



GlobiWell
Borehole and Groundwater Specialists

Groundwater Investigation & Borehole Siting Brakkloof 443

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INTRODUCTION

GlobiWell Consulting Hydrogeologists conducted a comprehensive groundwater investigation on Brakkloof 443 farm, located near the town of Plettenberg Bay. This report presents the findings of the investigation, including the identification of prospective borehole sites. Two borehole locations were identified within the study area based on thorough analysis.

The investigation was commissioned by Neil Hellmann to provide a groundwater resource required for the of a proposed development on the property. The fieldwork and analysis took place during the week of 3 to 7 October 2025.

The hydrogeological team responsible for the project included:

- Mr. Ruan van Jaarsveld – Hydrogeologist
- Mr. Martin de Klerk – Geophysicist
- Mr. Keanu Gouws – Geologist



Figure 1: Google earth image showing the property boundaries of the study area (green polygon)

GROUNDWATER INVESTIGATION METHODOLOGY

The investigation followed a structured methodology comprising the following components:

- **Geological desktop study** – Identification of preliminary hydrogeological targets using aerial photographs, published geological maps, aquifer classification, and aquifer quality maps.
- **Geophysical survey** – Evaluation of geological properties around potential hydrogeological targets through geophysical methods.
- **Data modulation** – Processing and modulation of raw geophysical data by Cape Geophysics following the completion of the surveys.
- **Data analysis and borehole siting** – Analysis of results by the hydrogeological team leading to the siting of specific borehole sites.
- **Scientific report** – Compilation of all findings and recommendations in this scientific report.

HYDROGEOLOGICAL TARGET AND AREA OF INTEREST

The study area is geologically diverse, consisting of three principal formations: the Peninsula Formation, the Enon Formation, and the Wankoe Formation. The Peninsula Formation forms the basal unit and is characterised by white quartzitic sandstones. Overlying the Peninsula Formation is the Enon Formation, which is distinguished by its sub-rounded pebbles and cobbles that are partially cemented by silica within a sandy or clay-rich matrix. The uppermost unit, the Wankoe Formation, is recognised as a coastal aeolianite deposit and is present as a relatively thin veneer.

A comprehensive desktop study, including a borehole hydrocensus, was conducted to assess the aquifer systems present within the study area. The findings indicate the presence of two main aquifers. The first is associated with the Enon Formation, which generally yields low volumes of groundwater and is characterised by brackish quality, with electrical conductivity typically at or above 250 mS/m. The second aquifer is hosted within the Peninsula Formation, where a highly fractured network of quartzites facilitates the production of groundwater of good quality, exhibiting electrical conductivity values of less than 150 mS/m, and moderate yields which could exceed 1.5 L/s.

Given the requirements of the proposed development for high-quality groundwater that would not necessitate extensive treatment to meet drinking water standards, the Peninsula Formation aquifer was selected as the primary hydrogeological target for further investigation.

As part of the desktop study phase, a hydrogeological lineament analysis was performed across the study area. In geological terms, a lineament is defined as a weathered or fractured zone visible in aerial or satellite imagery. These features are of significant hydrogeological interest because they often coincide with areas of enhanced rock permeability, making them favourable for groundwater occurrence. The process of identifying and mapping these lineaments provides essential direction for focused groundwater exploration and guides subsequent field investigations.

The outcomes of the lineament analysis, together with the mapped spatial distribution of geological units, are illustrated in Figure 2. The geological data used in this analysis were obtained from published geological maps. As the groundwater investigation progresses, further refinement of the geological mapping for the study area will be undertaken, thereby enhancing the precision of hydrogeological target identification.

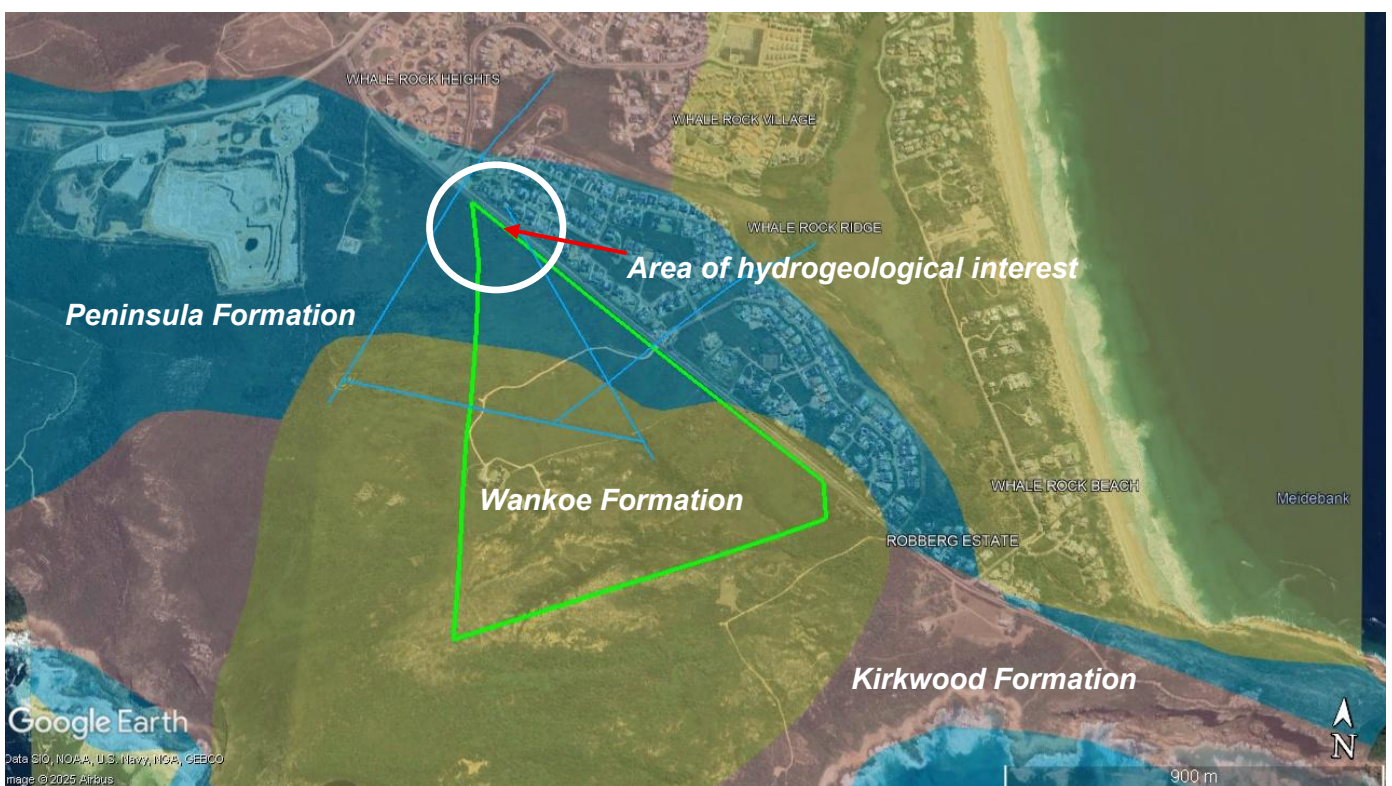


Figure 2: Presents the published geological map of the study area, providing a clear overview of the local geology and property boundaries. The property boundaries are delineated by a green polygon. Hydrogeological lineaments, which are potential zones of weathering or fracturing that are of significant interest for groundwater exploration, are represented by blue lines on the map. The map also highlights the specific area that was the focus of the fieldwork for the groundwater investigation, marked distinctly by a white circle.

GEOPHYSICS AND BOREHOLE SITING

Electrical Resistivity Tomography (ERT) was employed to assess the hydrogeological characteristics of the identified area of interest. ERT is a well-established geophysical technique widely used for mapping and investigating subsurface geological structures and stratigraphic units

The data obtained from the ERT surveys were processed and analysed, offering valuable insights into the occurrence and distribution of features likely to host groundwater. The interpretation of these results enabled the hydrogeological team to make informed decisions regarding the optimal locations for siting new boreholes, thereby improving the likelihood of intersecting productive aquifers.

One Electrical Resistivity Tomography (ERT) survey was carried out parallel to Whale Rock Drive. The primary objective of the surveys was to intersect and study potential fracture zones that had been previously identified through the lineament analysis.



Figure 3: Google earth image showing the location of ERT Traverse-1 (yellow line).

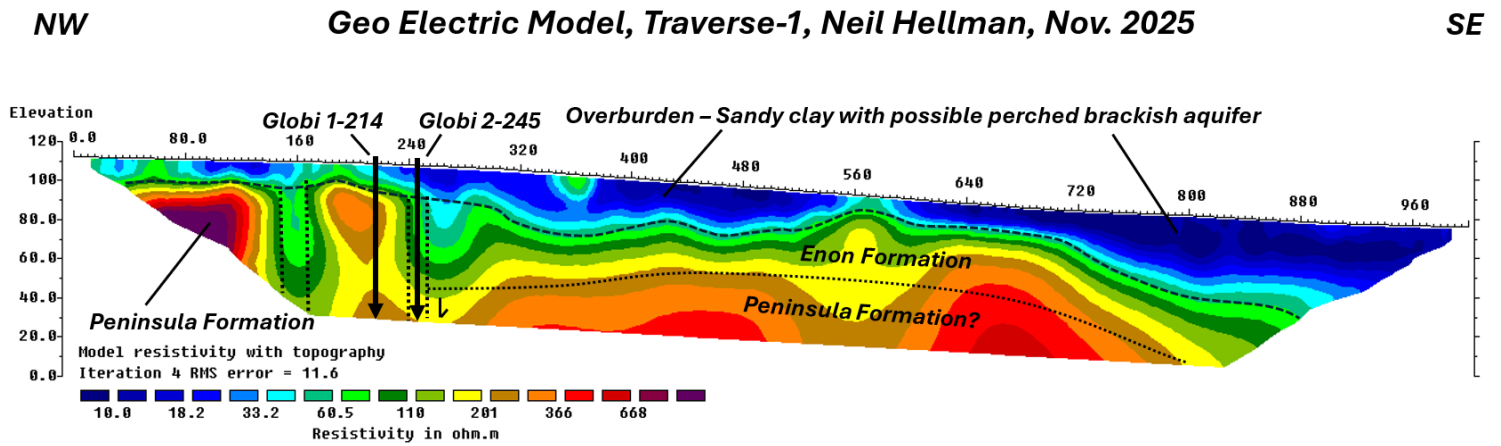


Figure 4: Modelled geoelectric profile from the data of Traverse-1. Two proposed borehole sites have been identified and are marked on the profile with black vertical arrows. The first site, Globi 1, is positioned at 214 metres along the traverse, while the second, Globi 2, is located at 245 metres along the same survey line. These positions were selected based on the interpretation of geoelectric responses, aiming to maximise the likelihood of intersecting productive aquifer zones.

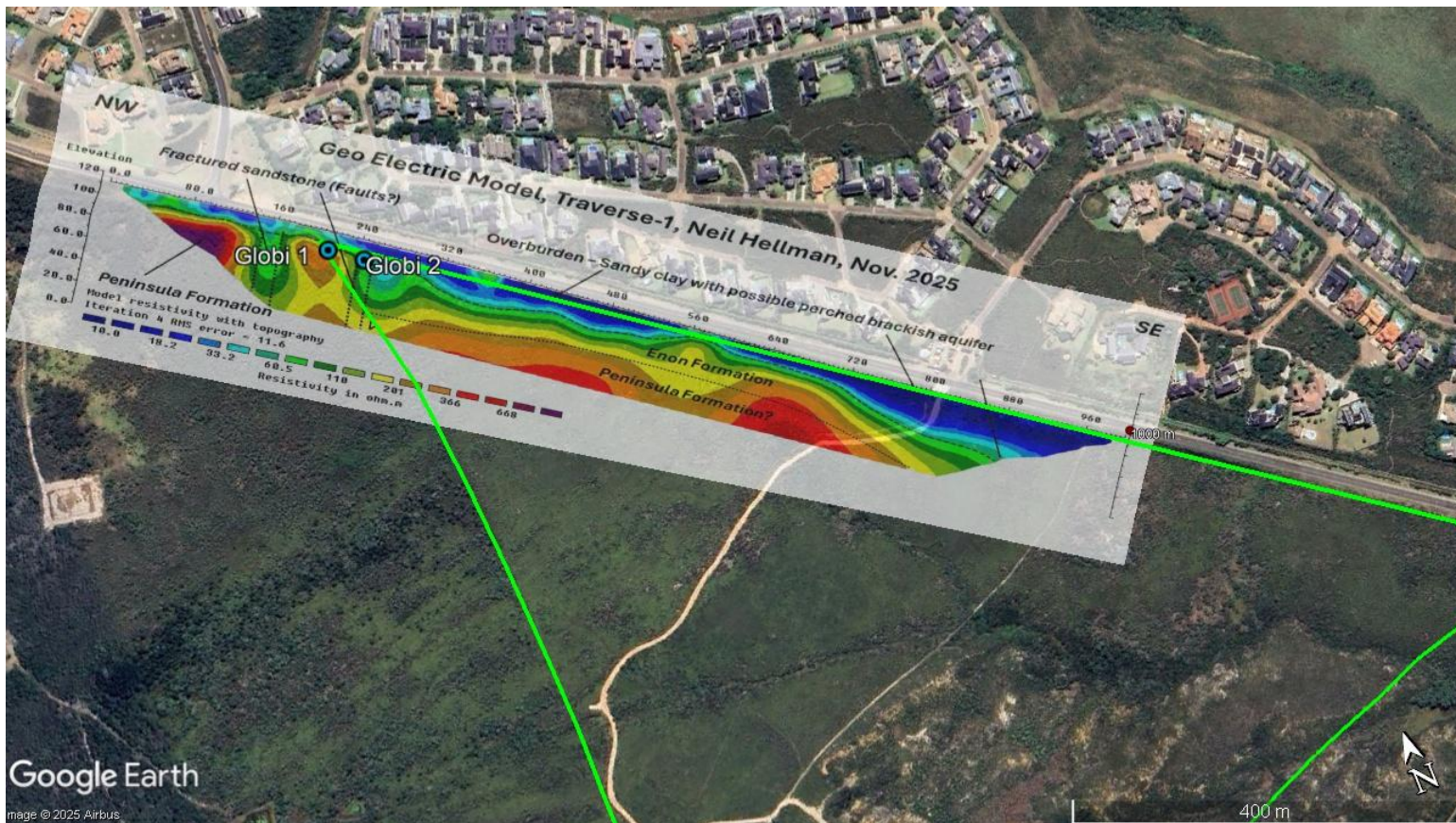


Figure 5: Google earth image showing the overlain ERT profile. Proposed borehole sites are indicated (blue dots).



Figure 6: Google earth image showing proposed borehole locations (blue dots).

DRILLING RECOMMENDATIONS

Proposed borehole sites:

The borehole is to be drilled to a total depth of 300 metres below ground level. This depth has been selected to ensure the interception and utilisation of all potential water-bearing fractures encountered during drilling.

Upon completion of drilling, the borehole must be lined with 140 mm outside diameter (OD) Class 12 threaded uPVC casing. The installation of this casing is essential to prevent the collapse of the borehole walls and to maintain the structural integrity of the borehole over time. The casing should only be perforated opposite water strikes of good quality (low electrical conductive), and not perforated opposite water strikes of poor quality (high electrical conductivity). This approach is intended to optimize both the quantity and quality of groundwater extracted from the borehole, making it a sustainable resource for future use.

The borehole drilling process should be supervised and managed by qualified GlobiWell Hydrogeologists to ensure optimal results and the protection of the resource. A hydrogeologist must be present on site to oversee each critical stage of the drilling operation. Their responsibilities will include the design of the borehole, guiding and coordinating the drilling team, and continuously assessing the drilling target throughout the drilling process.

During drilling, the hydrogeologist will determine the drilling yield, measure water quality from any water strikes encountered, and evaluate the suitability of the intersected groundwater. The hydrogeologist will also make informed decisions regarding when to terminate drilling. This will be based on either the successful intersection of sufficient groundwater or a professional assessment that the likelihood of encountering additional groundwater at greater depths is low.

The proposed borehole locations are listed below, listed in priority order with the recommended depth.

Table 1: Proposed Borehole Location

Borehole Name	Google Earth Latitude/Longitude	Estimated Depth	Priority
Globi 1	-34.090696°/23.356360°	300 m	1
Globi 2	-34.090878°/ 23.356652°	300 m	2

BOREHOLE DESIGN

- 0-18 m 254 mm air rotary drilling
- 0-18 m 219 mm OD steel casing
- 12-150 m 190 mm air rotary drilling
- 150-300 m 165 mm air rotary drilling
- 0-300 m 140 mm OD Class 12, uPVC

Overview of Borehole Design

The current borehole design has been developed with a focus on flexibility and adaptability to varying site conditions. This approach ensures that the borehole can accommodate changes in water yield and quality without requiring significant redesign or reconstruction.

Should the borehole intersect water yields that exceed 15 000 litres per hour, the design allows for the installation of larger uPVC casing. This feature enables the use of a larger diameter pump, ensuring that the increased water volume can be efficiently managed.

In addition, the design incorporates a large annular space around the casing. This spacious annulus provides sufficient room for intervention if any of the water encountered is brackish. In such cases, the affected zones can be effectively sealed off with cement grout, thereby protecting water quality and maintaining the integrity of the borehole.

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