PROSPECTING REPORT

2018

(in accordance with section 8 of the MPRDA (2002))

for

10032PR

with respect to

MELKBOOM 209, MATJIESFONTEIN 210, A PORTION OF THE FARM MATJIESDRIFT 329, A PORTION OF THE FARM 323 AND A PORTION OF THE FARM 372

1 DETAILS OF THE HOLDER OF THE PROSPECTING RIGHT

COMPANY NAME	MIDDEN MINING (Pty) Ltd
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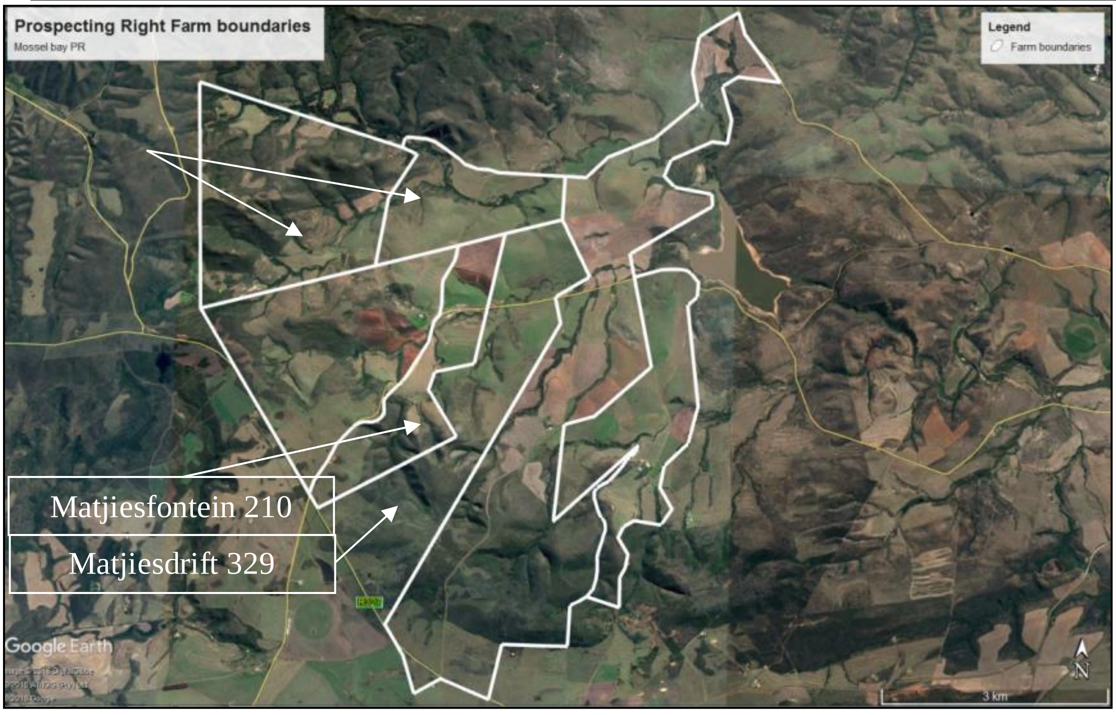

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2 SURVEY CONVENTION

The exploration work on this prospecting right was done with two kinds of surveying method.
Trenching was surveyed with a Land GPS giving us Latitude and Longitude in degrees minutes and seconds.
Boreholes, were surveyed by a professional surveyor who reported the coordinates for each borehole in the LO21 system.

3 LAND TENURE

3.1 Right

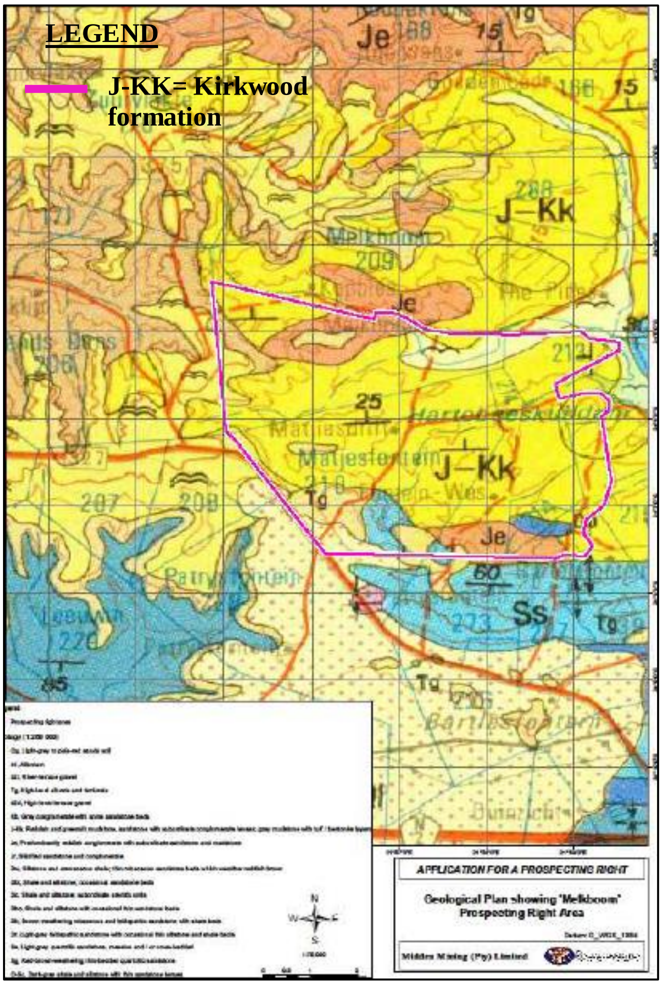
Reference no: 10032PR
Execution date: 22nd of September 2015
End date: 21st of September 2019
Mineral: Bentonite
(Appendix B: Scan of Prospecting right)

3.2 Agreement with Midden Mining

(Appendix C: Contract with Midden Mining)

4 REGIONAL GEOLOGICAL STRUCTURE

Midden Mining (Pty) Ltd ("Midden Mining") contacted Imerys Refractory Materials South Africa (Pty) Ltd ("IRMSA") to conduct prospecting work on their prospecting right in the Mossel bay area. This prospecting right is situated in the Kirkwood formation which is known for its viable Bentonite deposits in the Western Cape Province (Heidelberg/Plettenberg Bay).
During the Kirkwood period, bentonite ashes from subductive volcanic eruptions were deposited in a salty lacustrine environment. This depositional environment was very low in energy which allowed the bentonite ashes to settle into the lake, through gravity. This was followed by fine sediments that settled on top of the bentonite layer, leading to the geological sequence that is visible today. This low energy environment enabled the bentonite layers to be conserved.



- Deposition of the Cape Supergroup during the Cambrian-Ordovician Period in the Agulhas sea (Southern Gondwana)
- Closing of the Agulhas sea from late-Ordovician to early-Permian and the orogeny of the Cape Fold Belt
- Opening of the South Atlantic during the early-Cretaceous creating normal faulting re-using the thrust of the Cape Fold Belt orogeny
- Formation of basins along the Cape Fold Belt where the Cretaceous sediments were deposited, like the Kirkwood formation.

Figure 1: Geological Map with Prospecting right boundaries (J-KK = Kirkwood Formation)

5 EXPLORATION HISTORY

From 2015 to 2016, Midden Mining undertook to do field work, trenching with a digger loader and some hand auger drilling, highlighting some areas of interest (All data shared by Midden Mining to IRMSA is available in Appendix A).

Midden Mining then contacted IRMSA which conducted a site visit with one of the directors of Midden Mining (Robert N. Barnett), where the company (IMRSA) could indeed confirm the potential of the area for bentonite mining due to the numbers of positive signs observed like cracks and "popcorn" structures (see Figure 2 below).

Furthermore a sample was also taken, the analysis results are as follows:

- Viscosity = 35.41s
- Grit = 1.4%
- Free swell = 33ml
- BEC = 100meq/ml

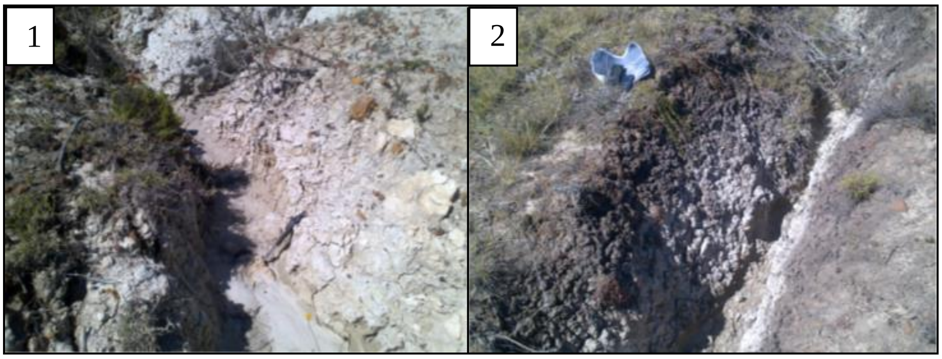


Figure 2: Bentonitic signs – 1: cracks and 2: "popcorn"-like structures

During 2016, IRMSA focused on mapping the bentonitic areas and the signs of bentonite outcrops, in order to plan a trenching campaign. This then gave clearer information on the areas that should be drilled to assess the potential of the area for Bentonite Mining.

In 2017, IRMSA proceeded with trenching and drilling which despite identification of 3 *bentonite layers, did not lead to identification of resources amenable to mining.*

Methods	**2015 (Midden Mining)**	**2016 (IRMSA)**	**2017 (IRMSA)**
Field Work	*recognized area of interest*	Mapping of poterntial bentonite outcrop and of Low Potential areas	Mapping of discontinuities around the Kirkwood formation to limit 2nd phase drilling area
Auger drilling	Looked for Layer dip in several areas of interest and study in situ lithology		
TLB Trenching	Looked for Layer strike in several areas of interest and study in situ lithology		
20t Excavator Trenching			Detailed mapping of bentonite outcrops and their consistency and confirmation of strike and dips per area
Percussion drilling			Proved unconsistency of bentonite layers alond the dip and the strike. Could use the data to model a quarry in most interesting block, showing 17.5 kt of inferred resources due to an high stripping ratio 11.5

Table 1: Different methods used to identify the bentonite layer

6 DATA COLLECTION

6.1 Geological Mapping

In 2016, the western part of the prospecting area was mapped. This mapping included the identification of bentonitic signs, like cracks in the topsoil and mainly "pop-corn" structures (i.e. natural swelling of bentonitic clay once exposed to weathering).
The methods used:

- Firstly to target the areas where Midden Mining reported signs of bentonite, in order to confirm their findings,
- Then to look in areas where nothing was reported, in order to classify them as either "low potential" or "high potential" areas
- And finally to connect the several signs of outcrops to plan the trenching campaign.

Remark: In this document an area with "bentonitic area" is a term used to describe a zone where a high density of cracks is found and where "pop-corn" structures can be observed in natural erosional features.
On the contrary, a "discontinuities" is a zone where none of these characteristics are observed.

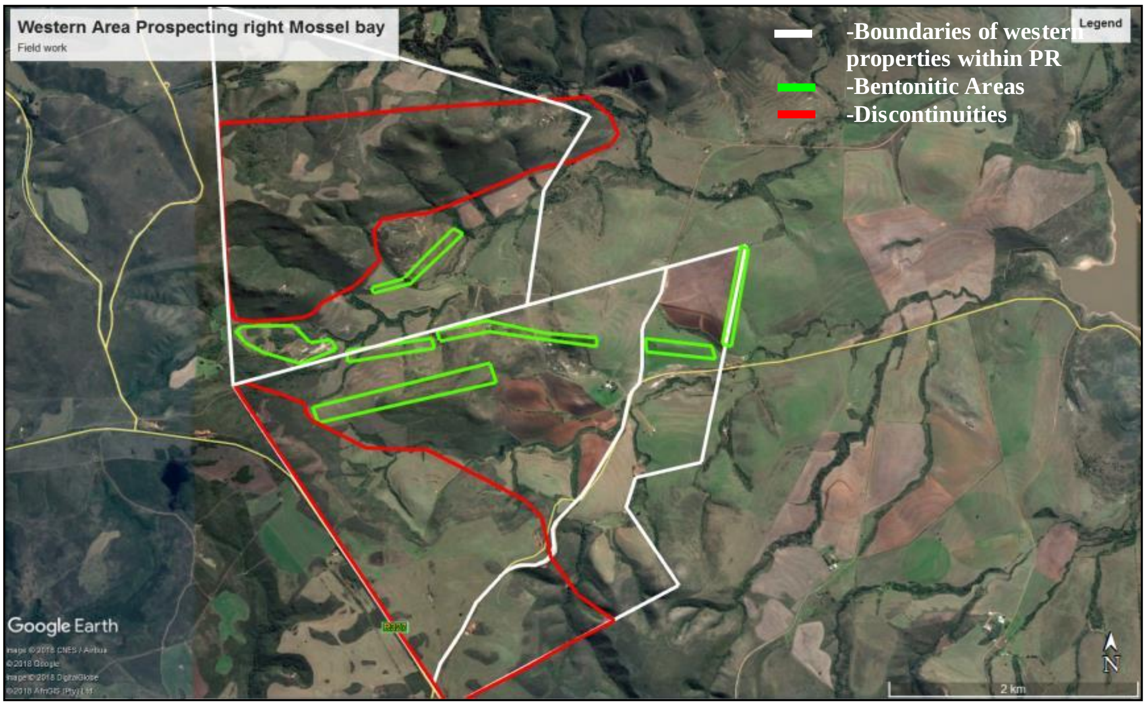


Figure 3: Bentonitic areas and discontinuities in the western part of the prospecting right

Based on the map, shown in Figure 3 above, the trenching was planned around the "High Potential" areas to find out the location, strike and dip of the possible bentonite layer (s), found in this area.

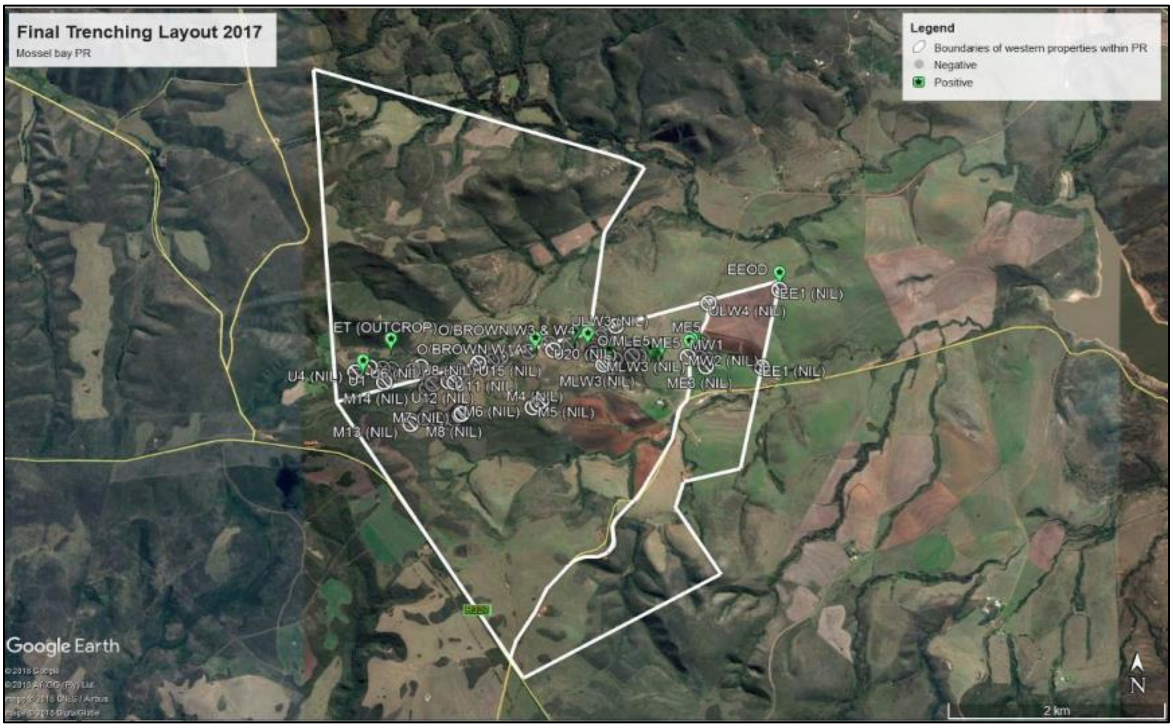


Figure 4: Final Trenching plan (Trenching coordinates summary shown in Appendix D below)

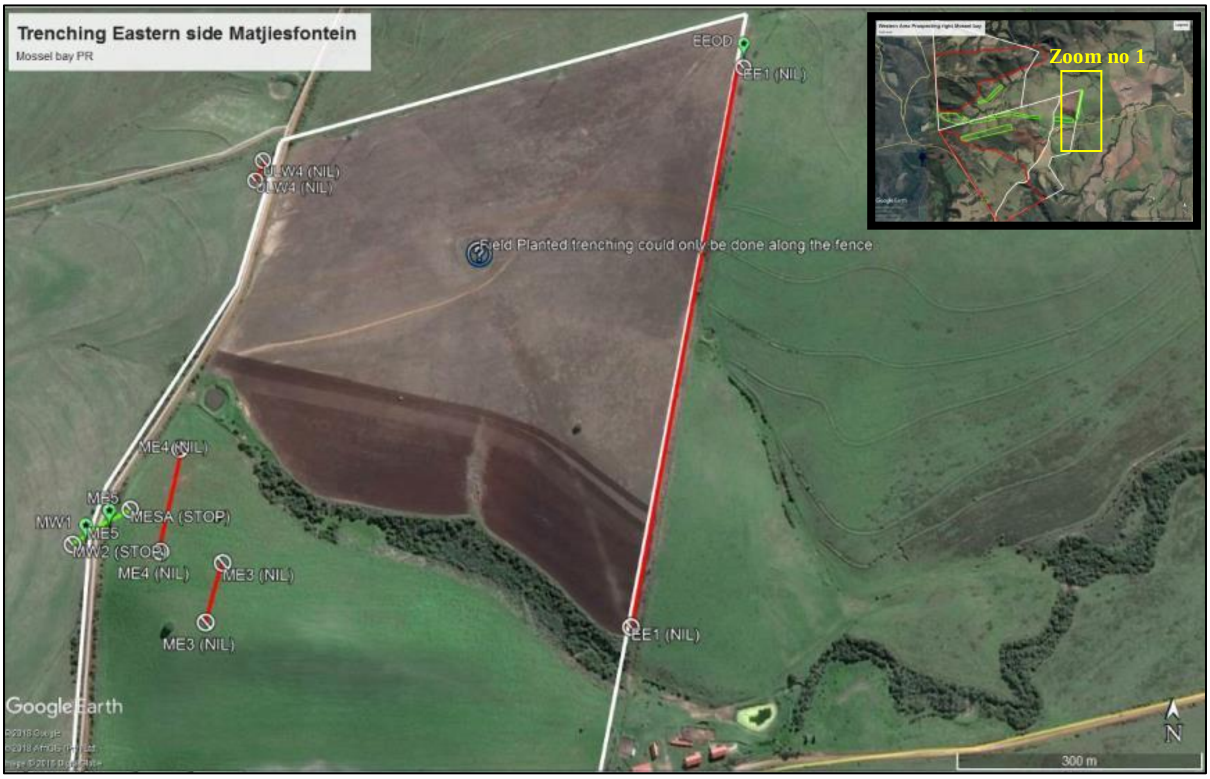


Figure 5: Zoom on the eastern side of Matjiesfontein Ptn 1 RE

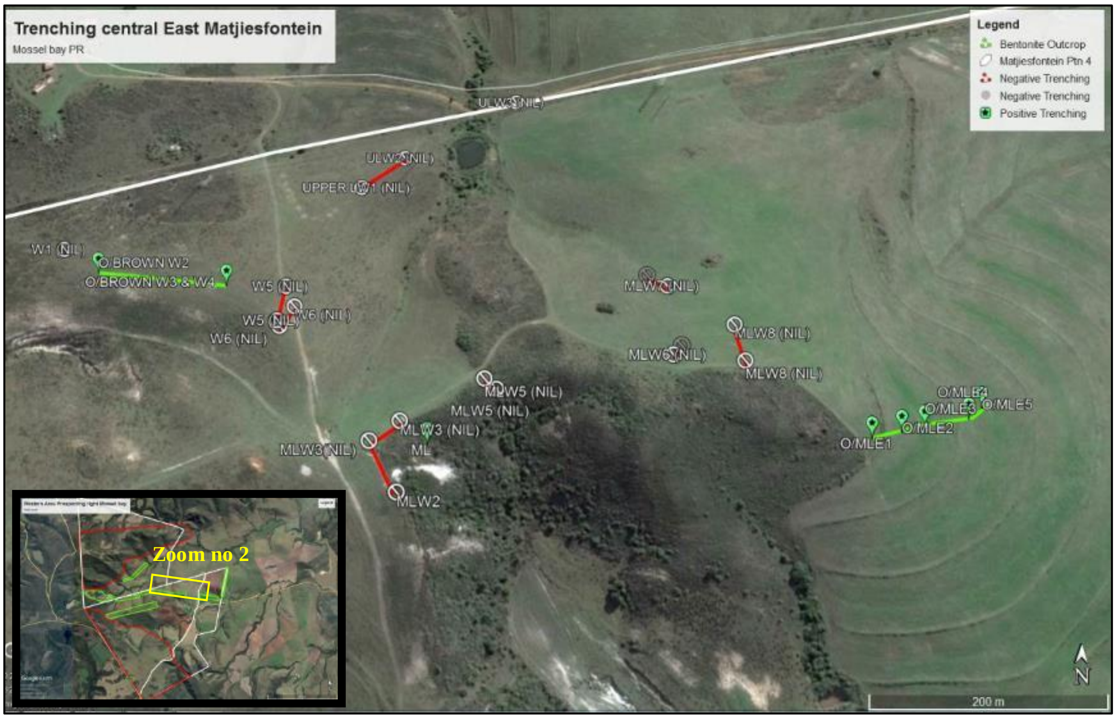


Figure 6: Zoom on north-eastern side of Matjiesfontein Ptn 4

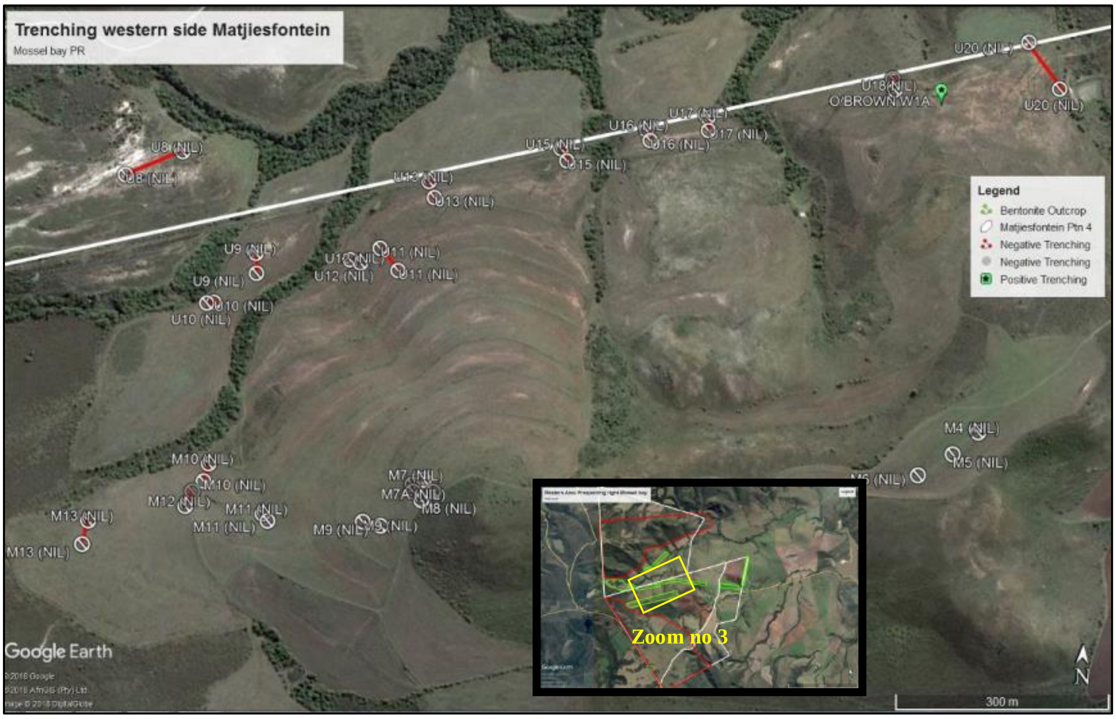


Figure 7: Zoom on north-western side of Matjiesfontein Ptn 4

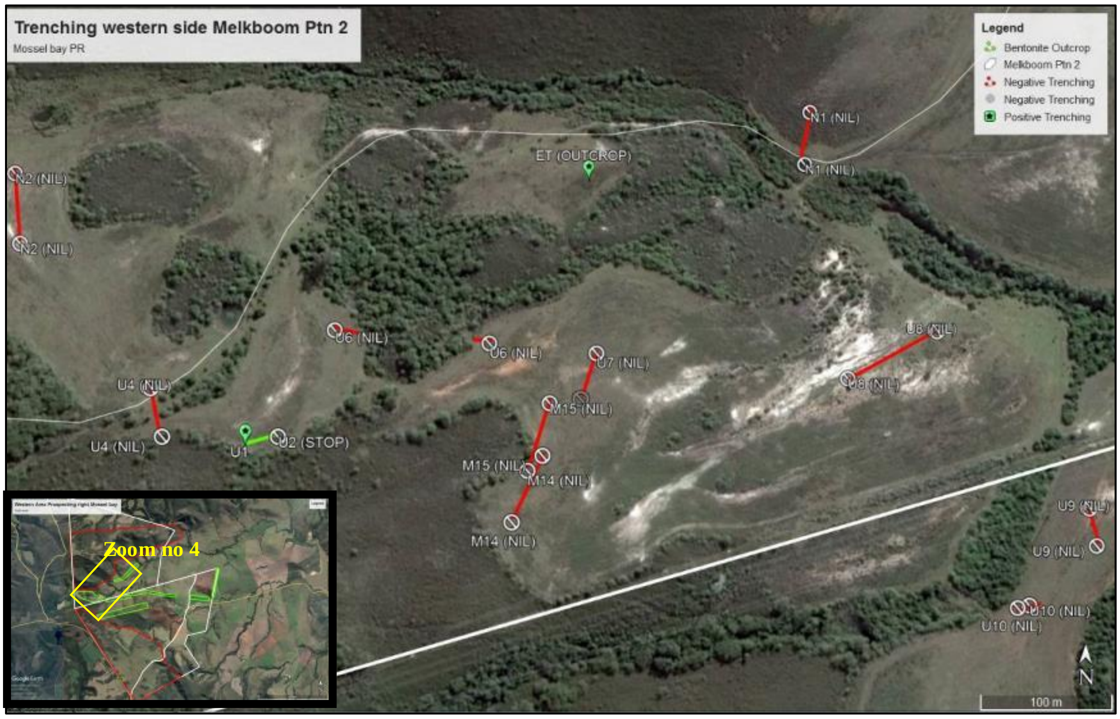


Figure 8: Zoom on South Western side of Melkboom Ptn 2

After 55 Trenches were dug (with one trench covering 750m) were done, we could confirm the presence of bentonite on the western part (233 hectares) of the prospecting right.

The outcrops we found were 1m thick maximum and minimum 0.3m, dipping from South to North between 10 and 20 degrees.

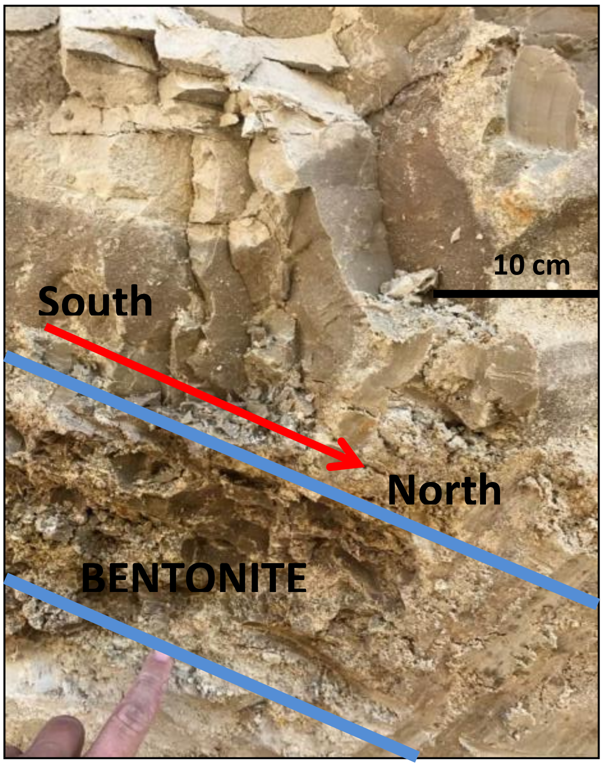


Figure 9: Dip of the bentonite layer

The trenching in the highly potential areas was done perpendicular to the assumed strike of the potential bentonite layers, with a length of about 20m and 30m apart. One trench on the eastern edge of Matiesfontein Ptn 1 RE was 750m long because the whole area was showing a high density of cracks.
The trenching campaign also shows the discontinuity of the bentonite layer close to the surface.
In most of the areas the bentonite would disappear between two trenches (see trenching collars, length, azimuth and dip).

Furthermore, we could confirm strike and dip of the layers and observed that the overburden cannot be used as a lithological reference to determine the geological sequence of the area, e.g. by doing trenches along the strike the bentonite could be identified but the type and color of the overburden varies, hence presenting no consistent lithological reference.

During the trenching campaign, we could also identify two kinds of lithology that could be used as low quality bentonite: Plastic Clay and Bentonitic Clay.

The outcrops located during the trenching campaign were the base for the planning of the drilling campaign. We added transversal sections to avoid missing any Bentonite layer in between the high potential areas that could be pinched out between 4-5m deep (maximum depth of the trenching).
The results of the trenching campaign are summarized in table 2 below.

Total Meters (m)	2145
Positive meters (m)	70
Negative Meters (m)	2075
Average Bentonite dip (degrees)	13.4

Table 2: Summary table of trenching campaign

6.2 Drilling campaign phase 1 results

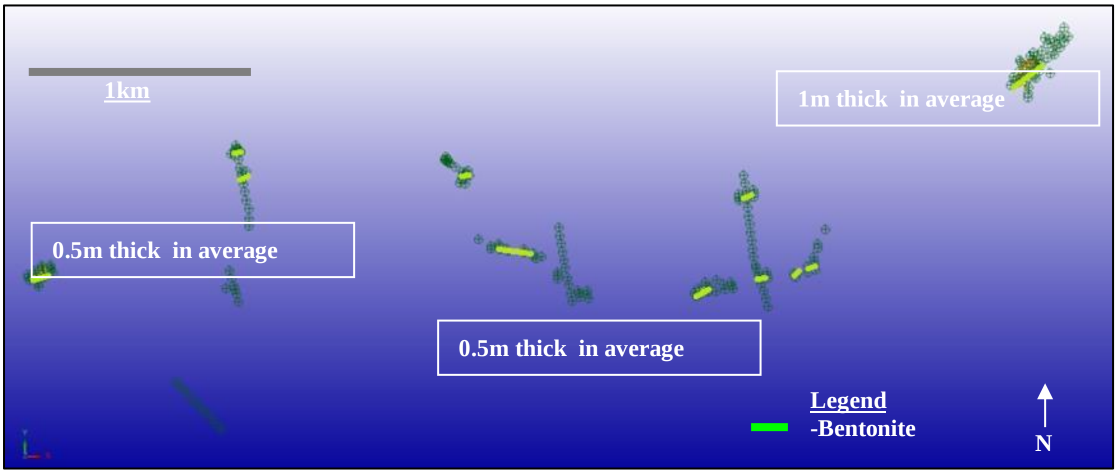


Figure 10: Final Drilling plan phase 1 May 2017

The first phase of the drilling campaign (refer to: Appendix E - Collar drilling campaign / Appendix F - Survey drilling campaign / Appendix G - Log drilling campaign) enabled us to understand more in details the bentonite deposit.

All the holes were surveyed by our surveyor and coordinates were reported in LO21 system.

The drilling method used is percussion drilling:

- Chips of rocks coming from the rock formation the scraper drill bit is drilling come out of the borehole and are recovered in a circular pan around the rods.
- After every meter the driller operator replaces the pan around the rod with a new one and take the sample recovered during the last meter away from the borehole, disposed in line together with the other samples.
- When the drill bit reaches a bentonite layer the geologist indicates to the drillers to stop and take the depth (indicated on the rod) with an accuracy of 0.1m.
- The sample is put in line with the rest of the samples with a board indicating the depth where the bentonite layer started (Shown in figure 11 below).
- The driller recover then the bentonite samples every meter until the geologist indicates that the bentonite layer is ending and repeats the same process as when the layer started.

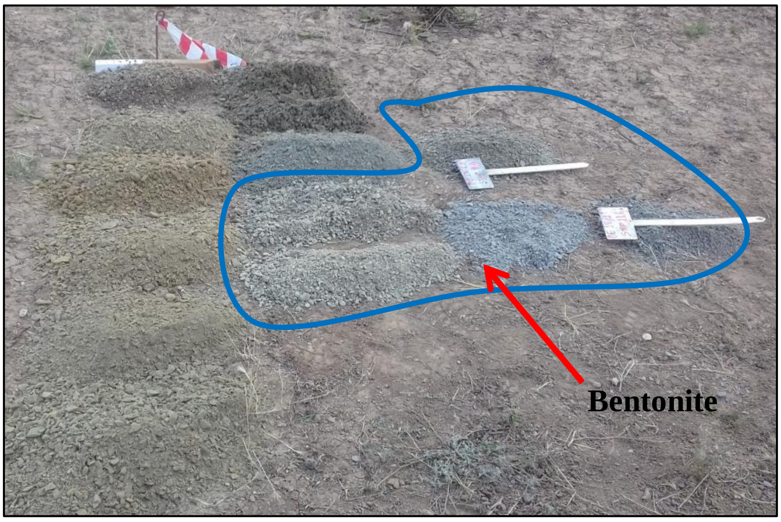


Figure 11: Sampling at DE18/1 at Hooikraal RE 304.

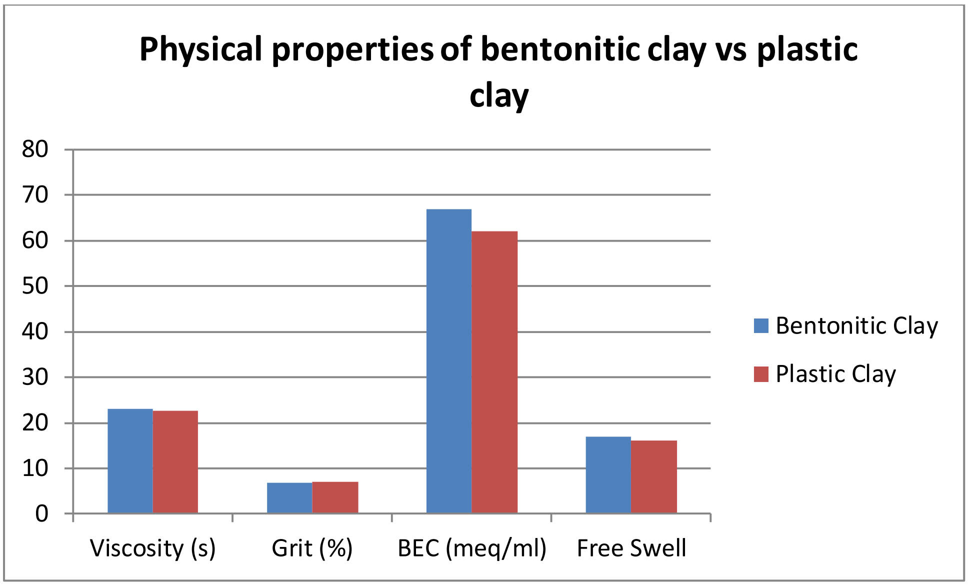
From our experience on the Heidelberg deposits, percussion drilling is the most cost effective method and still accurate at 0.1m for the depth of the bentonite.
Indeed, Bentonite is recognizable due to its plasticity; it will bring much more rounded chips to the surface than gritty material.

Core and Auger drilling is time consuming and costly, whereas percussion drilling is acceptable.

The drilling campaign first highlighted that three bentonite layers were present in that area (Shown in figure 10 above). Unfortunately all those layers are inconsistent along the strike or along the dip. Furthermore analysis (all analysis record in Appendix H) of the Plastic Clay and the Bentonitic Clay show that the Plastic Clay is too low quality to be used in the IMRSA process but the Bentonitic Clay is usable. However the bentonitic clay is not present in high volumes (see table 2 below).

Average Values	Viscosity (s)	Grit (%)	BEC (meq/ml)	Free Swell (ml)
Bentonitic clay	23.14	6.8	66.8	17
Plastic clay	22.7	7	62	16

Table 3: Average results for Plastic and Bentonitic clay (Appendix I)



Graph 1: Physical properties of bentonitic clay vs plastic clay

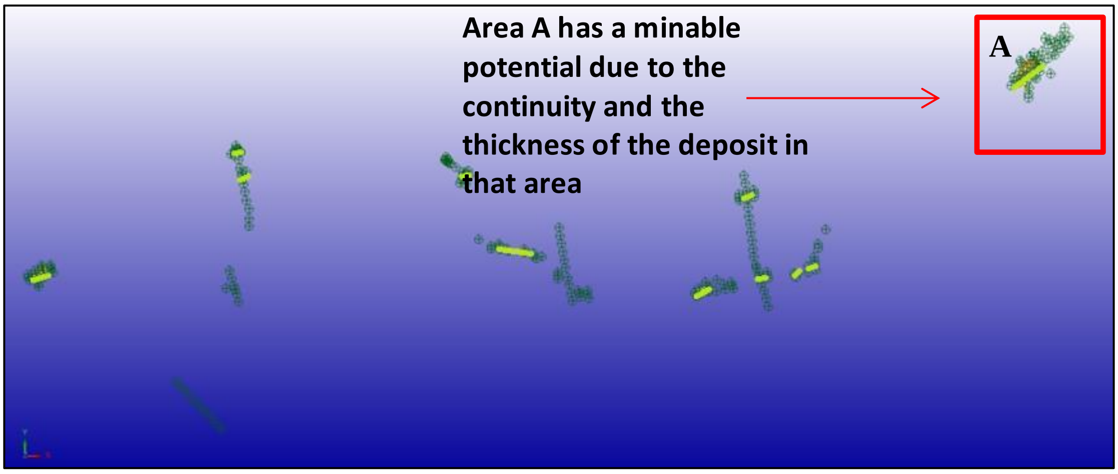


Figure 12: High potential Area (A) shown in the red box on the map

Area A represents the highest potential; indeed the bentonite layer is continuous on 7 drilling sections with bentonitic clay increasing the minable volumes. Therefore, it was decided to build a model on this specific area. The thinking was to see if the highest potential area is viable in order to decide if it is worth modeling the other areas.

As a consequence we planned another drilling campaign, to find out if the Eastern continuation of the bentonite layer drilled on block A does not continue to increase in thickness and shows even better potential.

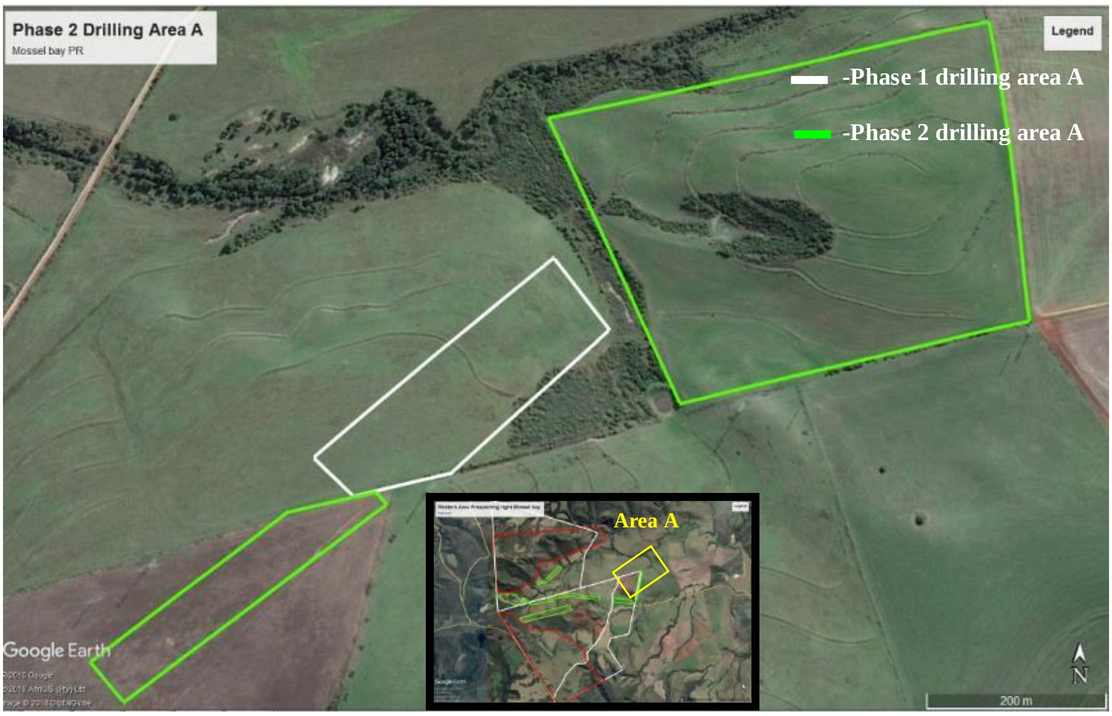


Figure 13: Map of plan drilling on Eastern extension of block A.

Furthermore, this drilling campaign enabled us to confirm the presence of several layers in the basin. When plotting their strike and compare it with the approximate location of the discontinuities of the layers around the basin highlighted during the field work that was done on a larger scale in the area (Figure 14), an observation was made that the south-western area is covered by a different formation but the south-eastern part of the prospecting area is still part of the Kirkwood formation.

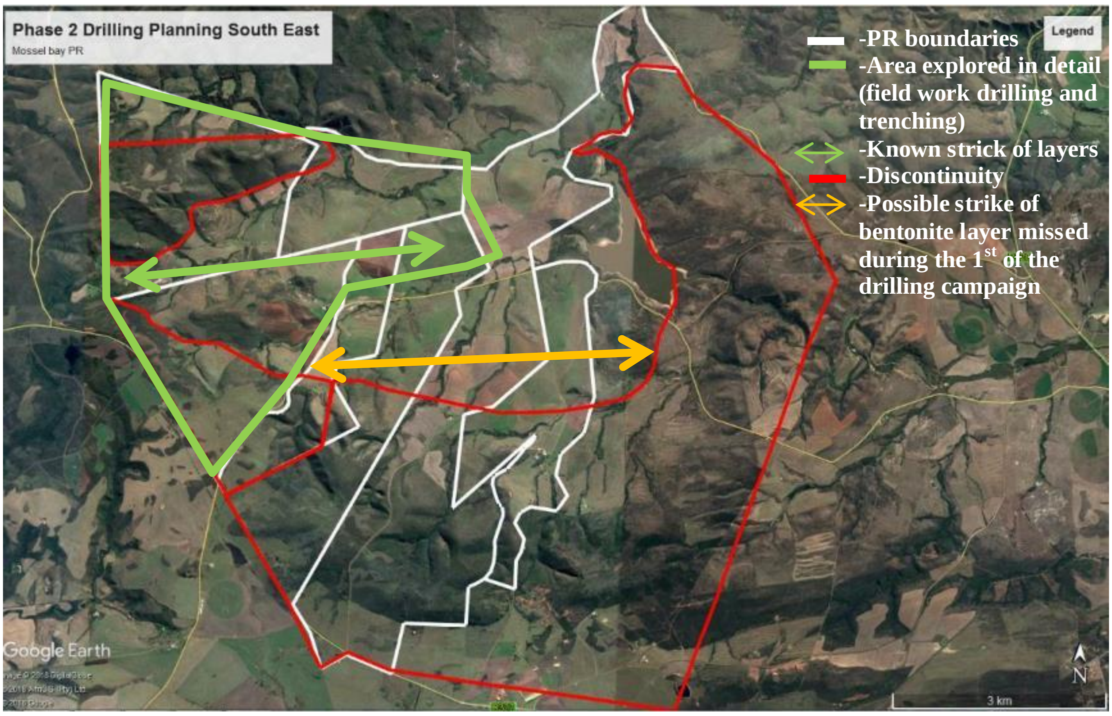


Figure 14 : Drilling plan South West part of prospecting right

Due to the elements display in the layout above, drilling was planned South East of the area first drilled in order to ensure not missing any potential bentonite layer.

6.3 Drilling campaign phase 2 results

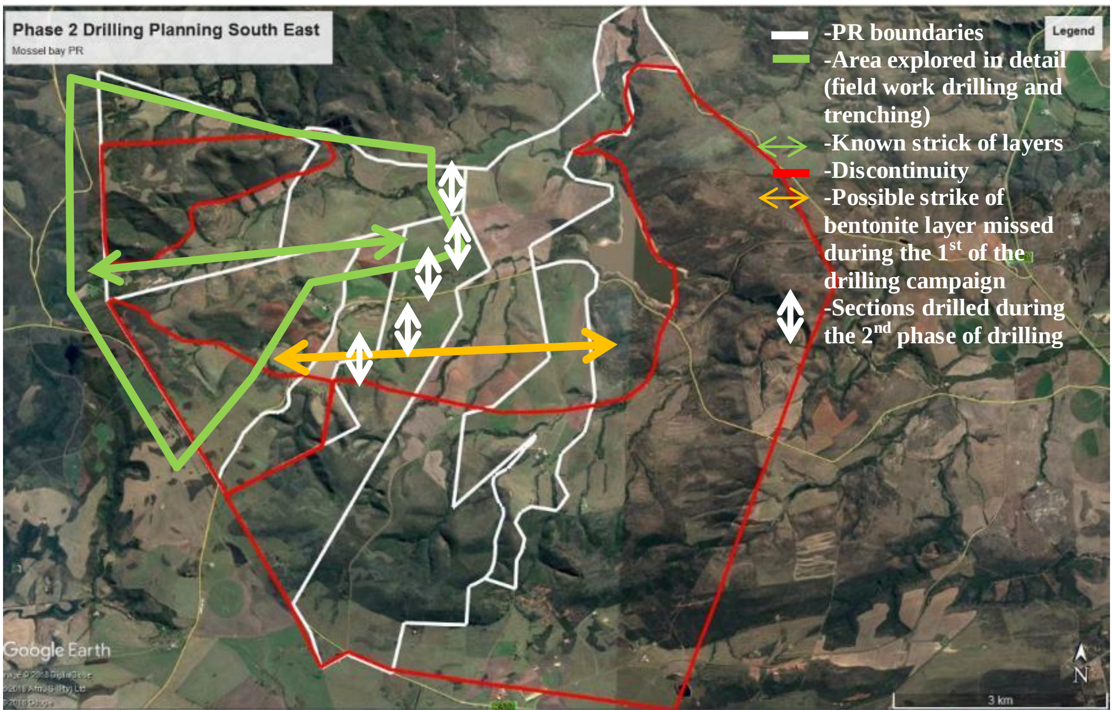


Figure 15: 2nd phase sections location

IMRSA couldn't get authorization to access the 2 most eastern farm of the prospecting right so we focused the drilling on the south part of Matjiesfontein Ptn 1 RE and Matjiesdrift (All drilling campaign results in Appendix G to H).

The two objectives of the second drilling campaign were, first checking if the improvement of the bentonite layer thickness and continuity observed on block A carries on to the Eastern extension of that block. It was observed during the drilling that the inconsistency of the layer was also visible on the eastern side of block A and that the layer thickness decreased (0.4m average).
Second, IRMSA wished to make sure no other bentonite layers were visible in the South Eastern area of the prospecting right. No bentonite layers were intersected on this specific area.

6.4 Modelling

6.4.1 Resource Estimation

The following process was followed to calculate the resources (SOP Resource and Reserve Estimation)

The following data of the boreholes are first imported into the drilling block's existing database or new database for blocks that were drill for the first time:
Collar=> Hole id / x / y / z / max depth / hole path
Survey=> Hole id / depth / dip / azimuth
Geology=> Hole id / depth from / depth to / lithology
Analysis (if available)=> Hole id / sample if / depth from / depth to / bec / free swell / grit / viscosity

After displaying the database and highlighting the Bentonite intersected on each borehole, the Bentonite Layer is modelled as follows
Create section approximately N/S depending of the boreholes layout. For each section create a closed string file modelling the intersected bentonite. Triangulate each one of those strings with its direct neighbours and create a closed solid. Validate it.
This solid and string will be saved as farm_block_bnt for each block.
The Bentonite solid will be used to estimate resources and reserves within a Block Model.

Therefor a block model covering the whole database with blocks of the following size 5*5*0.5 (m) is created once again for each block.
When analysis are available, the function "extract sample data" within geology in the database menu is used to create a string file that will process all analysis parameters (described in create database) . Call this string file farm_block_analysis.str

Basic statistics of this string file are checked to locate any non-trust worthy values and have an idea of the grade range in this block.

The model created earlier for the block is filled by the inverse distance* method within a constraint created from the solid file representing the bentonite, with the analysis string file. Each analysis parameter is calculated in its own attribute (BEC, Free swell, viscosity and grit).

*Inverse distance: Assigns block values using an inverse distance estimator. In other words, this estimation method assumes that points that are close to one another are more similar than those further apart. It uses the measured values surrounding the prediction point to determine the value of an unmeasured point. The measured values closest to the prediction point have more influence on the predicted value than those farther away.

If the analysis are available for all the BH of the block, 3 constraints will be created, grade A, grade B and grade C.
Grade A: constrained by blocks BEC>75, Free swell>26, Viscosity>28, Grit<2
Grade B: constrained by blocks BEC>75 and Free swell>26 or Viscosity>28 and Free swell>26 or BEC>75 and Viscosity>28
Grade B: constrained by blocks BEC>68 and Free swell>19 or Viscosity>23 and Free swell>19 or BEC>75 and Viscosity>23
If analysis is not available for all the BH there are then only one constraints needed, BNT (constrained within the bentonite solid)
6 new attributes are then created:

-Grade or Geology: character//OB. We will then assign the A, B, C or BNT value depending within which constraints the blocks of the model are part of.

-Density: real/ 1 decimal/ background value = 2, a value of 1.8 will be assign to this attribute within the bentonite constraint. The blocks within the bentonite will then show a 1.8 density and the overburden a 2 density.

-Recovery: real/ 2 decimal/ background value=1, the value to be assigned to the blocks within the bentonite constraints is calculated as follows:

1-(0.3/(average thickness of the bentonite on the block)).

Indeed it is assumed that during the excavating of the bentonite there is a loss of approximately 0.3m of the bentonite over the whole thickness of the layer. The above calculation gives us what percentage of bentonite is not recovered during the extraction.

The recovery attribute should be equal to that percentage within the bentonite constraint and for the rest it should be equal to the background value.

-Reserves tons: calculated/ 0 decimals/ / _xext*_yext*_zext*density*recovery, this attributes will facilitate reporting by calculating, from the volumes reported by the block model, the tons that can be declared within each quality (grade A, B or C and OB).

All the blocks within the model have a grade, a density and a recovery attribute.

A pit design respecting the quarries geotechnical requirements (Back wall at 70° and footwall following bentonite floor from back wall to surface) is modelled for each mining block. Reports giving the volumes, tons, “reserve tons” (corresponding to the tons that can be declared) and analysis per grade. Then the Stripping ratio for the block is calculated (OB tons/ Bentonite reserve tons) and Pit design can be modified in order to be as close as possible to a ratio of 6.5.

6.4.2 Resource Classification

Inferred Resources

An Inferred Resource will be estimated in areas directly next of drilled layers, where field work and aerial image study enable to estimate the length of a potential outcrop on the prospecting right area.
The minimum Thickness and width of the closest drilled section and the estimated length of the outcrop will used to calculate a volume. This volume will be timed by the bentonite density in order to get estimated tons

Indicated Resources

An Indicated Resource would typically correspond to tons that would be estimated in incomplete sections, where the modelled bentonite layer will be extended to the estimated cut off according to the already drilled boreholes in the sections. These reserves can be directly estimated from the bentonite solid volumes if no there no analysis within the drilling block.

Measured resources and proven reserves

A Measured Resource and Proven Reserve correspond to the tons estimated from modelled bentonite layer within a pit design where stripping ratio is known, the bentonite is commercially viable, and where the drill grid is complete (sections 30m apart and boreholes 15m apart maximum).

6.4.3 Mineral Resource Estimation

From the data gathered during the drilling campaign the model showed that one Block, Block A, was the most promising area. A quarry of 17.5kt of C grade bentonite, when mixing the bentonite layer with the bentonitic clay of lower quality, was modeled. This represents 0.2 years of production at current rate on around 4.4ha

The Modeling of the A block on the prospecting area shows that the S/R on that specific block would be around 11.5.

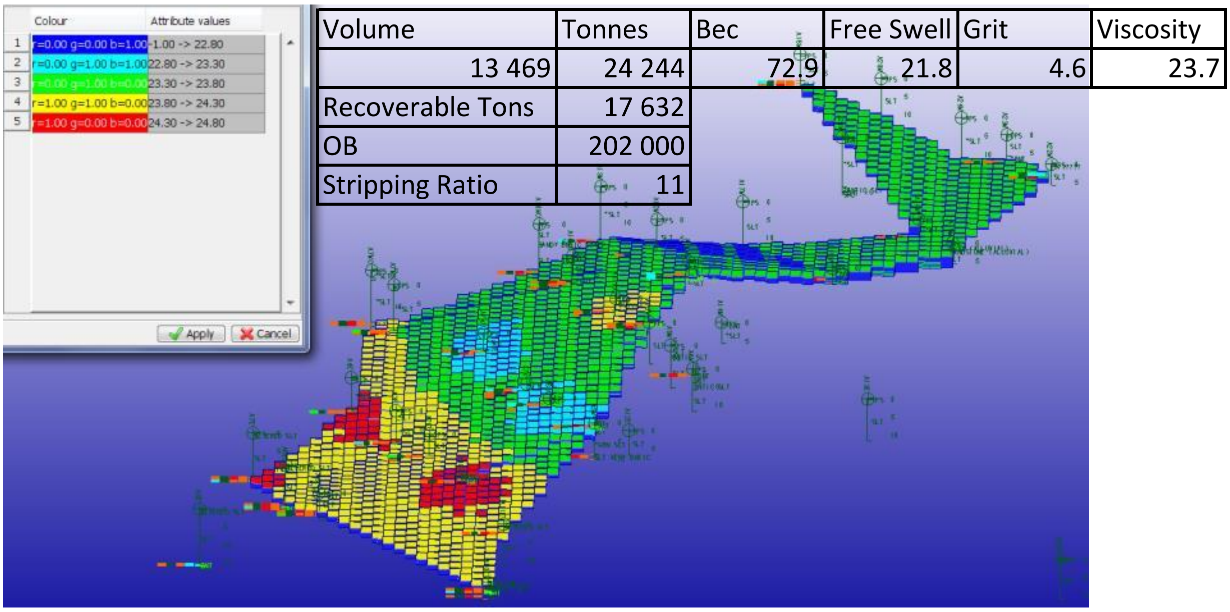


Figure 16: Block model colored by viscosity result

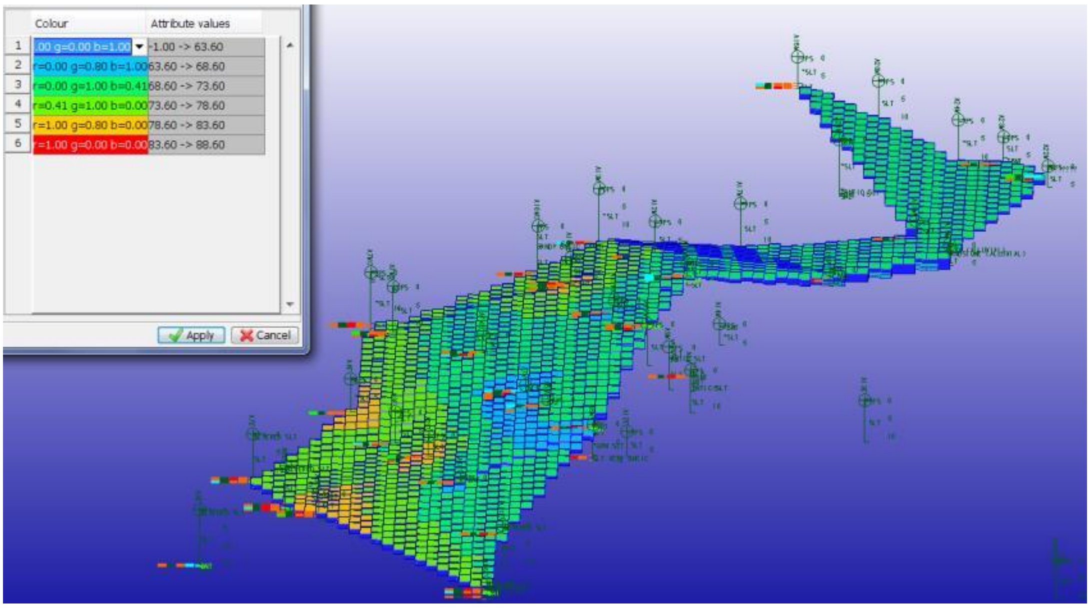


Figure 17: Block Model colored by BEC results

6.5 Economical evaluation

IMRSA is currently mining at a stripping ratio of 6.5. According to an exercise done on the company's Cape Bentonite site, the cost on total mining tons (Overburden + Ore) is around R20/t.
At a stripping ratio of 6.5 the cost per ton clay mined would be R130/t of raw bentonite, and if the moisture loss through the drying process is allowed for the cost per ton of dry bentonite is around R150/t.
If the same exercise for the modelled Mosselbay quarry is conducted with a stripping ratio of 11.5, it will bring the cost of dry bentonite to R265/t. An increase of a R115/t of product compared to that at the company mine in Heidelberg.

To summarize the 17.5kt of raw bentonite representing 15kt dried will cost 1,800 KZAR more to mine than at the company's current deposit in the Heidelberg area.

According to the cost study detailed above, block A is not viable for mining, therefore it is not worth it to model the other areas which only covers a 2-3 sections before the bentonite layer pinches out and that are on average less thick than block A.

Hence this exercise showed IMRSA that the western side of the prospecting area is not viable for mining, however it was found that the highest potential block was on the eastern edge of the area that could be prospected so far. Furthermore the field between block A and B could not be drilled due to crops growing during the drilling campaign.

7 REGULATION 2(2) PLAN

The plan contemplated in regulation 2(2) is attached in Appendix A.

8 RECOMMENDATION

According to the geological work that has been done on this prospecting right, the bentonite deposit is not economically viable due to inconsistency of the layers and the variable thickness. This is certainly due to an environment of deposition more energetic than the one in the Heidelberg-Riversdale basin (Overburden much more sandy in the Mossel bay area), preventing the totality of the bentonite ashes to sediment and washing away the layers perpendicularly to their strike.

9 COST

Mossel Bay Project Total cost YTD	Cost
Excavator	R 144 700
Survey Drilling Jan	R 26 030
Drilling Mossel Bay May	R 985 761
Diesel Drilling M May	R 55 538
Drilling Nov-Dec	R 617 600
Diesel Nov-Dec	R 39 600
Total	**R 1 869 229**

Table 4: Total cost summary of drilling

10 CONCLUSION

IRMSA could identify several Bentonite layers on the prospecting area, however these layer mainly inconsistent lengths that are not viable targets. The one prospecting block that shown some consistency was proved non economical after modelling the potential quarry and calculating a stripping ratio of 11.5 despite adding low quality bentonitic clay to increase volumes, which would increase mining cost by 110%.

Signed……………………………… Date…………………………

Yoann Hoibian
Production Geologist

Signed……………………………… Date…………………………

Julien Conte
Deputy Operations Director