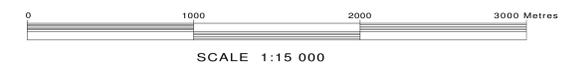


NAMAKWA SANDS
BRAND SE BAAI
HEAVY MINERALS MINE
GENERAL SURFACE PLAN
GME 14/18/2/4023/BSSB-GSP

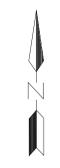


SURVEY SYSTEM: South-African Co-ordinate System
 Clarke 1880

Central Meridian 17° East

Y Constant X
 -50 000 3 400 000

BENCH MARK A993 -36259.984 61529.518 53.981 -36182.22 61828.21 53.981



GRID SQUARE 3117						
NAME	Spheroid Clarke 1880 Lo. 17			WGS84 Spheroid Lo. 17		
	Y	X	Z	Y	X	Z
A1	-36270.364	61512.702	133.443	-36261.270	61811.433	133.443
A15	-36363.442	61324.566	55.370	-36265.333	61623.342	55.370
A16	-35713.904	61298.349	46.612	-35635.792	61097.139	46.612
A18	-35509.329	61031.055	53.138	-35431.210	61329.948	53.138
A19	-35751.831	61046.880	53.240	-35673.714	61345.068	53.240
A27	-36374.455	61361.747	54.880	-36262.307	61660.021	54.880
A28	-36268.858	61388.415	55.000	-36186.750	61665.132	55.000
A3	-36898.730	60360.639	127.892	-36820.735	60661.416	127.892
A4	-36945.410	60506.505	151.628	-36867.338	61055.022	151.628
A8	-41807.009	57730.085	149.682	-41728.846	58026.710	149.682
TRG177	-45987.578	60241.886	213.209	-45910.820	60540.443	213.209
TRG4	-29626.115	56521.878	133.800	-29548.720	56820.750	133.800
TRG10	-35449.900	56745.160	150.700	-35371.760	60043.950	150.700

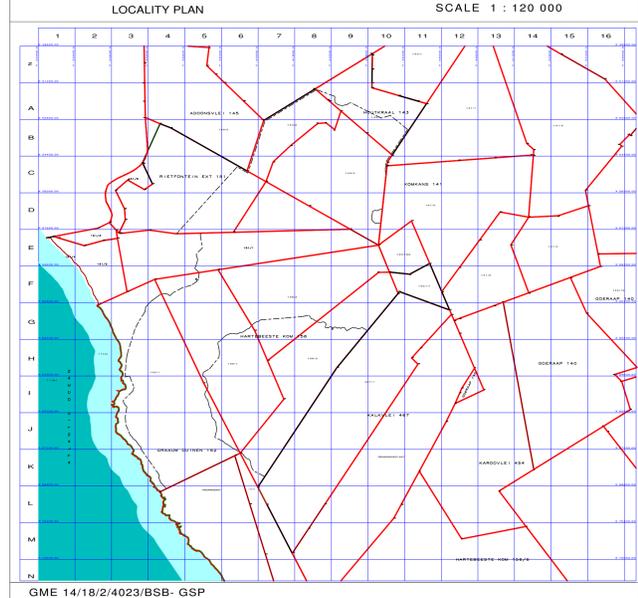
Legend

EOFS Boundary	
EMP authorisation boundary	
Mining Rights Boundary	
Restricted areas	

Aerial Survey By Photosurveys (Pty) Ltd		SCHEDULE OF FARM NAMES		
Date of Photography: Nov 1989	1. HOUTMAN 148	4. OORDEKAMP 149	7. KALDEKAT 142	
Project Name: AAI - AAC Group Survey Office	2. RIETFOONTEN EXT 154	5. HARTBEESTE-KOM 156	8. DRALWALDNER 143	
	3. HONINGSDORP 147	6. KROONVLEK 145	9. JANSKRAAL 141	

MAGISTERIAL DISTRICT OF VREDENDAL

PERMISSIONS & EXEMPTIONS GME 14/18/2/4023/05 02/11/03
 GME 14/18/2/4023/05 18/12/04
 GME 14/18/2/4023/05 30/07/14



GME 14/18/2/4023/BSSB - GSP		
RESPONSIBLE MINE SURVEYOR	LAST UPDATED	SIGNATURE
M Mphahlele	26/11/2020	
DRAWN BY	LAST UPDATED	SIGNATURE
M Mphahlele	26/11/2020	

Figure 7 1: Key project infrastructure relative to sensitive areas ("restricted areas")

7.1.3 Principal Findings

The proposed project will entail so-called triple bottom line costs and/or benefits. The triple bottom line concerns itself with environmental (taken to mean biophysical) sustainability, social equity and economic efficiency and is typically employed by companies seeking to report on their performance. The concept serves as a useful construct to frame the evaluation of environmental impacts of the project.

The challenge for DMRE is to take a decision which is sustainable in the long term and which will probably entail trade-offs between social, environmental and economic costs and benefits. The trade-offs are documented in the report, which assesses environmental impacts and benefits and compares these to the No-Go alternative. SRK believes it will be instructive to reduce the decision factors to the key points which the authorities should consider. These points constitute the principal findings of the EIA:

1. Tronox Mineral Sands (Pty) (Ltd) (Tronox) operates a heavy minerals mining business which includes the Namakwa Sands Mine (the Mine, or existing mine at Brand se Baai) and the Mineral Separation Plant (MSP) near Koekenaap, both north of Vredendal, on the Western Cape coast.
2. Heavy mineral sands are currently mined by Tronox NS using open-cast strip-mining methods at two locations at the Mine, namely the East Mine and West Mine.
3. The East Mine (the site or study area) is currently a shallow mine, where mining of only the top Red Aeolian Sand (RAS) layer occurs.
4. Tronox is authorised to also mine and process the deeper Orange Feldspathic Sand (OFS) resource underlying the RAS material at the East Mine, referred to as the East OFS (or EOFS) Project.
5. For the East OFS Project to proceed, Tronox must modify the Namakwa Sands East OFS Project Residue Disposal Plan (the project), which entails construction of an additional RSF, a change to the approach to tailings backfill (including the shallow backfill areas via haul trucks, and deep backfilling via conveyors [STFs]) and upgrade of infrastructure.
6. Should the application for the modified residue disposal method proposed in this application be refused, the East OFS project will not be technically feasible, and mining activities would cease in the East Mine in 2024. The financial viability of the Mine (operating out of the West Mine only) and smelter in Saldanha Bay would be threatened, and those employed directly at the East Mine would be retrenched should the project not proceed. The operation (including the MSP and a smelter in Saldanha Bay) directly employed ~1 200 people as at May 2019, the majority of which are Previously Disadvantaged Individuals.
7. The mine only uses seawater (and flocculants) in the processing and concentration plants, and therefore no contaminants (other than saline water) enter groundwater from operations.
8. Process water infiltration from operations (most notably existing RSFs) has led to a rise in EC values of groundwater at the Mine.
9. Most project components (other than process water pipelines and upgrades to the seawater intake) are located in mined out areas or areas approved for mining – i.e. are transformed.
10. Groundwater modelling has indicated that project will lead to a localised increase in the extent of the contamination plume and limited groundwater mounding.
11. Baseline groundwater quality exceeds the Class II drinking water limit of the South African National Standard (SANS) 241:2005 of 170 mS/m by a considerable margin.
12. No material impacts on anthropogenic groundwater users is anticipated.

13. Groundwater seepage may lead to localised changes in plant communities in the Groot Goeraap River and Sout River during operations.
14. A detailed alternative liner analysis (including groundwater modelling) has demonstrated that impacts on receptors is not mitigated by installing a Class C Liner at the RSF, and an in-situ base preparation layer has a higher permeability than consolidated fines (i.e. equates to a Class D liner in this circumstance). Tronox therefore believe that the additional capital expenditure required for containment of the RSF and Overburden stockpile is not justified. SRK agrees that the “no liner” alternative is environmentally acceptable, based on the risk based assessment.
15. Considering the impacts on revenue at the Mine, the assessment that anthropogenic receptors will not be affected by the containment alternative selected for either the RSF or Overburden stockpile, Tronox believe that the additional capital expenditure required for containment of the RSF and Overburden stockpile is not justified and motivate that the “no liner” alternative is the only reasonable and feasible containment design alternative for the RSF and Overburden stockpile. SRK agrees that the “no liner” alternative is environmentally acceptable, based on the risk based assessment.
16. The potential environmental impacts associated with the proposed project considered in the S&EIR process include nuisance from dust, traffic, altered surface water flow patterns, groundwater contamination, loss of Littorina habitat and marine pollution, vegetation loss / change, and disturbance to pans and watercourses, delayed return to the agricultural potential of the footprint of the RSF, increased revenue to government and economic investment, a decline in production at the Cawood Saltworks, altered sense of place and visual intrusion and the loss of heritage structures.
17. Assuming that the recommended mitigation measures will be effectively implemented, the project will not have unacceptably significant adverse impacts, while socio-economic benefits are also fairly modest.
18. The No-Go alternative entails the cessation of mining activities in the East Mine in 2024 (effectively cancelling the approved East OFS Project). As such, significant benefits of this alternative have been identified. However, the adverse socio-economic impact of the No-Go alternative is considered to be of *very high* significance and therefore not a viable option.
19. A number of mitigation and monitoring measures have been identified to avoid, minimise and manage direct potential environmental impacts associated with the project. These are laid out in the EMP (Appendix G).
20. Cumulative impacts on groundwater, terrestrial ecology and sense of place are generally rated as being of *medium* significance, while the cumulative socio-economic benefit of mining and agriculture in this socio-economically stressed region is considered to be *very high*.

7.2 Analysis of Need and Desirability of the Project

Best practice, as well as the EIA Regulations, 2014 (Appendix 3 Section 3 [f]) requires that the need and desirability of a project (including viable alternatives) are considered and evaluated against the tenets of sustainability. This requires an analysis of the effect of the project on *social, economic and ecological* systems; and places emphasis on consideration of a project's *justification* not only in terms of financial viability (which is often implicit in a [private] proponent's intention to implement the project), but also in terms of the specific needs and interests of the community and the opportunity cost of development (DEA&DP, 2013).

The principles in NEMA (see Section 2.2) serve as a guide for the interpretation of the issue of “need”, but do not conceive “need” as synonymous with the “general purpose and requirements” of the project.

The latter might relate to the applicant's project motivation, while the "need" relates to the interests and needs of the broader public. In this regard, an important NEMA principle is that environmental management must ensure that the environment is "held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage" (DEA, 2017a).

There are various proxies for assessing the need and desirability of a project, notably national and regional planning documents which enunciate the strategic needs and desires of broader society and communities: project alignment with these documents must therefore be considered and reported on in the EIA process. With the use of these documents or - where these planning documents are not available - using best judgment, the EAPs (and specialists) must consider the project's strategic context, or justification, in terms of the needs and interests of the broader community (DEA&DP, 2013).

The consideration of need and desirability in EIA decision-making therefore requires the consideration of the strategic context of the project along with broader societal needs and the public interest (DEA, 2017a). However, it is important to note that projects which deviate from strategic plans are not necessarily undesirable. The DEA notes that more important are the social, economic and ecological impacts of the deviation, and "the burden of proof falls on the applicant (and the EAP) to show why the impacts...might be justifiable" (DEA, 2010).

The *social* component of need and desirability can be assessed using *regional* planning documents such as SDFs, IDPs and Environmental Management Frameworks (EMFs) to assess the project's social compatibility with plans. These documents incorporate specific social objectives and emphasise the need to promote the social well-being, health, safety and security of communities, especially underprivileged and/or vulnerable communities.

The project is almost entirely located within a transformed, mined out area / area approved for mining at an existing mine. The project will allow the East Mine at Namakwa Sands to continue operation beyond 2024 and will secure existing employment opportunities at the Mine and associated facilities (i.e. the MSP and smelter) in the medium to long term.

The *economic* need and desirability of a project can be assessed using *national*, provincial, district and local municipal planning documents to assess the project's economic compatibility with plans. These documents describe specific economic objectives and emphasise the need to:

- Promote economic growth;
- Ensure environmental integrity and reconcile ecosystem requirements with conflicting land development pressures;
- Promote tourism through the protection and rehabilitation of the environment;
- Integrate bio-diversity conservation and mining through rehabilitation;
- Use environmental resources sustainably;
- Promote development in transformed areas and in areas with proven economic potential;
- Retain existing jobs;
- Reserve mineral deposits for future use;
- Attract new investments; and
- Promote social well-being of the community and share economic benefits.

Regional planning documents also emphasise the need to improve the environmental performance of development regionally. Further, there is an emphasis on increasing the role of the tourism sector, which promises to provide economic growth and employment coupled with greater protection of the

environment (the main draw card for tourists in the area). Protection of the coastal zone is recognised as a key objective in this regard.

Notwithstanding the above, regional planning documents also highlight the need to retain existing jobs, use exploit mineral resources sustainably and promote development in transformed areas. The MLM also requires economic growth and job creation as a means for improved social wellbeing, and according to the previous Matzikama SDF, the Namakwa Sands Mine was estimated to employ, directly or indirectly, up to 60% of people employed in the local municipality (Headland Planners, 2014). The Mine is therefore a key economic driver in the region.

Environmental protection and rehabilitation are integrated into mining methods at Tronox. Furthermore, the project will take place almost entirely within a transformed area, offsite impacts of the project can be mitigated to acceptable levels; and significant job losses can be expected if the project is not authorised. The project is, at face value, both needed and desirable regionally, both in this space (location) and at this time.

NEMA and the EIA Regulations, 2014 call for a hierarchical approach to the selection of development options, as well as impact management which includes the investigation of alternatives to avoid, reduce (mitigate and manage) and/or remediate (rehabilitate and restore) negative (ecological) impacts (DEA, 2017). The final project description was informed by an extensive analysis of containment alternatives, including a detailed groundwater impact modelling and assessment.

In summary:

- Social, economic and ecological factors are considered and assessed during the EIA process, to ensure that the development is sustainable. Mitigation measures are recommended in the EIA Report to prevent, minimise (and optimise) impacts and to secure stakeholders' environmental rights. An EMPr has been drafted and will be implemented to ensure that potential environmental pollution and degradation can be minimised, if not prevented (see Appendix G).
- The Project will generate impacts, both negative and positive (see Section 6) and these should be considered in evaluating the desirability of the project. Section 6 demonstrates that impacts can be managed to acceptable levels.

7.3 Recommendations

The specific recommended mitigation and optimisation measures are presented in Chapter 6 and the EMPr (Appendix G) and key measures are summarised in Table 7-1 above. Tronox would need to implement these mitigation measures to demonstrate compliance with the various authorisations (should they be granted).

Although it is in theory possible that the potential impacts (or unintended consequences) of implementing mitigation and optimisation measures could offset their intended effect, the majority of the recommendations made in this EIA Report can be implemented without resulting in any physical effects. The potential for such unintended consequences in the case of the project is therefore considered low.

Key recommendations, which are considered essential, are:

1. Implement the EMPr to guide construction and operations activities and to provide a framework for the ongoing assessment of environmental performance;
2. Profile, re-vegetate and stabilise RSF, STFs and Overburden stockpile walls with windbreaks as soon as practically possible (i.e. during operations);

3. Continue to monitor dust fallout on the Mine boundary and respond to exceedances of fall-out limits as specified in the most recent dust control regulations (currently National Dust Control Regulations, 2013);
4. Install an additional borehole (in the approximate location of -31.221185°S and 18.000656°E) to the quarterly monitoring network near the boundary of the Groot Goeraap River;
5. Install two boreholes (in the approximate locations of -31.224872°S;17.895495°E and -31.234620°S;17.892371°E) to the quarterly monitoring network near the north-west boundary (towards the Sout River);
6. Apply additional mitigation measures if monitoring data shows a significant variation in groundwater depth (>6m) or quality compared to the modelled outputs;
7. Install stormwater a diversion berm(s) downgradient of STF2 to prevent runoff and erosion downgradient of this facility;
8. Restrict access by all construction and operations staff to the approved Mining Right Area; and
9. Amend the WUL for the Mine to include the project.

7.4 Conclusion and Authorisation Opinion

This EIA Report has identified and assessed the potential biophysical and socio-economic impacts associated with the modified the Namakwa Sands East OFS Project Residue Disposal Plan, which entails construction of an additional RSF, a change to the approach to tailings backfill and upgrade of infrastructure at the Namakwa Sands Mine at Brand se Baai, West Coast District Municipality.

In terms of Section 31 (n) of NEMA, the EAP is required to provide an opinion as to whether the activity should or should not be authorised. In this section, a qualified opinion is ventured, and in this regard SRK believes that sufficient information is available for DMRE to take a decision.

The project will result in unavoidable adverse environmental impacts, although these are of limited intensity assuming the implementation of recommended mitigation and are not considered unacceptably significant. In addition, the project will ensure the ongoing regional socio-economic benefit of Namakwa Sands' East Mine operations over the next 25 to 35 years.

The public participation process conducted during the EIA process has given stakeholders the opportunity to assist with the identification of issues and potential impacts, and to submit their comments. Various Organs of State submitted comments, and none raised objections or fatal flaws.

Working on the assumption that Tronox is committed to ensuring that the project is operated and constructed to high standards, achieved through implementation of the recommended mitigation measures and ongoing monitoring of performance, SRK believes, and the EIA Report demonstrates, that through effective implementation of the stipulated mitigation measures, the adverse impacts can be reduced to levels compliant with national standards or guidelines. SRK agrees that the "no liner" alternative is environmentally acceptable, based on the risk based assessment.

The fundamental decision is whether to allow the development and the continued operation of the Mine, which is generally consistent with development policies for the area, but which may have limited biophysical impacts.

In conclusion SRK is of the opinion that on purely 'environmental' grounds (i.e. the project's potential socio-economic and biophysical implications) the application as it is currently articulated should **be approved**, provided the essential mitigation measures are implemented. Ultimately, however, the DMRE will need to consider whether the project benefits outweigh the potential impacts (and if the

negative socio-economic impact of the No-Go alternative is acceptable in the context of relatively low significance biophysical impacts of the development alternative).

If approved, it is SRK's opinion that the authorisation should be valid for a period of 10 years.

The Final EIA Report is now being submitted to DMRE for decision-making.

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Matthew Law

Principal Environmental Consultant

Prepared by

SRK Consulting - Certified Electronic Signature

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Sue Reuther

Principal Environmental Consultant

Reviewed by

SRK Consulting - Certified Electronic Signature

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Chris Dalgliesh

SRK Partner

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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