest areas, forest nature reserves and forest wilderness areas);
- land comprising a residential area;
- any public road, railway or cemetery;
- any land being used for public or government purposes or reserved in terms of any other law; or
- areas identified by the Minister by notice in the Gazette in terms of Section 49.

All of the above, as have been identified to date, are excluded from the ER application area for the proposed project. Where surveyed information was available to Rhino Oil and Gas these are reflected on the map of the application area (see Figure 1-1). Any decision by PASA would have to consider the extent of the ER application area taking cognisance of the requirements of Section 48(1) of the MPRDA.

4.4.2 **SCREENING TO DEFINE FUTURE TARGET AREAS**

The aerial FTG surveys included as part of the proposed ‘early-phase exploration’ would result in almost no interaction with the ground over which the survey is undertaken. Thus the environmental attributes of the sites where the survey takes place are of relatively little consequence and limited restriction of sites is required (See the EMP).
Although Rhino Oil and Gas has made application for a right over all of the properties included in the ER application area, they have been made aware that there are locations with environmental features and attributes that may be incompatible with early-phase exploration activities. Rhino Oil and Gas must implement measures to ensure that their future ground-based exploration activities (core holes and seismic surveys) within the Exploration Right area are undertaken in a lawful and environmentally responsible manner. The goal of the commitments is the avoidance of potential negative impacts, which is the primary mechanism in the mitigation hierarchy prescribed by NEMA.

To achieve this it is recommended that each target site is subjected to a preliminary screening to eliminate locations that have technical, practical, environmental or ethical attributes that would make them incompatible with exploration. The locations remaining after the screening would be potentially acceptable as target site for future ground-based exploration. However, each of these target sites must then be subject to appropriate environmental assessment and authorisation processes once the target location has been identified. During the course of this process Rhino Oil and Gas would also have to negotiate the terms and conditions of access with the land owner.

Rhino Oil and Gas has also been made aware of the regulatory restrictions that may be applicable to future well drilling and production activities (see Table 2-3). Their planning for and undertaking of exploration must take cognisance of this.

### 4.5 PROPOSED THREE-YEAR EXPLORATION WORK PROGRAMME

This Section provides a description of the activities that have been proposed by Rhino Oil and Gas as part of the early-phase exploration work programme submitted to PASA in terms of the MPRDA.

#### 4.5.1 REVISED EXPLORATION WORK PROGRAMME

As indicated previously, Rhino Oil and Gas has now excluded the core hole drilling and seismic surveying from the proposed ‘early-phase exploration’ work for which they are seeking environmental authorisation. The current focus of the application for environmental authorisation and this EIA is now only on remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey).

If the revised application is approved, Rhino Oil and Gas would only be in a position to conduct remote exploration techniques and to develop a more detailed understanding of the potential oil and gas resources in the application area.
Thereafter, should Rhino Oil and Gas propose to conduct ground-based exploration activities this would need to be informed by a further application to PASA and a separate environmental assessment and authorisation process.

A benefit of this revised approach is that any future application for ground-based exploration activities would be focussed on specified sites, thereby enabling I&APs to have a better understanding of where Rhino Oil and Gas proposes to access land and conduct ground-based exploration activities. This addresses some of the concerns raised by I&APs relating to where the proposed ground-based exploration activities may be located. The future environmental assessment process would investigate and report on the environmental attributes of the specified sites.

4.5.2 INTRODUCTION

The hydrocarbon potential of the geologically defined Karoo Basin, within which the proposed ER application area is located, has been known since the early 1900s and various exploration programmes were undertaken in the 1940s and 1960s. This work included seismic surveys and the drilling of several deep wells (targeting oil). Although some resources were discovered the reserves were not considered viable at the time. With the discovery of offshore reserves, exploration for petroleum in the onshore areas was largely abandoned. Recent developments in the technologies available to exploit unconventional gas resources, volatility in supply and prices of hydrocarbons have made prospecting for natural gas (and other petroleum resources) a more attractive financial proposition (less so with the recent decline in oil prices). Several organisations have commenced exploration efforts in the greater Karoo Basin region, targeting mostly coal bed methane or shale gas.

Rhino Oil and Gas proposes to undertake early-phase exploration for oil and gas resources which may be located within suitable subsurface geological strata. The initial, early-phase exploration is aimed at obtaining the data required to clearly define geological structures in the ER area and determining if an oil or gas resource exists that would warrant further exploration. The exploration work would thus target key geologies of the Karoo Basin. The results of the proposed early-phase exploration programme would serve as a basis for planning for possible further exploration.

The three-year exploration work programme proposed by Rhino Oil and Gas is presented in Table 4-2 below.
TABLE 4-2: THREE-YEAR EXPLORATION WORK PROGRAMME

<table>
<thead>
<tr>
<th>YEAR</th>
<th>PROPOSED EXPLORATION ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>• Improved mapping of subsurface structure and stratigraphy</td>
</tr>
<tr>
<td></td>
<td>• Detection of structural features and traps</td>
</tr>
<tr>
<td></td>
<td>• Enhance source rock geochemistry database</td>
</tr>
<tr>
<td>Year 2</td>
<td>• Geochemical database compilation</td>
</tr>
<tr>
<td></td>
<td>• Apatite fission track analysis</td>
</tr>
<tr>
<td>YEAR 2/3</td>
<td>• Full tensor gradiometry gravity survey (maximum total survey size of 4 000 km²)</td>
</tr>
<tr>
<td></td>
<td>• Define the locations or alignment for the ground-based activities</td>
</tr>
<tr>
<td></td>
<td>• Drill tests on identified structures (up to a maximum of 10 core holes)</td>
</tr>
<tr>
<td>Year 3</td>
<td>• Purchase existing seismic data</td>
</tr>
<tr>
<td></td>
<td>• Seismic acquisition (3D seismic acquisition of up to 125 line km).</td>
</tr>
</tbody>
</table>

Through an analysis of existing (historical) seismic and core hole information data retrieved during the TCP programme, and from studying published field data in combination with the information derived from Year 1 and 2, Rhino Oil and Gas would identify preliminary locations and/or alignment for the field (on-site) activities. It should be noted that the proposed exploration work is phased with results from the early phases informing the need and planning for the later phases. Each later phase would only be undertaken if the early phase results are considered to be positive.

4.5.3 EVALUATION OF GEOLOGICAL DATA

In the 1st and 2nd years of the exploration the work would be desktop based and aim to provide information that would lead to the identification of target sites for core hole drilling and alignment of seismic survey routes. The work listed below would be undertaken during the initial exploration period, but would continue throughout exploration as new data is acquired or generated:

- **a** An extensive review of available information that exists over the ER application area would be undertaken. This review would include identifying:
  - Sources of published and possibly unpublished data from the Council for Geoscience;
  - Private companies that may have information that could be purchased; and
  - Resources such as information from annual reports of companies close to, or adjoining the properties of interest.
- **c** Creation of geological models based on the database collated from these various sources;
- **d** Detection of structural features and traps;
- **a** Apatite fission track analysis;
- **r** Remote sensing, including the analysis of existing geophysical data available from the Council for Geoscience;
- **v** Visualisation of various target areas (target generation);
- **a** “pre-feasibility” analysis of the targets based on all the data gathered and analysed.
4.5.4 **SOURCE ROCK GEOCHEMISTRY DATABASE**

Also in the 1st and 2nd years, Rhino Oil and Gas would acquire data on source-rock geochemistry. This may include the acquisition of rock samples from surface outcrops for laboratory analysis. A database on geochemistry of the region would be compiled.

4.5.5 **FULL TENSOR GRADIOMETRY GRAVITY SURVEY**

In the 2nd year Rhino Oil and Gas would purchase full tensor gravity gradiometry (“FTG”) survey data where available and, depending on the data acquired, may commission further surveys. FTG data is used by oil, gas and mining companies to measure the density of the subsurface in order to assist in the building of subsurface geological models to aid exploration. While a conventional gravity survey records a single component of the three-component gravitational force, usually in the vertical plane, FTG uses multiple pairs of accelerometers to measure the rate of change of the gravity field in all three directions. The end result is a more accurate representation of the gravity field being surveyed (http://www.findingpetroleum.com). From these FTG surveys, a detailed interpretation of the subsurface geology can focus future exploration objectives.

FTG surveys involve grid-based flights using a light fixed wing aircraft (fitted with the FTG equipment) at slow speeds (~ 130 knots) and at an altitude of between 80 and 300 m above ground. It is envisaged that up to a maximum of 4 000 km$^2$ could be surveyed with a spacing of between 2 and 6 km between lines. In good weather the survey would take less than 7 days to complete. The grid pattern is not currently known, as this would ultimately be determined based on the findings of the initial exploration activities undertaken in Year 1 and 2. The flight parameters, survey grid and timing can be adapted to some degree depending on, inter alia, land use and other restrictions.

The fundamental component of a gravity gradiometer is the gravity gradient instrument (“GGI’), which consists of a slowly rotating disk on which four very precise accelerometers are mounted (termed a “complement’). The arrangement of the accelerometers together with their rotation allows a GGI to measure gravity gradients (i.e. the spatial rate of change of gravitational acceleration). These variations in the earth’s gravitational field help image subsurface structures.

FTG surveys provide a less invasive alternative to acquiring land-based data. This is an advantage when surveying environmentally sensitive areas and when trying to acquire onshore data where extensive permitting is required. Airborne acquisition neutralises any access and terrain issues associated with difficult to access areas.
4.5.6 **CORE BOREHOLE DRILLING**

Core borehole drilling is no longer included in the proposed ‘early-phase exploration’ work for which Rhino Oil and Gas are seeking environmental approval.

Rhino Oil and Gas would still propose to undertake core hole drilling as part of further early-phase exploration. The location of core hole sites is currently unknown, as these would ultimately be determined based on the findings of the initial exploration activities undertaken in Year 1 and 2. Target locations would initially be determined from an assessment of geological information derived from the available data and FTG survey. Since the exact location of an exploration core hole is flexible, it can be adjusted to accommodate local features, landowner’s needs and local environmental sensitivities. This process of adjusting a site’s location would always involve consultation with the land owner to reach a negotiated access agreement.

In proposing locations for drill sites, consideration would be given to environmental criteria. Each drill sites would be subject to the requisite environmental assessment and authorisation process.

---

1. A “stratigraphic well or hole” means a well or hole drilled only for the purpose of obtaining information pertaining to specific geological, structural and stratigraphic information that might lead towards the discovery of petroleum with no intent to produce from such a well (GN R466, June 2015).
4.5.7 **Seismic Data Acquisition**

Seismic surveys are no longer included in the proposed ‘early-phase exploration’ work for which Rhino Oil and Gas are seeking environmental approval.

Rhino Oil and Gas would still propose to undertake seismic surveys as part of further early-phase exploration. The location of seismic lines is currently unknown, as these would ultimately be determined based on the findings of the initial exploration activities undertaken in Year 1 and 2. Target routes would initially be determined from an assessment of geological information derived from the available data, FTG surveys and core borehole drilling. Since the exact alignment of a seismic line is flexible, it can be adjusted to accommodate local features, landowner’ needs and local environmental sensitivities. This process of adjusting a seismic line’s route would always involve consultation with the land owner to reach a negotiated access agreement.

In proposing routes for seismic survey alignments, consideration would be given to environmental criteria. Each route would be subject to the requisite environmental assessment and authorisation process.
FIGURE 4-4: SCHEMATIC OF TYPICAL SEISMIC SURVEY USING A VIBRATOR TRUCK

4.5.8 SUPPORTING INFRASTRUCTURE

The desktop work and aerial FTG survey do not require the establishment of any infrastructure.

4.5.9 REHABILITATION

No rehabilitation will be required as none of the proposed exploration activities will disturb any ground.

4.6 FURTHER APPRAISAL, WELL DRILLING OR FUTURE PRODUCTION

Rhino Oil and Gas has stated that the ultimate, long-term goal for the proposed project is to extract hydrocarbons in a commercially viable manner. However, they have indicated that there is currently insufficient information to determine if there is a resource and what techniques might be required for future hydrocarbon extraction.

Until the early-phase exploration (proposed and future) is concluded Rhino Oil and Gas are, therefore, not able to provide any information on the implications regarding further appraisal or well drilling during exploration nor future extraction of hydrocarbons. The early-phase exploration (proposed and future) is the first stage of the exploration process, and a prerequisite to determining what might take place during further exploration or future production. Refer to Section 4.2 for details on the general exploration process required to develop an oil or gas resource.
No further ground-based exploration, appraisal or well drilling and future production forms part of the current ER application. Thus no extraction of hydrocarbons or water, no stimulation of wells or hydraulic fracturing (fracking) is proposed in the initial three-year exploration work programme for which approval is sought.

If the early-phase exploration were to confirm the presence of a potential resource, then Rhino Oil and Gas would need to seek further authorisation / approval from PASA for any additional exploration work required to appraise the resource. Any further approval would be subject to an additional environmental assessment (or environmental authorisation amendment) process with further public consultation and specialist input. Approvals are also likely to be required in terms of other legislation.

Similarly, if the later exploration led to the discovery of a commercial resource suitable for development, then Rhino Oil and Gas would need to apply for and secure a Production Right from PASA. An application for a Production Right would need to be subject to a separate EIA process in terms of NEMA with further public consultation and specialist input. Approvals are also likely to be required in terms of other legislation.

Any further exploration work or future production operations that may arise, if a resource is discovered, is therefore beyond the scope of the current EIA process.

4.7 DETAILS OF ALL ALTERNATIVES CONSIDERED IN THE EIA PROCESS

4.7.1 PROPERTY OR LOCALITY ALTERNATIVES

4.7.1.1 Exploration Right Application Area

The purpose of exploration is to acquire and evaluate relevant data to determine where an oil or gas resource may be located. The process is iterative with data gained in early phases being used to improve the level of knowledge and refine the anticipated (or known) extent of the resource (refer to Section 4.2 for an overview of the exploration process). The exploration process begins with the development of a regional perspective of the geology to determine where conditions that are conducive to hydrocarbon formation may exist. Given the low level of accuracy of the publicly available petroleum resource data, it is necessary to apply for a right over a large area such that with ongoing data collation and refinement a resource is identified within the boundaries of application area. The expected dispersed nature of petroleum resources is such that a reasonably large area is required initially in order to identify a resource that may be economically viable. The result is that an ER application is typically made over large areas.

It is not possible for more than one ER to be held over land for the same mineral and thus an application area must be distinct from other ERs (and applications). Refer to the Figure 4-4 and the PASA website
for the hubmap with details of all existing ERs and applications (see www.petroleumagencyza.com). The extent of Rhino Oil and Gas’ 295 ER application area is such that it does not overlap with other areas.

As mentioned previously in Section 4.4.1, in terms of Section 48 of the MPRDA an ER may not be held over land comprising residential areas, any public road, railway or cemetery, any land being used for public or government purposes or reserved in terms of any other law or areas identified in terms of Section 49 of the MPRDA. Section 48 of the NEMPrA further restricts exploration from all protected areas. An exploration right therefore cannot be granted over such properties.

Exploration right applications are only made over areas, subject to the restraints indicated above, the applicant believes are likely to be prospective for the subject resource. No alternative ER application areas have been considered.

FIGURE 4-5: EXERPT FROM PASA HUBMAP
(source PASA website, August 2016)
4.7.1.2 Properties for Exploration Activities

The nature of exploration and the accuracy of the initial data available at the time of application are such that it is not possible at this point in time to define the location for the exploration activities that are typically undertaken in early-phase exploration. With exploration being very costly and having a low chance of success, Rhino Oil and Gas is motivated to undertake the fewest activities in the most cost effective manner. Thus exploration is undertaken in an iterative manner with the data gained in early phases being used to improve the method and locality of the work planned for the later phases (refer to Section 4.2 for an overview of the exploration process). It is, therefore, only possible to determine the actual properties where ground-based exploration activities (e.g. core boreholes and seismic surveys) may take place once the initial phases have been undertaken. These initial phases can only be undertaken once an ER is granted.

No ground-based exploration activities are proposed within the exploration work programme for which environmental authorisation is being sought. Thus this EIA process has not considered properties or property alternatives.

4.7.1.3 Specific Locality of ground-based activities

The specific locality of future ground-based exploration activities (e.g. core boreholes and seismic surveys) on properties can only be identified once the initial exploration phases have been undertaken and target sites identified. The nature of the proposed exploration activities is such that the target sites are not bound to fixed locations but are somewhat adjustable. This provides Rhino Oil and Gas with flexibility to position the sites for ground-based activities at localities that would avoid local sensitivities. Rhino Oil and Gas would ensure that all proposed activities are undertaken in a lawful and environmentally responsible manner.

No ground-based exploration activities are proposed within the exploration work programme for which environmental authorisation is being sought. Thus this EIA process has not considered localities or locality alternatives.

4.7.2 Design or Layout Alternatives

At this stage it is not possible to determine specific layout details for the FTG survey. The survey grid, flight parameters and timing can be adapted to some degree depending on target areas, land use, weather and other restrictions. The FTG survey will cover up to a maximum of 4 000 km².
4.7.3 **TYPE OF ACTIVITY**

Exploration techniques have improved over the past decades such that many of the activities undertaken are now of low intensity and have relatively low risk to the environment. This is particularly true for early-phase exploration where the exploration is not interrogating a resource, but is solely attempting to identify the most prospective areas for further investigation. Being very costly and having a low chance of success, an exploration company is financially motivated to undertake the fewest activities in the most cost effective manner. Thus exploration companies increasingly use remote sensing techniques for the identification of petroleum resources.

The desktop and data processing activities would have no environmental impact and are not considered further in this report. It is relevant to note that Rhino Oil and Gas is intending to gather as much information, as is possible, from desktop and remote sensing methods as opposed to ground-based activities. FTG survey is the only field work proposed for the exploration work programme for which environmental authorisation is being sought.

Rhino Oil and Gas still intend to undertake core hole drilling and seismic surveys as part of further early-phase exploration but would only do so after target sites had been identified and each site subject to the requisite environmental assessment and authorisation process.

4.7.4 **TECHNOLOGY ALTERNATIVES**

FTG survey is the only technology considered within the exploration work programme for which environmental authorisation is being sought. This remote sensing technique is of low intensity and has relatively low risk to the environment. This is a preferred technology for early-phase exploration.

4.7.5 **THE “NO-GO” ALTERNATIVE**

The “No-Go” alternative is the non-occurrence of the proposed exploration activities. Thus there would be no acquisition of data (via FTG) for the proposed ER area as proposed. In this case, the residual impacts (i.e. impacts after implementation of mitigation measures) of the proposed activities would not occur.

The implications of not undertaking the proposed early-phase exploration is that no additional information would be derived on the potential for an oil and gas resource in the region. In the absence of the exploration a potential petroleum resource cannot thus be identified, understood or assessed.

Without this knowledge no oil or gas field development would be able to occur. In the absence of oil and gas production there would obviously not be any of the potential risks related to detailed exploration nor future production. Similarly the potential benefits of oil and gas production would not be derived.
5 DESCRIPTION OF THE BASELINE ENVIRONMENT

This chapter provides a general overview of the current baseline conditions (biophysical, cultural and socio-economic) of the ER application area and surrounds.

5.1 BIOPHYSICAL ENVIRONMENT

5.1.1 CLIMATE

5.1.1.1 Temperature

The climate of the proposed ER area is generally milder than in the inlands areas of the broader region as it is strongly influenced by the mountainous topography associated with the Drakensberg Mountains located to the north and west of the ER area. The proposed ER area typically experiences an escarpment climate with warm summers and mild winter that includes periods of very cold conditions with snow. The average summer midday temperature expected within the proposed ER area is 17°C while the average winter midday temperature is 2°C which can drop to below zero.

5.1.1.2 Rainfall

The broader area is characterised by summer rainfall usually in the form of thunderstorms. Mean annual precipitation varies between 700 mm in the east of the proposed ER area up to 1000 mm to the west.

5.1.2 GEOLOGY

5.1.2.1 Regional Setting

The proposed exploration area lies in the north east of the Karoo Basin (see Figure 5-1). The main Karoo Basin in South Africa formed as a result of compression predominantly associated with flexural subsidence, characteristic of foreland basins, during the assembly of the Gondwana super-continent. Consensus on the tectonic setting of the basin, however, remains debated (Tankard et al., 2012; Schreiber-Enslin et al., 2014). The Karoo Basin represents a diverse and complex suite of rock units with an aerial extent of roughly 600 000 square kilometres that attains a maximum sedimentary thickness of 12 kilometres. The north east of the basin is host to several distinct facies of rocks that vary between shore face, fluvial and lacustrine sediments, deposited between the Permian and Triassic.
The deposition of Karoo Supergroup sediments ended in the early Jurassic during the emplacement of the igneous rocks that constitute the Drakensberg Group. The preserved basalts and dolerites attain a maximum thickness of approximately 1,400 m in the Lesotho area. The northern flank of the basin is defined by the erosional limits of the late Carboniferous-Permian Dwyka and Eccsa Groups, where they unconformably overlay Archean-Cambrian age, Kaapvaal and Namaqua-Natal basement. The Eccsa Supergroup consists mainly of sandstone and shale from the Permian period. The Dwyka Formation within the proposed exploration area consists mainly of tillite from the Carboniferous period.

FIGURE 5-1: SIMPLIFIED GEOLOGY OF THE KAROO BASINS
(source PASA brochure)
5.1.2.2 Geology of Proposed ER area

The geology of the proposed ER area comprises the Molteno, Elliot and Clarens Formations (from the Karoo Supergroup) and the Drakensberg Group (see Figure 5-2). The Molteno Formation is overlain by the Late Triassic Elliot Formation with a maximum thickness of approximately 500 m in the south. The formation comprises an alternating sequence of greyish-red or less commonly greenish-grey mudstone and subordinate fine- to medium-coarse sandstone.

![Figure 5-2: GEOLOGY OF THE EXPLORATION RIGHT AREA](source)

The Late Triassic/Early Jurassic Clarens Formation superimposes the Elliot Formation. This formation represents the final phase of Karoo sedimentation (Lurie, 2008). The Clarens Formation consists of fine-to very fine-grained sandstone and siltstone with subordinate mudstone and occasional chert and nodular limestone horizons (Johnson et al., 2006). The mudstones are generally pale-olive to pale-red in colour and the sandstones are usually very pale-orange, well sorted with sub-angular to sub-rounded grains (Karpeta and Johnson, 1979). The thickness of the Clarens Formation ranges 200-250 m, however, the northern extent of the formation has a thickness of 100 m.

The Drakensberg Group forms the upper part of the Drakensberg Mountains. It is characterised by the dark-grey basaltic lavas with subordinate tuffs and occasional sandstones (Karpeta and Johnson, 1979).
The basalts are made up of altercations of a tough and massive coarsely crystalline rock and easier-weathering vesicular varieties. The total thickness of Drakensberg Group is up to 700 m (Johnson et al., 2006).

Dolerite dykes, also present in the area, are inclined sheets and sills that intruded the Karoo Sequence. Dolerite dykes are generally 3 - 10 m wide and 5 - 30 km long, although some can be followed for 80 km (Johnson et al, 2006). The inclined sheets and sills range from a few metres to 200 m or more in thickness. Quaternary deposits (<2 m in thickness) are generally limited in the study area and concentrate only along the upper Kinira River and its upper tributaries (Karpeta and Johnson, 1979).

5.1.2.3 Resource assessment

Resource assessments of the Karoo Basin have historically emphasized the world-class coal reserves that have dominated the energy history of South Africa. Some limited onshore exploration for hydrocarbon occurrences was undertaken in the 1960s but no commercial hydrocarbon occurrences were discovered. However, it is expected that the north-east Karoo Basin has potential for a tremendous diversity of hydrocarbon resources including shale oil and shale gas, coalbed methane, helium and biogenic gas.

One of the complications recognised during the initial resource exploration effort undertaken in the 1960s was the widespread occurrence of dolerite dykes, especially in the north-east Karoo Basin. The thermal effects of these dykes led some early researchers to state that the dykes were required for distillation of hydrocarbons from adjacent coal and shale beds. The complexity of these dyke intrusions, well documented in the shallow north-east Karoo coal fields, makes it difficult to understand the geometry of any possible reservoir horizons in the adjacent sediments. As a result, there is poor understanding of the relationship between the observed non-commercial oil and gas occurrences and any structural control. Further compounding the perception of an absence of commercial hydrocarbons in the Karoo Basin was the documentation of low-permeability conditions in most drill holes. This led many researchers to conclude that the rocks possessed too low a permeability to produce hydrocarbons and porosities too low to trap them.

5.1.2.3.1 Shale Gas Potential

The development of shale gas fields, which commenced in the United States in the early 21st Century, has demonstrated the ability to produce voluminous economic quantities of hydrocarbons from extremely low permeability rocks. This was made possible by the use of horizontal drilling and hydraulic fracturing to maximize wellbore connectivity with low-permeability hydrocarbon-bearing strata.

As a result, shale gas in South Africa is being reassessed as a potential hydrocarbon resource. Most exploration focus has emphasized the potential gas resource of the deep Karoo Basin in the southern and western sub-basins where the rocks are most thermally mature. Based on limited preliminary data,
Advanced Resources International (ARI, 2011; ARI, 2013), on the behalf of the US Energy Information Administration, assessed the shale gas potential of the Lower Ecca Group shales in the southern Karoo Basin to contain 1,834 Tcf of gas-in-place with recoverable shale gas resources of 485 Tcf. In 2013, ARI completed a reassessment to show that the lower Permian Ecca Group contains 1,559 Tcf of shale-gas-in-place with 370 Tcf as the technically recoverable shale gas resource. In this part of the Karoo Basin, the sediments reach nearly 12 km in thickness (Raseroka and McLachlan, 2008). PASA estimates recoverable shale gas reserves of about 40 Tcf².

5.1.2.3.2 Oil Potential
The oil resource potential of the Karoo Basin has largely been ignored because of the historical absence of commercial oil discoveries, and the restricted occurrence of oil accumulations to the north-east Karoo Basin where the rocks are less thermally mature. Further evaluation still needs to be undertaken in the frontier basins.

5.1.2.3.3 Coalbed Methane Potential
The north-east Karoo Basin also has considerable potential as a Coalbed Methane (CBM) resource play due to well-documented gassy coals at relatively shallow drilling depths. Estimates of the CBM resource in the north-east Karoo ranges from 1 Tcf for the Waterberg Coalfield (Anglo Thermal Coal for Waterberg Coalfield) to over 196 Tcf for the NE Karoo region (PASA Unconventional Resources Onshore Report).

5.1.2.3.4 Helium Potential
In addition to the oil and CBM potential of the north-east Karoo Basin, there are also documented reserves of helium in Precambrian-hosted gold mines in some regions. The methane component of these reserves is estimated at over 11.5 billion cubic feet (Bcf) (Molopo Energy Company website; PASA Unconventional Resources Onshore Report). Helium is an extremely valuable strategic resource found in limited areas of the world. A rare gas on earth, the bulk of the current helium production (75%) is from the United States. The most important use of helium currently is for cryogenic cooling (32%), although helium has numerous other industrial uses which include welding, controlled atmosphere (medical and other laboratory testing), leak testing, as a purge gas, breathing mixtures for deep sea diving, and also as a lifting gas.

5.1.3 Seismicity
The Southern African region is considered to be relatively stable from a seismic perspective. South Africa is located on the African tectonic plate, which includes the African continent and parts of the floor of the Atlantic and Indian Oceans. In general earth tremors and quakes are infrequent and generally of low

magnitude. The largest ever recorded earthquake to occur in South Africa was the Ceres-Tulbagh Earthquake, which occurred in September 1969, and had a magnitude of 6.3 on the Richter Scale.

There are areas in South Africa with higher peak ground acceleration which indicates a greater likelihood of earth quakes. These are found in the Western Cape region and in parts of the northern and western Free State, as well as the Witwatersrand. Within the ER, the Cedarville Fault is an active fault with associated recorded earthquake activity (in 1986 an earthquake of 5.15 was recorded at the town of Matatiele which is located near the fault). The fault and associated geological structures are likely to cause preferred flow paths and form good groundwater exploration targets.

5.1.4 Soils

Two main landforms within the proposed ER area were mapped using the Soil and Terrain Database (SOTER) methodologies. Medium gradient hills with a slope ranging between 8 and 30% were found to occur on the south- and south eastern portions of the proposed ER area, while high gradient mountains with slope of more than 30% occur within the foothills of the mountainous areas (Figure 5-3). The high gradient mountains are considered to be unsuitable for crop production activities, however, they could be suitable for livestock grazing or nature conservation.

5.1.4.1 Soil Classes

Six dominant soil classes were identified within the proposed ER area (see Table 5-1), namely:

- Freely drained, structureless soils;
- Lithosols (shallow soils on hard or weathering rock);
- Undifferentiated clays;
- Undifferentiated poorly drained soils;
- Undifferentiated shallow soils; and
- Structureless and poorly drained soils.

A description of the properties and limitations associated with each soil class is provided in Table 5-1.
<table>
<thead>
<tr>
<th>Soil class</th>
<th>Favourable properties</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Freely drained, structureless soils</td>
<td>Favourable physical properties</td>
<td>May have restricted soil depth, excessive drainage, high erodibility, low natural fertility</td>
</tr>
<tr>
<td>2 Lithosols (shallow soils on hard or weathering rock)</td>
<td>May receive water runoff from associated rock</td>
<td>Restricted soil depth; associated with rockiness</td>
</tr>
<tr>
<td>3 Undifferentiated clays which are an association of swelling clay soils, dark clay soils which are not strongly swelling, poorly drained dark clay soils which are not strongly swelling, poorly drained swelling clay soils and dark clay soils, often shallow on hard or weathering rock.</td>
<td>High natural fertility</td>
<td>One or more of high swell-shrink potential, plastic and sticky, restrictive effective depth, wetness</td>
</tr>
<tr>
<td>4 Undifferentiated poorly drained soils which are an association of imperfectly drained soils, often shallow and often with a plinthic horizon and wetland soils.</td>
<td>Wetness favourable in dry areas; may sustain wetland vegetation</td>
<td>Seasonal or excessive wetness.</td>
</tr>
<tr>
<td>5 Undifferentiated shallow soils which include Lithosols (shallow soils on hard or weathering rock) and non-soil land classes.</td>
<td>Soil may receive water runoff from associated rock; water-intake areas</td>
<td>Restricted land use options</td>
</tr>
<tr>
<td>6 Structureless and poorly drained soils</td>
<td>May have favourable physical properties; relative wetness favourable in dry areas, may sustain wetland vegetation</td>
<td>Low base status, restricted depth, imperfect to poor drainage, excessive wetness, high erodibility</td>
</tr>
</tbody>
</table>

FIGURE 5-3: SOIL CLASSES IDENTIFIED WITHIN THE EXPLORATION RIGHT AREA
5.1.4.2 Land capability classification

The five different land capability classes identified within the proposed ER area are provided in Table 5-2 and illustrated in Figure 5-4. The classes vary from soils with moderate limitations (class III) to soils with extremely severe limitations (class VIII).

The majority of the proposed ER area (61 633 ha) is considered to be non-arable for the purposes of crop cultivation and has moderate to low suitability as grazing land. A small section on the eastern portion of the proposed ER area (400 ha) has wilderness land capability and in terms of land capability class system should preferably only be used for wildlife and habitat conservation. The remaining areas, approximately 27 140 ha, are mapped to have a moderate potential for arable agriculture. These soils are mainly located in valley bottoms where the slope gradients are less steep and pockets of arable land makes crop farming possible (typically in close proximity to villages).

<table>
<thead>
<tr>
<th>CLASS</th>
<th>DEFINITION</th>
<th>CONSERVATION NEED</th>
<th>USE / SUITABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>III</td>
<td>Moderate limitations. Some erosion hazards</td>
<td>Special conservation practice and tillage methods.</td>
<td>Rotation of crops and ley (50%)</td>
</tr>
<tr>
<td>IV</td>
<td>Severe limitations. Low arable potential. High erosion hazard</td>
<td>Intensive conservation practice</td>
<td>Long term leys (75%)</td>
</tr>
<tr>
<td>VI</td>
<td>Limitations preclude cultivation. Suitable for perennial vegetation</td>
<td>Protection measures for establishment e.g. Sod-seeding</td>
<td>Veld and / or afforestation</td>
</tr>
<tr>
<td>VII</td>
<td>Very severe limitations. Suitable only for natural vegetation</td>
<td>Adequate management for natural vegetation.</td>
<td>Natural veld grazing and afforestation</td>
</tr>
<tr>
<td>VIII</td>
<td>Extremely severe limitations. Not suitable for grazing or afforestation.</td>
<td>Total protection from agriculture</td>
<td>Wildlife</td>
</tr>
</tbody>
</table>

5.1.4.3 Degraded land

Due to the high erodibility of the soils present within the proposed ER area a substantial proportion of the proposed ER area has been designated as degraded land (see Figure 5-5). The degradation in this area include barren rock (159 ha) and degraded vegetation (36 851 ha).

5.1.4.4 Restricted areas

It should be noted that sensitive soils with hydromorphic properties which support wetland habitat will be excluded from proposed exploration activity sites by virtue of protection assigned to wetlands. Thus, the only other soil forms that should be protected from exploration activities are soil forms that contain beneficial water-retaining layers in and below the rooting zone. The advantage of these water-retaining layers is that soil water is stored for uptake by crops, especially during drier periods. Significant physical disturbance to these soils could result in a loss of this functionality. Such soils are anticipated to occur in a small portion of the south-eastern corner of the proposed ER area.
FIGURE 5-4: LAND CAPABILITY MAP OF THE EXPLORATION RIGHT AREA

FIGURE 5-5: DEGRADED LAND WITHIN THE EXPLORATION RIGHT AREA
5.1.5 LAND COVER

According the National Land Cover Data Set (2013/2014), the great majority of the ER area comprises grasslands (Figure 5-13). Some of the larger river valleys have thicket/dense bush in the upper reaches. Much of this comprises stands of alien and invasive trees rather than indigenous vegetation (pers. obs). The flatter ground in the lower elevation areas has been largely transformed, either by rural housing and urbanisation or through various forms of cultivation (subsistence and commercial). Many of the valley bottoms contain wetland areas.

5.1.6 HYDROLOGY

5.1.6.1 Catchments and River Systems

The exploration area falls within the Mzimvubu to Keiskamma Water Management Area (WMA) which has a total mean annual run off of 7 241 million cubic meters (mcm). The Mzimvubu to Keiskamma WMA has the highest mean annual runoff in South Africa, and equates to almost 15% of the total river flow in the country (NWRS, September 2004). The Mzimvubu to Keiskamma WMA consists of numerous quaternary catchments. The characteristics of the quaternary catchments located within the exploration area are included in Table 5-3 below. See Figure 5-6 for the distribution of the quaternary catchments within the exploration area (WR, 2005).

<table>
<thead>
<tr>
<th>Quaternary catchment</th>
<th>Mean annual Runoff (mcm)</th>
<th>Catchment area (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T34B</td>
<td>35.90</td>
<td>242</td>
</tr>
<tr>
<td>T34C</td>
<td>33.92</td>
<td>282</td>
</tr>
<tr>
<td>T33C</td>
<td>51.52</td>
<td>367</td>
</tr>
<tr>
<td>T33D</td>
<td>61.01</td>
<td>461</td>
</tr>
<tr>
<td>T33B</td>
<td>94.27</td>
<td>602</td>
</tr>
<tr>
<td>T33A</td>
<td>97.37</td>
<td>672</td>
</tr>
</tbody>
</table>

The Mosenene River, Seeta River, Mabele River, Lekhetlane River, Marulane River and the Tinana Rivers are located within the proposed ER area (see Figure 5-6). The source of these rivers including their associated tributaries is located within the exploration area. The Mosenene River, Seeta River, Mabele River, Lekhetlane River and the Marulane River flow in a south easterly direction towards the Kinira River which is located approximately 10km east from the proposed ER area. The Tinana and Phinari Rivers drain the southern extent of the area into the Thina River. The Kinira and Thina Rivers are the main tributaries of the Mzimvubu River which flows in a south easterly direction to the Indian Ocean at Port St Johns.
FIGURE 5-6: SURFACE WATER FEATURES WITHIN PROPOSED ER AREA, WITH QUATERNARY CATCHMENTS
Separate electronic file
5.1.6.2 Surface water users

Surface water use consists of a combination of domestic, livestock use and irrigation for crop production in the low lying areas. The uMzimvubu Catchment Partnership Programme has been established to tackle degradation of the upper uMzimvubu landscape, and protect the livelihoods dependent upon it. It is estimated that around 1 million people derive water and a livelihood within the greater catchment (pers comm UCPP). Significant investment has been made in the landscape and its use through the UCPP to improve surface water quality and there is intent from the Matatiele Local Municipality (MLM) to have the region declared as a ‘water factory’ through the NEMPAA or Mountain Catchment Act in the context of the 2015 National Water Resource Strategy (UCPP).

It is noted that much of the rural population within the proposed ER area is dependent on locally sourced water. Formal supply schemes are present in some villages, but many residents source water from springs and watercourses.

5.1.6.3 Wetlands

The upper section of the Umzimvubu catchment in the Matatiele LM hosts as much as 42 765 ha of wetland (email, UCPP). Numerous wetlands are located within the exploration area. For further information regarding the conservation status of these wetlands refer to Section 5.1.8. The location of the wetlands associated with the exploration area is illustrated in Figure 5-6 and Figure 5-13.

5.1.6.4 Major dams

No major dams are located within the proposed ER area. However, there are several small dams are located within the exploration area which are used for livestock and domestic purposes.

5.1.7 Groundwater

5.1.7.1 Aquifer Classification

The exploration area is classified as a minor aquifer region, which implies a moderately yielding aquifer system of variable water quality in terms of the Aquifer Classification Map of South Africa. Although borehole yields in the deeper aquifer are generally, considered low, structural features such as faults and fractures can produce higher yielding boreholes.

On a regional level, the hydrogeology of the proposed ER area comprises fractured and intergranular aquifers with yields in the range of 0.5 to 2 L/s (see Figure 5-7). The aquifer types within the proposed ER area can be further refined according to lithology (refer to Section 5.1.2.2):
Molteno Formation sandstones comprising fractured and intergranular aquifers. This formation contains quartzitic sandstone units, which could be targeted for groundwater use, especially along dolerite bodies contact zones. Borehole drilling into these rocks has been found to have a 43% success rate and yields generally ranging 0.5-2 L/s (King et al, 1998).

Elliot Formation sandstones comprising fractured and intergranular aquifers. This formation also contains quartzitic sandstone units and dolerite bodies contact zones suitable for targeting. Borehole drilling into these rocks has been found to have a 34% success rate and yields generally ranging 0.1-0.5 L/s (King et al, 1998).

Clarens Formation sandstones comprising fractured aquifers. These sandstones are distributed south of the Drakensberg Mountains. Borehole drilling into these rocks has been found to have a 60% success rate and yields generally ranging 0.5-2.0 L/s.

Drakensberg Group basaltic lavas represent a fractured and intergranular aquifer located along the Drakensberg Mountains. Borehole drilling into these rocks has been found to have a 33% success rate and yields generally ranging 0.1-0.5 L/s.

Karoo dolerites are anticipated to be associated with intense fracturing in the host rock as well as in the dolerite itself, which is why the contact zones between the dolerite and older sedimentary rock tend to be intergranular and fractured aquifers. These fractured zones allow for highly conductive pathways for water to infiltrate (recharge) and be transmitted. Yields can be considerable if the fracture system induced by both folding and intrusion are interconnected. Borehole drilling into these rocks has been found to have a 35% success rate and yields generally ranging 0.5-2.0 L/s.

Alluvium deposits are found along the upper Kinira River and its upper tributaries within the proposed ER area. The yields of the associated alluvium/intergranular aquifers range between 0.1-0.5 L/s. The likelihood of drilling successful boreholes is in the region of 95%.

Aquifer vulnerability indicates the tendency or likelihood for contamination to reach a specified position in the groundwater system after introduction at some location above the uppermost aquifer. In terms of the exploration area, the aquifer vulnerability in accordance to the Aquifer Vulnerability Map of South Africa (Conrad et al. 1999c), varies between ‘least’ and ‘moderate’ vulnerability. The areas of ‘least’ vulnerability are areas that are only vulnerable to conservative pollutants in the long term when continuously discharged or leached. The areas of ‘moderate’ vulnerability are areas which are vulnerable to some pollutants, but only when continuously discharged or leached.

Aquifer susceptibility indicates the qualitative measure of the relative ease with which a groundwater body can be potentially contaminated by anthropogenic activities and includes both aquifer vulnerability...
and the relative importance of the aquifer in terms of its classification. In terms of the Aquifer Susceptibility Map of South Africa (Conrad et al, 1999b), the exploration area is associated with a 'low' to 'medium' susceptibility aquifer.

![Aquifer Map](image)

**FIGURE 5-7: REGIONAL HYDROGEOLOGY OF THE PROPOSED ER AREA (DWAF, 2006).**

### 5.1.7.2 Groundwater levels

Available data from the National Groundwater Archive (NGA) indicates that groundwater levels range between 0.3 - 108 m below ground level, with discharge rates varying between 0.01 - 9.6 L/s. The depth of the boreholes contained within the database range between 2 - 180 meters below ground level (mbgl). However, when considering DWS published information (i.e. not the NGA) then the mean depth to groundwater ranges between 15 - 20 mbgl and the recommended borehole drilling depth ranges between 20 – 30 m.

Groundwater also surfaces at various spring sites. These sites include dykes intersecting features, contacts of dolerite sill/sheets, basal contact of fractured sandstone with an underlying less permeable mudstone horizon and on weathered basins (usually weathered dolerite sheets).
5.1.7.3 Groundwater Quality

The anticipated electrical conductivity concentration of groundwater within the proposed ER area is between 0 and 70 mS/m (see Figure 5-8), while and Total Dissolved Solids (TDS) are expected to range between 200 - 449 mg/L. Calcium and magnesium are dominant constituents of groundwater within the proposed ER area, however, groundwater with high fluoride content has been reported to the south.

![Figure 5-8: WATER QUALITY DISTRIBUTION WITHIN THE EXPLORATION RIGHT AREA](image)

5.1.7.4 Groundwater Use

There are 537 registered boreholes in the larger area which includes the proposed ER area, however only 193 of these boreholes are still in use. Of the remaining registered boreholes, 39 are recorded as being destroyed, 63 are abandoned and the status of the remaining 242 boreholes is not known. Registered groundwater use in the area ranges between 1 505 m$^3$ and 50 000 m$^3$ per annum (see Figure 5-7) and is used mainly for drinking, livestock watering and irrigation purposes (DWAF, 2008).

It is noted that much of the rural population within the proposed ER application area is dependent on locally sourced water. Water may be sourced from groundwater through unregistered boreholes or from springs and artesian wells. The town of Matatiele and farmers in the Cedarville Flats, located downstream...
of the ER application area, are also dependent on groundwater. It is possible that much of this groundwater is derived from the catchment areas located within the ER application area.

Stakeholders within the proposed ER area note that the Cedarville Fault is an important groundwater feature with regards to groundwater development and use. The Cedarville Fault is an active fault with associated recorded earthquake activity (in 1986 an earthquake of 5.15 was recorded at the town of Matatiele which is located near the fault). The fault and associated geological structures are likely to cause preferred flow paths and form good groundwater exploration targets. The fault forms a graben structure with deep weathered and colluvial profiles ideal for primary shallow aquifers.

5.1.8 Biodiversity

5.1.8.1 Flora

The proposed ER area is located within the grassland biome within the Sub-Escarpmont Grassland Bioregion and the Drakensberg Grassland Bioregion, which is structurally simple and strongly dominated by grasses which are comprised of various vegetation units. Vegetation units that are associated with the proposed ER area include the Drakensberg Foothill Moist Grassland, the East Griqualand Grassland, the Lesotho Highland Basalt Grassland, the Mabela Sandy Grassland and the Southern Drakensberg Highland Grassland (Mucina and Rutherford, 2006). The distribution of these vegetation units within the proposed ER area are illustrated in Figure 5-9. Further information pertaining to the various vegetation units is discussed below.

Drakensberg Foothill Moist Grassland

The Drakensberg Foothill Moist Grassland vegetation unit is moderately rolling and mountainous and is incised by river gorges of drier vegetation types. This vegetation unit is dominated by forb-rich grassland with short bunch grasses including *Themeda triandra* (Red Grass) and *Tristachia leucothrix* (Hairy Trident Grass). Almost 20% of this vegetation unit has been transformed for cultivated land and by urban sprawl (Mucina and Rutherford, 2006).

East Griqualand Grassland

The East Griqualand Grassland vegetation unit is characterised by hills with slopes covered by grassland with patches of bush clumps with *Leucosidea sericea* (Oldwood) (only wet areas), or *Dispyros lycoides* (Bluebush), *Acacia Karroo* (Currently known as *Vachellia karroo*) and *Ziziphus mucronata* (Buffalo thorn) in low-lying dry areas. Over one quarter of this vegetation unit has been transformed for cultivation (maize), plantations and urban sprawl (Mucina and Rutherford, 2006).

Lesotho Highland Basalt Grassland

The Lesotho Highland Basalt Grassland vegetation unit consist of plateaus and high ridges of mountains separated by deep valleys. Vegetation consists of short grassland with many areas also with *Passerina*
montana (Lithaba) dominated shrub land. Smaller shrubs such as Chrysocoma cillata (Beebos) and Pentzia cooperi are often very common in disturbed areas. Dominant species located at the lower and middle altitudes include Themeda triandra (Red grass) while Festuca caprina (Bokbaardgras) is located at lower altitudes. The species Kniphofia caulescnes (Caulescent red-hot poker) are predominately evident at higher altitudes. The Merxmeullera macowanii (Molalashlolo) grass is located along water courses and drainage lines. Almost 10% of this vegetation unit has been transformed predominantly by cultivation. The vegetation unit is also highly utilised for grazing by sheep, goats, cattle and donkeys. The majority of the disturbances to this vegetation unit take place within the lower altitudes (Mucina and Rutherford, 2006).

**Mabela Sandy Grassland**

The Mabela Sandy Grassland vegetation unit is characterised by flat valley basins. This vegetation unit is dominated by species-poor, low tussock-dominated, sour grasslands without indigenous trees. Sporobolus pyramidalis (Cat’s tailgrass) and Aristida junciformis (Wire grass) are indicator species. More than 20% of this vegetation unit has been transformed due to cultivation related activities such as maize and urban sprawl. Threats to the remainder of the vegetation unit include heavy grazing by livestock particularly in communal areas (Mucina and Rutherford, 2006).

**Southern Drakensberg Highland Grassland**

The Southern Drakensberg Highland Grassland vegetation unit is characterised by steeply sloping mountainous areas which support dense tussock grassland on slopes sometimes with dwarf-shrubby component of dwarf shrubland on exposed rocky areas. Dominant species associated with this vegetation unit include Themeda triandra (Red grass), heteropogon contortus (Black Speargrass), Eragrostis racemose (Narrow heart love grass), Eragrostis chloromelas (Boer love grass), E. curvula (Curved love grass), Elionurus muticus (Wire grass), Trachypogon spicatus (Giant spear grass), Andropogon appendiculatus (Blougrass), Harphochloa falx (Terpillar grass) and Tristachya leucothrix (Trident grass). More than 5% of this vegetation unit has been transformed due to cultivation related activities (Mucina and Rutherford, 2006).
FIGURE 5-9: DISTRIBUTION OF VEGETATION UNITS WITHIN THE EXPLORATION RIGHT AREA
Separate electronic file
5.1.8.2 Fauna

Numerous faunal species such as birds, amphibians, reptiles, mammals, fish and insects are associated with the various vegetation units located in the proposed ER area. The lower slopes of the Drakensberg Mountains support a greater variety of faunal species to that of the peaks. According to International Union Conservation of Nature (IUCN), red data faunal species likely to occur within the proposed ER area are included in the below.

**TABLE 5-4: FAUNAL SPECIES OF CONSERVATION CONCERN POSSIBLY OCCURRING WITHIN THE PROPOSED ER AREA**

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>CONSERVATIONAL STATUS (IUCN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bugeranus carunculatus</td>
<td>Wattled Crane</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Balearica regulorum</td>
<td>Grey Crowned Crane</td>
<td>Endangered</td>
</tr>
<tr>
<td>Anthropoides paradiseus</td>
<td>Blue Crane</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Heteromirafra ruddi</td>
<td>Rudd’s Lark</td>
<td>Endangered</td>
</tr>
<tr>
<td>Gypaetus barbatus</td>
<td>Bearded Vulture</td>
<td>Critically Endangered</td>
</tr>
<tr>
<td>Circus maurus</td>
<td>Black Harrier</td>
<td>Endangered</td>
</tr>
<tr>
<td>Gyps coprotheres</td>
<td>Cape Vulture</td>
<td>Endangered</td>
</tr>
<tr>
<td>Mammal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mystromys albicaudatus</td>
<td>White-tailed Rat</td>
<td>Endangered</td>
</tr>
<tr>
<td>Insects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paracilacris lateralis</td>
<td>Drakensberg Grass False Shieldback</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Reptiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bradypodion thamnobates</td>
<td>Dwarf chameleon</td>
<td>Near threatened</td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oreochromis mossambicus</td>
<td>Mozambique Tilapia</td>
<td>Near threatened</td>
</tr>
<tr>
<td>Tomichia cawstoni</td>
<td>-</td>
<td>Critically endangered</td>
</tr>
</tbody>
</table>

The White-tailed Rat is the most widely distributed of all the species of conservation concern within the ER application area. Although its current geographic range is considered relatively wide, the extensive fragmentation of habitat and its decline due to grazing and agriculture has resulted in the listing of this species as endangered. Little is known about its preferred habitat with species accounts providing varying descriptions from ‘black loam areas that consist of good vegetation cover’ to ‘sandy soils with good cover’ and ‘rocky, well covered slopes of dolerite and/or basalt origin’.

In the region the 3 Crane species (Blue, Grey-Crowned and Wattled) and the Black Harrier will favour wetland areas, particularly for breeding, but all will forage and occur widely in high altitude grasslands.

The vulture species (Cape and Bearded) forage extremely widely, but nesting sites and breeding are invariably restricted to south-facing vertical cliffs. Rudd’s Lark is restricted to short grassland on crest and hilltops at 1700 to 2200 m asl. A small isolated population is known from the Matatiele area, but its current status in this area is unclear and other populations could be present but overlooked.
5.1.8.3 Sites of conservation importance

Protected Areas

The Malekgalonyane (Ongeluksnek) Nature Reserve is located immediately adjacent to the proposed ER area (see Figure 5-10). The 13 000 ha reserve was proclaimed in 1976. All areas with protected status under the National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003); Biodiversity Act, 2004 (Act 10 of 2004); National Forests Act, 1998 (No. 84 of 1998) and Mountain Catchment Areas Act, 1970 (No. 63 of 1970) (including those under application) have been excluded from the extent of the ER application. The area within 5 km from the Ongeluksnek Nature Reserve boundary, considered as a buffer zone, is located within the ER application area.

The Maloti Drakensburg Transfrontier Conservation and Development Area (MDTFCA) straddles the 300 km border between Lesotho and South Africa incorporating more than 600 km of mountain range. Of distinct significance is the exceptional biodiversity of the region which includes over 2 500 species of flowering plant, approximately 13% of which are locally endemic. The area also holds over 600 known sites of San art and is a vital water catchment area for the people of Lesotho and South Africa. The broad and overall objective of the MDTFCA is to facilitate effective collaboration and coordination across district, provincial, international and institutional boundaries in conserving the natural and cultural heritage of the MDTFCA and also contribute to the socio-economic development of the region, particularly through sustainable tourism. The uKhahlamba Drakensberg Park and Sehlabethebe National Park have world heritage site status. The Malekgalonyane (Ongeluksnek) Nature Reserve lies at the southern end of the MDTFCA. The southern portion of the planning domain for the MDTFCA project area overlaps with the ER application area, but currently has no formal conservation status.

National Protected Areas Expansion Strategy

The aim of the National Protected Area Expansion Strategy (NPAES) is to achieve cost effective protected area expansion for ecological sustainability and adaptation to climate change. The NPAES sets targets for protected area expansion, provides maps of the most important areas for protected area expansion, and makes recommendations on mechanisms for protected area expansion. It deals with land-based and marine protected areas across all of South Africa’s territory (SANBI BGIS).

Much of the proposed ER area is located in a NPAES focus area (see Figure 5-10). Focus areas are important for the land-based protected area expansion network as these areas are large, intact and unfragmented areas which are suitable for creation or expansion of large protected areas.

Eastern Cape Protected Areas Expansion Strategy

The Eastern Cape Parks and Tourism Agency (ECPTA) undertook the development of a protected area expansion strategy in 2012. The ECPAES identified a range of focus and priority areas for the expansion of protected areas in the province. The stated purpose of the focus areas was to guide protected area expansion planning and implementation by the ECPTA over the next 5 years and the priority area purpose was to guide expansion beyond the 5 year horizon.
There are no focus areas identified by the ECPAES within the ER application area, but there are significant priority areas. These areas overlap the high altitude grasslands of the Lesotho Highland Basalt Grasslands and Southern Drakensberg Highland Grasslands (see Figure 5-9). The priority areas in the ECPAES match the extent of the focus areas in the NPAES to a large degree (see Figure 5-10).

Stewardship areas
Provincial government (through Eastern Cape Parks and Tourism) and the Matatiele Local Municipality have identified areas for protection through the declaration of stewardship areas under the Matatiele Water Factory Project. The proposed declaration of stewardship areas aims to improve land management of the upper catchment landscape, enhance ecosystem services and build climate change resilience, which can generate sustainable livelihood benefits and enhance water security of the region. The initial draft of the Matatiele stewardship process was adopted by the Matatiele Council in May 2015 (https://umzimvubu.org/projects/current-activities/).

The initial draft comprises a stewardship plan and priority maps for the entire Matatiele Local Municipality area which includes seven target protected areas (see Figure 5-10), based on the expansion of Eastern Cape protected areas along with key criteria such as freshwater and biodiversity priority areas as identified in the status quo research. The initial identified target areas are indicated to guide initial discussions and are considered to undergo further refinement and discussion over time (https://umzimvubu.files.wordpress.com/2014/10/matatiele-stewardship-process-outline-draft-1.pdf).

Biodiversity Hotspots
The Eastern Cape is known nationally and internationally for its high levels of biodiversity and endemism. The Maputaland-Albany-Pondoland Biodiversity hotspot extends stretches across 275 000 km² through parts of Mozambique, Swaziland and South Africa (see Figure 5-11) and is a globally recognised biodiversity hotspot. The Drakensberg-Alpine centre of endemism also extends over part of the area.

National Threatened Ecosystems
Section 52 of the National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004) provides for the listing of threatened ecosystems at both national and provincial level. The Mabela Sandy Grassland and the East Griqualand Grassland vegetation units are listed as vulnerable ecosystems within the proposed ER area (see Figure 5-9). Vulnerable ecosystems have a high risk of undergoing significant degradation. No critically endangered ecosystems are located within the proposed ER area (Mucina and Rutherford, 2006).
Freshwater ecosystems

The Water Research Commission and partners undertook the National Freshwater Ecosystem Priority Areas project (NF-EPA). The project produced several outcomes including the Atlas of Freshwater Ecosystem Priority Areas in South Africa, which provides strategic spatial priorities for conserving South Africa’s freshwater ecosystems and supporting sustainable use of water resources. The NF-EPA is supported by an implementation manual that provides guidance on the use of FEPA maps when planning and decision-making impacts on freshwater ecosystems. The manual provides ecosystem management guidelines for river FEPA’s, wetland FEPA’s, sub-quaternary catchments associated with river FEPA’s, and Upstream Management Areas. The purpose of freshwater ecosystem management is to conserve biodiversity patterns and ecological processes and to maintain natural variability. Management should aim to prevent the occurrence of large-scale damaging events, as well as the repeated, chronic, persistent, subtle events.

There are numerous NF-EPA Rivers and wetlands located within the proposed ER area (Figure 5-7). The present ecological state of the NF-EPA rivers located within the proposed ER area are classified as Class C (Moderately modified). The majority of the NF-EPA wetlands are floodplain wetlands with the remainder consisting of channelled valley-bottom, flat and seep wetlands (Figure 5-7).

According to the NF-EPA implementation manual, mining in any form (including prospecting/exploration) should not be permitted in wetland FEPA’s or within 1km of a wetland FEPA buffer, or within 1km of a riverine buffer (including all associated wetland systems and tributaries) within a FEPA catchment. It is noted that there is no legislation regarding buffers around rivers or wetlands in the National Water Act, 1998. The width of a buffer required around a watercourse or wetland depends on many factors such as the risk the proposed development poses to the water resources, the sensitivity of receiving environment and the proposed mitigation measures. The “Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries” (Macfarlane et al., 2014), currently under development by the Institute of Natural Resources is regarded as the most up to date tool for buffer zone determination.

Critical Biodiversity Areas (CBAs)

The Eastern Cape is globally recognised for its high biodiversity value and scenic beauty. It has the highest biome diversity of any province in South Africa. Recognising these important natural resources and the need to conserve them, the Department of Economic Development and Environment Affairs (DEDEA) together with the Department of Water and Sanitation (DWS) have collaborated to draw up the Eastern Cape Biodiversity Conservation Plan (ECBCP). The ECBCP addresses the urgent need to identify and map critical biodiversity areas and priorities for conservation in the Province. Critical Biodiversity Areas (CBAs) are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning (SANBI). The overall aim is to promote the sustainable utilisation of natural resources by avoiding the loss or degradation of natural habitat in CBAs and promoting sustainable development and natural resource utilisation throughout the landscape,
particularly in natural areas. The ECBCP provides an assessment of the value of areas as determined by their necessity in meeting defined conservation targets.

The distribution of terrestrial CBAs located within the exploration area is illustrated in Figure 5-11. Category 1 Terrestrial CBAs are important given that these areas consist of endangered vegetation types and are essential for meeting biodiversity targets for biodiversity features. Category 2 and 3 Terrestrial CBAs are important as these areas consist of endangered and vulnerable vegetation types respectively (ECCPH, August 2007).

The distribution of aquatic CBAs located within the exploration area is illustrated in Figure 5-12. Category 1 Aquatic CBAs are important given that these areas comprise important river sub-catchments and wetlands. Category 2 CBAs are important given that these areas consist of important sub-catchments (ECCPH, August 2007).

It is therefore evident that much of the proposed ER area is considered to be ecologically sensitive (i.e. CBA 1). It must however be noted that a significant amount subsistence agriculture is taking place in the lower lying area of the region (See Figure 5-13). Many of the datasets do not give cognisance to this, or such use may have escalated in intensity. It is therefore likely that certain areas assigned conservation planning status may in reality be disturbed or cultivated.
FIGURE 5.10: EXTENT OF THE PROPOSED ER AREA IN RELATION TO SITES WITH CONSERVATION STATUS

Separate electronic file
FIGURE 5-11: AREAS OF ASSESSED TERRESTRIAL BIODIVERSITY STATUS WITHIN THE PROPOSED ER AREA

Separate electronic file
FIGURE 5-12: AREAS OF ASSESSED AQUATIC BIODIVERSITY STATUS WITHIN THE PROPOSED ER AREA

Separate electronic file
5.1.9 AIR QUALITY

5.1.9.1 Emission sources and pollutants of concern

There is no comprehensive emission inventory of priority sources and pollutants in the Eastern Cape. However, the 2013 Air Quality Management Plan for the Province highlighted sources of emissions for the Alfred Nzo and Joe Gqabi District Municipalities (DM). Industrial and manufacturing in the Joe Gqabi DM includes a large timber processing plant at Ugie and smaller plants in the forestry area in the east. There are no major industrial and manufacturing activities in the Alfred Nzo DM. There may be small boilers at the hospitals and prisons in the region.

The energy use profile for cooking and heating functions for the proposed ER area is diverse. Paraffin and wood use are used predominantly for heating purposes, followed by electricity. Other sources such as gas, coal, solar heating and animal dung are limited in use. During the winter period, more people rely on wood burning as a source of warmth, especially if they do not have electricity, as is the case in many rural areas.

The burning of wood for heating is associated with several consequences for indoor and ambient air quality and for human health. Smoke resulting from incomplete combustion of wood contains many chemical substances that are harmful such as hazardous air pollutants (HAPs), fine particle pollution (ash), and volatile organic compounds (VOC).

Motor vehicle emissions for Alfred Nzo and Joe Gqabi DM are not a significant source of air pollution when compared to urban areas. Other sources of air pollution in Joe Gqabi DM include waste burning and informal brick making using clamp kilns. Some tyre burning is carried out.

5.1.9.2 Ambient air quality

The majority of the proposed ER area is rural in nature and is comprised mostly of small towns, isolated farmsteads, scattered communities and agricultural activities such as livestock grazing and crop cultivation. It follows that the air quality is expected to be good. Air quality may be compromised at times near waste burning sites and informal brick makers and in winter around concentrations of houses where fuel burning is used as a source of warmth. Veld fires are also a major contributor to reduced air quality in winter.

5.2 CULTURAL ENVIRONMENT

5.2.1 HERITAGE/CULTURAL RESOURCES

Only a few heritage surveys have been conducted in this area and the available data is incomplete and biased in terms of rock art. The area is exceptionally rich in rock art occurrences. Numerous San and pastoralist rock art sites are located in rock shelters in the sandstone outcrops. Of the 60 heritage sites
known in the area, 46 of these are rock art sites. It is highly likely that more sites are present in the area. The project area contains some of the finest executed shaded polychrome rock paintings in southern Africa. In fact, some of these paintings eland, in particular, are so exquisite that their artist has been dubbed the “San Michelangelo of Matatiele” (Woodhouse 1982). Flaking of the rock face typically occur in most shelters with subsequent permanent damage to the paintings. Many shelters are frequented by herd boys and other human visitors who often scribble their names over the paintings or even scratch-out complete images. Livestock often take shelter in the rock shelters and rub themselves against the painted surfaces thereby causing more damage. Several rock shelters and archaeological sites have been excavated in the project area (Malithetana 1 Rock Shelter, Kholokwe 1 Rock Shelter, Khinira 7 open site, Mafusing Rock Shelter). These shelters contained Later Stone Age tool and bone assemblages. Collectively, they provide evidence of San occupation of the southern Drakensberg area spanning various millennia.

There is very limited data on sites from the historical period, cultural landscape of living resources in the project area. This is more likely due to a lack of field surveys rather than an indication of their absence. The well-known Mariazelle Mission Station and the smaller Maria Linden Mission as well as the Ongeluksnek Mountain Pass are known historical features. Given the history of the greater Matatiele area it is to be expected that sites relating to the Griqua occupation of the area (from the 1860’s onward) could be located following systematic survey.

5.2.2 Palaeontological Resources

Paleontological surveys of the area are also limited although the underlying geology suggests that the area is very sensitive from a paleontological point of view. Fossils are associated with the Clarens Elliot Formation and Molteno Formations. Fossils associated with the Clarens Formation are well-known for the presence of dinosaur trackways and other trace fossils. The Molteno Formation is globally known for the presence of plant fossils belonging to the *Dicroidium* assemblage. Very few vertebrate remains have been recorded from the formation, but trace fossils, including well-defined dinosaur trackways have been described from different localities in the Karoo Basin. The Elliot Formation is well-known for the abundance of prehistoric life forms that it contains. This includes reptilian (mainly dinosaur) fossils and fish fossils (SAHRIS).

The lower elevation sections of the proposed ER area are underlain by formations of high (Clarens Formation, Stormberg Subgroup, Karoo Supergroup) and very high sensitivity (Molteno and Elliot Formations). Taking the above into consideration there is a high likelihood of fossil occurrence within the proposed ER area.
5.3 SOCIO-ECONOMIC ENVIRONMENT

The proposed ER area is located within the Matatiele Local Municipality (MLM) which falls within the Alfred Nzo District Municipality (ANDM) and the Elundini Local Municipality (ELM) which falls within the Joe Gqabi District Municipality (JGDM). Further detail regarding the demographics of the Matatiele Local Municipality (MLM) and the ELM is provided below.

5.3.1 POPULATION

5.3.1.1 Population

The ANDM has a total population of 804 500 people. The ANDM population is predominantly female, constituting approximately 55% of the total population, while males constitute 45% (ANDM, 2014/2015).

The MLM consists of a population of approximately 203 843 people. The MLM has a similar population distribution to the ANDM, with females and males constituting 54% and 46% of the population, respectively (MLM, 2014/2015).

The ELM has an estimated population of 123 600 people. The male and female ratio constitutes 46.6% and 53.4% respectively of the overall population (ELM, 2012/2017).

5.3.2 EMPLOYMENT

The average unemployment rate for the ANDM is currently estimated to be 43.5% (ANDM, 2014/2015). The unemployment rate is currently estimated at 38.2% for the MLM, 2014/2015). The average unemployment rate of Elundini Local Municipal is 23.11% (ELM, 2012/2017).

5.3.3 HOUSEHOLDS

The majority of residents within the ANDM reside in traditional dwellings that are made of traditional materials (70%). Only 29% of the residents reside in formal dwellings such as a house, flat in block town house cluster (ANDM, 2014/2015). Approximately 49.7% of the MLM population and 33% of the ELM population live in formal houses/buildings. The remainder of the population reside in huts, shacks and caravans (MLM, 2014/2015 and (ELM, 2012/2017).
5.3.4 BASIC SERVICES

In the ANDM approximately 47% of households do not have access to drinking water. Waterborne sanitation is only provided in urban areas which constitutes approximately 79% of households. Toilets in rural areas comprise pit toilets. The bucket system has been totally eradicated. Approximately 6% of the population have access to electricity while the remainder of the population sources energy from alternatives means such as wood, gas and paraffin.

In the MLM approximately 49% of all households have access to clean drinking water through local water supply schemes. The remainder of the households rely on water from rivers, springs and dams. Waterborne sanitation is only provided in urban areas within the local municipality. Toilets in rural areas comprise pit toilets while the bucket system has been totally eradicated. Approximately 45% of households use electricity for lighting, leaving 65% of household’s using alternative means of energy for lighting (MLM, 2014/2015).

Approximately 54 750 residents within the ELM obtain their drinking water from springs and rivers. Waterborne sanitation is found in most urban area. The rural areas make use of pit toilets while the bucket system has been eradicated. Approximately 43.6% of households use electricity for lighting within the ELM (ELM, 2012/2017).

5.3.5 EDUCATION

The ANDM has low education and literacy levels. Some 8% of the population has no education while 53% have only some form of primary school education. Only 14.2% of the population have completed grade 12, while only 4% of the population has attained any higher qualification (ANDM, 2014/2015).

The percentage of non-scholars in the MLM was 9.4% in 2011. The percentage of Children between the ages 6-13 that enrolled in school was 94.4% in 2011. Approximately 12.7% of the population have obtained a matric and the percentage of people that obtained a higher education is 3.1% (MLM, 2014/2015).

In the ELM approximately 15.9% of the population consists of non-scholars. Approximately 11.80% of the population have obtained a matric while only 5.2% of the population have obtained a higher education (ELM, 2012/2017).

5.3.6 CURRENT LAND COVER AND USES

5.3.6.1 Land Cover

See Section 5.1.5.
FIGURE 5-13: LAND COVER AND SOCIAL FEATURES

Separate electronic file
5.3.6.2 Agricultural activities

Agricultural activities are limited to the low lying areas where the topography, water and soils are suitable for agriculture. Agricultural activities associated with the proposed ER area include a combination of commercial and subsistence farming. Commercial farming consists mainly of livestock farming (cattle, sheep and goats), maize and in some areas potatoes. In some areas commercial farming can be associated with irrigation. Subsistence farming is mostly associated with villages which undertake both subsistence and small scale commercial farming. Hand to mouth subsistence farming involves small amounts of cultivation and little profitability which is mostly associated with individual households. Small scale commercial farming takes place where produce is sold within the local villages. The grasslands around most of the villages and rural settlements is heavily grazed by mixed herds of domestic livestock.

5.3.6.3 Eco-tourism

The region is well known for its scenic beauty (particularly views of the Drakensberg) and revenue is generated from numerous eco-tourism activities. Many of these activities are widely dispersed but focus points include the Mehloding hiking trail and Malekgalonyane (Ongeluksnek) Nature Reserve.

The Mehloding hiking trail has a duration of four days and starts at the village of Motseng and follows a north easterly direction, passing through villages of Masupha, Mpharane, Goxe, Pepela, and ends nears the Qacas Nek border post.

5.3.6.4 Villages

Numerous villages are located within the exploration area (see Table 5-6). In addition to this, the relevant wards in which these villages are located are also provided in Table 5-5 below. The larger of these villages are shown in Figure 5-13.

<table>
<thead>
<tr>
<th>MUNICIPALITY</th>
<th>RELEVANT WARD</th>
<th>RELEVANT VILLAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elundini Local Municipality</td>
<td>Ward Councillor: Ward 12</td>
<td>Mahaneng, eMazizi</td>
</tr>
<tr>
<td></td>
<td>Ward Councillor: Ward 13</td>
<td>Mashata, Sethatha, Mabutyana, Mobaabatsana, Mutuk,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Swqobong, Thoteng, Koebug, Ha-Sefoko, Black Fountain,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>New stand</td>
</tr>
<tr>
<td>Matatiele Local Municipality</td>
<td>Ward Councillor: Ward 7</td>
<td>Ha-Nkonwane, Tsita</td>
</tr>
<tr>
<td></td>
<td>Ward Councillor: Ward 8</td>
<td>Nichodo, Bellford, Matube Mission, Monkharkhaneng,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nkosana, Pehong, Matewu</td>
</tr>
<tr>
<td></td>
<td>Ward Councillor: Ward 11</td>
<td>Felleng, Mapfontein, Ponsiseng, Tsikarong, Tereseng,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tutaneng, Pepela, Mabua, Makomereng, Goxe, Polo,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kwambobo, Sabasaba</td>
</tr>
<tr>
<td></td>
<td>Ward Councillor: Ward 12</td>
<td>KwaNhau, Nkaus, Sekhutlong, Kwasikuflumi, Moghobi,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Machekong, Phuthing</td>
</tr>
</tbody>
</table>
5.3.6.5 Towns
There are no major towns located within the proposed ER area. Matatiele to the east is the largest town in the region.

5.3.6.6 Core Astronomy Areas
To date no Core or Central Astronomy Advantage Areas have been declared within the exploration right application area.

5.3.6.7 Local transport network
No main roads are associated with the ER area; rather numerous gravel roads linking the various villages are located within the exploration area.

There are no railways lines within the ER area.

5.3.6.8 Border posts
Two border posts into Lesotho are located within the exploration area. These include the Qacha’s Nek Border post and the Ongeluksnek Border post. The location of these border posts is illustrated in Figure 5-13.

5.3.6.9 Existing Mineral Rights
Rhino Oil and Gas obtained data from the National DMR on mineral rights holders. This data indicated that there are no other mineral rights holders with the proposed ER area. There is thus no requirement for consultation with mineral rights holders.
5.3.6.10 Land Claims

SLR submitted a request to the Regional Land Claims Commissioner: Eastern Cape with respect to the proposed ER area. The commissioner indicated that Chief Lebenya has a pending claim on a large number of the properties within the ER application area. A notification letter was sent to Chief Lebenya, who has also been consulted with as a leader of the Bakoena Traditional Authority.
6 IMPACT DESCRIPTION AND ASSESSMENT

This Chapter describes and assesses the significance of potential impacts related to the proposed exploration activities. The potential impacts of the proposed aerial FTG survey are addressed below.

The potential impacts of core hole drilling and seismic surveys have not been assessed in this EIA as they do not form part of the proposed ‘early-phase exploration’ work for which Rhino Oil and Gas are seeking environmental authorisation. Refer to Section 4.5.1 for further details.

All impacts are systematically assessed and presented according to predefined rating scales (see Section 3.3.4). The significance of impacts with and without mitigation is also assessed. The status of all impacts should be considered to be negative unless otherwise indicated. Mitigation or optimisation measures are proposed which could ameliorate the negative impacts or enhance potential benefits, respectively.

6.1 AIRBORNE FULL TENSOR GRADIOMETRY

For a description of the FTG activity please refer to Section 4.5.5.

6.1.1 BIOPHYSICAL IMPACTS

The flying of a light aircraft to undertake an FTG survey is not anticipated to have any impact of significance on the biophysical environment. Overpass flights of light aircraft are not uncommon over the region, even protected areas. Other than a momentary flight response, it is estimated that the impact of noise on wildlife would be insignificant.

6.1.2 CULTURAL/HERITAGE IMPACTS

The flying of a light aircraft to undertake an FTG survey is not anticipated to have any impact of significance on the cultural or heritage environment. Any noise impact would be as described below.

6.1.3 SOCIO-ECONOMIC IMPACTS

6.1.3.1 Noise Impacts

Description of impact

The noise generated by a light aircraft flying at a low altitude (approximately 100 m) could be a nuisance to or result in the localised disturbance of a receptor. No health impacts (such as loss of hearing or increased blood pressure) are anticipated based on the proposed FTG survey.
Assessment
Based on a light aircraft (e.g., Cessna) flying at a low altitude of + 80 m, it is estimated that the maximum noise level would not exceed 70 dBA outdoors and 60 dBA indoors. The latter is similar to conversational speech measured at 1 m.

It is estimated that in good weather the survey (up to a maximum of 4 000 km²) would take less than seven days to complete. At any one location the duration of the overflight would be tens of seconds. At a receptor location there would be a gradual increase in sound level above the ambient level as the aircraft approaches; increase to a maximum level overhead; then decrease to below the residual level as the aircraft recedes. Thus the noise outdoors would be audible for no more than a minute or two as the aircraft passes over (i.e., very low duration). Indoors the noise generated would probably not be noticed. Although the survey would cover wide areas, the extent of the impact is localised for each receptor. Where there are no receptors there would be no impact. Thus, depending on the selected flight path, an impact is possible.

Although aircraft noise would increase noise levels in what are largely quiet rural and agricultural areas, only a slight disturbance or nuisance is anticipated (i.e., low intensity). Based on these considerations and the fact that disturbances from light aircraft are not uncommon with a multitude of light aircraft working in and traversing the region, the significance of this impact is considered to be very low before and after mitigation.

Mitigation
- All planned survey flights should comply with local civil aviation rules.
- Flight paths must be pre-planned to avoid special nature reserves, national parks and world heritage sites. Where this is not possible, an altitude of 2 500 feet (762 m) should be maintained (as per Section 47(1) of NEMPRAA), unless permission is obtained from the management authority or in an emergency.
- All pilots must be briefed on ecological risks associated with flying at a low level over sensitive areas.
- Where flights are planned to occur over game farms, landowners should be notified of the survey programme prior to survey commencement.

<table>
<thead>
<tr>
<th>TABLE 6-1: IMPACT OF FTG AIRCRAFT ON NOISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATING SCALES</td>
</tr>
<tr>
<td>Status</td>
</tr>
<tr>
<td>Intensity</td>
</tr>
<tr>
<td>Duration</td>
</tr>
<tr>
<td>Extent</td>
</tr>
<tr>
<td>Consequence</td>
</tr>
<tr>
<td>Probability</td>
</tr>
<tr>
<td>Significance</td>
</tr>
<tr>
<td>Confidence</td>
</tr>
</tbody>
</table>
### Table 1: Nature of cumulative impact

<table>
<thead>
<tr>
<th>Nature of cumulative impact</th>
<th>Other activities that may contribute to the cumulative impact include other disturbances from light aircrafts, which are not uncommon in the region. Cumulative impact is considered to be of LOW significance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree to which impact can be reversed</td>
<td>Fully reversible</td>
</tr>
<tr>
<td>Degree to which impact may cause irreplaceable loss of resources</td>
<td>None</td>
</tr>
<tr>
<td>Degree to which impact can be mitigated</td>
<td>Very Low</td>
</tr>
</tbody>
</table>

### 6.2 LOCAL LIMITATIONS TO EXPLORATION

As discussed in the preceding sections, the flying of a light aircraft to undertake an FTG survey would be unlikely to pose significant risk to the environment. As a result there are relatively few constraints arising from legislation, regulation, guidelines and best practice that would apply. Compliance with civil aviation rules would be key as would maintenance of a minimum altitude of 2 500 feet (762 m) over protected areas (as per Section 47(1) of NEMPRAA).

The flying of a light aircraft to undertake an FTG survey would have no effect on water use or availability and could therefore be undertaken without regard for water related constraints and restrictions.

At the time of completion of the EIA report there was no indication of any change to the public or landowner position with regards the application. The majority opinion is opposed to exploration for unconventional gas or petroleum resources in the ER application area. Rhino Oil and Gas has been advised of this and the challenges it may pose to exploration.

### 6.3 EFFECT OF GRANTING OF AN EXPLORATION RIGHT

**Description of impact**

There is strong public opinion and I&APs refer to a significant body of evidence from around the world (not least that hydraulic fracturing is banned in a growing number of countries and territories), that late phase exploration and production of unconventional gas has huge risks to society and the environment. Such risks are borne by the landowners and local communities who do not participate in the economic benefits that accrue to the right holder and government. While there may be a consumer driven need for hydrocarbon extraction, the risks and costs to society and the environment far outweigh the benefits. The extraction of unconventional hydrocarbons is therefore not wanted in the Eastern Cape.

Even though early-phase exploration may have impacts of low significance, the public have raised concern that the granting of an exploration right would set in motion the development of a petroleum extraction project that would be extremely difficult to stop. Because the granting of this exploration right will set in motion a process with an unknown outcome and risk, it should not be approved.
Assessment
The MPRDA provides that the State, as custodian of mineral and petroleum resources in South Africa, may issue mineral and petroleum rights to applicants. Such rights must enable the sustainable development of South Africa’s mineral and petroleum resources within a framework of national environmental policy, while promoting economic and social development.

The granting of a right has no effect on the presence or absence of a resource, merely on whom has the entitlement to that mineral (i.e. minerals and petroleum exist regardless of the holder). A mineral and/or petroleum right is only part of the regulatory approval required by a holder and in isolation does not enable the holder to access the subject mineral. A holder must also have obtained environmental authorisation in terms of Chapter 5 of the NEMA. Furthermore, a mineral and/or petroleum right and environmental authorisation do not provide blanket approval for any conceived operation, but are both particular to the specific activities that the holder has detailed in an application. The holder is also required to negotiate access with the land owner and determine payment of compensation for loss or damages due to the specific activities. It is therefore presented that the grant of a right over a parcel of land does provide the holder carte blanche with respect to the mineral and land in question. There is thus not necessarily a direct conflict with the land owners’ right to use the surface. It would in fact be the undertaking of specified activities that could result in an impact on or conflict between the land owner and the mineral and/or petroleum rights holder (if any). Such specified activities would have been subject to approval through an environmental authorisation process. In the case of this application by Rhino Oil and Gas, only remote sensing activities are included which have been shown not to have any impact on the environment.

Any further exploration (beyond what may be approved in an environmental authorisation) would have to be subject to the requisite environmental assessment and authorisation process under the NEMA and an amendment to the ER in terms of the MPRDA. Such processes assess the merits of an application in light of the principles of sustainable development as set out in Section 2 of NEMA. An environmental authorisation process would not grant approval for the undertaking of activities resulting in impacts of unacceptable significance. A decision could include a refusal of the authorisation if unacceptable impacts were predicted as a result of the specified activities. Each of the right approval sections in the MPRDA (80 and 84) sets out that rights may only be granted if the activity will not result in unacceptable pollution, ecological degradation or damage to the environment. Thus a decision to grant the current ER application by Rhino Oil and Gas (for remote sensing activities only) does not guarantee that future applications for further exploration or production would be approved.

It is also noted that the specified activities associated with a mineral and/or petroleum right may also be subject to approval requirements under other legislation. The need for such authorisations (e.g. water use licence, land use planning permission etc) provide further permitting frameworks for impact assessment and management.
Mitigation

- The conditions of the exploration right and environmental authorisation (if granted) should specifically limit exploration activity in terms of the approvals to desktop and remote sensing activities.
- Any further exploration or future production activities must be subject to the requisite environmental assessment and authorisation process under the NEMA and an amendment to the exploration right in terms of the MPRDA.

6.4 “No-Go” alternative impacts

Description of impact

The “no-go” alternative is the non-occurrence of the proposed exploration activities. The positive implications of not going ahead with the proposed exploration are:

- no impacts resulting from the FTG survey within the exploration right area;
- no (reduced) chance of any risks arising from further exploration or future production; and
- allayment of the current majority opposition from the public.

The negative implications of not going ahead with the proposed exploration are as follows:

- South Africa would lose the opportunity to further establish the extent of indigenous oil or gas reserves in the Eastern Cape;
- Lost economic opportunities related to sunken costs (i.e. costs already incurred) of initial desktop investigations in the proposed exploration licence area;
- If economic oil and gas reserves do exist and are not developed, South Africa / Rhino Oil and Gas would lose the opportunity to maximise the use of its own indigenous oil and gas reserves; and
- Other sources of energy would need to be identified and developed in order to meet the growing demand in South Africa.

Assessment

As noted in the Need and Desirability section (see Section 4.3), there is a drive from national and provincial Government to stimulate development and grow the economy of South Africa. In order to facilitate this economic growth, there is a need to ensure that there is sufficient capacity in the country’s electricity supply by diversifying the primary energy sources within South Africa. One of the proposals to meet this aim is to develop the oil and gas sector within the country.

Onshore exploration and production of unconventional oil and gas could bring about significant economic growth. Since the scale and potential of such an industry are not known, the potential impacts associated with the future industry are also not known. It is also acknowledged that the onshore production of unconventional oil and gas could potentially result in environmental damages. Since the scale,
technology, location and extent of these possible activities are not known, the potential biophysical and socio-economic impacts associated with the future industry are also not known.

If onshore exploration does not proceed and domestic gas is not considered as a possible energy source, the anticipated electricity demand for South Africa would need to be met through other means (e.g. renewables, coal, nuclear or imported gas), all of which would have their own biophysical and socio-economic impacts. Since the scale, technology, location and extent of these possible alternatives are not known, the potential impact associated with these alternatives is not known.

The great majority of I&APs that have participated in the EIA process have expressed their opposition to all forms of oil and gas exploration in the Eastern Cape and to this application in particular. Thus the “no-go” alternative would alleviate much of the anxiety and concerns related to potential future shake gas development should reserves be identified for further exploration and/or future production.

Given the wide array of unknown facts regarding the potential for economic growth and the potential for environmental impacts arising from unconventional gas production, as well as the unknown facts of the future energy mix in the absence of gas, the overall impact associated with the “no-go” alternative is considered to be of unknown significance.

**Mitigation**

The only way to derive information on the potential of domestic onshore unconventional oil and gas resources is to undertake early-phase exploration such as is proposed. It is only with the results of exploration in hand that many of the current unknowns and assumptions can be confirmed. Such results may confirm that onshore domestic onshore unconventional oil and gas is prospective or that it is not.

In many cases it would only be through the undertaking of early-phase exploration that data and information necessary to understand the potentially affected environmental parameters and the risks thereto of a domestic onshore unconventional oil and gas industry could be derived.

### 6.5 CUMULATIVE IMPACTS

**Description of impact**

A cumulative impact means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with the activity when added to existing and reasonably foreseeable impacts from other activities.
Assessment
Given that the assessed impacts of the aerial FTG surveys and other remote sensing methods are considered be of very low significance, there is no chance of cumulative impacts of any significance.

I&APs continue to request that the impacts of potential further exploration and future production be assessed in this EIA order for them to have a full picture of the risk of the eventual project (given that the purpose of exploration is to get to extraction). Rhino Oil and Gas maintains that it cannot yet, without conducting the early-phase exploration work, know what the future options entail. Without information on the scope, extent, duration and location of future activities proposed by an applicant it is not possible for an EAP to undertake a reliable assessment of future impacts. To do so without this information would be speculative at best.

Mitigation
No mitigation is required. The risks and benefits of future activities would need to be well understood and assessed in order to inform considered decision making on future authorisations.
7 CONCLUSIONS AND RECOMMENDATIONS

This chapter summarises the key findings of the EIA.

The proposed exploration right application with its associated activities requires authorisation in terms of both the MPRDA and NEMA. SLR, appointed as the environmental assessment practitioner by Rhino Oil and Gas, has undertaken a Scoping and EIA process in terms of the EIA Regulations 2014 to inform an authority decision on the application made for environmental authorisation under the NEMA. The range of impacts, as identified through the Scoping process, has been assessed in the EIA. The two main objectives of this EIA are, firstly, to assess the significance of environmental impacts resulting from the proposed exploration activities and secondly to suggest the methods and commitments required to mitigate negative impacts and enhance benefits.

Rhino Oil and Gas is proposing to undertake exploration for potential hydrocarbon resources. The current ER application only includes remote exploration techniques which are early-phase activities, aimed identifying areas with the ER area which may be suitable for further exploration activities to identify possible petroleum resource within the ER application area (approximately 109 000 ha). The initial three-year exploration work programme is restricted to analysis of existing data and an aerial full tensor gradiometry gravity survey. If the application is approved Rhino Oil and Gas would be in a position to conduct the remote exploration techniques and to develop a more detailed understanding of the potential oil and gas resources in the application area. Thereafter, should Rhino Oil and Gas propose to conduct ground-based exploration activities (core boreholes and seismic surveys) this would necessitate a further application to PASA and a separate environmental assessment and authorisation process in terms of NEMA.

7.1 SUMMARY OF SPECIALIST FINDINGS

Specialist studies were commissioned but not completed for this EIA as the revised scope of the exploration work programme did not warrant their inclusion. The generic feedback from the specialists was that certain portions of the proposed ER application area are considered to be environmentally sensitive and that care would be required in selecting sites for ground-based exploration if impacts are to be avoided to an acceptable level. However, accurate representation of such sensitivities was problematic at the scale of the ER application area. The specialists suggested that measures should be put in place to select target exploration sites outside of areas of moderate to high sensitivity and previously disturbed areas should be favoured. It was recommended by the specialists that evaluation of specified sites be undertaken by appropriate specialists at the time when application is made for environmental authorisation of those activities.
7.2 ENVIRONMENTAL IMPACT STATEMENT

7.2.1 KEY FINDINGS

The key finding of the EIA is of a stark contrast between very low significance impacts resulting from an exploration work programme which is limited to desktop and remote sensing methods and extremely strong public opposition to all forms of exploration for onshore unconventional gas.

As discussed below, the assessment concludes that the impacts of proposed exploration activities would be extremely limited in extent, widely dispersed, of very short duration and very low intensity and would there have very low significance. On the simple merits of the application there is therefore no environmental reason why the exploration activities should not be approved. All of the ER application area, as shown in Figure 1-1 would be suitable for the undertaking of the remote sensing exploration methods as proposed. It is noted however that the proposed activities are likely to be the first in a series of exploration stages comprising activities that would likely increase in impact significance (if exploration was successful and the project proceeded to the following stages). The intensity and duration of such impacts would likely increase with each subsequent phase, but would likely become confined to increasingly limited target areas.

The public opposition to the exploration right application has been strongly voiced and have been received almost unanimously from all the sectors of society that have participated in the EIA. It is evident however that the majority of the opposition is not directly against the merits of exploration activities as proposed, but rather against the anticipated outcome and risks that, if successful, could result from exploration and the subsequent activities. The public perception is interpreted to be that issuing of an exploration right will lead to successful exploration; that would result in production which, must happen with the use of hydraulic fracturing; which will lead to widespread impacts on water and land causing devastation to local livelihoods. The perception is informed by the widely publicised, purported negative effects of hydraulic fracturing and the decisions taken by many governing bodies from around the world to suspend such activities. The related concern is that once an exploration right is granted, it will be nearly impossible to stop the process later, even if the environmental risks to local receptors outweigh the benefits. This is seen to arise from a mistrust and or misunderstanding of the governance framework that is in place to regulate petroleum exploration and production; concern as to whether government can balance the needs and interests of local people against such development that would potentially contribute to national coffers and an expectation that enforcement of compliance with environmental management obligations would be poor. For these reasons the public approach is to ‘close the door on exploration before it opens’, thereby preventing any future risk, or potential benefit, from resulting.
7.2.2 SUMMARY OF IMPACTS

7.2.2.1 Noise from Aerial FTG Surveys

The flying of a light aircraft to undertake an FTG survey is not anticipated to have any impact of significance on the biophysical environment. Overpass flights of light aircraft are not uncommon over the region, even protected areas. Other than a momentary flight response, it is estimated that the impact of noise on wildlife would be insignificant (A. Jongens, pers comm). There will similarly not be any impacts of significance on the cultural or heritage environment.

The flying of a light aircraft for the FTG survey will generate noise that could impact on receptors. Based on a light aircraft (e.g. Cessna) flying at a low altitude of + 80 m, it is estimated the maximum noise levels would typically not exceed 70 dBA outdoors and 60 dBA indoors. The latter level is similar to conversational speech measured at 1 m. It is likely that in good weather the FTG survey (up to a maximum of 4 000 km²) would take less than seven days to complete. At any one location the duration of the overflight would be tens of seconds.

The noise generated by a light aircraft flying at a low altitude (approximately 100 m) could be a nuisance to or result in the localised disturbance of a receptor. No health impacts (such as loss of hearing or increased blood pressure) are anticipated from the proposed FTG survey. At a receptor location there would be a gradual increase in sound level above the ambient level as the aircraft approaches; increase to a maximum level overhead; then decrease to below the residual level as the aircraft recedes. Thus the noise outdoors would be audible for no more than a minute or two as the aircraft passes over (i.e. very low duration). Indoors the noise generated would probably not be noticed. Although the survey would cover wide areas, the extent of the impact is localised for each receptor. Where there are no receptors there would be no impact. Thus, depending on the selected flight path, an impact is possible.

Although aircraft noise would increase noise levels in what are largely quiet rural and agricultural areas, only a slight disturbance or nuisance is anticipated (i.e. low intensity). Based on these considerations and the fact that disturbances from light aircraft are not uncommon with a multitude of light aircraft working in and traversing the region, the significance of this impact is considered to be very low before and after mitigation. All planned survey flights should comply with local civil aviation rules. Flight paths must be pre-planned to avoid special nature reserves, national parks and world heritage sites.

7.2.2.2 Local Limitations to Exploration

As discussed in the preceding section, the flying of a light aircraft to undertake an FTG survey would be unlikely to pose significant risk to the environment. There are thus relatively few constraints arising from legislation, regulation, guidelines and best practice. Compliance with civil aviation rules would be key as would maintenance of a minimum altitude of 2 500 feet (762 m) over protected areas (as per Section 47(1) of NEMPRAA).
The flying of a light aircraft to undertake an FTG survey would have no effect on water use or availability and could therefore be undertaken without regard for water related constraints and restrictions.

At the time of completion of the EIA report there was no indication of any change to the public or landowner position with regards the application. The majority opinion is opposed to exploration for unconventional gas or petroleum resources in the ER application area.

7.2.2.3 Effect of Granting of an Exploration Right

Even though early-phase exploration may have impacts of low significance, the public have raised concern that the granting of an exploration right would set in motion the development of a petroleum extraction project that would be extremely difficult to stop. Because the granting of this exploration right will set in motion a process with an unknown outcome and risk, it should not be approved.

The MPRDA provides that the State, as custodian of mineral and petroleum resources in South Africa, may issue mineral and petroleum rights to applicants. Such rights must enable the sustainable development of South Africa’s mineral and petroleum resources within a framework of national environmental policy, while promoting economic and social development.

The granting of a right has no effect on the presence or absence of a resource, merely on whom has the entitlement to that mineral (i.e. minerals and petroleum exist regardless of the holder). A mineral and/or petroleum right is only part of the regulatory approval required. A holder must first have obtained environmental authorisation in terms of Chapter 5 of the NEMA. Both a mineral and/or petroleum right and environmental authorisation are particular to the specific activities that the holder has detailed. A holder is also required to negotiate access with the land owner and determine payment of compensation for loss or damages due to the specific activities. It is therefore not the grant of a right over a parcel of land, but the undertaking of specified activities that could result in an impact on or conflict between the land owner and the mineral rights holder (if any). Such specified activities would have been subject to approval through an environmental authorisation process. In the case of this application by Rhino Oil and Gas, only remote sensing activities are included which have been shown not to have any impact on the environment.

Any further exploration (beyond what may be approved in an environmental authorisation) would have to be subject to the requisite environmental assessment and authorisation process under the NEMA and an amendment to the ER in terms of the MPRDA. Such processes assess the merits of an application in light of the principles of sustainable development as set out in Section 2 of NEMA. An environmental authorisation process would not grant approval for the undertaking of activities resulting in impacts of unacceptable significance. A decision could include a refusal of the authorisation if unacceptable impacts were predicted as a result of the specified activities. Each of the petroleum right approval sections in the MPRDA (80 and 84) sets out that rights may only be granted if the activity will not result in unacceptable
pollution, ecological degradation or damage to the environment. Thus a decision to grant the current ER application by Rhino Oil and Gas (for remote sensing activities only) does not guarantee that future applications for further exploration or production would be approved.

It is also noted that the specified activities associated with a mineral and/or petroleum right may also be subject to approval requirements under other legislation. The need for such authorisations (e.g. water use licence, land use planning permission etc) provide further permitting frameworks for impact assessment and management.

7.2.2.4 No-go
The positive implications of not going ahead with the proposed exploration are:

- no impacts resulting from the FTG survey;
- no (reduced) chance of any risks arising from further exploration or future production; and
- allayment of the current majority opposition from the public.

The negative implications of not going ahead with the proposed exploration are as follows:

- South Africa would lose the opportunity to further establish the extent of indigenous oil or gas reserves in the Eastern Cape;
- lost economic opportunities related to sunken costs (i.e. costs already incurred) of initial desktop investigations in the proposed exploration licence area;
- if economic oil and gas reserves do exist and are not developed, South Africa / Rhino Oil and Gas would lose the opportunity to maximise the use of its own indigenous oil and gas reserves; and
- other sources of energy would need to be identified and developed in order to meet the growing demand in South Africa.

As noted in the Need and Desirability section (see Section 4.3), there is a drive from national and provincial Government to stimulate development and grow the economy of South Africa. In order to facilitate this economic growth, there is a need to ensure that there is sufficient capacity in the country’s energy supply by diversifying the primary energy sources within South Africa. One of the proposals to meet this aim is to develop the domestic oil and gas sector within the country.

Onshore exploration and production of unconventional oil and gas could bring about significant economic growth. Since the scale and potential of such an industry are not known, the potential economic impacts associated with the future industry are not known. It is also acknowledged that the onshore production of unconventional oil and gas could potentially result in environmental damages. Since the scale, technology, location and extent of these possible activities are not known, the potential biophysical and socio-economic impacts associated with the future industry are also not known.
If onshore exploration does not proceed and domestic gas is not considered as a possible energy source, the anticipated electricity demand for South Africa would need to be met through other means (e.g. renewables, coal, nuclear or imported gas), all of which would have their own biophysical and socio-economic impacts. Since the scale, technology, location and extent of these possible alternatives are not known, the potential impact associated with these alternatives is not known.

The great majority of I&APs that have participated in the EIA process have expressed their opposition to all forms of oil and gas exploration in the Eastern Cape and to this application in particular. Thus the “no-go” alternative would alleviate much of the anxiety and concerns related to potential future shale gas development should reserves be identified for further exploration and/or future production.

Given the wide array of unknown facts regarding the potential for economic growth and the potential for environmental impacts arising from unconventional gas production, as well as the unknown facts of the future energy mix in the absence of gas, the overall impact associated with the “no-go” alternative is considered to be of unknown significance.

7.2.2.5 Cumulative Impact

Given that the assessed impacts of the aerial FTG surveys and other remote sensing methods are considered be of very low significance, there is no chance of cumulative impacts of any significance.

I&APs continue to request that the impacts of potential further exploration and future production be assessed in this EIA order for them to have a complete understanding of the risk of the eventual oil or gas production project (given that the purpose of exploration is to get to extraction). Rhino Oil and Gas maintains that it cannot yet, without conducting the early-phase exploration work, know what the future options entail. Without information on the scope, extent, duration and location of future activities proposed by an applicant it is not possible for an EAP to undertake a reliable assessment of future impacts.

7.3 IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES

The overall impact management objective for Rhino Oil and Gas is to undertake exploration in a socially, environmentally and economically sustainable manner. With only remote sensing exploration methods under consideration by the applicant, no specific impact management objectives or outcomes are necessitated.

7.4 FINAL PROJECT ALTERNATIVES

The focus of the application for environmental authorisation is now only on remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey). Rhino Oil and
Gas has excluded the core hole drilling and seismic surveying from the proposed ‘early-phase exploration’ work. A benefit of this revised approach is that any future application for ground-based exploration activities would be focussed on specified sites, thereby enabling directly affected parties to participate meaningfully and the future environmental assessment to investigate and report on the site’s environmental attributes. This addresses some of the concerns raised by I&APs relating to the location of proposed ground-based exploration activities.

If the revised application is approved, Rhino Oil and Gas would only be in a position to conduct remote exploration techniques and to develop a more detailed understanding of the potential oil and gas resources in the application area. Thereafter, should Rhino Oil and Gas propose to conduct ground-based exploration activities at target sites, this would need to be informed by a further application to PASA and a separate environmental assessment and authorisation process.

### 7.5 RECOMMENDATION / OPINION OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

The key principles of sustainability, including ecological integrity, economic efficiency, and equity and social justice, are integrated below as part of the supporting rationale for recommending an opinion on whether the proposed project should be approved or not.

**Ecological integrity**

It is SLR’s opinion that the remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey) as proposed would have no direct impact on the ecology, biodiversity or conservation status of any habitat or species within the ER application area.

**Economic efficiency**

It is SLR’s opinion that the remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey) as proposed would have no direct impact on any aspect of the local economy within the ER application area.

**Equity and social justice**

It is SLR’s opinion that the remote exploration techniques (including analysis of existing data and an aerial full tensor gradiometry gravity survey) as proposed would have no direct impact on any social aspect within the ER application area. That being said, there remains the fact the majority of I&APs consulted are opposed to the grant of the Exploration Right application for unconventional gas or petroleum resources.

It is therefore the opinion of SLR, in terms of the sustainability criteria described above and the nature and extent of the proposed early-phase exploration programme (remote sensing only), that the generally
VERY LOW significance of the impacts, with the implementation of the proposed mitigation measures, should support a positive decision being made by the Minister of Mineral Resources (or delegated authority) in this regard. Since the proposed exploration activities are associated with Rhino Oil and Gas’s initial three-year exploration work programme, the applicant requests that that Environmental Authorisation (should it be granted) be issued and remain valid for a period of three years or more.

**In spite of the recommendation for a positive environmental authorisation of the current exploration work programme, the following key points with likely applicability to potential future applications and activities are noted by the EAP:**

- parts of the exploration right application area have environmental attributes that may not be compatible with development (including ground-based exploration or production activities);
- restrictions imposed by current regulations would render parts of the exploration right application area unavailable to certain ground-based exploration and production activities; and
- I&APs in general are strongly opposed to all forms of onshore exploration and extraction of unconventional oil and gas and this is unlikely to change for future applications or operations.

The applicant and authority have been informed this and advised that current planning and decision-making should as much as possible take cognizance of the above.

### 7.6 FINANCIAL PROVISION

In terms of Section 24P of NEMA and associated regulations pertaining to the financial provision (GN. R1147), an applicant for Environmental Authorisation relating to exploration must, before the Minister of Mineral Resources issues the Environmental Authorisation, comply with the prescribed financial provision for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts.

The estimated cost for management and / or rehabilitation of potential negative environmental impacts that might be incurred during the proposed remote sensing exploration activities is nil.

### 7.7 DEVIATIONS FROM SCOPING

As discussed in Section 1.2, and detailed in Section 4.4, the extent of the ER application area has changed since acceptance of the Scoping Report due to the removal of the Malekgalonyane (Ongeluksnek) Nature Reserve from the ER application area. This change did not require any addition to the Plan of Study as presented in the EIA.

As discussed in Section 1.2 and detailed in Section 4.5.1, Rhino Oil and Gas excluded the ground-based core hole drilling and seismic survey from the proposed ‘early-phase exploration’ work for which they are
seeking environmental authorisation. The current focus of the application and the related environmental
assessment work is now only on remote exploration techniques (including analysis of existing data and
an aerial full tensor gradiometry gravity survey). This change did not require any addition to the Plan of
Study as presented in the EIA.

The Plan of Study presented in the Scoping Report detailed the undertaking of six specialist studies. How-
ever, with exclusion of core hole drilling and seismic survey activities from the scope of the EIA (see
Section 4.5.1) these studies are not applicable and as such their findings have not been incorporated into
the EIR. Detailed investigations of target sites would need to be undertaken during the environmental
assessment and authorisation application process for future ground-based exploration activities.

In accepting the Scoping Report, the PASA specified a condition that where desktop data was used
during environmental assessment this should be subject to authentication by physical assessment. With
core hole drilling and seismic survey activities no longer included in the scope of the EIA there was no
merit in undertaking such work.
## 8 REFERENCES

<table>
<thead>
<tr>
<th>Reference</th>
<th>In text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>Reference</td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
</tr>
</tbody>
</table>
9 ENVIRONMENTAL MANAGEMENT PROGRAMME

This chapter lists the auditable environmental management objectives, outcomes and actions required to avoid or minimise impacts on the environment from the proposed exploration activities.

9.1 INTRODUCTION

This EMPR is based on the results of the EIA undertaken by SLR for the Exploration Right ("ER") application to explore for petroleum products on various farms in the magisterial districts of Matatiele and Mount Fletcher, Eastern Cape, South Africa (12/3/295 ER). The EMPR aims to address the potential environmental impacts resulting from the proposed early-phase exploration work for which authorisation is sought. The EMPR has been prepared as per the requirements of the EIA Regulations 2014 and Appendix 4 thereto. The EMPR, once approved by the competent authority, is a legal document and Rhino Oil and Gas is overall accountable and responsible for the implementation thereof.

9.2 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY COVERED BY THE EMPR

Details of the activities proposed by Rhino Oil and Gas that are regulated by this EMPR are described in Section 4.5 of the EIA report. The activities covered by the EMPR include an aerial full tensor gradiometry gravity survey (maximum total survey size of 4000 square kilometres).

9.3 DETAILS OF THE EAP

Details and the expertise of the EAP who prepared this EMPR are provided in Section 3.1.1 of the EIA report.

9.4 RESPONSIBLE PERSONS

It is the responsibility of Rhino Oil and Gas to implement the EMPR and to make sure that all the actions are carried out. The successful implementation of the EMPR is dependent on clearly defined roles and responsibilities for each of the management actions given. Roles have been ascribed to the following parties:

<table>
<thead>
<tr>
<th>Position</th>
<th>Responsibility in terms of the EMPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhino Exploration Manager</td>
<td>Overall responsible for the Exploration programme including its planning and design, operations and closure phases. Takes overall responsibility for compliance to the EMPR.</td>
</tr>
<tr>
<td>Rhino Exploration Geologist</td>
<td>Responsible for the management of the Exploration programme, all employees and contractors. Takes responsibility for implementation of the EMPR.</td>
</tr>
<tr>
<td>Rhino SHEQ Manager:</td>
<td>Environmental personnel at Rhino Oil and Gas responsible for:</td>
</tr>
<tr>
<td></td>
<td>• Overseeing environmental compliance of all operations with respect to EMPR and legislation;</td>
</tr>
<tr>
<td></td>
<td>• Appointment of external parties required to fulfil EMPR obligations;</td>
</tr>
<tr>
<td></td>
<td>• Provision of awareness and training material;</td>
</tr>
</tbody>
</table>
9.5 STRUCTURE OF THE EMPR

The EMPR is set out to provide environmental management i) objectives, ii) outcomes and iii) actions. Each of these is presented for the following phases of the exploration work programme:

- planning and design;
- undertaking of exploration; and
- rehabilitation and post closure.

Pre-construct and construction phases are not considered as they do not have relevance to the exploration work programme.

9.6 IMPACT MANAGEMENT OBJECTIVES

The section below provides a description of the objectives of the EMPR.

The overall objective of impact management is to avoid the occurrence of impacts, then reduce the significance of negative impacts and enhance positive impacts as far as practically possible and lastly to rehabilitate any disturbances resulting from exploration. The key objectives are to:

- undertake exploration in a socially, environmentally and economically sustainable manner;
- meet all regulatory conditions;
- maintain Rhino Oil and Gas’ reputation;
- provide for a forum for consultation with land owners and affected parties; and
- facilitate socio-economic development where practicable.

9.6.1 PLANNING AND DESIGN

Specific impact management objectives for the planning and design phase are to:

- identify the grid routes for the FTG;
- implement a screening approach when identifying potential routes in order to avoid impacts; and
- consult with land owners where required.
9.6.2 **Undertaking of Exploration**

Specific impact management objectives during the exploration phase are to:

- minimise disturbance to the ecological environment;
- minimise disturbance on the biophysical environment including the protection of soils, surface water and groundwater during exploration operations;
- minimise disturbances to cultural and heritage sites;
- minimise disturbance to current land uses, land owners and neighbouring activities; and
- gather environmental information relevant to monitor potential impacts and inform assessment and management of future activities.

9.6.3 **Rehabilitation and Post Closure**

The primary closure objective is to ensure that exploration decisions and actions throughout operations, and specifically during closure, enable a condition approximating the pre-exploration condition or better to be achieved at any site impacted by an exploration activity.

9.7 **Impact Management Outcomes**

The section below provides a description of the desired outcomes (i.e. standards to be achieved) of mitigation that is proposed in order to manage, remedy, control or modify potential impacts. The specific actions identified to achieve these outcomes are described in the following section.

9.7.1 **Planning and Design**

Specific impact management outcomes for the planning and design phase are to:

- select FTG grid routes that satisfy exploration need and legislative requirements; and
- collate sufficient data to provide for confirmation of impacts during and post exploration.

9.7.2 **Undertaking of Exploration**

Specific impact management outcomes during the exploration phase are:

- no significant change to the soil properties or land use potential of a site;
- no significant change to the quality or availability of any water resource;
- no significant nuisance effect to any receptor (noise, vibration, dust or privacy);
- no damage to or reduction in condition of existing infrastructure;
- no significant or long-term change to vegetation, habitat or fauna occurring at or adjacent to a site;
- no loss of a heritage or palaeontological resource;
• No significant change in ambient air quality;
• No uncompensated disruption of land use nor loss of income for land owners;
• No negative effect on the local economy;
• Compliance with the EMP; and
• No environmental incidents or emergencies.

9.7.3 REHABILITATION AND POST CLOSURE

Specific impact management outcomes during the rehabilitation phase are:

• Ensure no post-closure health or safety hazards;
• Ensure rehabilitated land is stable and productive in the long term, either for on-going agricultural use or as a self-sustaining vegetation cover;
• Minimise long term maintenance requirements on rehabilitated areas; and
• Open, accurate and transparent communication with stakeholders;

9.8 IMPACT MANAGEMENT ACTIONS

The mitigation actions, as necessary to achieve the objectives and outcomes set out in the preceding sections, are presented in tabular format below. The action plans include the timeframes for implementing the mitigation actions together with the assignment of responsibility for implementation.

9.8.1 PLANNING AND DESIGN

The planning and design phase for the exploration activities requires the sequential implementation of a number of actions in order to inform the determination of FTG grid routes. Each of the actions are described below:

9.8.1.1 Identification of Target Sites from Geological Information

Exploration is an iterative process with data acquired from a prior stage required to improve the knowledge and understanding of the resource, which may then be subject to more intensive exploration at a later stage. Exploration begins with the identification of target areas based on a general geological understanding, often informed by publically available data. The analysis and interpretation by Rhino Oil and Gas’ geologists and geophysicists of the available and acquired data would result in the identification of potentially prospective areas. On completion of this work, Rhino Oil and Gas would propose target FTG grid routes in order to acquire additional data that could improve the understanding of the potentially prospective areas.
9.8.1.2 Site screening

The target FTG grid routes must be subject to desktop screening in terms of relevant technical and environmental criteria. Key considerations for the screening of FTG routes would be the presence of protected areas in terms of NEMPRAA, private game farms and other noise sensitive receptors.

Only if this screening confirms that there are no fatal flaws to the proposed grid route would Rhino Oil and Gas initiate the FTG survey. Prior notice will be given to the owners of noise sensitive receptors directly under the survey route.
### 9.8.2 Undertaking of Exploration

Management actions required during the undertaking of exploration are described in Table 9-1.

#### TABLE 9-1: Environmental Actions during Exploration

<table>
<thead>
<tr>
<th>Objectives and Goals</th>
<th>Management Actions</th>
<th>Implementation Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roles and Responsibilities</strong></td>
<td>Ultimate responsibility for the implementation of and compliance with the EMPR during exploration rests with Rhino Oil and Gas. Rhino Oil and Gas is to nominate an Exploration Manager to be responsible for overseeing compliance with the EMPR. The Exploration Manager is responsible for implementation, monitoring and auditing of compliance with the EMPR. The Exploration Manager may assign specific tasks and roles required by the EMPR to other suitably qualified personal including the Exploration Geologist and SHEQ Manager.</td>
<td>Rhino Oil and Gas Exploration Manager</td>
</tr>
<tr>
<td></td>
<td>Each contractor is to provide Rhino Oil and Gas with a signed letter indicating their acknowledgement of the conditions of the right and EMPR. Contractors are responsible for compliance with the EMPR for all aspects of their work package. Any incident or non-compliance is to be immediately reported to Rhino Oil and Gas.</td>
<td>Exploration Manager SHEQ Manager</td>
</tr>
<tr>
<td></td>
<td>The Exploration Manager must ensure that a SHEQ Manager is involved in the management of operations. Rhino Oil and Gas must ensure that these personnel are suitably trained and are provided with the necessary resources and authority to implement and monitor the EMPR.</td>
<td>Exploration Manager</td>
</tr>
<tr>
<td></td>
<td>The SHEQ Manager is to ensure regular compliance checks during all exploration work periods. Records are to be kept.</td>
<td>SHEQ Manager</td>
</tr>
<tr>
<td><strong>Environmental Awareness and Training</strong></td>
<td>Environmental induction training must be provided to all persons involved in exploration, including permanent workers, contractors and consultants.</td>
<td>SHEQ Manager</td>
</tr>
<tr>
<td>Objectives and Goals</td>
<td>Management Actions</td>
<td>Implementation Programme</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>EMPR as well as the consequences of their individual actions</td>
<td>Contract or job-specific training must be provided to those contractors or personnel involved in activities which risk assessment has identified as having high risk.</td>
<td>On appointment of new personnel. Repeat annually.</td>
</tr>
<tr>
<td>Occupational Health and Safety</td>
<td>All activities are to be managed in compliance with the requirements of the Mine Health and Safety Act and Regulations thereto, as well as other legislation relevant to the activity.</td>
<td>SHEQ Manager During exploration</td>
</tr>
<tr>
<td>FTG Survey</td>
<td>All planned survey flights should comply with local civil aviation rules. Flight paths must be pre-planned to avoid national parks, nature reserves and world heritage sites. Where this is not possible, an altitude of 2 500 feet (762 m) should be maintained (as per Section 47(1) of NEMPRAA), unless permission is obtained from the management authority or in an emergency. All pilots must be briefed on ecological risks associated with flying at a low level over sensitive areas. In planning flight paths, specialists on Cranes and Vultures at the EWT or ECPTA should be consulted with regards roosting and nesting sites and seasons. Where practical the flight paths should avoid these sites by at least 500 m. Where flights are planned to occur over game farms or other potentially noise sensitive receptors, landowners should be notified of the survey programme prior to survey commencement.</td>
<td>SHEQ Manager and independent environmental scientist Prior to and during surveys</td>
</tr>
<tr>
<td>Planning for further ground-based exploration</td>
<td>Screening of target core hole drill sites and seismic alignment routes against appropriate GIS datasets. The screening should include the application of minimum separation distance from the site/route perimeter and sensitive environmental features/attributes. Enviro-legal assessment to ascertain the authorisations that would be required for the exploration activity.</td>
<td>Exploration manager and independent environmental scientist Prior to application for environmental authorisation or land owner consultation</td>
</tr>
<tr>
<td>Ensure accommodation of landowner’s needs through negotiated approach</td>
<td>The owners of land or occupiers at target exploration sites/routes are to be consulted and agreement obtained to access, establish and undertake exploration on a target site.</td>
<td>Exploration manager Post screening of sites</td>
</tr>
<tr>
<td>Understanding of status of environmental</td>
<td>Initiate fieldwork, sampling, analysis of key environmental attributes relevant to the target site/route.</td>
<td>Exploration manager and Post screening of sites and land owner</td>
</tr>
<tr>
<td>Objectives and Goals</td>
<td>Management Actions</td>
<td>Implementation Programme</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>features/attributes to enable detection of change, if any.</td>
<td>Make application to PASA, and any other authority, for the requisite authorisation(s) of the exploration activity at the specified site/route. Undertake the assessment and reporting process required to inform the authority decision on the authorisation(s).</td>
<td>independent environmental scientist. Prior to commencement of exploration.</td>
</tr>
<tr>
<td>Ensure that exploration sites are lawful and environmentally appropriate.</td>
<td></td>
<td>Exploration manager and independent environmental scientist. Prior to commencement of exploration</td>
</tr>
<tr>
<td>Public Relations</td>
<td>To keep affected parties informed of developments. The owners and lawful occupiers of land over which exploration is located must be updated on progress and developments.</td>
<td>Exploration geologist. Annualy or at a new development.</td>
</tr>
<tr>
<td></td>
<td>Rhino Oil and Gas must maintain a complaints register for the exploration. The complaints register must record the following: Date when complaint/concern was received; Name of person to whom the complaint/concern was reported; Nature of the complaint/concern reported; The way in which the complaint/concern was addressed (date to be included).</td>
<td>SHEQ Manager. During exploration.</td>
</tr>
<tr>
<td></td>
<td>Any complaints regarding the exploration must be brought to the attention of the SHEQ Manager within 24 hours after receiving the complaint.</td>
<td>SHEQ Manager. During exploration.</td>
</tr>
<tr>
<td></td>
<td>Rhino Oil and Gas must assess the merits of every complaint and initiate an investigation when required. Each complaint must be investigated and remedied where possible.</td>
<td>SHEQ Manager. As required, within 48 hrs.</td>
</tr>
<tr>
<td></td>
<td>The complaints register must be kept up to date for inspection by members of PASA.</td>
<td>SHEQ Manager. During construction.</td>
</tr>
<tr>
<td>Environmental Risks and Emergencies</td>
<td>Risk assessments to be undertaken for all exploration activities. Environmental ‘Emergency Response Plans’ are to be developed for potential high risks. Rhino Oil and Gas is to provide contractors with a copy of the Emergency Response Plan and require contractors to produce Emergency Response Plans for their unique activities.</td>
<td>Regional SHEQ Manager. Prior to exploration. For any new activity.</td>
</tr>
<tr>
<td>Ensure appropriate response to an emergency and prevent the recurrence of repeat incidents</td>
<td>In the case of an emergency the appropriate response in terms of the Emergency Response Plan should be initiated. Such Emergency Response and reporting must be in terms of Section 30 of the NEMA</td>
<td>Exploration Manager and Regional SHEQ Manager. During exploration, at an incident.</td>
</tr>
<tr>
<td>EMPR Compliance</td>
<td>A copy of the right and EIA/EMPR must be kept at the operations or site office.</td>
<td>Exploration. During exploration.</td>
</tr>
</tbody>
</table>
## Objectives and Goals

<table>
<thead>
<tr>
<th>Management Actions</th>
<th>Implementation Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>required management measures and compliance with the EMPR</strong></td>
<td>Responsibility</td>
</tr>
<tr>
<td>Each contractor must keep a copy of the EMPR at their site office/vehicle and this copy must be available to their staff.</td>
<td>Contractor</td>
</tr>
<tr>
<td>Contractors must implement any procedures and written instructions in terms of the EMPR issued to them by Rhino Oil and Gas. Contractors must not deviate from the EMPR or written instructions without approval from Rhino Oil and Gas.</td>
<td>Contractor</td>
</tr>
<tr>
<td>The SHEQ Manager must monitor and audit the exploration activities to ensure compliance with this EMPR and the right.</td>
<td>SHEQ Manager</td>
</tr>
<tr>
<td>A register of all environmental incidents is to be maintained. The SHEQ Manager is to inform the Exploration Geologist of all incidents.</td>
<td>SHEQ Manager</td>
</tr>
<tr>
<td>Records relating to the compliance and non-compliance with the conditions of the EMPR must be kept in good order. Such records must be available for inspection at the site office and must be made available to PASA within seven (7) working days of the date of the written request by the PASA for such records.</td>
<td>SHEQ Officer</td>
</tr>
<tr>
<td><strong>Appointment of Independent Environmental Scientist</strong></td>
<td>Exploration Manager</td>
</tr>
</tbody>
</table>

Rhino Oil and Gas is to appoint a suitably qualified and experienced IES for the undertaking of actions required by this EMPR.

---

SLR Project: 723.18034.00005  Rhino Oil and Gas - Exploration Right Application: EIA and EMP report  Report No.3  September 2016
9.8.3 REHABILITATION AND POST CLOSURE

No management actions are required for the rehabilitation or closure of the proposed ‘early-phase exploration’ work for which Rhino Oil and Gas are seeking environmental authorisation.

9.9 MONITORING IMPLEMENTATION OF ACTIONS

No environmental monitoring is required for the proposed ‘early-phase exploration’ work for which Rhino Oil and Gas are seeking environmental authorisation.

9.10 REPORTING ON EMPR COMPLIANCE

The SHEQ Manager at Rhino Oil and Gas must conduct internal management audits against the commitments in the EMPR. These audits must be conducted on an on-going basis during activities until final closure. The findings must be documented for both record keeping purposes and for informing continual improvement. A quarterly audit report must be produced and submitted to PASA.

In addition, and in accordance with Regulation 55 of the Mining regulations (GN R527) and as set out in NEMA GNR982, an independent professional must conduct an EMPR performance assessment in accordance with the timeframes as specified in the Environmental Authorisation (if provided) or at least every 2 years. Compliance with the provisions of the EMPR and the adequacy of the EMPR relative to the activities and risks must be assessed in the performance assessment. This report must be submitted to PASA.

9.11 ENVIRONMENTAL AWARENESS PLAN

This section includes an environmental awareness plan for the proposed exploration project.

Rhino Oil and Gas will commit to informing all employees and contractors of environmental risk which may result from the undertaking of exploration. The purpose of the environmental awareness plan is to ensure that management and all personnel understand the general environmental requirements of the activities and localities in which work is undertaken. The environmental awareness plan should enable Rhino Oil and Gas to achieve the objectives of their environmental policy. The plan should describe how employees will be informed of environmental risks which may result from their work, the manner in which the risk must be dealt with in order to avoid pollution or degradation of the environment and the training required for general environmental awareness and the dealing of emergency situations and remediation measures for such emergencies.
The environmental awareness plan should communicate:

- The importance of conformance with the environmental policy, procedures and other requirements of good environmental management;
- The significant environmental impacts and risks of individuals work activities associated with the operation of the site and explain the environmental benefits of improved performance;
- Individuals’ roles and responsibilities in achieving the aims and objectives of the environmental policy; and
- The potential consequences of not complying with environmental procedures.

In addition, greater environmental awareness must be communicated to personnel involved in specific activities which can have a significant impact on the environment and management must ensure that they are competent to carry out their tasks on the basis of appropriate education, training and/or experience.

Rhino Oil and Gas must present induction training (repeated annually), which includes an environmental awareness aspect, to all personnel and contractors involved with exploration. The information required includes a description of the local environment, the sensitive aspects of this environment, the risks associated with the exploration activities and the obligations of personnel towards environmental controls and methodologies. All exploration activities should be approached in a risk-averse manner and the precautionary principle should always be applied.

The induction and environmental awareness training provided by Rhino Oil and Gas must communicate to individuals at a level of detail specific to the requirements of their job, but should generally comprise:

- Basic SHEQ awareness training for all prior to involvement in exploration.
- General environmental awareness training must be given to all Employees and contractors prior to any involvement in field based exploration. The Environmental Code of Conduct should be displayed at each exploration site. Personnel and contractors who have not attended the training must not be allowed on any site.
- Specific environmental awareness training to be provided to personnel and contractors whose work activities can have a significant impact on the environment.

Records should be kept of all awareness training.
10 APPENDICES

APPENDIX 1: CO-ORDINATES OF THE EXPLORATION RIGHT AREA
APPENDIX 2: PROPERTIES INCLUDED IN THE EXPLORATION RIGHT APPLICATION AREA
APPENDIX 3: EAP UNDERTAKING
APPENDIX 4: PROOF OF REGISTRATIONS OF THE PRACTITIONERS
APPENDIX 5: CURRICULA VITAE OF THE PROJECT TEAM
APPENDIX 6: PUBLIC PARTICIPATION PROCESS

Appendix 6.1: Authority Correspondence since submission of the Scoping Report
- Scoping Report approval
  - Comments on EIR

Appendix 6.2: I&AP database

Appendix 6.3: I&AP Submissions post completion of Scoping Report
- Comments since Scoping Report submission
- Minutes of EIA feedback meetings
- Comments on EIR review

Appendix 6.4: Land Claimant information

Appendix 6.5: I&AP correspondence since submission of the Scoping Report
- Notice on PASA decision on Scoping Report
- Notice of EIR Review
- Presentation made at feedback meetings
- Reminder of EIR Comments deadline (email & SMS)