


	<p style="text-align: center;"><b>IMERYS REFRACTORY MINERALS SOUTH AFRICA (PTY) LTD</b></p> <p style="text-align: center;"><b>CAPE BENTONITE MINE</b></p>	
<p><b>TITLE : Geological and Socio-Economic Motivation Report for Uitpanskraal 585 Mineral Area 2</b></p>	<p><b>Version 01</b></p>	<p><b>20 November 2024</b></p>

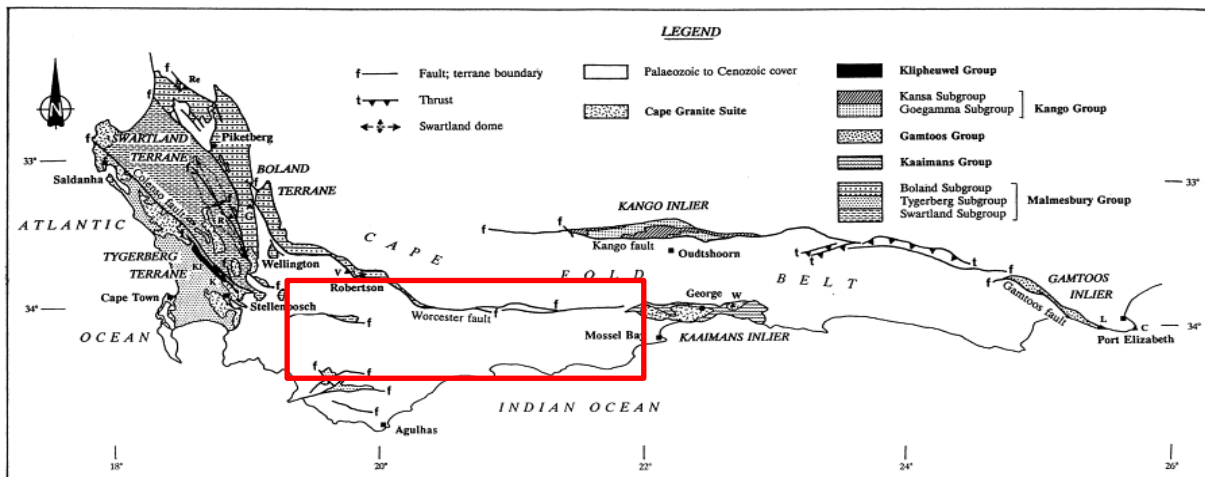
**GEOLOGICAL MOTIVATION**


**I.GEOLOGICAL INTRODUCTION TO THE HEIDELBERG-RIVERSDALE BENTONITE DEPOSIT**

The Bentonite is a clay part of the smectite family, one of the seven clay families. This deposit is situated in the Cape basin, more precisely in one of its subsidiaries, the Heidelberg-Riversdale Basin.

From a global point of view, the Cape Basin was first formed during the Cape Fold Belt orogeny (Permian-Triassic) as a foreland basin. Thereafter it continued to subside during the fragmentation of the Gondwana due to the opening of the South-Atlantic. This second phase was controlled by Normal faulting such as the Worcester Fault governing the Heidelberg-Riversdale Basin (Figure 1.1). These faults divide the area in two structural blocks:

- Highly deformed rocks of the Cape Fold Belt
- Sediments post orogeny slightly folded but an average dipping of 25 degrees towards the North



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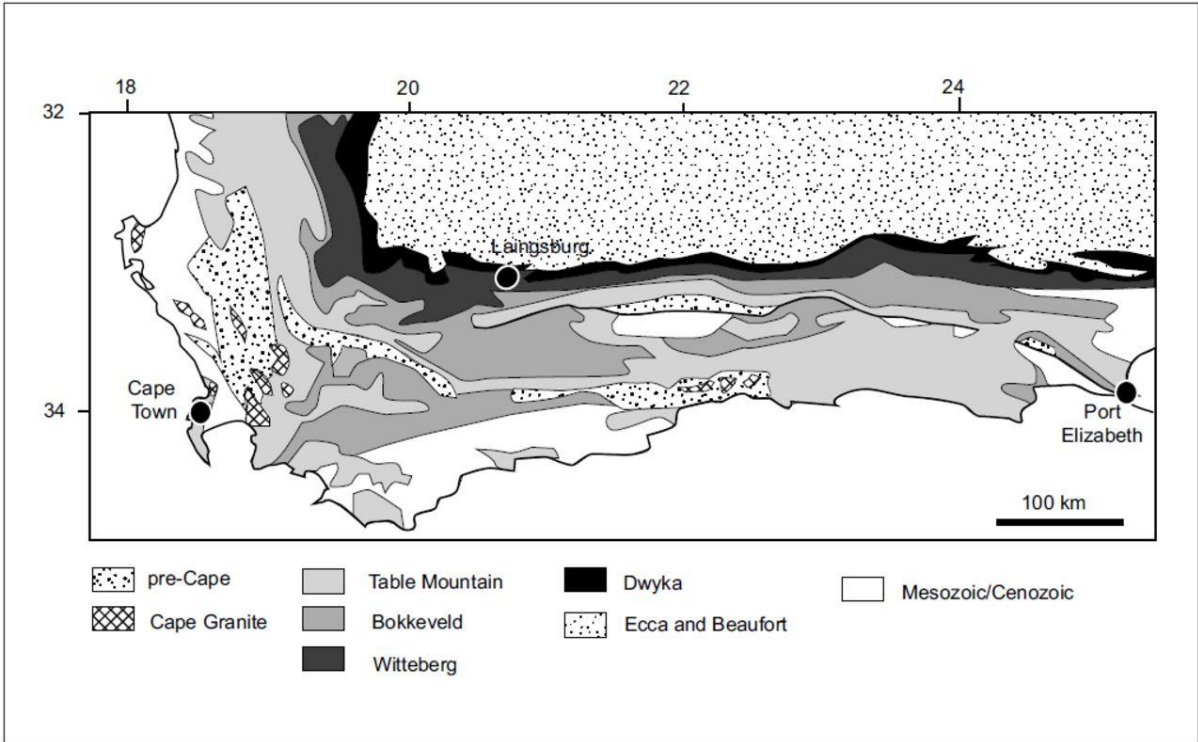

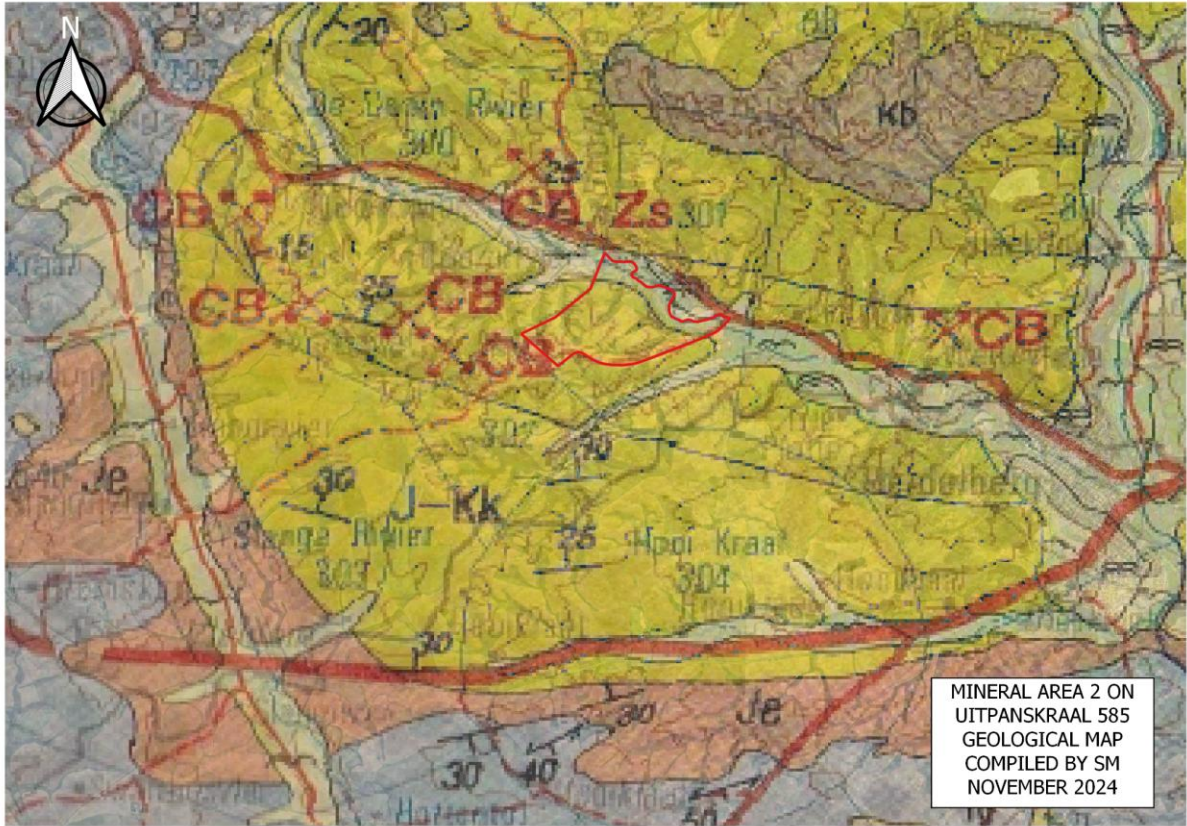



Figure 1.2: Regional geology map showing Cape Fold Belt Area Geological History of Southern Africa (S.H HAUGHTON-sajg.geoscienceworld.org)

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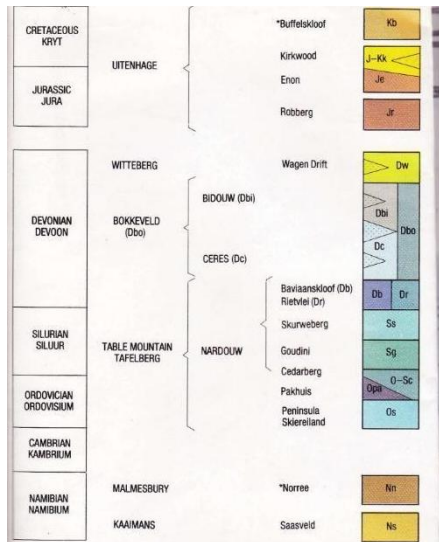



Figure 1.3: Local geology map (Geological History of Southern Africa S.H HAUGHTON-Geological Map 1:40 000 Riversdale)

During the formation of the Heidelberg-Riversdale basin, Alkaline volcanic episodes took place (Figure 2), leading to the deposition of ashes in salted Lacustrine environment where they were subjected to hydrothermal variations.

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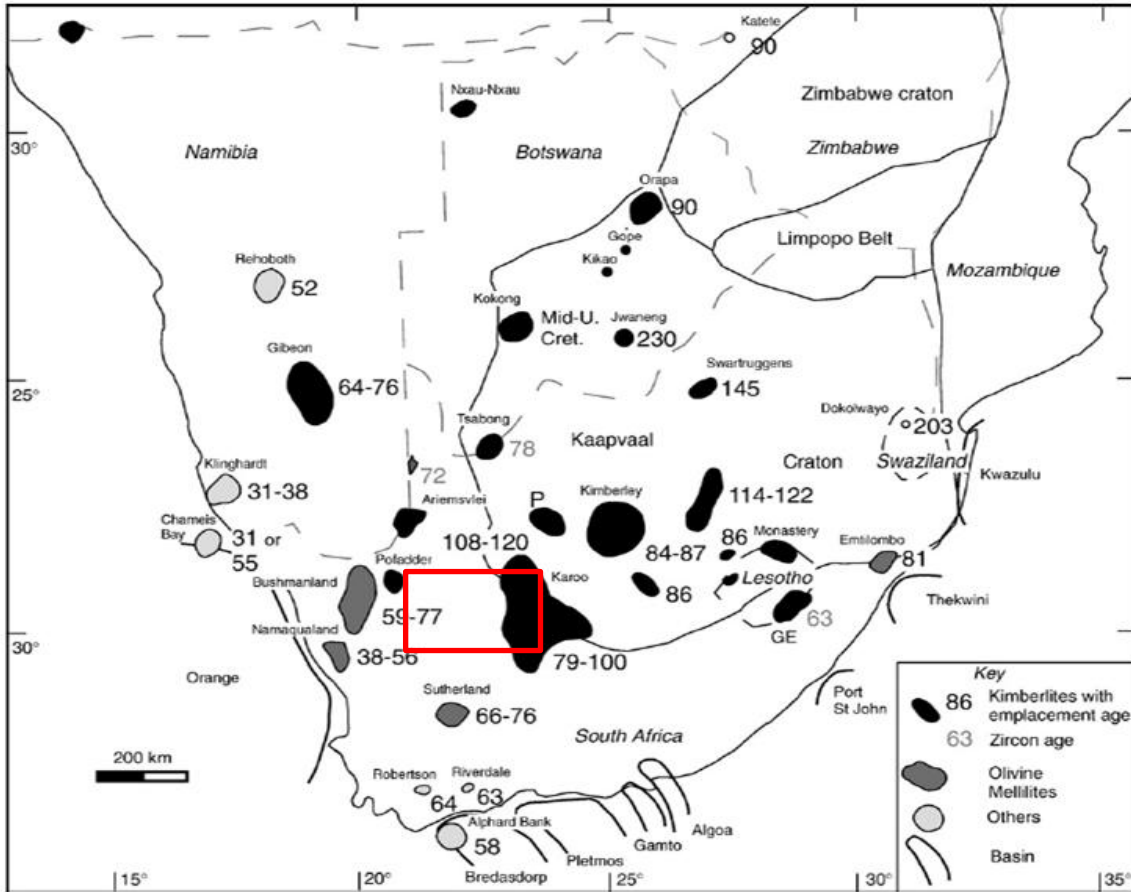



Figure 2: Global Map of the Southern African volcanic episode of the Cretaceous (Controls of post-Gondwanaland alkaline volcanism in southern Africa; A.E. Moore; <http://www.sciencedirect.com>)

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The glass components of the ashes were chemically altered in this low energy environment and consolidated into distinct clay layers. These clay layers currently form the Heidelberg-Riversdale Bentonite Deposits.

These deposits are also outstanding due to the salted environment in which the ashes were deposited. Indeed, this parameter will lead to the formation of Sodium Bentonite. Heidelberg-Riversdale Bentonite deposits are the only, currently mined, Sodium Bentonite deposit in South-Africa.

II/.SODIUM BENTONITE


There are two main kinds of Bentonite:

- Sodium
- Calcium

Both of these clays have Green compressive strength and Dry compressive strength properties, used in the Foundry’s industry mainly. However, calcium bentonite needs heavy processing in order to get the sodium bentonite physical properties (High viscosity/Free swell/Base exchange Capacity/Sinter Plate Absorption etc.). Sodium Bentonite requires a minimum energy to be processed in comparison with calcium bentonite which makes its use a lot more sustainable for the environment.


III/. Farm Uitpanskraal 585 MA2

On the farm Uitpanskraal 585 MA2, we were able to locate one bentonite horizon, called the main horizon. This horizon represents 3 layers of Sodium Bentonite with an average thickness of 1 meter which will supply the mine with good quality clay .The deposit on farm Uitpanskraal 585 MA2 will increase the lifespan of the mine by approximately 5 years with 132 225 tons of raw clay.

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**Figure 3.1: Bentonite Layer distribution on Uitskraal 585 MA2**

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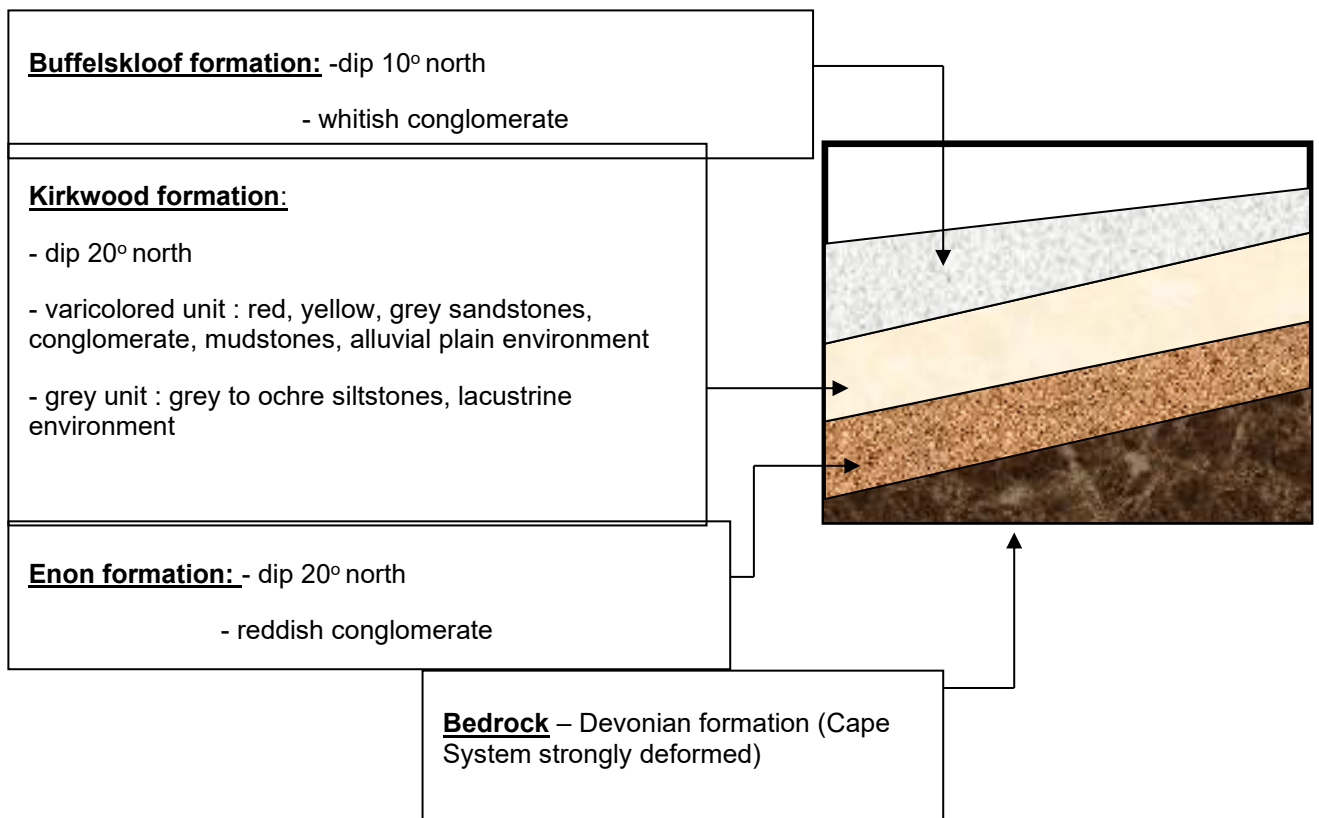



Figure 3.2: Schematic geological cross section (Brocca Alexandre and Viallette Eric, practical training Final presentation)

## SOCIO-ECONOMIC MOTIVATION

The deposit on Uitpanskraal 585 MA2 will increase the lifespan of the mine on this Farm by approximately 5 years. Cape Bentonite Mine is currently employing 64 people, of which 90% of them are from the local communities of Heidelberg and Riversdale.

Imerys is investing in the local community through their Social Labour Plan. It consists of a 4 year investment plan which includes projects such as upgrading or creating community infrastructures. This investment plan also includes bursaries, internship, skills development programs etc. in order to improve the education and skills level of the local community members.

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Cape Bentonite is also supporting on a daily basis the local suppliers in order to provide the company with the items required in the Bentonite Production.

Finally, the company also pays royalties to the land owners of the properties where mining activities occur and are proposed.

END