

BACKGROUND INFORMATION DOCUMENT



Council for Geoscience

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE CARBON CAPTURE UTILISATION AND STORAGE (CCUS) PROJECT: 3D SEISMIC SURVEY AND DRILLING

PROJECT ANNOUNCEMENT

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1. PURPOSE OF THIS DOCUMENT

The purpose of this **Background Information Document** (BID) is as follows:

1. It serves to provide an overview of the proposed **3D seismic survey and drilling** in support of the **Carbon Capture Utilisation and Storage (CCUS) Project** (the "Project");
2. It outlines the **Environmental and Social Impact Assessment** that will be undertaken for the proposed Project; and
3. It allows stakeholders to provide upfront comments regarding the proposed Project.



2. BACKGROUND & MOTIVATION

South Africa (SA) has a coal-based energy economy and emits carbon dioxide (CO₂) into the atmosphere at approximately 400 million tonnes per year. In recognising its contribution to climate change, the country has committed itself to undertake steps to minimise such emissions. CCUS has been acknowledged by SA as one of the technologies to mitigate the emissions of CO₂ into the atmosphere and forms one of the Nationally Appropriate Mitigation Actions (NAMA). It is also one of the national flagship projects. CCUS forms part of a just transition to a future low-carbon energy economy.

The Council for Geoscience (CGS) is undertaking a geoscientific research project for the piloting of CCUS in Leandra in Mpumalanga, where it is proposed to inject CO₂ into deep suitable geological formations, approximately 1km below the surface. The Government of SA has received funding from the World Bank's International Bank for Reconstruction and Development to finance the CCUS Project and intends to apply part of the proceeds for conducting Geological Characterisation comprising, amongst others, of drilling exploration boreholes and undertaking high-resolution 3D seismic survey at the proposed injection site. This document only focuses on the Geological Characterisation component of the overall CCUS.

3. PROJECT OVERVIEW

3.1 Location

The northern portion of the Highveld coalfields presents unique geology, which affords the potential storage of CO₂. The site is situated near Lebohang (Leandra) in the Govan Mbeki Local Municipality, which falls within the Mpumalanga Province of SA. The R29 runs through the central part of the overall project area. Refer to the map contained in **Figure 1** below.

The proposed drilling site is located along the R29 from Leandra to Kinross and is bounded to the south by a railway line from Secunda to Springs. The area earmarked for the 3D seismic survey encompasses most of the town of Lebohang, as well as rural areas to the east and north-east. Refer to the map contained in **Figure 2** below.



Figure 1: Regional locality map

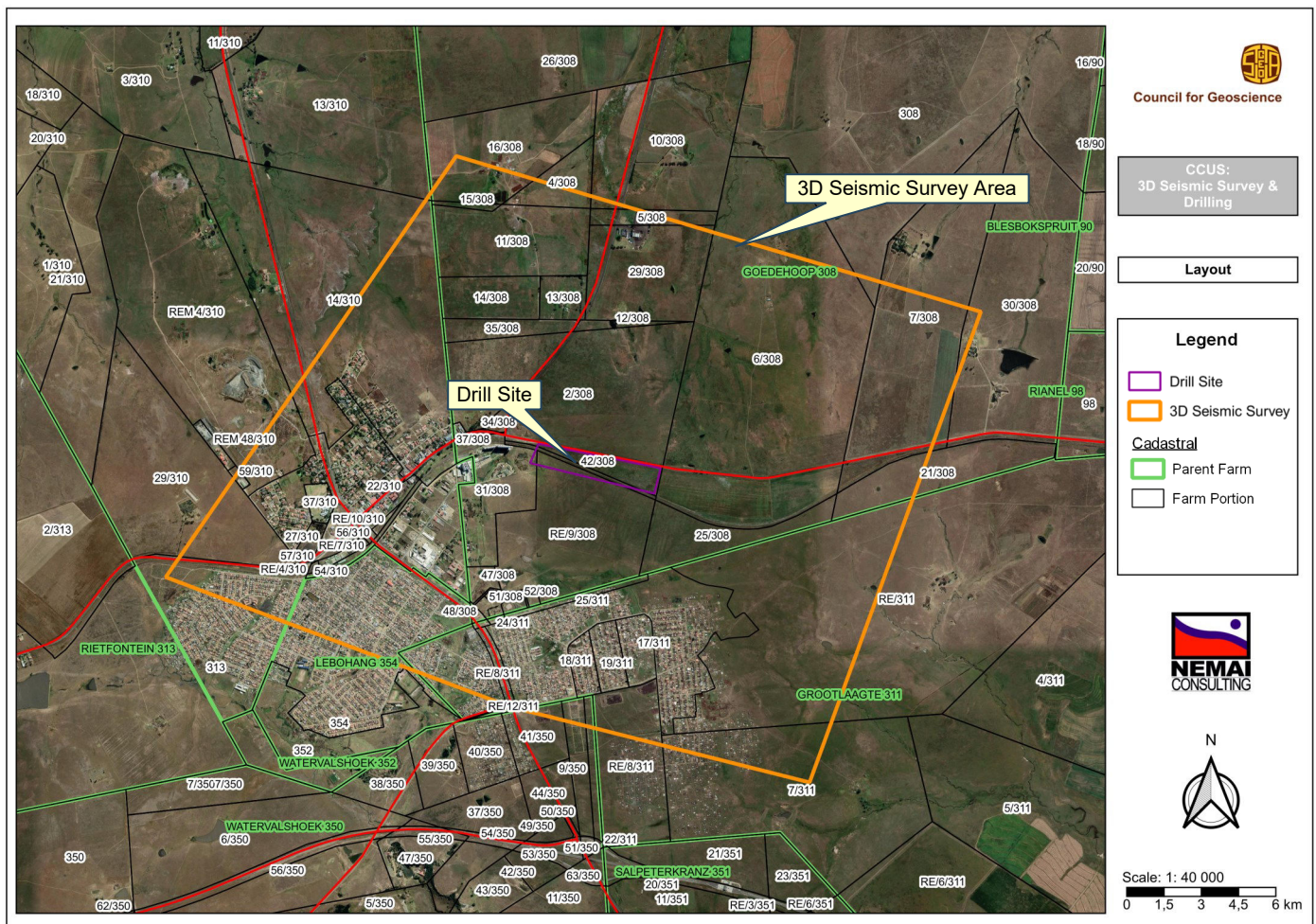


Figure 2: Proposed drilling site & seismic survey area

3.2 Drilling

The boreholes will be cored from the top of the bedrock to total depth with a minimum hole diameter of c. 95 mm. At various intervals during the drilling, suites of geophysical instruments will be installed in the borehole to obtain geophysical information. In addition, tests to determine the presence and quantity of gasses, e.g., hydrocarbons/light gasses, and tests to determine hydrological information will be conducted at systematic horizons, e.g., where water strikes are intersected, in the borehole.

Plant, equipment and goods associated with the drilling shall include (amongst others):

- Drill rigs including masts or derricks;
- Drilling fluid mixing, pumping and recycling equipment;
- Grouting pumps, mixers and all other equipment necessary for grout casing of the borehole, when necessary;
- Lighting plants and other equipment necessary to allow safe and efficient 24-hour operation;
- Adequate power supply unit for the drilling operation and the staff camp;
- Water supply for drilling and potable water for workers;
- Site office accommodation, stores, workshops and kitchen facilities at the site;
- Office for CGS representatives;
- Adequate vehicles to allow completion of the work, including suitable transport to safely transport contractor personnel to and from the drill site;
- Adequate, approved temporary ablution and latrine facilities;
- A reliable communication system; and
- All spare parts and back-up plant and equipment to ensure safe and efficient completion of the work.

On completion, the borehole will be securely capped with a concrete sanitation block and a lockable metal cap with a clear sign to avoid potential hazards to people and animals. The drill site will also be suitably rehabilitated. New facilities will be created for the injection phase.

3.3 3D Seismic Survey

A seismic survey is a method of investigating subterranean structure. The technique is based on determining the time interval that elapses between the initiation of a seismic wave at a selected shot point (i.e., location where the seismic wave is generated) and the arrival of reflected or refracted impulses at one or more seismic detectors (Source: <https://www.britannica.com/science/seismic-survey>).

The purpose of the high resolution 3D survey for the CCUS Project is to map the structures, reservoir and seal rocks in detail over the identified potential injection site. The 3D survey will also establish the baseline for future time-lapse CO₂ monitoring activities. 3D seismic surveys must be conducted over a large area in order to provide sufficient data for accurate interpretation of the subsurface geology.

For the Project, the seismic waves will be induced by vibrating truck-mounted heavy plates on the ground. These specialised trucks are known as “Vibroseis” (see **Figure 3**). By analysing the time it takes for the seismic waves to reflect off subsurface formations and return to the surface, formations can be mapped. 3D surveys are acquired by laying out energy source points (vibroseis) and receiver points (geophones) in a grid over the area to be surveyed.

The 3D seismic data for the Project will be processed using pre-stack time/depth migration and post-stack time migration approaches for comparison purposes. The information from the existing legacy and borehole data will be utilised to provide constraints on the designs of the seismic surveys and processing of the seismic data.



Figure 3: Example of a Vibroseis

4. ENVIRONMENTAL ASSESSMENT

4.1 Environmental Governance Framework

Nemai Consulting was appointed by the CGS to undertake an Environmental and Social Impact Assessment (ESIA) for the 3D seismic survey and drilling required as part of the CCUS Project.

The ESIA must satisfy the following:

- The proposed Project will be supported by funding from the World Bank’s International Bank for Reconstruction and Development (IBRD), and therefore it is to be executed to meet all related requirements, including the World Bank Environmental and Social Framework, the General Environmental, Health and Safety (EHS) Guidelines, Industry specific EHS Guidelines and Good International Industry Practice (GIIP).
- South Africa’s environmental legal requirements, including the following (amongst others):
 - ◊ National Environmental Management Act (Act No. 107 of 1998) and the Environmental Impact Assessment (EIA) Regulations of 2014, as amended (“EIA Regulations”);
 - ◊ National Environmental Management: Waste Act (Act No. 59 of 2008);
 - ◊ National Water Act (Act No. 36 of 1998); and
 - ◊ Mineral and Petroleum Resources Development Act (Act No. 28 of 2002).

There are also other pieces of legislation and mandated authorities governing specific environmental management topics (e.g., air quality) and features (e.g. biodiversity, heritage and cultural resources, etc.), which will be considered further as the ESIA process unfolds.

4.2 Specialist Studies

The following specialist studies will be undertaken as part of the ESIA to assess the impacts of the proposed 3D seismic survey and drilling on the receiving environment:

1. Socio-Economic Impact Assessment;
2. Heritage Impact Assessment;
3. Terrestrial Ecological Impact Assessment;
4. Aquatic Impact Assessment and Delineation; and
5. Health and Safety Assessment.

The findings of technical studies, such as geotechnical and hydrogeological studies undertaken by the CGS, will also be considered during the ESIA.



4.3 Stakeholder Engagement

4.3.1 Purpose of Stakeholder Engagement

The purpose of stakeholder engagement, which forms part of the ESIA, includes the following:

- To inform stakeholders about the Project;
- To allow stakeholders to express their views, issues, and concerns with regard to the Project;
- To grant stakeholders an opportunity to recommend measures to avoid or reduce adverse impacts and enhance positive impacts associated with the Project; and
- To enable the project team to incorporate the needs, concerns, and recommendations of stakeholders into the Project, where feasible.

4.3.2 Public Meeting

The following public meeting will be held to provide a platform for project-related discussions and to obtain input from stakeholders:

Table 1: Public Meeting Details

Date:	15 March 2023
Time:	10:00 AM – 12:30 PM
Venue:	Difa Nkosi Hall, Leandra (Coordinates: 26°22'35.08"S, 28°55'19.72"E)



4.3.3 Providing Comments

Please submit your contact information and any comments that you may have regarding the proposed CCUS: 3D seismic survey and drilling to the contact person below by 28 March 2023. The attached Reply Form can be used for commenting purposes.

5. CONTACT DETAILS

For any queries or comments related to the proposed 3D seismic survey and drilling required as part of the CCUS Project, please contact the Environmental Assessment Practitioner below:



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