



SOUTH AFRICAN HERITAGE RESOURCES AGENCY
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DATE: 16 February 2011
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PASA REF: 12/3/221

OUR REF: 9/2/002/0001, 9/2/003/0001, 9/2/001/0001, 9/2/057/0001, 9/2/023/0001,
9/2/024/0001, 9/2/033/0001, 9/2/046/0001, 9/2/061/0001, 9/2/062/0001,
9/2/067/0001, 9/2/070/0001, 9/2/077/0001, 9/2/082/0001, 9/2/085/0001,
9/2/086/0001, 9/2/098/0001, 9/2/100/0001

Mrs Toni Pietersen
Golder Associates Africa
PO Box 6001
Halfway House
1685

Dear Mrs Pietersen,

**PROPOSED SOUTH WESTERN KAROO BASIN GAS EXPLORATION PROJECT
BY SHELL EXPLORATION COMPANY B. V. EASTERN PRECINCT (PASA REF.
No. 12/3/221)**

Thank you for your indication that shale gas exploration activities are proposed for this site.

In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that before such sites are disturbed by development it is incumbent on the developer to ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.

In your application received by SAHRA there was an indication of an assessment of the heritage resources. Please be advised that the Heritage Impact Assessment must assess not only archaeology and palaeontology, but also any other heritage resources that may be impacted, such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes.

Many thanks
Yours sincerely

A handwritten signature in black ink, appearing to read 'Mfalimbanti', written in a cursive style.

PP Mrs Nonofho Ndobochani
SAHRA: Archaeology, Palaeontology and Meteorite Unit
For: CHIEF EXECUTIVE OFFICER

Copy: PHRA Eastern Cape Office
PHRA Northern Cape Office

Proposed South Western Karoo Basin Gas Exploration Project by Shell Exploration Company B.V



BACKGROUND INFORMATION DOCUMENT AND INVITATION TO COMMENT



CENTRAL PRECINCT

First document for comment

January 2011

This Background Information Document (BID) provides Interested and Affected Parties (I&APs) with information on the proposed project and invites them to participate in the public consultation process to develop the Environmental Management Programme (EMP).

The EMP and public consultation will be undertaken by Golder Associates.

You are invited to register as an I&AP to comment on this BID. Please send us your initial comments and questions by 18 February 2011.

There will be additional opportunities in the future for you to participate and provide comments.

You are welcome to also register as an I&AP for any of the other Exploration Right applications if you wish.

Please complete the enclosed registration/comment sheet, or contact:

Public Participation Office

Toni Pietersen
Golder Associates Africa
PO Box 6001

Halfway House 1685,
South Africa

Tel: 011 254 4805 or

Tel: 011 313 1072

Fax: 011 315 0317

Email:

Central Precinct:

centralkaroo@golder.co.za

Eastern Precinct:

easternkaroo@golder.co.za

Western Precinct:

westernkaroo@golder.co.za

Web site : www.golder.co.za

*Hierdie dokument is ook
beskikbaar in Afrikaans.*

*Lo mqulu uyafumaneka
nangolwimi lweXhosa.*

INTRODUCTION

Shell Exploration Company B.V., a registered company of Royal Dutch Shell plc (Shell) has applied to the Petroleum Agency of South Africa (PASA) seeking the award of exploration rights to undertake gas exploration activities in the South Western Karoo Basin, South Africa.

This document relates to the exploration right application referred to as the Central Precinct, intersecting the Eastern, Western & Northern Cape, PASA Reference No. 12/3/220.

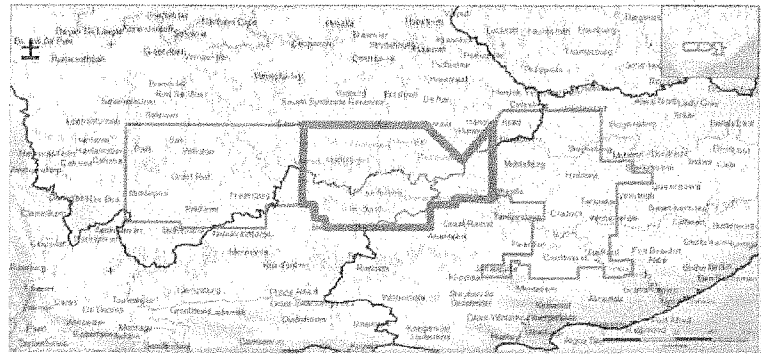


Figure 1: Project overview (purple line) and adjacent exploration rights applications (red lines).

The purpose of exploration activities will be to assess whether there is a viable unconventional gas (shale gas) resource within the proposed 30,000 square kilometre exploration area. Proposed exploration activities will include:

- Conducting geophysical data acquisition and studies.
- Drilling exploration wells with possible gas stimulation (hydraulic fracturing & testing).

The precise locations within the proposed area where exploration activities may take place have not yet been identified. Investigations into the surface characteristics and the environment are in progress and the opinions of stakeholders in the area are being gathered.

PASA is expected to make a decision during 2011 whether to award the initial three year exploration rights. Before PASA makes a decision, environmental and regulatory approvals must be obtained from the respective legislative authorities of South Africa. At each stage consultation with stakeholders and landowners will be essential. If Shell is awarded an Exploration Right then Shell anticipates starting drilling a number of wells towards the end of 2012.

The illustration (Figure 2) provides an overview of possible areas within which suitable well sites may be identified for future exploration drilling activities. These areas were selected based upon desktop geological studies performed by Shell during 2010. In order to identify and select suitable sites, consultation with landowners will be critical. Part of the first consultation process, gathering information and seeking comments, is outlined in this document.

For Shell to be awarded an exploration right, the company is required to:

- Submit an exploration right application in terms of the Mineral and Petroleum Resources Development Act (MPRDA) (Act 28 of 2002) to the Petroleum Agency of South Africa (PASA). Shell submitted the application and it was accepted on 14th December 2010.
- Compile an Environmental Management Programme (EMP) and to consult with Interested and Affected Parties (I&APs).

Shell has appointed Golder Associates (Golder) to compile the EMP and to undertake the public consultation process. The EMP is the first step in the process to obtain environmental authorisation for exploration activities to commence. EMPs for exploration are usually undertaken at a broad, regional level as they assess large areas.

Royal Dutch Shell

Royal Dutch Shell is a global group of energy and petrochemical companies. Shell is active in more than 90 countries and employs more than 100,000 full-time employees worldwide. In 2009, the company produced 3.1 million barrels of oil equivalent per day and had more than 44,000 service stations world-wide.

Shell in South Africa

Shell's long association with South Africa dates back to 1902 when it initially traded paraffin and kerosene which brought both light and heat to communities across South Africa.

Today, Shell South Africa is mainly involved in the retail and business to business sectors. The company has a nationwide retail network of strategically located service stations. The Commercial Fuels and Lubricants Division sells diesel, lubricants, illuminating paraffin, bitumen and heavy furnace fuels directly to end users in the transport, construction, manufacturing, mining, marine and agriculture sectors. In the manufacturing area, the Sapref refinery, jointly owned by Shell and BP, is one of the largest refineries in Africa. Other Shell interests in South Africa include aviation and chemicals.

PROPOSED GAS EXPLORATION AREA

Proposed Exploration Project in the Karoo

Similar to many other countries in the world, South Africa is faced with the challenge of being able to meet future energy demands of an expanding economy coupled with continuously improving standards of living. Developing a natural gas energy supply to help meet this growing demand would be of considerable value to South Africa, especially as natural gas is the cleanest of the fossil fuels. It can be used to generate electricity to power homes and businesses. It is also used for cooking, heating and transport fuels.

Previous hydrocarbon exploration activities in the Karoo have identified gas-bearing geological formations at depths down to nearly five kilometres. But at that time, the 1960s, it was not technically feasible to extract this "shale gas" (also referred to as unconventional gas), so exploration activities stopped in the late 1970s.

Since then, technological advances have made it possible to get gas to flow from these "tight" rocks. Tens of thousands of wells have been drilled around the world using modern, standardised drilling and fracturing techniques. If sufficient amounts of shale gas are found in the Karoo, Shell believes that it will be possible to extract this safely, efficiently and responsibly.

Shell was awarded a 12 month Technical Co-operation Permit (TCP) in December 2009 for the South Western Karoo Basin. During the period of Shell's TCP, extensive geological desktop studies suggested that gas is present across the South Western Karoo Basin. However, it is not yet possible to determine the precise volume and quality, nor the possible rate of flow of gas in any one particular area.

This requires significant exploration to address the key sub-surface uncertainties and risks. Shell has therefore applied to PASA for an exploration licence, which if granted will be valid for three years, with the possibility that Shell can seek up to three renewals for a total of up to nine years.

What is shale gas?

Shale gas is natural gas that occurs deep underground in shale, a rock that is similar to clay but has been baked hard by heat and pressure over millions of years. Some of the gas is held in natural fractures, some in tiny (pore) spaces, and some is absorbed in the organic material from which the shale was formed. The gas in the fractures flows freely and can be produced immediately, but gas trapped in the pore spaces and organic material does not flow freely. Hydraulic fracturing, pumping water and sand into the shale at high pressure, releases this gas.

Proposed Exploration Project

Shell has submitted an exploration licence application referred to as the Central Precinct, intersecting the Eastern, Western & Northern Capes, PASA Reference No. 12/3/220.

The application covers a total area of ±30,000 km² in the magisterial districts of: Aberdeen, Beaufort-West, Carnarvon, Graaff-Reinet, Middelburg, Murraysburg, Noupoot, Richmond and Victoria-West.

Shell has also made two other applications for consideration by PASA with reference No.'s 12/3/219, and 12/3/221 respectively.

Landowners: A complete list of properties within the proposed gas exploration area is available from:

- <http://www.golder.co.za>;
- The list of public places on the reverse side of the enclosed Registration and Comment Sheet, and
- The Public Participation Office at Golder.

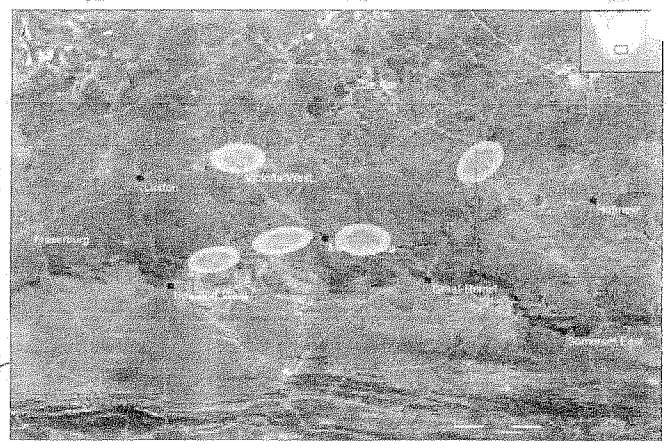


Figure 2: Illustration of possible areas within which suitable well sites may be identified for future exploration drilling activities.

Proposed Exploration Activities

There are several steps involved in the proposed exploration activities, which are summarised in this document.

Acquisition of Geophysical Data

In order to better understand the geological characteristics of the Karoo, Shell plans to use a geophysical technique commonly used in modern petroleum, mining and geothermal resource exploration termed "Magneto-Tellurics" (MT).

Naturally varying magnetic fields, caused by sunspot and even distant thunderstorm activity induce electrical fields in the earth. The MT technique measures these very small magnetic fields from which information is recovered and interpreted to map the subsurface geology, down to depths of 10 km in some instances. This technique has already been used successfully by academic institutions to study the geological history of the Karoo area.

The MT equipment easily fits into a small suitcase and can be carried by one person. A number of small receiving sensors are positioned on the ground, orientated in different directions to allow measurement of the magnetic field. The equipment is set-up during the day, records data overnight and then is moved to a new location the following day. The distance between measuring locations is typically 3 km - 10 km.

Shell will engage with land owners to seek permission to access their land to allow these measurements to be taken.

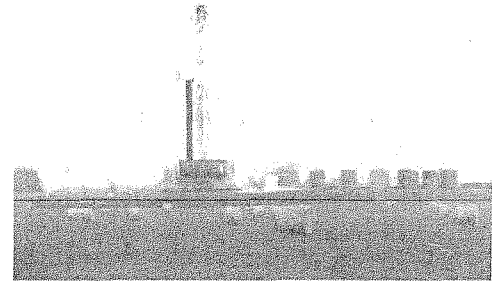


Figure 3: Example of a typical drilling site.

Exploration Drilling

To search for gas trapped in the shale, Shell may drill down to depths of as much as 4000 m to 5000 m. The drilling rig would drill a hole approximately 20-30" (inches) in diameter at the surface.

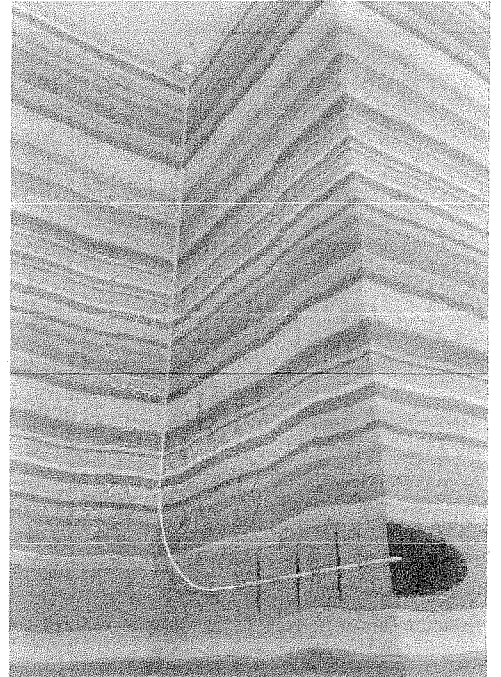


Figure 4: Steel casing inside the well protects shallow fresh-water aquifers.

As indicated in Figure 3, the "site" where temporary drilling operations take place may require up to 100 m x 100 m (1 ha) of land for temporary use. The drilling equipment used to drill the well is transported on trucks for the duration of operations. When operating, the drilling rig itself may be up to 30 m high. Depending on regulatory approvals, drilling may take place 24 hours a day. After the well is drilled the equipment is taken away.

Evaluation of Gas Flow

Once a well has been drilled, geological samples of the rock cuttings from the bore hole are collected and analysed to determine whether gas is present in the rock formations deep underground.



Figure 5: Acquisition of geophysical data using Magneto-Telluric equipment.

When wells were drilled in the 1960s some gas was found in a few wells but did not flow easily to the surface. For this reason Shell does not expect to find large quantities of gas when the well is drilled. The gas is trapped very tightly in the rocks, deep underground.

If analysis of the rock samples indicates that gas is present the next step is to evaluate whether the gas can be stimulated to flow. A technique called hydraulic fracturing (fracking) would then be used, which has been used on tens of thousands of similar wells around the world.

To fracture the rock deep underground, a fluid is pumped under high pressure into the rock formation to try to create fractures in the rock. The fluid mixture comprises 99% water and sand, and, together with a small amount of special-purpose chemicals, improves the efficiency of the fracturing process.

If the fracturing operation is successful and a small amount of gas starts to flow up the well to the surface the next step is to measure the flow rate. This will allow an early indication of the volumes of gas possible from that well. At this stage it may be an option to capture and convert a small volume of the gas into energy, thus minimising flaring and allowing the gas properties to be better characterised.

Supporting Infrastructure

The proposed exploration activities will require additional infrastructure, including :

- **Well site**
Establishing a well site for drilling operations, including a suitable access road to the site, which may need to be prepared and compacted for heavy load. Other on-site infrastructure may include portable offices, generators, lighting equipment and fuel storage.
- **Water supply**
Water is required during exploration to cool and lubricate the drill bit, carry rock cuttings to the surface during drilling for analysis and for hydraulic fracturing the rock if gas flow rate evaluation is undertaken. Shell's approach is to avoid using shallow water aquifers and is investigating a number of potential water sources to support these requirements, including sea water, surface water and deep saline aquifers.
- **Waste management**
Shell will capture any water that returns to the surface during drilling operations (known as produced water). Once feasibility studies have been completed, investigating different options for responsible disposal or recycling of the waste products, Shell will develop a waste management implementation plan applicable to each well site location. These plans will comply with all relevant national and local legislation.
- **Rehabilitation of land**
If a location is deemed unsuitable for development, the wells will be sealed and Shell will implement a land rehabilitation programme appropriate to the local habitat. This will be further assessed as part of the impact assessment and specialist studies.

Next Steps

The Short Term

A number of technical studies will be undertaken as part of the Environmental Management Programme (EMP) process. Desktop studies will cover the larger application area and some fieldwork will be undertaken in selected areas to support the findings of the desktop studies.

Once the EMP has provided a broad level of data, other approval processes must be followed before exploration activities can commence.

PASA is expected to make a decision during 2011 on whether to award the initial three year exploration rights. Before PASA makes this decision, environmental and regulatory advice must be obtained from the respective legislative authorities of South Africa. Consultation with stakeholders and landowners will be essential at each stage. If PASA awards the Exploration Right then Shell anticipates starting drilling a number of wells towards the end 2012 (again subject to regulatory approvals).

If the presence of gas is indicated during the initial three year exploration period, Shell can make a formal application to PASA to renew its exploration rights and to undertake additional exploration activities. This request for renewal of an exploration right can be made three times, which if granted each time, could allow Shell to explore for up to nine years. If the results are disappointing, then Shell could cease exploration activities at any stage and would implement a site specific rehabilitation programme before leaving the site.

The Longer Term

After a well is drilled successfully and gas flows to the surface, the next step typically would be to drill additional wells 5 km – 25 km away from the original well to establish whether similar geological characteristics exist.

If the indications are positive, the most likely engineering concept would be to drill several wells from a single, existing site. In this situation, additional infrastructure would be required to "connect" the sites so that the gas can be distributed or used to generate energy locally, feeding into existing national electricity infrastructure.

Permission for access to land

Landowners are currently being requested permission for access to their land by Golder's environmental specialists. The team will work under a strict code of conduct which requires, for example, prior permission for access, and not disturbing farm activities. Specialists will inform landowners when they arrive and when they are leaving a particular property. Individuals will carry identification and a letter of appointment from Golder.

Shell will comply with all legal requirements relevant to the exploration activities and will obtain necessary approvals and permits. In addition, Shell will follow its own internal guidelines on environment and social performance. These guidelines require an integrated environmental, social and health impact assessment to be carried out prior to the start of drilling operations. Throughout the process, Shell will work closely with regulators, stakeholders and landowners.

A brief summary of the environmental regulatory framework follows.

Mineral and Petroleum Resources Development Act (Act 28 of 2002)

Section 79 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) (MPRDA) stipulates that an applicant for an exploration right is:

(4)(a) to notify and consult with any affected party; and

(4)(b) to submit an environmental management programme in terms of Section 39 within a period of 120 days from the date of the notice.

The Petroleum Agency of South Africa (PASA) is the lead decision-making authority for the EMP in terms of the MPRDA.

As part of the EMP process, a number of technical studies will be undertaken. These studies will comprise desktop studies over the larger application area, as well as some ground-truthing (fieldwork) in selected areas that will support the findings of the desktop studies.

Technical studies will be conducted on:

- ❖ Surface and groundwater;
- ❖ Ecology / biodiversity;
- ❖ Soil;
- ❖ Environmental noise;
- ❖ Air quality;
- ❖ Human health; and
- ❖ Heritage (including palaeontology).

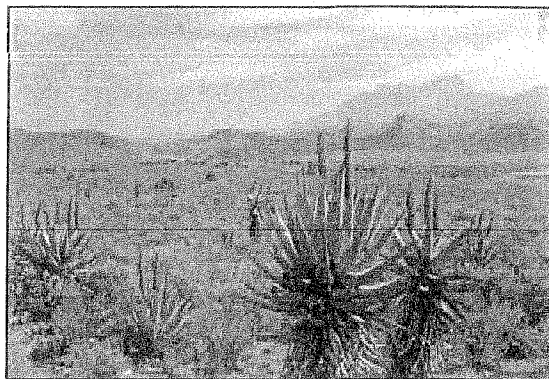
As stipulated in the MPRDA, Shell has 120 days from the date that PASA accepts the exploration right application to submit the EMP. If PASA approves the final EMP then the next approval would be for PASA to grant the Exploration Right. Further permits and regulatory approvals will be required before Shell can commence activities.

National Environmental Management Act (Act 107 of 1998)

The EIA Regulations GN R543 under the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) (as amended) set out a list of identified activities that may not commence without environmental authorisation from the competent authority. Should the project include activities listed under GN R544, GN R545 and GN R546, the Environment Impact Assessment (EIA) procedure as provided for in Regulations 27 to 36 of the NEMA EIA Regulations GN R543 will be followed. The NEMA EIA will commence subsequent to the submission of the EMP to PASA in April 2011.

National Water Act (Act 36 of 1998)

Several water uses, as defined in terms of Section 21 of the National Water Act (Act 36 of 1998), may form part of the proposed project. Examples of such water uses include Section 21(a) "taking water from a water source, 21(b) "storing of water", and Section 21(g) "disposing of waste in a manner which may detrimentally impact on a water resource". An Integrated Water Use License Application (IWULA) will need to be lodged with the Department of Water Affairs (DWA) to obtain the required license. The IWULA process will be undertaken by Golder's water and waste management specialist team, and the application process will run in parallel with the (NEMA) EIA, starting in April 2011.



PUBLIC CONSULTATION PROCESS

Interested and Affected Parties (I&APs) are required to formally register as stakeholders. You are therefore requested to register by **Friday 18 February 2011**. Please use the enclosed Registration and Comment Sheet if you wish to register.

Your registration forms a vital contribution in the engagement process to help develop the EMP in accordance with MPRDA regulations. Table 1 outlines the timeline for the EMP, with suggested opportunities for further consultation.

Table 1: Key steps and scheduling of stakeholder engagement process

Key steps	Dates
1. Submit gas exploration licence application to PASA	03 December 2010
2. Acceptance by PASA	14 December 2010
3. Announce EMP process and notify I&APs	03 January 2011 – 18 February 2011
4. Open houses	24 January 2011 – 04 February 2011
5. Public review of Draft EMP	28 February 2011 – 01 April 2011
6. Public meetings/open houses	14 March 2011 – 25 March 2011
7. Submit final EMP to PASA	11 April 2011
8. Letter to registered I&APs to inform them of PASA's decision	Expected: August 2011

Note: Following completion and approval of the EMP and if Shell is successfully awarded an Exploration Right further public consultation will be arranged in accordance with the NEMA EIA legislation process prior to commencing certain exploration activities.

Open Houses

During the initial announcement period for the proposed gas exploration project, Golder Associates will convene a series of meetings, called 'open houses' at a number of locations within Shell's gas exploration application area. I&APs who are interested to attend an open house meeting are kindly requested to complete and return the enclosed Registration and Comment Sheet to the Public Participation Office (address provided on the Registration and Comment Sheet). I&APs are welcome to attend any one of the listed open houses. Table 2 lists the dates, times and venues of the open houses.

Table 2: Open houses, venues and times

Venue	Date	Time
Central Precinct		
1. Victoria-West: Town Hall, 36 Kerk Street, Unbuntu Municipality, Victoria-West	Tuesday 25 January 2011	09:00 – 12:00
2. Beaufort-West: Grasdene Hall, 15 Kerk Street, Beaufort-West	Thursday 27 January 2011	09:00 – 12:00
3. Murraysburg: Town Hall, 23 Beaufort Street, Murraysburg	Friday 28 January 2011	10:00 – 13:00
4. Graaff-Reinet: Sappa Rm, Town Hall, 71 Hout Street, Camdeboo Municipality, Graaff-Reinet	Friday 28 January 2011	17:00 – 20:00
Eastern Precinct		
5. Hofmeyr: Bowling Club, Farm Rietfontein, Hofmeyr	Monday 24 January 2011	09:00 – 12:00
6. Somerset-East: Town Hall, 67 Nojoli Street, Blue Crane Route Municipality, Somerset-East	Monday 31 January 2011	09:00 – 12:00
7. Port Elizabeth: Town Hall, Municipal Offices, Goven Mbeki Ave, Brister House, Port Elizabeth	Monday 31 January 2011	17:00 – 20:00
Western Precinct		
8. Loxton: Community Hall, Sport grounds, Vygie Street, Loxton	Wednesday 26 January 2011	10:00 – 13:00
9. Cape Town: Edgemoed Bowling Club, Edgemoed Drive, Edgemoed, Cape Town	Tuesday 1 February 2011	17:00 – 20:00
10. Sutherland: Church Hall, Dutch Reformed Church, Piet Retief Road, Sutherland	Wednesday 2 February 2011	14:00 – 17:00

Your registration as an I&AP and comments are important

The purpose of the EMP process is to provide the authorities with sufficient information on which to base a decision on whether to authorise the proposed project or not, and if yes, under which conditions. The contributions of stakeholders from all sectors of society will assist in informed and sustainable decision-making. Golder invites all stakeholders to participate freely, and to submit any comments or information they feel may be useful. Address details appear on page 1.