

NAME OF APPLICANT: **IMPUMA QUARRIES (PTY) LTD**

REFERENCE NUMBER: **EC 30/5/1/2/2/10002MR**

**ENVIRONMENTAL IMPACT
ASSESSMENT
AND
ENVIRONMENTAL MANAGEMENT
PROGRAMME**

**SUBMITTED FOR AN APPLICATION FOR A
MINING RIGHT IN TERMS OF SECTION 39 AND
OF REGULATIONS 50 AND 51 OF THE MINERAL
AND PETROLEUM RESOURCES
DEVELOPMENT ACT, 2002, (ACT NO 28 OF
2002) (the Act)**

DRAFT FOR COMMENT

[Type text]

STANDARD DIRECTIVE

All applicants for mining rights are herewith, in terms of the provisions of Section 29 (a) and in terms of section 39 (5) of the Mineral and Petroleum Resources Development Act, directed to submit an environmental Impact Assessment, and an Environmental Management Programme strictly in accordance with the subject headings herein, and to compile the content according to all the sub items to the said subject headings referred to in the guideline published on the Departments website, within 30 days of notification by the Regional Manager of the acceptance of such application.

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Contents

1	Description of the baseline environment	2
1.1	Concise description of the environment on site relative to the environment in the surrounding area	2
1.1.1	Topography	3
1.1.2	Visual Impact	4
1.1.3	Soil	4
1.1.4	Land Capability	5
1.1.5	Natural Vegetation	5
1.1.6	Animal Life	10
1.1.7	Surface Water	14
1.1.8	Ground Water	15
1.1.9	Air Quality (Dust)	18
1.1.10	Noise	18
1.1.11	Blast Vibration	18
1.1.12	Fly Rock	18
1.1.13	Socio economic profile of the area	18
1.2	Concise description of each of the existing environmental aspects both on the site applied for and in the surrounding area which may require protection or remediation	25
1.3	Concise description of the specific land uses, cultural and heritage aspects and infrastructure on the site and neighbouring properties / farms in respect of which the potential exists for the socio-economic conditions of other parties to be affected by the proposed mining operation	25
1.4	Annotated map showing the spatial locality and aerial extent of all environmental, cultural/heritage, infrastructure and land use features identified on site and on the neighbouring properties and farms	25
1.5	Confirmation that supporting documents in the form of specialist studies are attached as appendices ..	26
2	The proposed mining operation	26
2.1	The mineral to be mined	26
2.2	The mining method to be employed and provide a concise description of the intended magnitude thereof in terms of volumes, depth and aerial extent	26
2.3	List of the main mining actions, activities, or processes	27
2.4	Plan showing the location and aerial extent of the aforesaid main mining actions, activities, or processes as required to calculate the financial provision in accordance with the Department's published guideline. (Reg. 51(b) (v))	28
2.5	Listed activities (in terms of the NEMA ETA regulations) which will be occurring within the proposed project	29
2.6	Indication of the phases (construction, operational, decommissioning) and estimated time frames in relation to the implementation of these actions, activities or processes and infrastructure	31
2.7	Confirmation if any other relevant information is attached as appendices	31
3	The potential impacts	32
3.1	List of the potential impacts, on environmental aspects separately in respect of each of the aforesaid main mining actions, activities, processes, and activities listed in the NEMA ETA regulations	32
3.2	List of all potential cumulative environmental impacts	33
3.3	State specifically whether or not there is a risk of acid mine drainage or potential groundwater contamination associated with the mineral to be mined. (If such a risk is associated with the mineral to be mined provide a summary of the findings and recommendations of a specialist geo-hydrological report in that regard)	34
4	The alternative land use or developments that may be affected	36
4.1	Concise description of the alternative land use of the area in which the mine is proposed to operate	36
4.2	List and description of all the main features and infrastructure related to the alternative land uses or developments	36
4.3	Plan showing the location and aerial extent of the aforesaid main features of the alternative land use and infrastructure related to alternative land developments identified during scoping	37
5	The potential impacts of the alternative land use or development	37
5.1	List of the potential impacts of each of the aforesaid main features and infrastructure related to the alternative land use or development and related listed activities	37
5.2	Description of all potential cumulative impacts of the main features and infrastructure related to the identified alternative land uses or developments	38
6	Identification of potential social and cultural impacts	38
6.1	List of potential impacts of the proposed mining operation on the socio-economic conditions of other parties' land use activities	38
6.2	Description of the cultural and heritage aspects that will potentially be affected, and describe the potential impact on such cultural / heritage aspect. (In cases where such features are not applicable the applicant must still include the item in the list and describe it as not applicable)	38
6.3	Quantification of the impact on the socio-economic conditions of directly affected persons	39
7	Assessment and evaluation of potential impacts	41
7.1	List of each potential impact identified in paragraphs 3 and 6 above	41
7.2	Concomitant impact rating for each potential impact listed in paragraph 7.1 above	44
7.3	Indication of the phases (construction, operational, decommissioning) and estimated time frames in relation to the potential impacts rated	50

8	Identification of the alternative land uses which will be impacted upon.....	51
9	Listed results of a specialist comparative land use assessment. (Refer to the concomitant section of the guideline posted on the official website of the Department and attach the specialist study as an appendix).....	51
10	List of all the significant impacts as identified in the assessment conducted in terms of Regulation 50 (c).....	51
11	Identification of interested and affected parties.....	52
11.1	List of names of landowners and other affected parties in respect of the land uses that have been identified on the property and adjacent and non-adjacent properties that may be affected by the mining operation:.....	52
11.2	List of the relevant Local Government, Provincial Government Departments, Land Claims Commissioner and Tribal Authorities consulted	53
11.3	List of relevant Government Agencies and institutions responsible for various aspects of the environment and infrastructure.	53
11.4	List of relevant local communities that were consulted:	54
12	The details of the engagement process.	56
12.1	Confirm which authorities have been consulted with regard to any economic development plans or proclaimed nature reserves in the area	56
12.2	Confirm that the nature and scope of the mining project and the typical impacts of such quarry have been explained to I&AP's including landowners, SAHRA and communities concerned.	56
12.3	Confirm which specialists, knowledgeable institutions and knowledgeable persons have been consulted and indicate in what regard	56
13	Details regarding the manner in which the issues raised were addressed.....	57
13.1	Confirm whether or not the description of the environment has been compiled with the participation of the landowner, I&AP's and Communities concerned.	57
13.2	Confirm whether the potential impacts have been compiled with the participation of landowner and I&AP's.....	57
13.3	Confirm whether or not the list of potential impacts related to Social and Cultural impacts have been compiled with parties directly affected	57
13.4	Provide list of issues raised by I&AP's and indicate whether they have been accommodated in this document.....	58
14	The appropriate mitigatory measures for each significant impact of the proposed mining operation.....	59
15	Arrangements for monitoring and management of environmental impacts.	60
16	Technical and supporting information.	62
17	Description of environmental objectives and specific goals for mine closure.....	63
17.1	Environmental aspects that describe the pre-mining environment to serve as guide for setting closure objectives.....	63
17.2	Measures required to contain or remedy any causes of pollution or degradation or the migration of pollutants, both for closure of the mine and post-closure.	63
18	Description of environmental objectives and specific goals for the management of identified environmental impacts emanating from the proposed mining operation. (As informed by the information provided in the EIA in terms of Regulation 50 (h)).	64
18.1	List of identified impacts which will require monitoring programmes.	64
18.2	List of the source activities that are the cause of the impacts which require to be managed.	68
18.3	Management activities which, where applicable, will be conducted daily, weekly, monthly, quarterly, annually or periodically as the case may be in order to control any action, activity or process which causes pollution or environmental degradation.....	68
18.4	The roles and responsibilities for the execution of the monitoring and management programmes.	70
19	Description of environmental objectives and specific goals for the socio-economic conditions as identified in the social and labour plan.....	70
19.1	Description of environmental objectives and specific goals for historical and cultural aspects.	70
19.2	Environmental objectives and goals in respect of historical and cultural aspects identified in specialist studies conducted: Outline of the implementation programme.....	70
20	The appropriate technical and management options chosen for each environmental impact, socio-economic condition and historical and cultural aspect in each phase of the mining operation, as follows;.....	71
20.1	Topsoil handling.....	76
20.2	Dust reduction measures	76
20.3	Hydrocarbon control measures	78
20.4	Stormwater Management System	81
20.5	Excavation edge shaping	82
21	Action plans to achieve the objectives and specific goals contemplated in Regulation 50 (a).	83
21.1	Establishment phase.....	83
21.2	Operational Rehabilitation	84
21.3	Decommissioning rehabilitation.....	84
22	Procedures for environmentally related emergencies and remediation.....	86

23	Planned monitoring and environmental management programme performance assessment.	87
24	Financial provision in relation to the execution of the environmental management programme:	87
24.1	Plan showing the location and aerial extent of the aforesaid main mining actions, activities, or processes anticipated.	87
24.2	Annual forecasted financial provision calculation:	87
24.3	Confirmation of the amount that will be provided should the right be granted.	87
24.4	The method of providing Financial provision contemplated in Regulation 53.	87
25	Environmental Awareness Plan (Section 39 (3) (c))	87
25.1	Visitor Environmental Awareness:	87
25.2	Senior and Middle Management Environmental Awareness:	88
25.3	Operator / Workforce Environmental Awareness:	89
26	Attachment of specialist reports, technical and supporting information. (Provide a List)	89
27	SECTION 39 (4) (a) (Iii), Capacity to manage and rehabilitate the environment (Include all the items referred to in the concomitant section of the guideline posted on the official web site of the Department)	90
28	UNDERTAKING	90
28.1	The Environmental Management Programme will, should it comply with the provisions of section 39 (4) (a) of the Act and the right be granted, be approved and become an obligation in terms of the right issued. As part of the proposed Environmental Management Programme, the applicant is required to provide an undertaking that it will be executed as approved and that the provisions of the Act and regulations thereto will be complied with.	90
29	IDENTIFICATION OF THE REPORT	90

List of figures:

Figure 1: Locality Plan	1
Figure 2: Updated scope of application	2
Figure 3: Surrounding Land Use	3
Figure 4: Existing Topography.....	4
Figure 5: Vegetation types.....	9
Figure 6: Site in CBA context	10
Figure 7: Surface Water Regime	14
Figure 8: Hydrocensus (Groundwater)	17
Figure 9: Locality in municipal / ward context.....	19
Figure 10: Final Site Layout Plan	29
Figure 11: Alternative land use: Windfarm	37
Figure 12: Surrounding and adjacent landowners.....	52
Figure 13: Design Guidelines for industrial and domestic waste temporary storage facility ...	79
Figure 14: Design guidelines: Bunded fuel tank.....	80
Figure 15: Design guidelines: Vehicle washbay.....	81
Figure 16: Final edge pit configuration	82
Figure 17: Buttress blasting proposal explained	83

List of tables:

Table 1: Applicant details	1
Table 2: Land Capability	5
Table 3: Birds which may occur in study area.....	13
Table 4: Groundwater resources in the area.....	16
Table 5: Expected vs recommended vibration limits	18
Table 6: Socio-economic background: Gender Profile	20
Table 7: Socio-economic profile: Population profile	20
Table 8: Socio-economic profile: Highest education levels	21
Table 9: Socio-economic profile: Pass rates	22
Table 10: Socio economic profile: Employment	22
Table 11: Socio-economic profile: Household Income	22
Table 12: Socio-economic profile: Affordability	23

[Type text]

Table 13: Socio-economic profile: Housing Backlog	23
Table 14: Socio-economic profile: Water and Sanitation	24
Table 15: Socio-economic profile: Access to water.....	24
Table 16: Socio-economic profile: Access to electricity	24
Table 17: Reserve calculation.....	26
Table 18: List of activities.....	28
Table 19: Possible listed activities (Listing notice 1)	30
Table 20: Possible listed activities: Listing Notice 2	30
Table 21: Possible listed activities: Listing notice 3.....	30
Table 22: Simplified time schedule of activities.....	31
Table 23: List of potential impacts.....	33
Table 24: Classification of potential impacts	49
Table 25: Simplified schedule of activities (repeat)	50
Table 26: list of adjacent owners who wished to register as I&APs	53
Table 27: List of Local Government and tribal authorities consulted.....	53
Table 28: List of NGOs consulted	54
Table 29: List of local community representatives consulted	54
Table 30: List of additional registered I&APs	55
Table 31: List of issues raised thus far.....	59
Table 32: Proposed monitoring	62
Table 33: List of impacts requiring monitoring.....	68
Table 34: Proposed monitoring (repeat)	69
Table 35: Appropriate technical and management options chosen to reduce / eliminate impact	76
Table 36: Dust reduction measures to be implemented	78

List of ANNEXURES

- Annexure A: Biodiversity Sensitivity Analysis compiled by K. Coetzee of Conservation Management Services
- Annexure B: Specialist Geohydrological Assessment by GEOSS
- Annexure C: Heritage Impact Assessment and Phase 1 AIA by K van Ryneveld of Archaeomaps
- Annexure D: Palaeontological Impact Assessment by John Almond
- Annexure E: Draft Environmental Induction Training programme

Applicant Details:

Applicant Company:	Impuma Quarry (Pty) Ltd
Name of contact person:	Mr D Derbyshire
Branch/Division:	Head Office
Postal Address:	PO Box 1338 Plettenberg Bay 6600
Province:	Western Cape
Postal Code:	6600
Telephone No:	044 533 0884
Fax No:	044 533 0970
E-mail address:	len@denron.co.za
<u>Physical address</u>	
Building Name:	Denron
Street Name 1:	N2
Town/City:	Bitou, Plettenberg Bay
Magisterial District:	Knysna
Province:	Western Cape

Table 1: Applicant details

Locality Plan of proposed project



Figure 1: Locality Plan

SECTION 1: ENVIRONMENTAL IMPACT ASSESSMENT

1 Description of the baseline environment

1.1 Concise description of the environment on site relative to the environment in the surrounding area.

This application was lodged with a proposal to mine two sections (i.e. two separate excavations (viz Section 1 and Section 2)). The Scoping report was compiled with the understanding that these 2 sections would be applicable. Specialist studies were conducted under briefs which included both sections.

However, Section 1 has been abandoned as a Mining Section.

So when reading this document please always be aware that Section 1 mining will no longer take place. Processing plant and logistical facilities will reduce in scale and will be located on the Section 2 footprint.

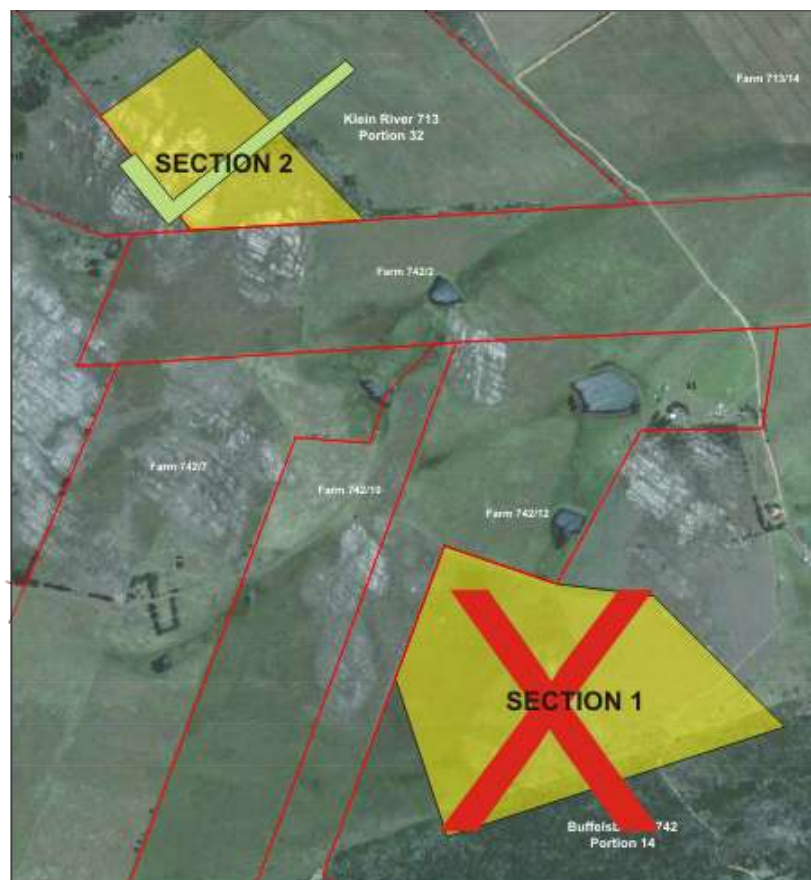


Figure 2: Updated scope of application

1.1.1 Surrounding Land Use

The information contained in the following figure is presented as background to potential existing impactee¹ of any impact which may be generated by mining activity:



Figure 3: Surrounding Land Use

1.1.2 Topography

The excavation's upper edge is located at about 125m above means sea level in a NE facing slope. Detail mine plan with contours is contained in para 2.4, whilst figure 3 below shows a more general indication of existing topography.

¹ The Red Cap windfarm is discussed later as a future alternative land use

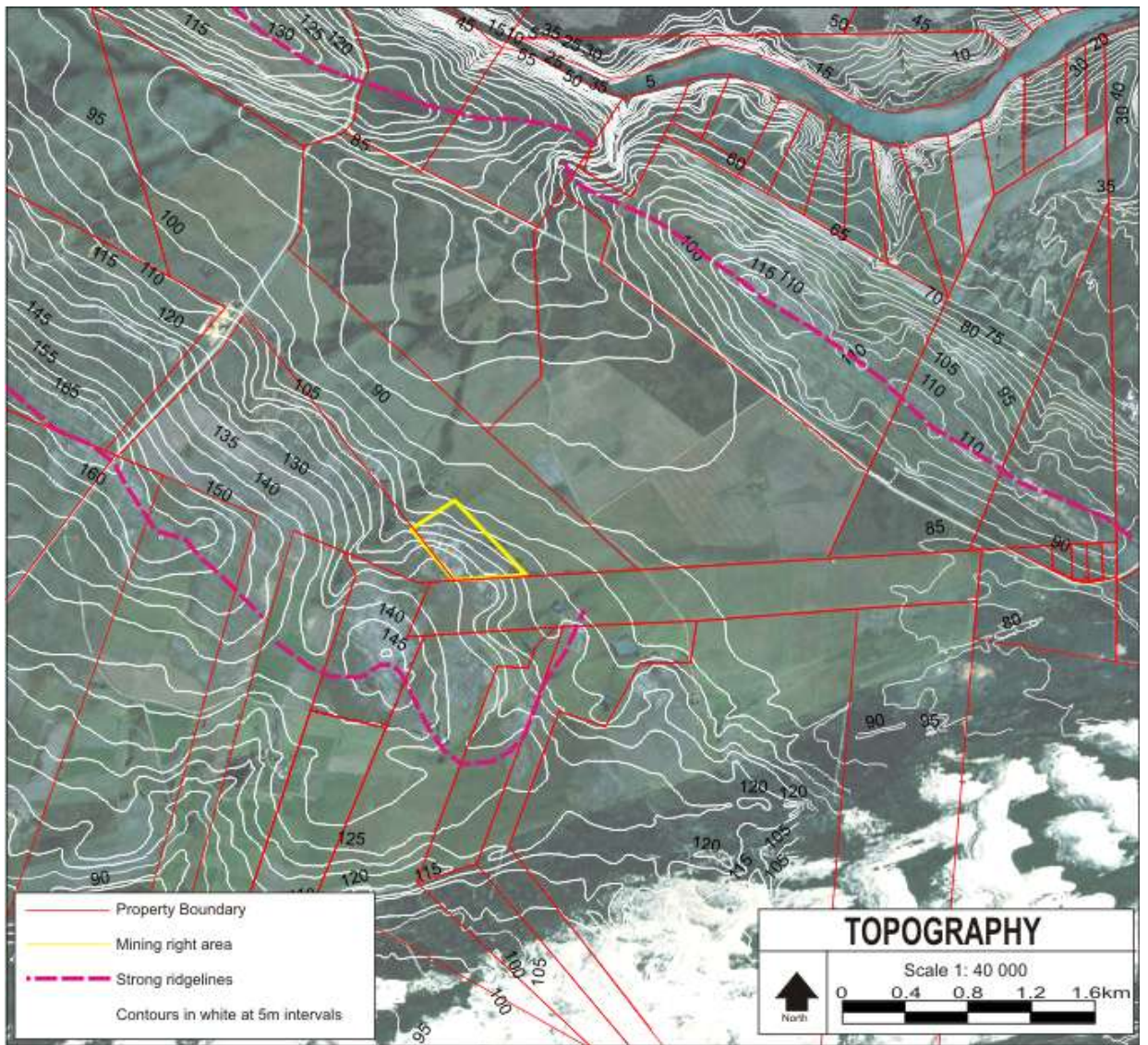


Figure 4: Existing Topography

1.1.3 Visual Impact

This site is at present a grazing area and does not present any visual impact (i.e. no manmade features intrude on the natural environment). The NE facing slope makes the site distantly visible to sections of the link road between Oyster Bay and Cape St Francis.

1.1.4 Soil

The soils are not generally suited to arable dry-land or irrigated cultivation of crops. The Mispah soil form is the soil form that would be in dominance where available. Most of the excavation takes place on rocky outcrop where no topsoil is available for harvesting.

Topsoil will be available for removal and stockpiling for later re-use in the plant and stockpiling area. Topsoil depths are unknown at this stage but assumed to be in the order of 15-30cm (which is typical for these Mispah soil types).

1.1.5 Land Capability

The land capability of the entire farm portion has been classified as wilderness area with subordinate grazing. This classification is more restrictive than pure grazing classification (which is probably the more accurate land capability rating).

Land capability	Area	%
Wilderness area (Outcrop)	6.0ha	42.1%
Wilderness Area (Non-outcrop)	8.4ha	57.9%
Arable Land	0ha	0%
Grazing	0ha	0%
Wetland Area	0ha	0%
Total	14.4ha	100%

Table 2: Land Capability

The carrying capacity of the undisturbed veld (i.e. only in the plant and stockpiling area is approximately 11-13ha / large stock unit (http://www.agis.agric.za/agismap_atlas/)), but the aim of the rehabilitation programme is to restore the veld to its wilderness rating.

1.1.6 Natural Vegetation

The following is an excerpt from a Specialist Biodiversity Assessment conducted by Ken Coetzee of Conservation Management Services. The report is contained in full in Annexure A:

“The vegetation of the two study sites was described by Mucina et al (2006) as Tsitsikamma Sandstone Fynbos. They describe it as either Proteoid, Restioid or Ericoid Fynbos with Fynbos Thicket in wetter areas. Cowling & Heijnis (1999) described the broad habitat unit within which the study area falls as Humansdorp Grassy Fynbos in their determination of Broad Habitat Units for systematic conservation planning in the Cape Floristic Region.

In their mapping of the Subtropical Thicket Biome, Vlok & Euston-Brown (2002) also map the vegetation as Humansdorp Grassy Fynbos on the *STEP* Vegetation Map.

At Site 2 [*i.e. only area programmed to still be mined*] there is an extensive untransformed north-facing rocky slope with a cover of undisturbed Restioid Fynbos. (See Plates 7 & 8). Plant species are the same as at Site 1 with the addition of *Leucospermum cuneifolium* and a few more restioid species. *Relhania genistifolia* is prevalent. At midslope the fynbos becomes more grassy, becoming pure grassy pasture at the flat area at the foot of the slope on deeper sandy soil. (See Plate 9). The bottom half of the site contains an area of formerly cultivated old lands upon which the pioneer *Stoebe plumosa* and grasses, particularly *Stenotaphrum secundatum*, dominate. (See Plate 10). This lower part of the site is severely invaded by alien *Acacia saligna* and *Acacia mearnsii*. (See Plates 11 & 12: [note that the plate numbers are directly from the Biodiversity Sensitivity Analysis report – Annexure A).



Plate 7 & 8: The untransformed Restioid Fynbos of Site 2.



PLATE 9: Grassy conditions at mid- and lower slope on deeper soils on Site 2.



PLATE 10: Grassy pasture at the bottom of the slope of Site 2, probably cultivated in the past.



PLATES 11 & 12: Infestations of *Acacia saligna* and *Acacia mearnsii* on Site 2.

Grasses that occur in the fynbos at both sites include:

Cymbopogon plurinodis
Cynodon dactylon
Digitaria eriantha
Ehrharta calycina
Eragrostis capensis
Eragrostis curvula
Hyparrhenia hirta
Pennisetum clandestinum
Sporobolus africanus
Stenotaphrum secundatum
Themeda triandra.

A small seepage area occurs below a small earth dam within a dense stand of *Acacia saligna* trees in the bottom north-eastern corner of Site 2. The presence of water is probably seasonal and the moist conditions are dominated almost exclusively by the grass *Stenotaphrum secundatum* with an overstorey of invasive alien trees.

PLANT CHECKLIST

The following plant species were located on both study sites during the field evaluation. For a more complete list, including all annuals and geophytes, it will be necessary to visit and collect during the other seasons of the year.

<i>Acacia cyclops</i> (alien)	<i>Lampranthus</i> sp
<i>Acacia mearnsii</i> (alien)	<i>Leucadendron salignum</i>
<i>Acacia saligna</i> (alien)	<i>Leucospermum cuneiforme</i>
<i>Agathosma ovata</i>	<i>Lobelia tomentosa</i>
<i>Anthospermum galioides</i>	<i>Metalasia pungens</i>
<i>Arctopus echinatus</i>	<i>Morella quercifolia</i>
<i>Aristida adscensionis</i>	<i>Nylandtia spinosa</i>
<i>Aspalathus spinosa</i>	<i>Oxalis bifurca</i>
<i>Asparagus africanus</i>	<i>Oxalis imbricata</i>
<i>Asparagus suaveolens</i>	<i>Oxalis smithiana</i>
<i>Bobartia orientalis</i>	<i>Pelargonium alchemelloides</i>
<i>Boophane disticha</i>	<i>Pennisetum clandestinum</i> (alien)
<i>Canthium inerme</i>	<i>Phylla lachnaeoides</i>
<i>Carissa bispinosa</i>	<i>Podalyria myrtillifolia</i>
<i>Crassula muscosa</i>	<i>Pteridium aquilinum</i>
<i>Cymbopogon plurinodis</i>	<i>Ptrocelastrus tricuspoidatus</i>
<i>Cynodon dactylon</i>	<i>Relhania qenistifolia</i>
<i>Cyphia volubilis</i>	<i>Rhamnus prinoides</i>
<i>Delosperma littoralis</i>	<i>Rubus pinnatus</i>

<i>Digitaria eriantha</i>	<i>Searsia glauca</i>
<i>Diospyros dichrophylla</i>	<i>Searsia laevigata</i>
<i>Disa sagittalis</i>	<i>Searsia longispina</i>
<i>Ehrharta calycina</i>	<i>Searsia lucida forma lucida</i>
<i>Eragrostis capensis</i>	<i>Selago corymbosa</i>
<i>Eragrostis curvula</i>	<i>Selago glomerata</i>
<i>Erica gracilis</i>	<i>Senecio lilicifolius</i>
<i>Erica sparmannii</i>	<i>Senecio othonniflorus</i>
<i>Euryops munitus</i>	<i>Sporobolus africanus</i>
<i>Exomis microphylla</i>	<i>Sporobolus fimbriatus</i>
<i>Helichrysum cymosum</i>	<i>Stenotaphrum secundatum</i>
<i>Helichrysum patulum</i>	<i>Stoebe plumosa</i>
<i>Heliophila subulata</i>	<i>Struthiola macowanii</i>
<i>Hibiscus aethiopicus</i>	<i>Thamnochortis cinereus</i>
<i>Hyparrhenia hirta</i>	<i>Themeda triandra</i>
<i>Ischyrolepis capensis</i>	<i>Watsonia angusta</i>

For academic background the area in pre-cultivation years consisted of the following vegetation types – see map below.

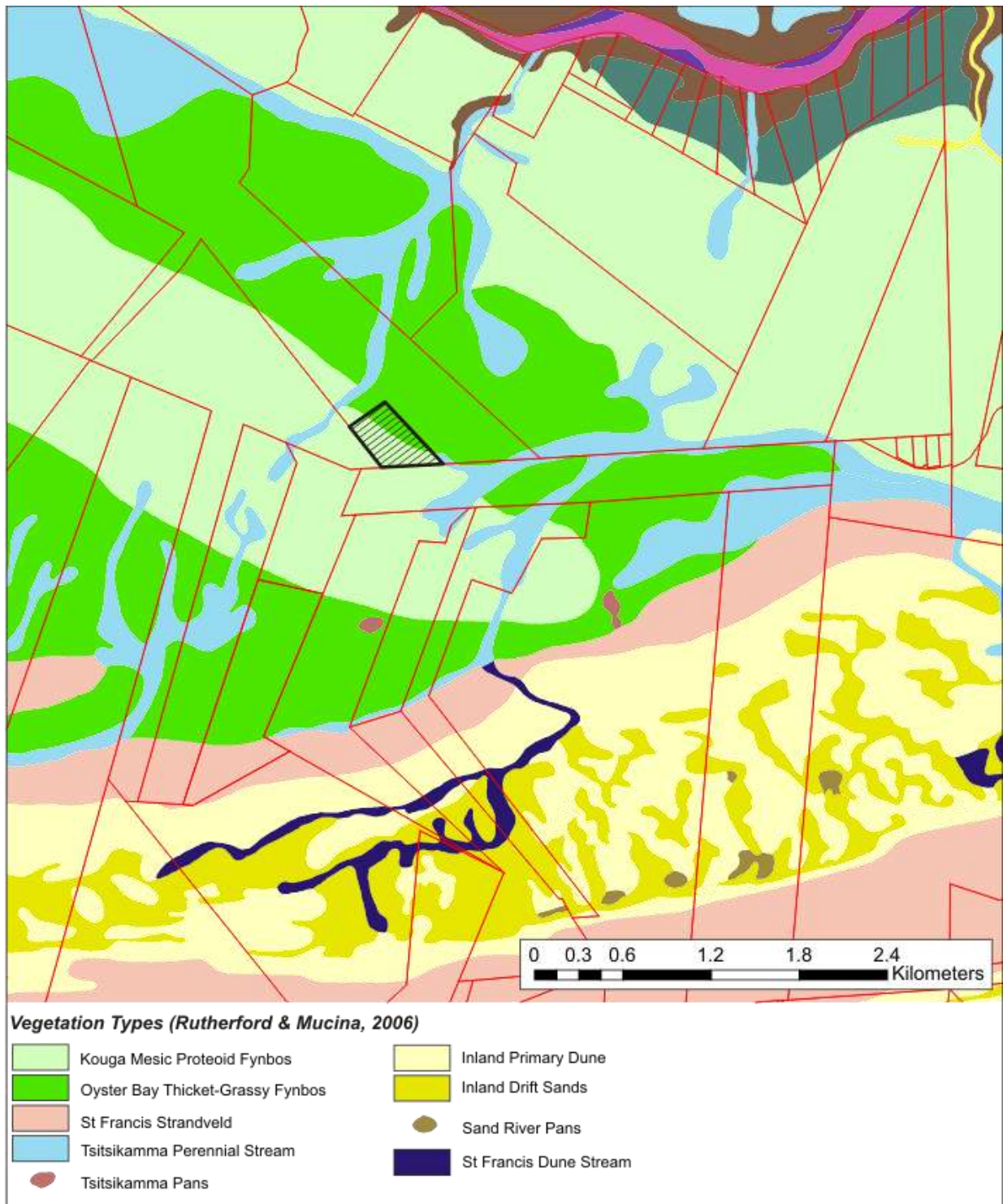


Figure 5: Vegetation types

It is also important to note that the site is located as follows in respect of CBA classification – see map below. The map is sourced from the SANBI GIS data available on the internet at www.bgis.sanbi.org and the information was put together by Derek Berliner & Philip Desmet in the preparation of mapping for Terrestrial Critical Biodiversity Areas for the Eastern Cape:

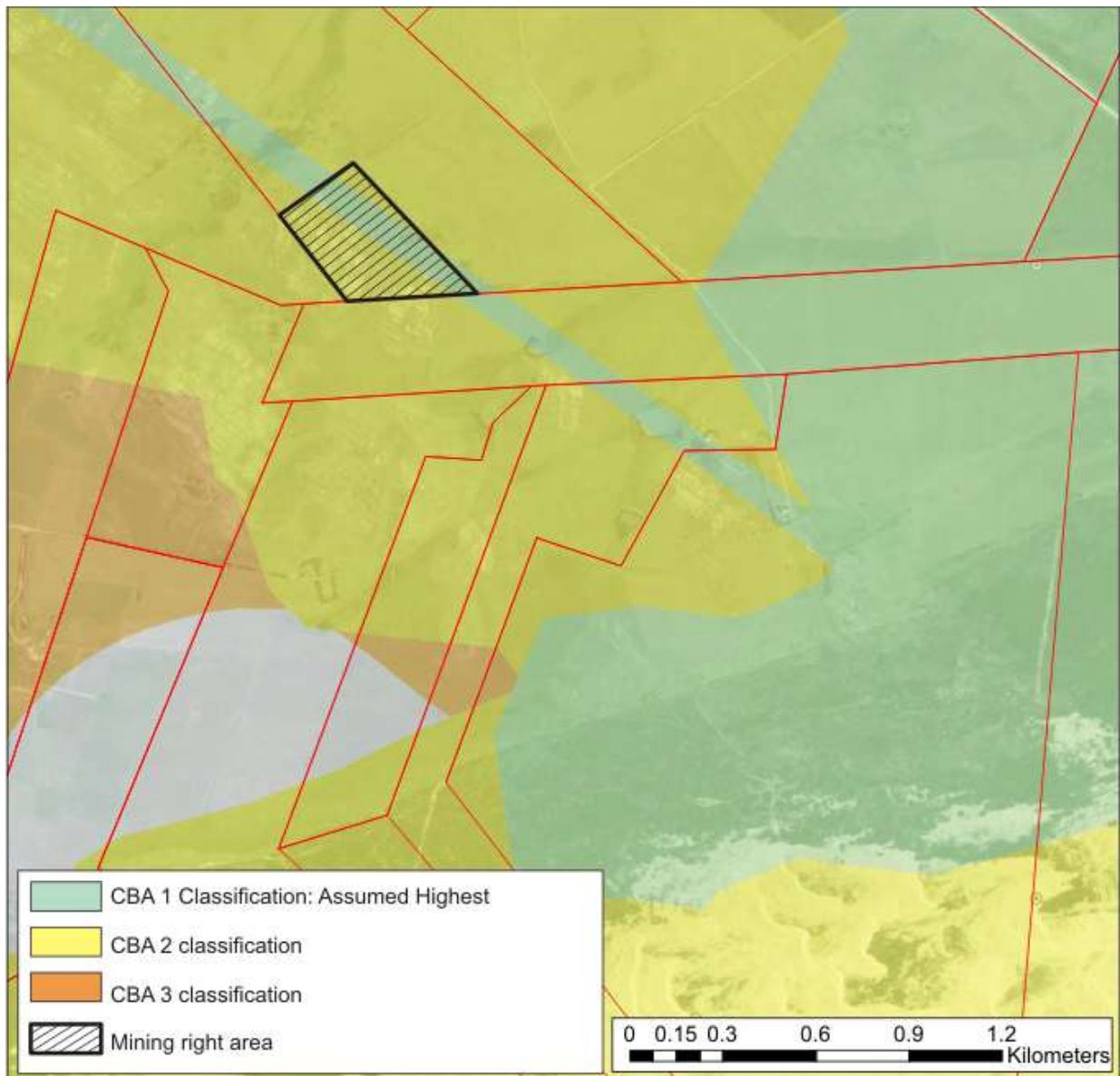


Figure 6: Site in CBA context

In conclusion, the specialist study has the following content:

“The balance of the area on the rocky slope of Site 2 consists of relatively undisturbed Fynbos which is also classed, by Mucina et al (2006), as vulnerable, but is not considered to be vulnerable enough to be classified as a CBA in Figure 4B. Although classed as vulnerable, the Fynbos of the two study sites contain no vulnerable, threatened or endangered (Red Data listed) plant species (Raimondo et al, 2009). The isolated nature of these Fynbos patches is also a problem for the long-term status of the patches. Fragmentation of the original habitat has had its negative impact and heavy livestock grazing is also having an impact.

In summary, it is estimated that the Fynbos that occurs on the two study sites is not particularly sensitive and that the loss of this Fynbos will not be significant in terms of the conservation of this particular habitat type in the area. In terms of the CBA mapping and sensitive sites mapping in Figures 4A and 4B, some of

the corridors, linkages and ecological processes proposed for the maintenance of CBA classification were found to be invalid and inaccurate at the fine scale of the study site evaluation.

As a mitigatory measure, it is proposed that a biodiversity offset, consisting of the complete and careful conservation of all the other sandstone outcrops on the farms affected be considered. This would entail fencing the outcrops to ensure controlled utilization by livestock at an acceptable frequency”

1.1.7 Animal Life

Vast expanses of the same vegetation surrounding the site provide a habitat suitable for species typical of the area.

The following concern was raised during the initial stage of consultation:

“The St Francis Kromme Trust notes the application to mine rock and aggregate on the two sites located on farms south of the St Francis-Oyster Bay road and the BID's assessment that "the animal life around the affected area will be temporarily chased away by the presence of such activities" as drilling, blasting and crushing. The BID goes on to say "There is a vast expanse of similar habitat type around every proposed activity area and it is unlikely that any impact on animal life will occur from the proposed activities." (pages 13 and 14).

The Trust advises that the coastal plain between Tsitsikamma and PE is one of the most important areas in the country for Denham's Bustard and White-bellied Korhaan, and both species are found in high density on the particular stretch of land proposed for these mining activities. These bird species are highly selective about habitat and there is not, in fact, a vast expanse of similar habitat around the area. The concentrations of Denham's Bustard, in particular, that are found in this location are not seen anywhere else. What effect will blasting have on the well-being of this species? And what effect will these activities have on the White-bellied Korhaan, a species notoriously sensitive to human activity? The Humansdorp population of these birds is virtually isolated from the rest of the country, making it extremely important to protect. It is essential that an assessment of the impacts specifically on the bird population be included in the environmental assessment.”

Given the background presented above, a full biodiversity assessment was conducted. The following is an excerpt from that report (contained in full in Annexure A). The section quoted deals only with the existing situation (and impact will be discussed later)²:

“INVENTORY: No specific studies of the vertebrate fauna of the study sites have been done before. Published literature about the distribution of fauna, in particular the Red Data Book listed species, together with an on-site habitat evaluation was used as a basis for predicting the likely presence of vertebrate fauna in the general area and on the study sites in particular.

² Note that the Specialist's references to Section 1 and 2 have been left in the quoted text but only Section 2 will be mined.

HABITAT: The two study sites contain a relatively limited variety of habitat types for vertebrate fauna occupation. The transformed croplands are suitable habitat for only the most ubiquitous and generalist species, many of which are birds and small mammals. The rocky fynbos areas are the least transformed and thus provide habitat for a good variety of reptiles, rodents and birds. The alien tree-infested areas, like the croplands, provide habitat for only the most disturbance-tolerant vertebrates. Grassy pasture areas, like the croplands and alien tree infestations, provide habitat for a range of catholic species consisting mostly of rodents, birds and a few reptiles and amphibians. Site 1 can be classed as a highly disturbed and transformed area while Site 2 is only partly transformed and less disturbed.

LANDSCAPE TRANSFORMATION: The two study sites, both of which contain remnants of the historical fynbos of the general area, are almost completely surrounded by a highly transformed landscape. Most of the transformation is due to the cultivation of arable soils for crops and forage for livestock, but extensive areas have become degraded by invasions of alien trees like *Acacia cyclops*, *Acacia saligna* and *Acacia mearnsii*, all of which occur on both of the study sites.

As a result of these transformations, much of the natural indigenous vertebrate fauna of the study sites has been lost due to the effects of disturbance, habitat overutilization, habitat loss and fragmentation.

The following account outlines likely occurrence, as well as the predicted sensitivity of the fauna, to the likely impacts of the quarrying activities.

REPTILES AND FROG FAUNA

ANURA:

The study area falls within a zone of moderate species richness for the Anura, between 11 and 20 species for most of the south and eastern Cape Coastal area (Minter et al, 2004). Of the 15 species that have been recorded in the quarter degree in which the study area is located, all of them fall into the Red Data Book category *least concern* and are thus not in any way classed as threatened, vulnerable or endangered (Minter et al, 2004).

REPTILIA:

There is no current or up-to-date Red Data Book for the reptiles of South Africa. The Southern African Red Data Book for reptiles and amphibians (Branch, 1988) is thus the only reference, albeit out of date. According to this work, no endangered, vulnerable or threatened reptile species are recorded for the quarter degree within which the study area is located. Branch (1998), Alexander & Marais (2007) and Tolley & Burger (2007) were also consulted regarding a more up-to-date distribution of Red Data listed reptiles.

MAMMALS

At least 50 mammal species are predicted to occur within the quarter degree in which the study area occurs. These include 10 herbivores, 12 carnivores, 12

bats, 6 insectivores, 2 hares, 2 primates, 1 elephant shrew, aardvark and 19 rodents.

The study sites obviously do not contain suitable habitat for all the mammal species predicted to occur in the area. Only two of the likely species are recorded in the Red Data Book for Mammals (Friedman & Daly, 2004). They are:

Oribi	- <i>Ourebea ourebi</i>	- Endangered
Fynbos golden mole	- <i>Amblysomis corriae</i>	- Near threatened.

Oribi are restricted to untransformed grassveld providing short grass for grazing and tall grass for cover (Skinner & Chimimba, 2005) and are easily outcompeted by cattle overgrazing. The fynbos and pastures of the two study sites do not contain suitable Oribi habitat nor are they anywhere near to any suitable habitat for this species.

The fynbos golden mole is marginal for the study area (occurring mostly westwards), but it is also restricted to deeper soils at forest fringes and associated fynbos. The study sites, situated on hard sandstone rock outcrops and cropland with shallow soils certainly do not provide typical suitable habitat for this mole. It can thus be summarised that these Red Data listed mammal species are in no way threatened on the study area by the proposed quarrying activity, due to the lack of suitable habitat for either species as well as the small restricted area that will be ultimately impacted.

BIRDS

According to Barnes (2000), the following birds that occur in the same quarter degree as that of the study area, are listed in the Red Data Book for the birds of South Africa and may therefore occur in the study area.

COMMON NAME	SCIENTIFIC NAME	RED DATA BOOK CATEGORY
Martial eagle	<i>Polemaetus bellicosus</i>	Vulnerable
African marsh harrier	<i>Circus ranivorus</i>	Vulnerable
Blue crane	<i>Anthropoides paradiseus</i>	Vulnerable
Stanley's bustard	<i>Neotis denhami</i>	Vulnerable
White bellied korhaan	<i>Eupodotis cafra</i>	Vulnerable
Knysna warbler	<i>Bradypteris sylvaticus</i>	Vulnerable
Secretary bird	<i>Saggitarius serpentarius</i>	Near threatened

Table 3: Birds which may occur in study area

Due to the habitat types available on both study sites, the Knysna warbler can be excluded as a possible inhabitant because it prefers the dense tangled vegetation typical of watercourses, the edge of forests and open alien tree infestations (Hockey, et al, 2005). Similarly, the martial eagle can be excluded as it requires extensive ranges which include open woodland, savannah, forest edges, shrubland and drainage line woodland. The study sites provide neither a suitable area nor the required habitat. The known (published) distribution of

white-bellied korhaan, blue crane, Stanley's bustard, secretary birds and African marsh harrier coincides with the area in which the quarries are proposed.

1.1.8 Surface Water

There are no surface water resources of any significance on or near the proposed mining section. The main concerns raised in scoping related to:

- The impact of the proposed excavations on surrounding seeps and springs- DR Wilkie, Johan Muller (this is a groundwater issues and will be discussed under such heading)
- Impact on the Sand River and the Wetlands on Buffelsbos (Johan Muller).

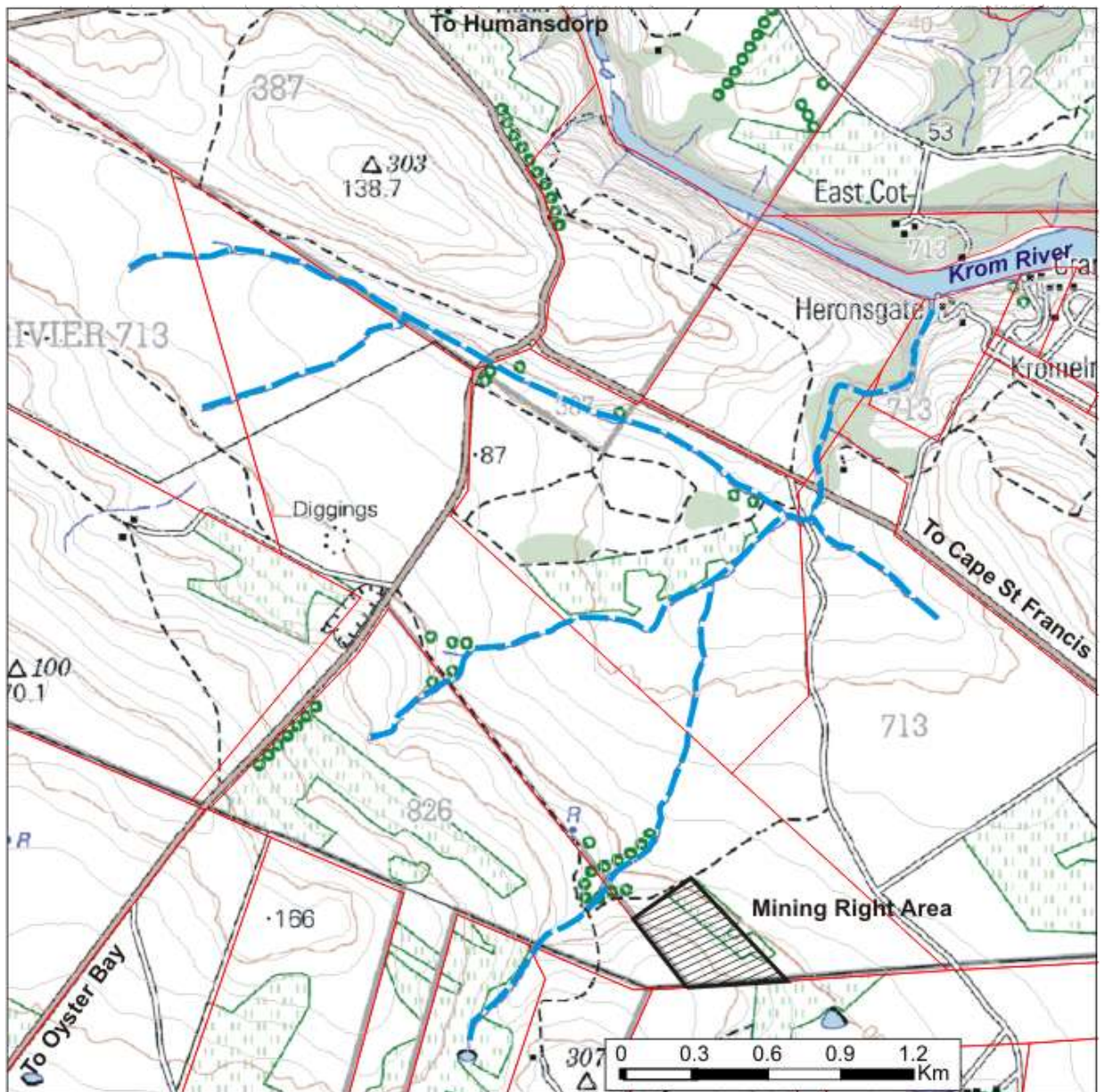


Figure 7: Surface Water Regime

The diagram above shows that the proposed mining right area faces in a direction away from the main and subordinate streams in the area. All basins in the areas

drain toward the Krom River, located some 2.5km north of the proposed mining right area.

1.1.9 Ground Water

The site is located in quaternary basin K90E which allows for 150m³ groundwater to be withdrawn per hectare per year (over the entire farm). Concern was expressed during the circulation of initial call for comments that the blasting may affect local groundwater sources. This resulted in the briefing of a specialist geohydrological study. Such study was completed and the entire report is contained in Annexure B.

The following paragraphs and diagrams are selected excerpts from that report which deal with the baseline environmental situation³:

“The Peninsula Formation is generally regarded as a significant aquifer. The very high quartz content in the sandstone renders it very brittle and far more prone to fracturing than ductile deformation. It is largely anisotropic, and groundwater flow and recharge is controlled by networks of fissures, joints, and fractures. Lithologically controlled springs are common in the TMG when impeding shale layers (such as the Cedarberg Formation) force groundwater to the surface.

Groundwater quality in the TMG is excellent, with Electrical Conductivities ranging between 5 and 70 mS/m (Meyer, 2001). The groundwater generally has a dominant Na Cl nature.

Numerous boreholes were visited and information obtained from land owners, the sites visited are presented in Map 3 (Appendix A). Where possible a water level was measured and field chemistry analysed. Table 2 presents the results and information obtained. While access to the farm Penny Sands was not permitted by the owner Roy Seeney information about a dry borehole drilled on his property was obtained from a neighbouring landowner – the borehole coordinates are therefore only an approximate.

³ Remember that the specialist study included both sections 1 and 2 which were proposed for mining. Section 1 has been cancelled and the mining right area is referred to as Section 2 in the geohydrology text.

Site	Type	Date	time	lat (WGS84)	long (WGS84)	elevation (mamsl)	WL (mbgl)	Pump/ rest	BH depth (mbgl)	BH yield (l/s)
Crouse_BH1	Borehole	24-May-12	15:15	-34.14983	24.72295	138	27.74	rest	110	~0.1
Gerber_BH1	Borehole	24-May-12	12:30	-34.15253	24.74361	103	24.2	pump	100	0.11
Gerber_BH2	Borehole	24-May-12	13:15	-34.15113	24.74429	99	2.875	rest	65	3.33
Gerber_S1	Spring	24-May-12	12:50	-34.15263	24.7449	95	0	rest	-	-
Gerber_S2	Spring	24-May-12	14:20	-34.13208	24.7176	87	0	rest	-	-
Knott_BH1	Borehole	24-May-12	13:45	-34.14510	24.74253	86	5.45	rest	50	11.11
Knott_BH2	Borehole	24-May-12	13:55	-34.14516	24.74249	84	5.631	rest	~100	<1
PennySands	Borehole	25-May-12		-34.14275	24.72269	123			100	0.1
Quarry1_P	Exploration Borehole	25-May-12	12:50	-34.14191	24.7279	108	6.67	rest	23.47	<0.1
Quarry1_V	Exploration Borehole	25-May-12	12:38	-34.14408	24.72815	123	16.885	rest	17	<0.1
Quarry1_W	Exploration Borehole	25-May-12	12:40	-34.14351	24.72805	120	-		5	Ex
Quarry2_C	Exploration Borehole	25-May-12	13:47	-34.15490	24.73879	117	8.93	rest	9	<0.1
Quarry2_F	Exploration Borehole	25-May-12	13:55	-34.15469	24.73786	116	9.6	rest	19.57	<0.1
Quarry2_H	Exploration Borehole	25-May-12	14:05	-34.15505	24.73713	118			7.58	<0.1
Quarry2_I	Exploration Borehole	25-May-12	14:12	-34.15537	24.73736	117	8.425	rest	21	<0.1
Quarry2_J	Exploration Borehole	25-May-12	14:25	-34.15597	24.73777	117	5.87	rest	17	<0.1
Quarry2_K	Exploration Borehole	25-May-12	14:40	-34.15554	24.73816	119	7.664	rest	20	<0.1
Wilkie_S1	Spring	25-May-12	10:45	-34.12857	24.72561	71	0	rest	-	-
Wilkie_S2	Spring	25-May-12	10:48	-34.12925	24.72576	73	0	rest	-	-
Wilkie_S3	Spring	25-May-12	10:51	-34.12948	24.72665	69	0	rest	-	-
Wilkie_S4	Spring	25-May-12	10:54	-34.12958	24.72766	69	0	rest	-	-
Wilkie_S5	Spring	25-May-12	11:00	-34.12951	24.72796	70	0	rest	-	-
Wilkie_S6	Spring	25-May-12	11:04	-34.13025	24.72625	74	0	rest	-	-
Wilkie_S7	Spring	25-May-12	11:28	-34.13078	24.73055	68	0	rest	-	-
Wilkie_S8	Spring	25-May-12	11:38	-34.13200	24.7278	73	0	rest	-	-

Table 4: Groundwater resources in the area

The diagram overleaf shows the location of the above tabled points of interest in relation to the proposed excavation (on Section 2).

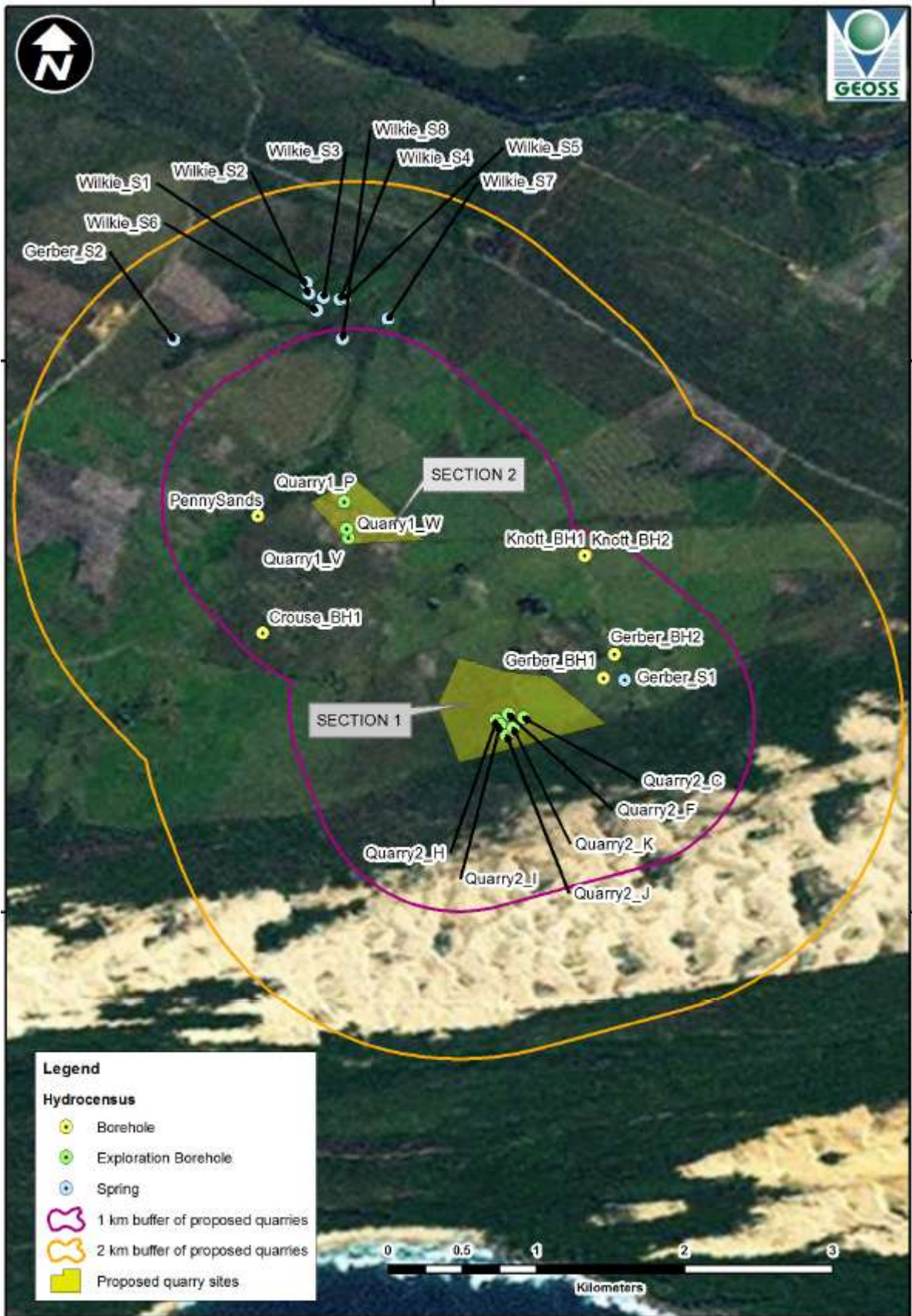


Figure 8: Hydrocensus (Groundwater)

1.1.10 Air Quality (Dust)

At present, the ambient dust levels are very low and any existing dust impact is the result of:

- Occasional vehicles on gravel roads in the area
- Very occasional ploughing of lands

1.1.11 Noise

Current noise generating activities in the area are related to:

- Traffic (not much) on unsurfaced roads in the area
- General minimal farm related noise

1.1.12 Blast Vibration

The closest existing structure⁴ to the proposed blasting area is the landowner farmstead which is located 600m from the closest point of the proposed excavation, whilst the closest proposed wind turbine (refer Para 4.3) is located 600m away to the north.

The transmissivity i.e. the capacity of this quartzitic sandstone to transmit blast vibration is probably similar to that of the transmissivity of Table Mountain Sandstone in which we have our most reliable blast vibration monitoring results. The table below shows that even at 700m where underlain by sandstone, structures would be at no risk.

Distance from blast	Expected recorded vibration level at respective distances PPV in mm/s (peak particle velocity)	USBM (United States Bureau of Mines) recommended limit
350m	3-6 mm/s	10 mm/s
700m	2 mm/s	10 mm/s

Table 5: Expected vs recommended vibration limits

It is further noted that the South African Standard recommended maximum PPV is 12.5 mm/s.

1.1.13 Fly Rock

Fly rock is legally acknowledged as being a potential impact within a radius of up to 500m. That means that the only potential impact is restricted to grazing lands which must be cleared of farm personnel and stock.

1.1.14 Socio economic profile of the area

The following socio-economic indicators have been sourced from the Community Profiles database of StatsSA as well as from the IDP for the wards within the Kouga Local Municipality (LM). Note that the data contained below is based on 2001 data and it is entirely possible that the stats may have changed since then, but in the absence of such stats, the 2001 census data has to form the basis for the Socio-Economic description.

⁴ Note that no reference is made here to the proposed wind turbines for which ROD has been granted to Red Cap Investments (Pty) Ltd - see para ___ for details.

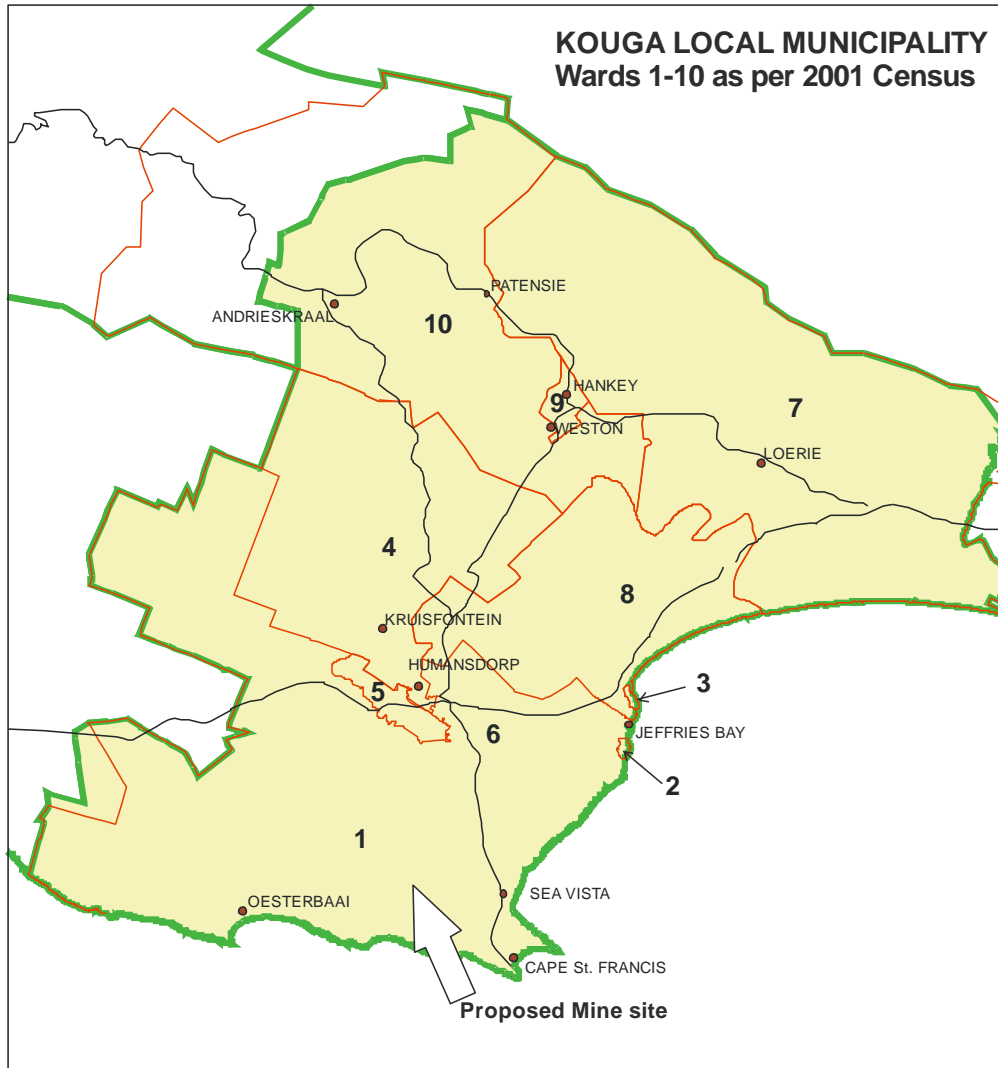


Figure 9: Locality in municipal / ward context

i. Gender Profile

WARD	SIZE KM ²	TOTAL POP	GENDER DISTRIBUTION		HOUSEHOLDS		SETTLEMENTS
			Female	Male	Male headed	Female headed	
Ward 1	579.6	4 967	2525	2442	1320	458	St Francis Bay, Sea Vista, Cape St Francis, Oyster Bay, Umzamowethu, Paradise, Aston Bay, Farms
Ward 2	1.2	7 871	3918	3953	1360	885	Pellsrus, Tokyo Sexwale
Ward 3	6.6	4 861	2554	2307	1577	385	Wave Crest, Kabeljous,
Ward 4	625.3	11 094	5425	5669	1877	618	Kruisfontein, Die Berg, Maak n Las , Andrieskraal
Ward 5	2.9	6 784	3552	3232	836	634	H"dorp CBD & Old town, Arcadia, Part of Kruisfontein,
Ward 6	3.2	6 895	3593	3302	1277	705	Kwanomzamo, Boskloof-Safery St
Ward 7	606.9	8 900	4525	4375	1799	566	Weston, Rooidraai, Loerie, Thornhill, Sunnyside,
Ward 8	332.2	4 651	2446	2205	1177	465	C – Place, Ocean View, Gamtoos farms, part of Golf course in H"dorp, Panorama

WARD	SIZE KM ²	TOTAL POP	GENDER DISTRIBUTION		HOUSEHOLDS		SETTLEMENTS
			Female	Male	Male headed	Female headed	
Ward 9	20.13	8 280	4441	3839	1190	797	Phillipsville, Centerton, Hankey
Ward 10	241.3	6 392	3376	3016	1137	449	Patensie, Ramaphosa
TOTAL	2 419.4	70 695	36 355	34 340	13 550	5 962	

Table 6: Socio-economic background: Gender Profile

ii. Population Profile

The table below reflects the expected growth rates for selected towns based on 2006 data (i.e. the year 5 figures are the expected populations in 2010). These figures are used in the determination of future service delivery.

Growth rate extrapolations

	GROWTH RATE	NO. OF HOUSE- HOLDS	CURRENT POP (2006)	EFFECTIVE POPULATION GROWTH				
				Year 1	Year 2	Year 3	Year 4	Year 5
Cape St Francis	1,5%	3031	2800	2842	2885	2928	2972	3016
Hankey	1%	3 039	11 721	11 838	11 957	12 076	12 197	12 319
Humansdorp	2%	5 617	23 991	24 471	24 960	25 459	25 968	26 488
Jeffreys Bay	2.50%	11 356	40 203	41 208	42 238	43 294	44 377	45 486
Loerie	0.50%	573	2 428	2 440	2 452	2 465	2 477	2 489
Oyster Bay	1.00%	533	1 016	1 026	1 036	1 047	1 057	1 068
Patensie	1.00%	928	3 845	3 883	3 922	3 962	4 001	4 041
Thornhill	0.50%	660	2 250	2 257	2 264	2 270	2 277	2 284

Table 7: Socio-economic profile: Population profile

iii. Economic Profile

The following excerpt from the IDP document clearly describes the key economic activities (as well as status) of the municipality:

Kouga has a low proportion of people aged under 20 years (34.99%) and a fair proportion of people aged over 64 years (6.10%). The Municipality is a top performer in the Eastern Cape with low rates of dependency (1.29), unemployment (24.67%) and poverty (31.36%). Municipal **productivity** is higher than the District and Provincial averages, principally due to high growth in value creation relative to employment and labour remuneration. Growth in GDP and employment, from 1996 to 2004, and skills available to the local economy, are higher than the Provincial average, while GDP per worker (formal and informal) is the lowest in Cacadu and second lowest in the Eastern Cape. Kouga has among the highest **Formal Economy Performance** scores, with positive factors including the positive trade balance, a fairly diversified economy, low financial grant dependence, and strong GDP and employment growth performance. The local economy has experienced a positive shift in share for employment and GDP from 1996 to 2004, and is one of only two municipalities in the Province to emerge as a leading economy in respect of both GDP and formal employment, provincially and nationally. The Municipality fares well on **Economic Absorption Capacity**, considering high total disposable income, employment multiplier and informal sector capacity to generate economic opportunities relative to formal employment. The Municipality has modest buying power and a somewhat negative income-expenditure balance. The local economy claims a **comparative advantage**, for both employment and GDP contribution, in agriculture (centred on agriculture and hunting at 9.87%

GVA and 27.99% employment) and construction (6.18% GVA and 10.42% employment). Kouga also claims GVA advantages in utilities (electricity supply, 1.82%, and water, 1.45%), trade (centred on retail trade at 9.03%) and community services (dominated by public administration at 6.69%). Leading products of the local economy include game and tourism, deciduous fruit and dairy. The Municipality is home to a string of popular coastal tourist destinations from Jeffreys Bay to Cape St Francis, and offers a wide range of activities and products including historical and heritage sites, the Kouga Cultural Centre, surfing, fishing, hiking, biking and sandboarding, birding and game viewing, and various other outdoor and adventure activities”

IDP Kouga Municipality 2007-2012

iv. Education Levels

Statistics for highest education level achieved are as follows:

<i>Highest education level</i>		
CATEGORY	NUMBER	PERCENTAGE (%)
No schooling	6952	10%
Grade 1-12	54894	78%
Certificate	551	1%
Diploma	1380	2%
Bachelors and higher	1126	2%
Not applicable	5790	8%
TOTAL	70693	100

Table 8: Socio-economic profile: Highest education levels

The IDP states the following in respect of the current status of education in the Municipality:

“The unemployment is perpetuated by the limited educational levels in the Municipality. The literacy rate for Kouga is 64.4% (2002), and was 60.5% in 1996. The statistics show an increase in the number of illiterate persons. That means almost a full third of the population is not literate, a significant factor for economic development and job creation. Almost 11% have no schooling and a further 40% only have primary school education i.e. 51% of the population has no or very little education”....

Social problems such as alcohol abuse, drug abuse, unemployment and the disintegration of families are important factors contributing to the dismal educational scenario. The foundation for future education starts at the availability and utilisation of pre-school facilities in order to create prepared minds. 894 children are enrolled in pre-school facilities. This needs to be compared with the total amount of 5 788 children aged between 0–4 years. The available statistics do not display children aged 5–6 as a category, but these children should still be added to the 0–4 year category. It is clear that only a small percentage of young children are currently benefiting from pre-school facilities. The table below [not reproduced here] does not list any pre-school facilities in Wards 4, 5 and 8. This could be problematic, with particular reference to Ward 4, which shows the highest number of children aged 0-4 years in the Municipality. Support should also be forthcoming to facilitate the registration and access to subsidies for all facilities”

The facts show a significant percentage of persons with low levels of formal education and this aspect is an area that should thus form one of the targets of the Social and Labour Plan. Also of importance is the very low pass rate in this Municipality:

National	66,6%
Provincial	59,3%
District	74,5%
Kouga	56.9%

Table 9: Socio-economic profile: Pass rates

v. Employment, Unemployment & Income Profile

The table below shows that any employment opportunities which do arise will be easily catered for in this situation.

	Eligible Work Force (19-65yrs)	Unemployed	
		#	%
Cape St Francis	1 523	305	20
Hankey	6 388	2 078	32.5
Humansdorp	13 051	2 662	20.4
Jeffreys Bay	21 870	4 462	20.4
Loerie	1 320	429	32.5
Oyster Bay	553	114	20.6
Patensie	2 092	830	39.7
Thornhill	1 224	398	32.5

Table 10: Socio economic profile: Employment

“The unemployment rate varies between 20% – 39%, depending on the area. The rural areas, namely Wards 7, 9 and 10, are most affected by unemployment. This is significantly higher than indicated in the Cacadu Study of 2005, which estimated the unemployment rate to be between 13 – 15%”. – IDP Kouga Municipality 2007-2012.

Household monthly income is shown in the table below. It is noteworthy that the statistics are based on 2001 figures and that they are higher than the average for the province and at a national level:

WARDS	NO INCOME		INCOME R 1 – R800		TOTAL	
	Households	% of total Households	Households	% of total Households	Households	% of total Households
Kouga	2257	11.5	4 151	21.3	6408	32.8
1	131	5.8	230	5.5	361	5.6
2	347	15.4	570	13.7	917	14.3
3	76	3.4	114	2.7	190	3
4	164	7.3	585	14.1	749	11.7
5	123	5.4	204	4.9	363	5.7
6	298	13.2	486	11.7	784	12.2
7	375	16.6	662	15.9	1037	16.2
8	97	4.3	287	6.9	384	6
9	519	23	491	11.8	1010	15.8
10	123	5.4	479	11.5	602	9.4

Table 11: Socio-economic profile: Household Income

Affordability based percentage of water/ sanitation bill of monthly household income:

	NUMBER OF HOUSEHOLDS WITH MONTHLY INCOME OF:					AFFORDABILITY			
	< R400	R401 TO R800	R801 TO R1600	R1601 TO R3200	> R3200	WATER		SANITATION	
						Typical Monthly Water bill	Avg % of Monthly Income	Typical Monthly Water bill	Avg % of Monthly Income
Cape St Francis	28	75	162	105	2659	R24	2.80%	*R48	5.60%
Hankey	172	457	979	641	789	R24	2.80%	R48	5.60%
Humans-Dorp	1163	1809	590	590	1465	R24	2.80%	R48	5.60%
Jeffreys Bay	2350	3656	1192	1192	2964	R24	2.80%	R48	5.60%
Loerie	98	200	128	106	41	R24	2.80%	R48	5.60%
Oyster Bay	100	48	58	43	284	R24	2.80%	R48	5.60%
Patensie	52	139	300	195	243	R24	2.80%	R48	5.60%
Thornhill	Unknown					Unknown			

Table 12: Socio-economic profile: Affordability

vi. Infrastructure: Housing

The table below shows the housing backlog to be serious cause for concern:

	HOUSING BACKLOG (SHORT TERM)	CURRENT HOUSING PROJECTS (NUMBER OF UNITS)	APPROVED HOUSING PROJECTS FOR 2007 - 2009
Kouga	10776	1037	633
Ward 1	840	Nil	Nil
Ward 2	2710	Nil	Nil
Ward 3	Nil	Nil	Nil
Ward 4	2000	607	Nil
Ward 5	860	Nil	Nil
Ward 6	860	Nil	Nil
Ward 7	910	40	273
Ward 8	680	Nil	360
Ward 9	1840	310	Nil
Ward 10	740	80	Nil

Table 13: Socio-economic profile: Housing Backlog

vii. Infrastructure: Water and Sanitation

Approximately 30% of the Municipal population have no access (in 2001) or very rudimentary access to toilets. This is far higher than the provincial percentage.

	BUCKET LATRINES HOUSEHOLDS & %		NO SANITATION HOUSEHOLDS & %	
Kouga	2671	13.6	2129	10.9
Ward 1	63	2.4	68	3.2
Ward 2	2	0.1	33	1.6
Ward 3	2	0.1	2	0.1
Ward 4	882	33	314	14.7
Ward 5	453	17	7	0.3
Ward 6	301	11.3	190	8.9
Ward 7	151	5.7	786	36.9
Ward 8	296	11.1	86	4

	BUCKET LATRINES HOUSEHOLDS & %		NO SANITATION HOUSEHOLDS & %	
Ward 9	508	19	328	15.4
Ward 10	8	0.3	309	14.5

Table 14: Socio-economic profile: Water and Sanitation

Water: 76% of households have access to water within their own properties whilst the remainder must use a community stand with a fairly significant 12% over 200m away or no access.

Access to Water

	NO PIPED WATER		STAND PIPES > 200 M		STAND PIPES <200M		PIPE WATER IN THE YARD		WATER IN DWELLING	
Kouga	476	2.40%	2218	11.30%	2113	10.80%	7134	36.50%	7603	38.9%
Ward 1	11	2.3	27	1.2	55	2.6	619	8.7	1066	14
Ward 2	3	0.6	332	15	468	22.1	1080	15.1	366	4.8
Ward 3	7	1.5	18	0.8	15	0.7	40	0.6	1883	24.8
Ward 4	116	24.4	308	13.9	552	26.1	725	10.2	794	10.4
Ward 5	4	0.8	15	0.7	1	0	647	9.1	806	10.6
Ward 6	6	1.3	287	12.9	197	9.3	749	10.5	744	9.6
Ward 7	223	46.8	423	19.1	199	9.4	986	13.8	531	7
Ward 8	9	1.9	344	15.5	21	1	329	4.6	940	12.4
Ward 9	34	7.1	350	15.8	183	8.7	1178	16.5	242	3.2
Ward 10	58	12.2	110	5	418	19	776	10	224	2.9

Table 15: Socio-economic profile: Access to water

viii. Infrastructure: Electricity

Only 32% of households have electrical connection for lighting while the remainder use mostly candles. This indicates a lower than average number of electrical connections than for the Local and District Municipality when compared with Provincial statistics, but the table below does show that electrification has increased at a faster rate than the number of new households thereby showing State commitment to the cause of electrification.

Electricity

	HOUSEHOLDS WITH ELECTRICITY (2001)	%	HOUSEHOLDS WITH ELECTRICITY (2006)	CURRENT HOUSING PROJECTS: WILL INCREASE NUMBER OF H/HOLDS
Kouga	4 663	24%	8237 (32%)	
Ward 1	192	10.70%	840	Nil
Ward 2	870	38.80%	2450	Nil
Ward 3	2	0.10%	0	Nil
Ward 4	592	23.70%	1900	607
Ward 5	64	4%	760	Nil
Ward 6	606	30.60%	537	354
Ward 7	928	39.20%	210	40
Ward 8	457	27.80%	0	Nil
Ward 9	612	30.80%	1490	310
Ward 10	320	20.20%	50	80

Table 16: Socio-economic profile: Access to electricity

1.2 Concise description of each of the existing environmental aspects both on the site applied for and in the surrounding area which may require protection or remediation.

Vegetation: The specialist has identified that although the vegetation patches do not provide any connectivity it does exist in an untransformed state on the rocky outcrop which is programmed for mining in terms of this application. This vegetation loss will be permanent and the specialist recommends that off-set be provided by the applicant (in the form of conservation of other rocky outcrops in the area) – This will have to be formalised with the landowner/s in the area.

“In summary, it is estimated that the Fynbos that occurs on the two study sites is not particularly sensitive and that the loss of this Fynbos will not be significant in terms of the conservation of this particular habitat type in the area” Biodiversity Sensitivity Analysis, 2012

1.3 Concise description of the specific land uses, cultural and heritage aspects and infrastructure on the site and neighbouring properties / farms in respect of which the potential exists for the socio-economic conditions of other parties to be affected by the proposed mining operation.

None.

1.4 Annotated map showing the spatial locality and aerial extent of all environmental, cultural/heritage, infrastructure and land use features identified on site and on the neighbouring properties and farms.

Refer the following maps contained herein:

<u>Figure 3: Surrounding Land Use</u>	page 3
<u>Figure 4: Existing Topography</u>	page 4
<u>Figure 5: Vegetation types</u>	page 9
<u>Figure 6: Site in CBA context</u>	page 10
<u>Figure 7: Surface Water Regime</u>	page 14
<u>Figure 8: Hydrocensus (Groundwater)</u>	page 17
<u>Figure 9: Locality in municipal / ward context</u>	page 19
<u>Figure 10: Final Site Layout Plan</u>	page 29
<u>Figure 11: Alternative land use: Windfarm</u>	page 37
<u>Figure 12: Surrounding and adjacent landowners</u>	page 52

In addition, Annexures A-C contain more detailed maps in respect of:

- Biodiversity
- Geohydrology
- Cultural/heritage issues

1.5 Confirmation that supporting documents in the form of specialist studies are attached as appendices.

The following annexures are attached:

- Annexure A: Biodiversity Sensitivity Analysis compiled by K. Coetzee of Conservation Management Services
- Annexure B: Specialist Geohydrological Assessment by GEOSS
- Annexure C: Heritage Impact Assessment and Phase 1 AIA by K van Ryneveld of Archaeomaps
- Annexure D: Palaeontological Impact Assessment by John Almond

2 The proposed mining operation.

2.1 The mineral to be mined.

Quartzitic sandstone for aggregate production (Peninsula formation).

2.2 The mining method to be employed and provide a concise description of the intended magnitude thereof in terms of volumes, depth and aerial extent.

Figure 10 below shows the final planned extent of the excavation. The floor of the excavation is planned to get to 55m amsl from an average natural ground level of 110m amsl (i.e. approximately 55m depth).

The surface extent of the excavation is 5.6ha (56 000m²).

Volume of the pit is calculated as follows:

Bench Level	Area (m ²)	Average depth(m)	Volume (m ³)
115	15 169	5	75 845
105	50 145	8	401 160
95	39 631	10	396 310
85	30 230	10	302 300
75	21 562	10	215 620
65	13 777	10	137 770
55	7 895	10	78 950
Total			1 607 955

Table 17: Reserve calculation

The volume above is m³ banked. The Specific Gravity of the material is 2.2t/m³ so total tonnage to be mined = 3 537 000tons (which at a sales rate of 240 000t/annum results in a lifespan of 15 years).

2.3 List of the main mining actions, activities, or processes.

The complete project will consist of the following actions, activities and processes from the establishment phase through to the decommissioning and after care phase:

Activity
1. PRE- ESTABLISHMENT ACTIVITIES
1.1. Approvals (Pre-establishment)
1.2. Site Survey to place facilities
1.3. Demarcate No-Go areas (inside of mining right area)
2. ESTABLISHMENT ACTIVITIES
2.1. Construct access road from existing farm track
2.2. Provide chemical toilets for site establishment staff
2.3. Fence & danger signpost the site
2.4. Supply header tanks
2.5. Connect to water supply from header tank to logistical facilities
2.6. Place Genset
2.7. Remove topsoil to berms in Logistics area
2.8. Remove topsoil to berms in Plant and Stockpiling area
2.9. Construct Primary Ramp
2.10. Construct haul road to excavation
2.11. Construct / Place Container for office and store
2.12. Place personnel amenities container
2.13. Construct Workshop with oil trap
2.14. Construct bunded fuel storage tank
2.15. Construct domestic and industrial waste collection point
2.16. Construct wash bay with oil trap
2.17. Cast concrete footings for crushing plant
2.18. Erect Crushing plant
2.19. Construct weighbridge
2.20. Establish stormwater management system
2.21. Initiate induction environmental training of staff
2.22. Install mist sprays on plant
2.23. Conduct post establishment Environmental Performance Assessment (EPA)
2.24. Remove topsoil in initial excavation expansion area
3. OPERATIONAL PHASE ACTIVITIES
3.1. Topsoil removal to perimeter stockpile ahead of face advance
3.2. Drilling
3.3. Blasting
3.4. Loading of shot rock
3.5. Hauling of shot rock
3.6. Crushing and screening of shot rock
3.7. Stockpiling of product
3.8. Loading of product for delivery
3.9. Use of workshop
3.10. Use of Refueling Facility
3.11. Use of access/delivery road to the site
4. OPERATIONAL PHASE MONITORING AND REHABILITATION ACTIVITIES
4.1. Monitor fly rock during and after blasting
4.2. Record blast ground and air vibration
4.3. Monitor dust blowing in N2 direction

Activity
4.4. Conduct EPA (bi-annually)
4.5. Maintain stormwater system
4.6. Maintain dust control sprinklers on plant
4.7. Maintain access/delivery road
4.8. Collection of waste bins
4.9. Enforce no-go area access
4.10. Decontaminate floors and diesel tank
4.11. Operational Rehabilitation - upper perimeter face splitting
5. DECOMMISSIONING PHASE ACTIVITIES
<i>Complete rehabilitation of the excavation through:</i>
5.1. Conduct upper bench splitting of hard face
5.2. Retain safety fence and berm around top of excavation rim
5.3. Allow excavation floor to flood as reedbed
5.4. Retain haul road access
<i>Complete rehabilitation of the logistical facility, plant and stockpiling area through:</i>
5.5. Demolish all unrequired structures
5.6. Remove all process plant and steel structures
5.7. Remove all protruding foundations and footings
5.8. Remove all pipelines and cables
5.9. Remove ramp to bottom of pit
5.10. Remove diesel tank & decontaminate
5.11. Remove weighbridge concrete structures
5.12. Rip / scarify all hardened areas
5.13. Replace Topsoil ex berms in the plant and logistics area
5.14. Replace Topsoil ex berms in stockpile area
5.15. Re-vegetate plant & logistics area by seeding
5.16. Seed stockpile area
5.17. Retain stormwater management system
5.18. Retain access roads for future use
6. AFTERCARE PERIOD
6.1. Maintain stormwater management system
6.2. Remove alien vegetation (Black wattle, Port Jackson and Rooikrans)
6.3. Conduct supplementary seeding if necessary
6.4. Conduct final performance assessment
6.5. Lodge closure Application
6.6. DME Grant Closure Application

Table 18: List of activities

2.4 Plan showing the location and aerial extent of the aforesaid main mining actions, activities, or processes as required to calculate the financial provision in accordance with the Department's published guideline. (Reg. 51(b) (v)).

The figure below illustrates the proposed full extent of mining (excavation, stockpiling area, processing area and logistical facilities area):

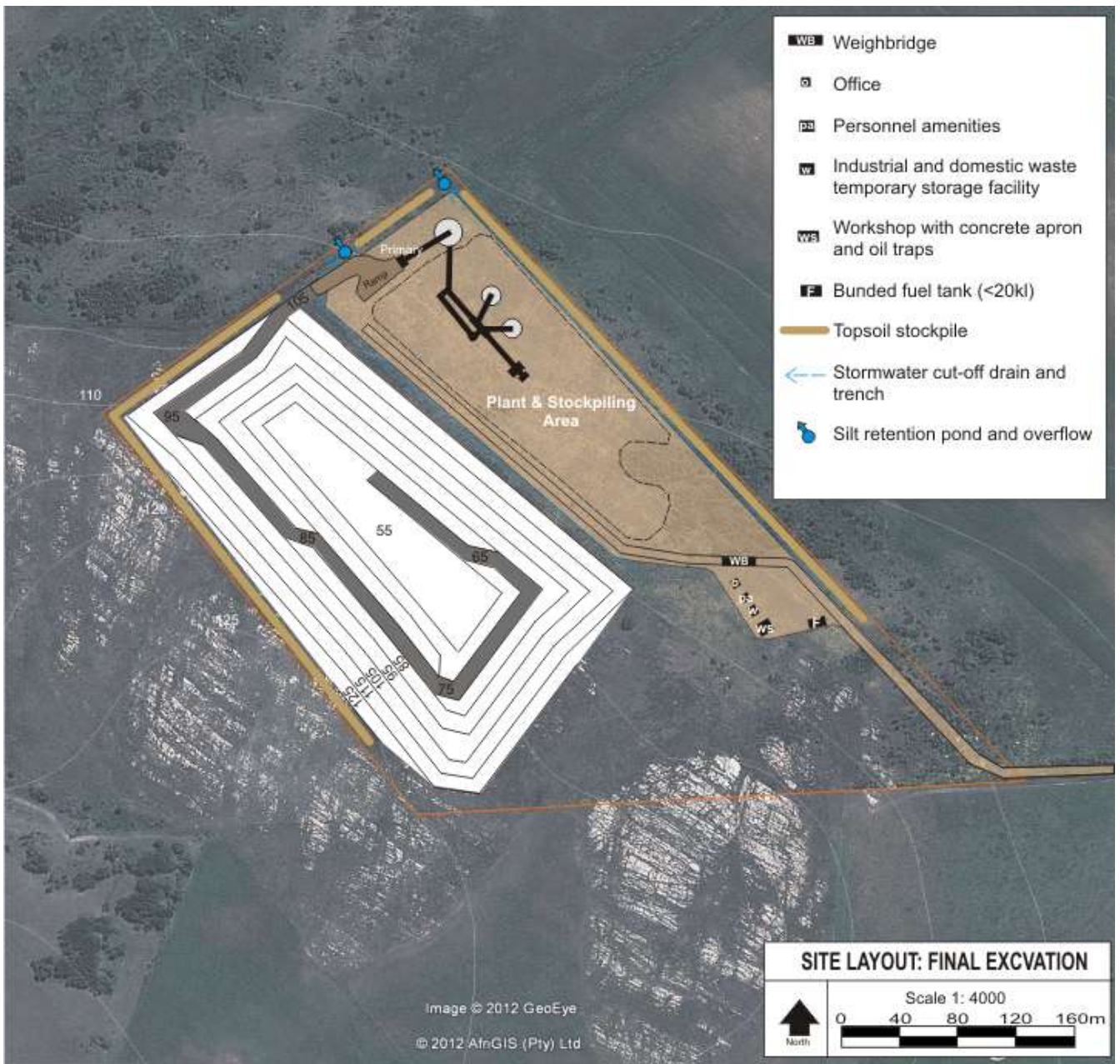


Figure 10: Final Site Layout Plan

The 14.4ha mining right area is proposed to be made up of the following:

- Excavation area: 5.6ha
- Plant stockpiling and logistical facility area: 3.6ha
- Remaining area = 5.1ha for topsoil storage, stormwater management, access road on site and no go area/s

2.5 Listed activities (in terms of the NEMA ETA regulations) which will be occurring within the proposed project.

The following activities represent listed activities which could in theory be applicable to the mine and were listed in the scoping report. Progress / alterations to this are as contained in “comment” column where applicable:

In terms of Listing Notice 1 (i.e. No.R. 544):

Listing #	Description	Comment
11	Construction of(ii) channels.... where such construction occurs within 32 m of a watercourse...	Not going to happen.
22	Construction of any road where no road reserve exists and the road is wider than 8m	Unlikely but must be borne in mind when specifying construction phase activities.
23	Transformation of vacant land to... industrial use, outside urban area where total area to be transformed is bigger than 1ha but less than 20ha	Yes. The excavation will measure 5.6ha in total. The plant and stockpiling disturbance area will measure 3.6ha
56	Phased activities	

Table 19: Possible listed activities (Listing notice 1)

In terms of Listing Notice 2 (i.e. No.R. 545):

Listing #	Description	Comment
15	Physical alteration of vacant land for ... industrial use where total area to be transformed is 20ha or more.	No. The excavation will measure 5.6ha in total. The plant and stockpiling disturbance area will measure ±3.6ha
20	Any activity which requires a mining right	Yes

Table 20: Possible listed activities: Listing Notice 2

In terms of Listing Notice 3 (i.e. No. R. 546) for Eastern Cape:

Listing #	Description	Comment
4	Construction of a road wider than 4m ... outside urban areas in Critical Biodiversity areas	Any roads constructed wider than 4m
10	Construction of facilities... for storage of ... dangerous good... combined capacity of 30m ³	Unlikely that storage will exceed 30m ³ on this site but must be specified
12	The clearance of an area of 300m ² or more of vegetation where 75% or more of the cover constitutes indigenous vegetation... in a CBA identified in bioregional plan	No. The excavation area is not in CBA
13	The clearance of an area of 1ha or more of vegetation where 75% or more of the cover constitutes indigenous vegetation... in a sensitive area as identified in an EM framework as contemplated in Chapter 5 of the (NEM)Act and adopted by the competent authority	Uncertain. Does the excavation area fall within a defined sensitive area
14	The clearance of an area of 5ha or more of vegetation where 75% or more of the cover constitutes indigenous vegetation...outside urban area	Yes. The excavation is located within untransformed vegetation and is proposed to measure 5.6ha
19	Widening of existing road by more than 4m ... outside urban areas in Critical Biodiversity areas... or in sensitive area	Any roads widened by more than 4m – none planned at this stage
26	Phased activities	

Table 21: Possible listed activities: Listing notice 3

2.6 Indication of the phases (construction, operational, decommissioning) and estimated time frames in relation to the implementation of these actions, activities or processes and infrastructure.

A simplified time frame diagram is as shown in the table below:

	Years																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Pre-establishment and construction phase	■																			
Operational Phase		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
Decommissioning rehabilitation Phase																	■			
Aftercare Phase																		■	■	
Closure Application																				■

Table 22: Simplified time schedule of activities

2.7 Confirmation if any other relevant information is attached as appendices.

None.

3 The potential impacts

3.1 List of the potential impacts, on environmental aspects separately in respect of each of the aforesaid main mining actions, activities, processes, and activities listed in the NEMA ETA regulations.

The following table lists each of the activities which may generate impacts. The shaded blocks represent a ***potential*** impact which could ***conceivably*** occur, but this is before any attenuation and is not ranked.

Activity	Geology	Topography	Topsoil	Vegetation	Land Capability	Ground Water	Surface Water	Animal Life	Noise	Air Quality (Dust)	Fly Rock	Visual	Social/ Economic	Archaeology/Cultural	Vibration	Hydrocarbon Impact	Traffic /Access
1. PRE- ESTABLISHMENT ACTIVITIES																	
1.1. Approvals (Pre-establishment)																	
1.2. Site Survey to place facilities																	
1.3. Demarcate No-Go areas																	
2. ESTABLISHMENT ACTIVITIES																	
2.1. Construct access road from existing farm track			■	■				■	■	■				■		■	■
2.2. Provide chemical toilets for site establishment staff						■											
2.3. Fence & danger signpost the site													■				
2.4. Install header tanks												■				■	
2.5. Connect to water supply from header tank to logistical facilities																	
2.6. Place Genset																■	
2.7. Remove topsoil to berms in Plant, Stockpiling and Logistics area			■	■			■	■	■	■		■		■		■	
2.8. Construct Primary Ramp		■							■	■		■				■	
2.9. Construct haul road to excavation									■	■							
2.10. Construct / Place Container for office and store																	
2.11. Place personnel amenities container																	
2.12. Construct Workshop with oil trap																	
2.13. Construct bunded fuel storage tank																	
2.14. Construct domestic and industrial waste collection point																	
2.15. Construct wash bay with oil trap																	
2.16. Cast concrete footings for crushing plant																	

Activity	Geology	Topography	Topsoil	Vegetation	Land Capability	Ground Water	Surface Water	Animal Life	Noise	Air Quality (Dust)	Fly Rock	Visual	Social/ Economic	Archaeology/Cultural	Vibration	Hydrocarbon Impact	Traffic /Access
2.17. Erect Crushing plant																	
2.18. Construct weighbridge																	
2.19. Establish stormwater management system																	
2.20. Initiate induction environmental training of staff																	
2.21. Install mist sprays on plant																	
2.22. Conduct post establishment Environmental Performance Assessment (EPA)																	
2.23. Remove topsoil in initial excavation expansion area																	
3. OPERATIONAL PHASE ACTIVITIES																	
3.1. Topsoil removal to perimeter stockpile ahead of face advance																	
3.2. Drilling																	
3.3. Blasting (I.e. Face Advance)																	
3.4. Loading of shot rock																	
3.5. Hauling of shot rock																	
3.6. Crushing and screening of shot rock																	
3.7. Stockpiling of product																	
3.8. Loading of product for delivery																	
3.9. Use of workshop																	
3.10. Use of Refueling Facility																	
3.11. Use of access/delivery road to the site																	

Table 23: List of potential impacts

3.2 List of all potential cumulative environmental impacts.

The only current identified land use is that of *cattle farming*. So cumulative impacts do not accrue given the single land use.

The alternative land use is identified as Conservation which has such limited negative impacts that the impacts identified in this report represent the cumulative impact.

The proposal to use the site as a windfarm does result in the mine presenting cumulative impacts as follows:

Visual Impact: In addition to the visual impact of the wind turbines, the mine would result in another potential source of visual impact. Note however that the

turbines are largely placed away from roads but are up to 150m high(?). The proposed excavation will at most represent a moderate impact.

Vegetation: The impact of wind turbines and associated infrastructure on local endemism and habitats is not known (to this writer) in detail. Specialist study has been conducted at this site and it has been shown that off-set should be implemented to mitigate the impact of the loss of vegetation that will be attributable to the excavation in untransformed vegetation remnant.

Noise and dust: The windfarm will only result in noise and dust during the construction phase and provided the quarry and the construction phase do not overlap, then there will be no accumulated impact. If the construction phase of the wind turbines does overlap with mining, then some minor accumulated negative impact will occur.

The proposal for the location of the Nuclear Plant at Thyspunt. When considering the location of the mine, this results in the following cumulative impacts:

Vegetation: There is no cumulative impact given the location of the plant in a different vegetation type.

Noise and dust: The nuclear plant will only result in noise and dust during the construction phase and provided the quarry and the construction phase do not overlap, then there will be no accumulated impact. If the construction phase of the wind turbines does overlap with mining, then some minor accumulated negative impact will occur.

Traffic and safety: Unknown but it is unlikely that the access to the power plant will be along any of the roads used by the quarry. Most traffic will in any event take place during the construction phase. Heavy truck movement will occur between quarry and the mine.

So even though the proposed nuclear plant is located only a few km from the proposed mine, the cumulative impact is very minor given the separation created by different drainage basins & different vegetation types.

When both the windfarm and the nuclear plant are considered together with the proposed mine, then the following cumulative impacts occur, (including those listed above):

Socio-economic Impact: Purely from a job creation point of view, the proposed confluence of all of these activities will result in significant positive impact, however there will no doubt be negative impact on tourism (on that which does exist in the area between Cape St Francis and Oyster Bay), and possibly on house prices and property values in the area.

3.3 State specifically whether or not there is a risk of acid mine drainage or potential groundwater contamination associated

with the mineral to be mined. (If such a risk is associated with the mineral to be mined provide a summary of the findings and recommendations of a specialist geo-hydrological report in that regard).

No such potential exists.

4 The alternative land use or developments that may be affected.

4.1 Concise description of the alternative land use of the area in which the mine is proposed to operate.

The only reasonable alternative land uses identified are as follows:

Farming: The proposed mining area has a marginal arable agricultural potential (www.agis.agric.za). The only feasible agricultural use for the land is for cattle farming as is currently the case. Mining will contribute significantly more to job opportunities and economic upliftment in the area, especially when considering the small footprint required against the backdrop of the vast cattle farms required.

Conservation: The long term use of the land as conservation is not precluded by the proposed mining.

Power Generation: the area has been subject to application for wind farm. Such windfarm has been approved and the two parties have been in consultation to ensure no conflict of interests.

4.2 List and description of all the main features and infrastructure related to the alternative land uses or developments.

Farming: Cattle farming. No infrastructure in the vicinity of the mine – just grazing

Conservation: No infrastructure in the vicinity of the mine. Note that the use of the site for conservation would require intervention by landowner.

Power Generation: Requires access routes to wind turbines, wind turbine foot pedestals, wind turbines themselves and possibly material source for roads and concrete footings.

4.3 Plan showing the location and aerial extent of the aforesaid main features of the alternative land use and infrastructure related to alternative land developments identified during scoping.



Figure 11: Alternative land use: Windfarm

5 The potential impacts of the alternative land use or development

5.1 List of the potential impacts of each of the aforesaid main features and infrastructure related to the alternative land use or development and related listed activities.

Farming: Cattle farming. No impact except perhaps on natural vegetation should overgrazing occur. Note that most natural vegetation has in any event been replaced with pasture species in the region.

Conservation: No infrastructure in the vicinity of the mine. Positive impact in terms of the natural environment.

Power Generation: The potential impacts which arise from development of the windfarm are impacts as follows:

- Negative:
 - Disturbance of vegetation remnants
 - Visual Impact
 - Impact on fauna – habitat destruction, etc.
 - Archaeology
- Positive:
 - Socio-economic
 - Provision of “clean” renewable energy

5.2 Description of all potential cumulative impacts of the main features and infrastructure related to the identified alternative land uses or developments.

Refer Para 3.2.

6 Identification of potential social and cultural impacts.

6.1 List of potential impacts of the proposed mining operation on the socio-economic conditions of other parties’ land use activities.

The only potential direct threat to agricultural production is to the income of the landowner. Such “threat” is offset by the income received for the rental of the surface. No surrounding landowner’s agricultural income will be affected (except possibly for 15minutes every month or quarter when 500m should be cleared of farm personnel and stock)

6.2 Description of the cultural and heritage aspects that will potentially be affected, and describe the potential impact on such cultural / heritage aspect. (In cases where such features are not applicable the applicant must still include the item in the list and describe it as not applicable).

Specialist study has been undertaken to describe the impact on archaeological, cultural and heritage issues. The full report is contained in Annexure C, but concludes in each case as follows:

Archaeological (Section 2):

Based on surface artefact quantities and specifically archaeological context, the FS1 Stone Age occurrence at Section 2 is ascribed a SAHRA Low Significance

and Generally Protected C Field Rating. It is recommended that development in the area proceeds as applied for provided that:

- Development proceeds under a SAHRA Site Destruction Permit – Based on post depositional and ongoing landscape formation processes more artefacts may well be encountered during development; and
- Development be preceded by a brief archaeological site inspection – Disturbed artefact contexts together with low artefact densities hold little potential for future research aside from basic typological and technological descriptions, but the impact of post depositional and landscape formation processes on deposits are potentially significant specifically within the field of landscape archaeology.

Cultural:

Impact of the Mining Right Application on Klein Rivier (Farm 713-32) and Buffelsbosch (Farm 742-14), Humansdorp District Project on the cultural landscape can be described as high and permanent, but limited to the immediate study sites. Being situated north of the Holocene dune landscape and within fair distance from major public access roads and areas of habitation, visual impact of the development on the cultural landscape can be described as low.

6.3 Quantification of the impact on the socio-economic conditions of directly affected persons.

PERSPECTIVES ON SOCIO-ECONOMIC/ECONOMIC IMPACT

The socio-economic impact of the quarry is assessed within the following perspectives:

(a) Regional Context

- The site is located within the western district municipality which includes:
 - i. Regional service centre of Humansdorp and Jeffries Bay
 - ii. Tourism centre and holiday destination of St Francis Bay & Cape St Francis
 - iii. Holiday homes in Oyster Bay
 - iv. Farming: Mostly cattle

The quarries stated prime function is to serve the proposed nuclear power plant, windfarm and associated infrastructure, however should these markets not materialise then the quarry will still operate at a lesser volume as a commercial quarry as a regional aggregate supplier. Its socio-economic impact likewise relates to regional level assessment.

- The site itself is located exactly midway between Oyster Bay and St Francis Bay and despite its proximity to these centres is located away from tourist views.
- The Red Cap windfarm has been approved.

(b) Surrounding Land Use Context

The surrounding land use consists of:

- The overwhelming majority of surrounding land use consists of cattle farming.
- The closest road is the link between St Francis Bay and the Oyster Bay / Humansdorp Road. This is a little used road and at the time of assessment was in a very poor condition. It is located 1.5km NE of the proposed excavation.
- The closest communities are the Oyster Bay and Cape St Francis communities, each 8km west and east of the excavation respectively.
- The closest residences are located 0.6km to the SE and SW

(c) Socio-Economic Upliftment

As there is no immediate previously disadvantaged community living on or adjacent to the site, the socio-economic contribution of the project can only focus on the labour sending communities of Oyster Bay and Cape St Francis.

The quarry will develop additional job opportunities.

The applicant company is bound by prescriptions of the Social and Labour Plan to contribute to the community's skills development and must also implement a Local Economic Development project which meets the satisfaction of the DMR and local authority. Negotiations are still underway in this regard.

POTENTIAL IMPACTEES

(a) Labour Sending Community

(i) Community Skills Development:

The applicant has committed to the provision of (a limited number) of bursaries (at FET college), Learnerships, School support etc. for member of the community (i.e. above and beyond their responsibility to staff)

(ii) Positive socio-economic programmes

As detailed in the Social and Labour Plan as has been tabled to the DMR, the applicant has committed itself to as yet not finalised LED project which must serve as many members of the community as possible and the project must be sustainable after quarry closure.

(b) Agricultural Economy

The only potential direct threat to agricultural production is to the income of the landowner who will receive income for the rental of the surface. No surrounding landowner's agricultural income will be materially affected.

(c) Tourism Industry

The quarry is not on a tourist route and although visible to traffic on the little used link between Cape St Francis and the Humansdorp-Oyster Bay road, such views are from a distance of 1.5km (probably within a future windfarm) .

POTENTIAL ECONOMIC AND SECONDARY SOCIO-ECONOMIC IMPACT OF IMPUMA QUARRY ON EXISTING COMMERCIAL OPERATIONS

Comment/concern has been raised on the basis that the market is not growing and that a turn-down in demand could lead to curtailment of existing quarry sector employment in the region in light of an additional producer being introduced at Impuma. This argument /concern only applies if the Nuclear Power Station and windfarm do not materialise. If such alternative land uses do not materialise then the production rate will drop to be in the order of 10 000tons per month.

This site is the only quarry in the area which would crush hard rock (as opposed to ENON pebble) and thus will be able to supply G2 base course at a reduced cost to the regions road maintenance programme. G2 quality material cannot be supplied by the pebble quarries

7 Assessment and evaluation of potential impacts.

7.1 List of each potential impact identified in paragraphs 3 and 6 above.

Activity
1. PRE- ESTABLISHMENT ACTIVITIES
1.1. Approvals (Pre-establishment)
1.2. Site Survey to place facilities
1.3. Demarcate No-Go areas
2. ESTABLISHMENT ACTIVITIES
2.1. Construct access road from existing farm track impact on:
2.1.1. Topsoil
2.1.2. Vegetation
2.1.3. Land Capability
2.1.4. Noise
2.1.5. Air Quality
2.1.6. Archaeology
2.1.7. Hydrocarbon Impact
2.1.8. Traffic
2.2. Provide chemical toilets for site establishment staff impact on:
2.2.1. Groundwater
2.3. Fence & danger signpost the site
2.4. Install header tanks impact on:
2.4.1. Visual impact
2.4.2. Hydrocarbon
2.5. Connect to water supply from header

Activity
tank to logistical facilities
2.6. Place Genset (impact on)
2.6.1. Hydrocarbon
2.7. Remove topsoil to berms in Plant, Stockpiling and Logistics area impact on:
2.7.1. Soil
2.7.2. Vegetation
2.7.3. Land Capability
2.7.4. Surface Water
2.7.5. Animal Life
2.7.6. Noise
2.7.7. Air quality
2.7.8. Visual
2.7.9. Archaeology
2.7.10. Hydrocarbon
2.8. Construct Primary Ramp could impact on
2.8.1. Topography
2.8.2. Noise
2.8.3. Dust
2.8.4. Hydrocarbon
2.9. Construct haul road to excavation
2.10. Construct / Place Container for office and store
2.11. Place personnel amenities container
2.12. Construct Workshop with oil trap
2.13. Construct bunded fuel storage tank
2.14. Construct domestic and industrial waste collection point
2.15. Construct wash bay with oil trap
2.16. Cast concrete footings for crushing plant
2.17. Erect Crushing plant could impact on
2.17.1. Visual aspects
2.17.2. Hydrocarbon pollution
2.18. Construct weighbridge
2.19. Establish stormwater management system could impact on:
2.19.1. Topography
2.19.2. Topsoil
2.19.3. Noise
2.19.4. Air Quality
2.19.5. Hydrocarbon
2.20. Initiate induction environmental training of staff
2.21. Install mist sprays on plant
2.22. Conduct post establishment Environmental Performance Assessment (EPA)
3. OPERATIONAL PHASE ACTIVITIES

Activity
3.1. Topsoil removal to perimeter stockpile ahead of face advance
3.1.1. Soil
3.1.2. Vegetation
3.1.3. Land Capability
3.1.4. Surface Wtare
3.1.5. Animal Life
3.1.6. Noise
3.1.7. Air quality
3.1.8. Visual
3.1.9. Archaeology
3.1.10. Hydrocarbon
3.2. Drilling
3.2.1. Noise
3.2.2. Dust
3.2.3. Hydrocarbon
3.3. Blasting (I.e. Face Advance)
3.3.1. Geology
3.3.2. Topography
3.3.3. Noise
3.3.4. Dust
3.3.5. Fly Rock
3.3.6. Visual Aspects
3.3.7. Vibration
3.4. Loading of shot rock
3.4.1. Noise
3.4.2. Dust
3.4.3. Hydrocarbon pollution
3.5. Hauling of shot rock
3.5.1. Noise
3.5.2. Dust
3.5.3. Hydrocarbon pollution
3.6. Crushing and screening of shot rock
3.6.1. Noise
3.6.2. Dust
3.6.3. Hydrocarbon Pollution
3.7. Stockpiling of product
3.7.1. Noise
3.7.2. Dust
3.7.3. Hydrocarbon pollution
3.8. Loading of product for delivery
3.8.1. Dust
3.8.2. Hydrocarbon Pollution
3.9. Use of workshop
3.9.1. Hydrocarbon Pollution
3.10. Use of Refueling Facility
3.10.1. Hydrocarbon Pollution
3.11. Use of access/delivery road to the site
3.11.1. Noise
3.11.2. Dust

Activity
3.11.3. Hydrocarbon pollution
3.11.4. Traffic/safety

7.2 Concomitant impact rating for each potential impact listed in paragraph 7.1 above

This section describes the impact of the proposed mining programme. The impacts are rated according to nature, extent, duration, probability of occurring and significance.

a) The significance level is based on the following criteria:

Significance		Criteria
Negative	Significant (S)	<ul style="list-style-type: none"> Recommended level always exceeded with associated widespread community action Disturbance to areas that are pristine, have conservation value, are important resource to humans and will be lost forever Complete loss of land capability Destruction of rare or endangered specimens May affect the viability of the project
	Moderate (M)	<ul style="list-style-type: none"> Moderate measurable deterioration and discomfort Recommended level occasionally violated – still widespread complaints Partial loss of land capability Complete change in species variety or prevalence May be managed Is insignificant if managed according to EMP provisions
	Minor/ (I) Insignificant	<ul style="list-style-type: none"> Minor deterioration. Change not measurable Recommended level will rarely if ever be violated Sporadic community complaints Minor deterioration in land capability Minor changes in species variety or prevalence
	Negligible	<ul style="list-style-type: none"> An impact will occur but it is barely discernible and not worthy of further investigation
Positive	Minor	<ul style="list-style-type: none"> Improvements in local socio-economics
	Significant	<ul style="list-style-type: none"> Major improvements in local socio-economics with some regional benefits

b) The **duration** is classified as

- Permanent (post-closure)
- Life of Mine (LOM)
- Temporary

c) The **probability** is ranked as

- Definite/Certain
- Possible
- Unlikely

Activity	Nature of impact	Extent	Duration	Probability	Significance
1. PRE- ESTABLISHMENT ACTIVITIES					

Activity	Nature of impact	Extent	Duration	Probability	Significance
1.1. Approvals (Pre-establishment)	None				
1.2. Site Survey to place facilities	None				
1.3. Demarcate No-Go areas	None				
2. ESTABLISHMENT ACTIVITIES					
2.1. Construct access road from existing farm track impact on:					
2.1.1. Topsoil	Topsoil disturbance will occur through removal to side of road prior to construction	From existing farm access road to quarry = 700m in order of 4m wide	Life of mine / Probably permanent	Definite	Insignificant
2.1.2. Vegetation	Vegetation will be removed along with topsoil. No natural vegetation will be removed	From existing farm access road to quarry = 700m in order of 4m wide	Life of mine / Probably permanent	Definite	Negligible
2.1.3. Land Capability	The road length will be lost to cattle grazing and will be fenced	From existing farm access road to quarry = 700m in order of 4m wide	Life of mine / Probably permanent	Definite	Negligible
2.1.4. Noise	Earthmoving equipment during construction	Local	Establishment phase	Definite	Negligible
2.1.5. Air Quality	Earthmoving equipment during construction	Local	Establishment phase	Definite	Negligible
2.1.6. Archaeology	Possible disturbance of artefacts	Point	Permanent	Unlikely	Insignificant
2.1.7. Hydrocarbon Impact	Potential for fuel and oil leaks by earthmoving equipment	Point	Temporary	Unlikely	Negligible to Insignificant
2.1.8. Traffic	Increased traffic during establishment phase	Regional (i.e. between Humansdorp & Mine)	Establishment Phase	Definite	Negligible
2.2. Provide chemical toilets for site establishment staff impact on:					
2.2.1. Groundwater	Possible leak of personnel amenities	Point	Until more suitable amenities supplied	Unlikely	Negligible
2.3. Fence & danger signpost the site	None				
2.4. Install header tanks impact on:					
2.4.1. Visual impact	Header tanks could be visible to surrounding roads	Distant – roads 1.7km away	Life of mine	Unlikely	Negligible
2.4.2. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Point	During construction	Unlikely	Negligible to Insignificant
2.5. Connect to water supply from header tank to logistical facilities	None				
2.6. Place Genset (impact on)					
2.6.1. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Point	During construction	Unlikely	Negligible to Insignificant
2.7. Remove topsoil to berms in Plant, Stockpiling and Logistics area impact on:					
2.7.1. Soil	Topsoil will be removed to topsoil berms	3.6ha	Life of mine	Definite	Moderate

Activity	Nature of impact	Extent	Duration	Probability	Significance
2.7.2. Vegetation	Vegetation will be removed along with topsoil. Some natural vegetation will be removed	3.6ha	Life of mine	Definite	Moderate
2.7.3. Land Capability	The area will be lost to cattle grazing and will be fenced to keep stock out	3.6ha	Life of mine	Definite	Insignificant
2.7.4. Surface Water	Contribution to drainage basin will be altered, but flow will still occur. Remember there are currently no water channels on the site	3.6ha	Life of mine	Definite	Insignificant
2.7.5. Animal Life	Habitat will be disturbed on footprint and activity will result in less animal life in the vicinity	Local area / immediate vicinity	Life of mine ⁵	Definite	Insignificant to moderate ⁵
2.7.6. Noise	Earthmoving equipment during construction	Local	Establishment phase	Definite	Negligible
2.7.7. Air quality	Earthmoving equipment during construction	Local area / immediate vicinity	Establishment phase	Definite	Insignificant
2.7.8. Visual	Denuded area may be visible to traffic along road	For lengths of the link road between Cape St Francis and Oyster Bay when travelling west.	Life of mine	Definite	Insignificant
2.7.9. Archaeology	Destruction of artefacts	Point	Occurs at establishment... permanent impact	Unlikely	Insignificant
2.7.10. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Point	During construction	Unlikely	Negligible to Insignificant
2.8. Construct Primary Ramp could impact on					
2.8.1. Topography	Construction of ramp to 5m in height (max)	Point	Life of mine	Definite	Insignificant
2.8.2. Noise	Earthmoving equipment during construction	Local	Establishment phase	Definite	Negligible
2.8.3. Dust	Earthmoving equipment during construction	Local area / immediate vicinity	Establishment phase	Definite	Insignificant
2.8.4. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Point	During construction	Unlikely	Negligible to Insignificant
2.9. Construct haul road to excavation	None. Topsoil already removed during development of plant, stockpiling and logistical facility area				
2.10. Construct / Place Container for office and store	None. Topsoil already removed during development of plant, stockpiling and logistical facility area				
2.11. Place personnel amenities container	None. Topsoil already removed during development of plant, stockpiling and logistical facility area				
2.12. Construct Workshop with oil trap	None. Topsoil already removed during development of plant, stockpiling and logistical facility area				
2.13. Construct bunded fuel storage tank	None. Topsoil already removed during development of plant, stockpiling and logistical facility area				
2.14. Construct domestic and industrial waste collection point	None. Topsoil already removed during development of plant, stockpiling and logistical facility area				
2.15. Construct wash bay with oil trap	None. Topsoil already removed during development of plant, stockpiling and logistical facility area				
2.16. Cast concrete footings for crushing plant					
2.17. Erect Crushing plant could impact on					

⁵ Although it has been shown in metropolitan context that quarries provide habitat to several species despite activity

⁶ Refer Annexure A Page 13 where specialist quantifies risk

Activity	Nature of impact	Extent	Duration	Probability	Significance
2.17.1. Visual aspects	Plant / portions of plant will be visible to surrounding users	For lengths of road between Cape St Francis & Oyster Bay when travelling west.	Life of mine	Definite	Insignificant
2.17.2. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Point	During construction	Unlikely	Negligible to Insignificant
2.18. Construct weighbridge	None. Topsoil already removed during development of plant, stockpiling and logistical facility area				
2.19. Establish stormwater management system could impact on:					
2.19.1. Topography	Digging of trenches to 50cm deep and silt retention ponds to 1.5m deep	Trenches (1x cut-off and 1 x drain) above and below cleared area. Two silt retention ponds	Constructed during establishment phase but in place for Life of Mine	Definite	Insignificant
2.19.2. Topsoil	Topsoil will be removed to topsoil berms	Trenches: 1m wide x 1.5km	Life of mine	Definite	Insignificant
2.19.3. Noise	Earthmoving equipment during construction	Local	Establishment phase	Definite	Negligible
2.19.4. Air Quality	Earthmoving equipment during construction	Local area / immediate vicinity	Establishment phase	Definite	Insignificant
2.19.5. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Point	During construction	Unlikely	Negligible to Insignificant
2.20. Initiate induction environmental training of staff	Positive				
2.21. Install mist sprays on plant	Positive				
2.22. Conduct post establishment Environmental Performance Assessment (EPA)	Positive				
3. OPERATIONAL PHASE ACTIVITIES					
3.1. Topsoil removal to perimeter stockpile ahead of face advance					
3.1.1. Soil	Topsoil will be removed to topsoil berms when available between outcrop	Eventual excavation extent 5.6ha	Permanent	Definite	Moderate
3.1.2. Vegetation	Vegetation will be removed along with topsoil. Some natural vegetation will be removed when in place between outcrops	Eventual excavation extent 5.6ha	Permanent	Definite	Moderate / Insignificant ⁷
3.1.3. Land Capability	The area will be lost to cattle grazing and will be fenced. Grazing in any event unlikely in this rocky outcrop	Eventual excavation extent 5.6ha	Permanent	Definite	Insignificant
3.1.4. Surface Water	Contribution to drainage basin will be altered as surface flow will enter pit. Remember there are currently no water channels on the site	Eventual excavation extent 5.6ha	Permanent	Definite	Insignificant
3.1.5. Animal Life	Habitat will be disturbed on footprint and activity will result in less animal life in the vicinity	Local area / immediate vicinity	Life of mine ⁸	Definite	Insignificant
3.1.6. Noise	Earthmoving equipment	Local	On occurrence	Definite	Negligible

⁷ Refer Annexure A for specialist report

⁸ Although it has been shown in metropolitan context that quarries provide habitat to several species despite activity

Activity	Nature of impact	Extent	Duration	Probability	Significance
3.1.7. Air quality	Earthmoving equipment during construction	Local area / immediate vicinity	On occurrence	Definite	Insignificant
3.1.8. Visual	Denuded area may be visible to traffic along road	For lengths of the road between Cape St Francis & Oyster Bay when travelling west.	Progressive with advance of pit	Definite	Insignificant
3.1.9. Archaeology	Destruction of artefacts	Point	Permanent impact	Probable	Insignificant ⁹
3.1.10. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Point	On occurrence	Possible	Negligible to Insignificant
3.2. Drilling					
3.2.1. Noise	Percussion drilling noise	Local area	On occurrence	Definite	Insignificant
3.2.2. Dust	Drilling generated dust	Local area	On occurrence	Definite	Insignificant
3.2.3. Hydrocarbon	Potential for fuel and oil leaks by drilling equipment	Point	On occurrence	Possible	Negligible to Insignificant
3.3. Blasting (I.e. Face Advance)					
3.3.1. Geology	Loss of quartzitic sandstone to development	Point	Permanent	Definite	Negligible
3.3.2. Topography	Alteration of landscape through development of pit	5.6ha to average 55m deep	Permanent	Definite	Moderate
3.3.3. Noise	Blast noise	Beyond local area	On occurrence (max 1 per month – probably 1 per quarter)	Definite	Up to moderate
3.3.4. Dust	Dust generated during blasting	Local area / immediate vicinity	On occurrence (max 1 per month – probably 1 per quarter)	Definite	Up to moderate
3.3.5. Fly Rock	Fly rock produced during blasting. Possible impact on future wind turbines.	No structures within 500m (so no impact) but if wind turbines developed within 500m then blast design to be altered.	On occurrence (max 1 per month – probably 1 per quarter)	Possible	Up to significant if future wind turbines damaged
3.3.6. Visual Aspects	Visual impact to increase as face moves up the hill. Maximum face height ever exposed = 20m if viewed horizontally ¹⁰	For lengths of the road between Cape St Francis & Oyster Bay when travelling west.	Permanent	Definite	Insignificant
3.3.7. Vibration	Vibration produced during blasting. Possible impact on future wind turbines.	No structures within 500m (so no impact) but if wind turbines developed within 350m then blast design to be altered.	On occurrence (max 1 per month – probably 1 per quarter)	Unlikely	Up to significant if future wind turbines damaged
3.4. Loading of shot rock					
3.4.1. Noise	Earthmoving equipment	Local	Life of Mine	Definite	Negligible
3.4.2. Dust	Earthmoving equipment	Local area / immediate vicinity	Life of Mine	Definite	Insignificant
3.4.3. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Point	Life of Mine	Unlikely	Negligible to Insignificant
3.5. Hauling of shot rock					
3.5.1. Noise	Earthmoving equipment	Local	Life of Mine	Definite	Negligible
3.5.2. Dust	Earthmoving equipment	Local area / immediate vicinity	Life of Mine	Definite	Insignificant

⁹ Refer Annexure B for specialist Archaeological report

¹⁰ Will be viewed from elevation lower than front excavation rim, therefore maximum exposure is reduced.

Activity	Nature of impact	Extent	Duration	Probability	Significance
3.5.3. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Point	Life of Mine	Unlikely	Negligible to Insignificant
3.6. Crushing and screening of shot rock					
3.6.1. Noise	Earthmoving equipment	Local	Life of Mine	Definite	Negligible
3.6.2. Dust	Earthmoving equipment	Local area / immediate vicinity	Life of Mine	Definite	Insignificant
3.6.3. Hydrocarbon Pollution	Potential for fuel and oil leaks by earthmoving equipment	Point	Life of Mine	Unlikely	Negligible to Insignificant
3.7. Stockpiling of product					
3.7.1. Noise	Earthmoving equipment	Local	Life of Mine	Definite	Negligible
3.7.2. Dust	Earthmoving equipment	Local area / immediate vicinity	Life of Mine	Definite	Insignificant
3.7.3. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Point	Life of Mine	Unlikely	Negligible to Insignificant
3.8. Loading of product for delivery					
3.8.1. Dust	Earthmoving equipment	Local area / immediate vicinity	Life of Mine	Definite	Insignificant
3.8.2. Hydrocarbon Pollution	Potential for fuel and oil leaks by earthmoving equipment	Point	Life of Mine	Possible	Negligible to Insignificant
3.9. Use of workshop					
3.9.1. Hydrocarbon Pollution	Potential for fuel and oil leaks	Point	Life of Mine	Probable	Negligible to Insignificant
3.10. Use of Refueling Facility					
3.10.1. Hydrocarbon Pollution	Potential for fuel and oil leaks	Point	Life of Mine	Unlikely	Negligible to Insignificant
3.11. Use of access/delivery road to the site					
3.11.1. Noise	Earthmoving equipment	Local	Life of Mine	Definite	Negligible
3.11.2. Dust	Earthmoving equipment	Local area / immediate vicinity	Life of Mine	Definite	Insignificant
3.11.3. Hydrocarbon pollution	Potential for fuel and oil leaks by delivery vehicles	Point	Life of Mine	Unlikely	Negligible to Insignificant
3.11.4. Traffic/safety	Delivery vehicles (average 20 tons)	Local along delivery routes	Life of Mine	Definite	Insignificant to Moderate ¹¹

Table 24: Classification of potential impacts

¹¹ Assume 20000t/month to be transported that would require 1000 laden trucks leaving the site per month. Assuming 9 hour working days this amounts to 45 trucks per day or 5 per hour in a 9 hour working day. But remember that this is only for maximum production assuming delivery to the proposed Thyspunt nuclear power plant. Should such plant not be constructed then the deliveries will take place at a much reduced rate. Also should the nuclear plant be supplied, it is unlikely that public roads would be utilised (although such possibility is not ruled out at this stage).

7.3 Indication of the phases (construction, operational, decommissioning) and estimated time frames in relation to the potential impacts rated.

Impacts occur in a range from on occurrence of event to permanent as described in the table above. Life of Mine impact refers to up to 20 years as per chart below.

	Years																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Pre-establishment and construction phase	■																			
Operational Phase		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
Decommissioning rehabilitation Phase																	■			
Aftercare Phase																		■	■	
Closure Application																				■

Table 25: Simplified schedule of activities (repeat)

8 Identification of the alternative land uses which will be impacted upon.

The identified alternative land uses are:

Cattle Farming: The proposed operation will permanently preclude grazing over an area of 5.6ha (i.e. the excavation extent) and temporarily (i.e. Life of Mine of 20 years) impede the use of the entire mining area (14.3ha) for grazing.

Conservation: This has been identified as a possible alternative land use. Should mining go ahead it would temporarily (i.e. 20 years) prevent use of the 14.3ha for conservation. The post mining excavation can form part of a conservation landscape.

Windfarm: Provided that the wind turbines are located sufficiently far from the excavation, there will be no impact on the proposed alternative land use.

9 Listed results of a specialist comparative land use assessment.

Study underway _

10 List of all the significant impacts as identified in the assessment conducted in terms of Regulation 50 (c)

This regulation requires the applicant to determine the appropriate mitigation measures for each significant impact of the proposed mining operation. This is not intended to be a duplication of Reg 51(b) which requires a description of the mitigation measures in detail. It is only intended to determine the appropriate type of mitigatory measure to be applied in the EMP.

When assessing the criteria which describe the levels of impact in the table in para 7.2, it is clear that there are no significant impacts. The highest level of impact is a moderate impact which is generated by:

- Topsoil removal in preparation of the plant, stockpile and logistical facility area.
- Impact on topography as a result of the excavation advance.
- Impact on vegetation remnant due to excavation development

11 Identification of interested and affected parties.

11.1 List of names of landowners and other affected parties in respect of the land uses that have been identified on the property and adjacent and non-adjacent properties that may be affected by the mining operation:

The following map shows the locality of the landowner and surrounding landowners which were consulted. This map contains Section 1 excavation area as it was initially part of the application and has now been cancelled:

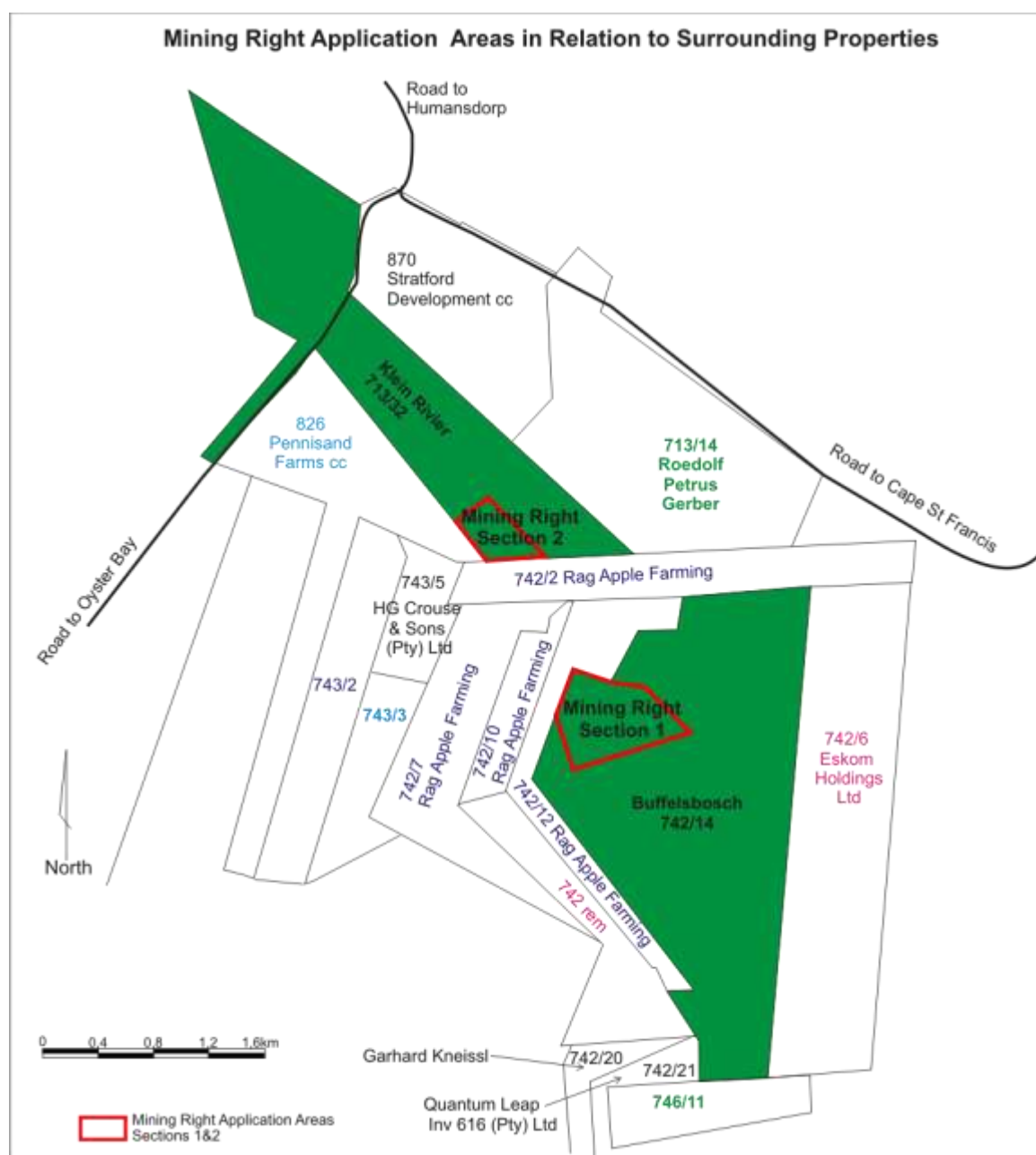


Figure 12: Surrounding and adjacent landowners

The landowner was consulted and sent registered letter and all surrounding (adjacent) landowners were sent registered mail informing them of the application together with a copy of the Background Information Document. The only 2 adjacent landowners who wished to register as I&AP's are as follows:

NAME	ADDRESS	CELL:	TEL:	FAX:	EMAIL:
D R Wilkie	P O Box 28147 Sunridge Park Port Elizabeth 6008	082 990 1280	-	086 504 7895	derrick@bjb.co.za
A B Crouse	P O Box 457 Humansdorp 6300	074 194 9050	-	-	-

Table 26: list of adjacent owners who wished to register as I&APs

The landowners contact details are as follows:

Mr R Gerber
PO Box _
Humansdorp
6300

In addition, Mr Lance Blain of Red Cap Investments who have the approved windfarm in the area was also consulted. See Annexure _ for agreement between Red Cap and Impuma Quarries.

11.2 List of the relevant Local Government, Provincial Government Departments, Land Claims Commissioner and Tribal Authorities consulted

The following table lists the applicable parties that were consulted in this regard:

NAME ORGANISATION /	CONTACT PERSON	ADDRESS	TEL:	FAX:	EMAIL:
Gamtkwa KhoiSan Council	Kobus Reichert Heritage Representative	P O Box 196 Hankey 6350	042-296 0399	042-296 0399	kobusreichert@yahoo.com
Kouga Municipality	Roderick Mintoor ECO		042-200 8377		rmintoor@ec108.org.za

Table 27: List of Local Government and tribal authorities consulted

It must be noted that the Department of Mineral Resources liaises directly with the other Government Departments (such as Water Affairs, Agriculture, Environment, Health, etc)

11.3 List of relevant Government Agencies and institutions responsible for various aspects of the environment and infrastructure.

NAME / ORGANISATION	CONTACT PERSON	ADDRESS	TEL:	FAX:	EMAIL:
St Francis Kromme Trust	Maggie Langlands	P O Box 76 St Francis Bay, 6312			langlands@wirelessza.co.za
	Chris Barratt – Chairman				stfranciskrommetrust@barratt.co.za
Eskom	Thelma Keulder Environmental &		021-553 2447	086 663 0488	Thelma.Keulder@eskom.co.za

NAME / ORGANISATION	CONTACT PERSON	ADDRESS	TEL:	FAX:	EMAIL:
	Land Management				
Eskom	Gert Greeff Environmental & Land Manager, Nuclear Sites	KNPS Private Bag X10 Kernkrag Melkbosstrand 7441	021-553 2447	021-553 4171	GreeffG@eskom.co.za
Eskom Holdings	Mr Linda Khoza	P O Box 2834 Sunninghill 2157			
SAHRA	Dr M Galimberti	P O Box 4637 Cape Town 8000	021-462 4502	021-462 4509	mgalimberti@sahra.org.za
Thyspunt Alliance	Trudie Malan	P O Box 102 St Francis Bay 6312			dolphin@intekom.co.za

Table 28: List of NGOs consulted

11.4 List of relevant local communities that were consulted:

NAME / ORGANISATION	CONTACT PERSON	ADDRESS	TEL:	FAX:	EMAIL:
SFB Residents Association	Jacky Green Admin Manager St Francis Bay RPA		042-200 1404		contact@sfbresidents.org
Gamtkwa KhoiSan Council	Kobus Reichert Heritage Representative	P O Box 196 Hankey 6350	042-296 0399	042-296 0399	kobusreichert@yahoo.com
FEKRRA - Federation of Kouga Ratepayers & Residents Association	Louis Geldenhuys Chairperson				louis.geldenhuys@absamail.co.za
Ward Councillor – Ward 12	Ben Rheeder				benrheeder@telkomsa.net
Ward Councillor – Ward 1	Zolani Mayoni				zmayoni.kouga@gmail.com
MP Democratic Alliance	Elza van Lingen	P O Box 566 St Francis Bay 6312	021-403 8751	086 614 1944	evlingen@da-mp.org.za

Table 29: List of local community representatives consulted

In addition, a newspaper advert was placed in the Kouga Express advertising the proposed quarry. This together with word of mouth advertising¹² of the project has led to the following parties also registering as Interested and Affected Parties:

NAME / ORGANISATION	ADDRESS	TEL:	FAX:	EMAIL:
Mike Morrison	3 College Road St Francis Bay 6312			mmad@telkomsa.net
Mandy Brent	3 College Road St Francis Bay 6312			mmad@telkomsa.net
Les Brent	71 Lyme Road St Francis Bay 6312			lesbrent@telkomsa.net
Neil Brent	71 Lyme Road St Francis Bay 6312			lesbrent@telkomsa.net
Bart & Caryl Logie	P O Box 435 St Francis Bay 6312	042-294 0588		B.Logie@telkomsa.net
Andrea von Holdt	42 4 th Avenue Walmer, Port Elizabeth 6070	041-403 0400	041-403 0401	Andrea.VonHoldt@coega.co.za
Jaqui Frylinck	P O Box 16248 Vlaeberg 8018			jfrylinck@rgare.com
Jeanne Wassenaar	11 Orchard Street Newlands 7700	021-671 8114	021-671 8114	jeannewas@gmail.com
Tanja Lategan	10F Mimoso Road Jeffreys Bay 6330			wjibay@mweb.co.za
Maggie Langlands	P O Box 293 St Francis Bay 6312			Langlands@wirelessza.co.za

¹² Special Thanks are required here to Ms Trudie Malan of Thyspunt Alliance for here tireless efforts in getting the community involved.

NAME / ORGANISATION	ADDRESS	TEL:	FAX:	EMAIL:
Michael Hugh Simms	3 Shore Road St Francis Bay 6312			msimms@yebo.co.za
Thea Malan	P O Box 418 St Francis Bay 6312			malanthea@gmail.com
Andre van den Heever	P O Box 649 Humansdorp 6300			eunicia@netactive.co.za
Chris Cowling	P O Box 1348 Humansdorp 6300	042-298 0206	086 666 4107	chris.cowling@kingsley.co.za
Jan Wassenaar	P O Box 16248 Vlaeberg 8018			Wassenaar@mweb.co.za
Renee Royal	250 Chelmsford Rd Durban 4001	031-205 8091	031-205 8058	reeneeroyal@mweb.co.za
Johan Muller	P O Box 808 Jeffreys Bay 6330	042-293 3195	042-293 3194	chatten@intekom.co.za
Coris Meyer	116 Riverglades Oyster Bay Road Humansdorp 6300	042-294 0747		premfish@agnet.co.za
Erich Gideon Wilhelm Tilders	P O Box 252 St Francis Bay 6312	042 298 0057		helmie@intekom.co.za
Dr Shirley Pierce Cowling	P O Box 364 St Francis Bay 6312	042-298 0259	086 512 3854	scowling@kingsley.co.za
Peter Collison	18 Reservoir Rd St Francis Bay 6312			collir@iafrica.com
Gideon Roos	Maori Ave 2 Cape St Francis 6312			roosq@isat.co.za
Prof R M Cowling	P O Box 77000 Port Elizabeth 6031	042-298 0259	086 512 3854	rnc@kingsley.co.za richard.cowling@nmmu.ac.za
Yvonne Bosman	P O Box 174 St Francis Bay 6312	042-294 0842		ycraig@iafrica.com
Martha Hutchinson	P O Box 1153 Humansdorp 6300			marthamariahutch@gmail.com
G P Liefeldt	15 Doringboom Crescent Jeffreys Bay 6330	042-293 2121		adelibay@kouganet.co.za
Norman Newcombe		041-994 6785		norman_newcombe@goodyear.co.za
Renee van Rensburg				renee@tja.co.za
B J Jonker	17 Rietbok Crescent Cape St Francis	011-535 4004		JonkerBJ@Nedbankcapital.co.za
Mike Stark	Unit 2 The Kromme Harley Street St Francis Bay 6312	042-294 1123		stark@racomp.co.za
Nic & Ilse Alberts				bahiaibay@vodamail.co.za
Derek Britz		011-201 8927	086 633 7479	DerekB@drivecon.net
Garth Perry	P O Box 285 St Francis Bay 6312		086 211 7895	goofyp@iafrica.com
Brenda Wittey				brendyww@hotmail.com
Lynne Davies				lldandbdg@mweb.co.za
Des Eriksen	6 Hope Singel Cape St Francis			deserik@africa.com
Piet du Preez	P O Box 2383 Parys 9585			pietdp@vodamail.co.za

Table 30: List of additional registered I&APs

12 The details of the engagement process.

12.1 Confirm which authorities have been consulted with regard to any economic development plans or proclaimed nature reserves in the area

The only local authority which has been consulted is the Kouga Municipality's Municipal Manager and Environmental Section. They have only responded by way of acknowledgement of receipt but have not forwarded any comments on the Background Information Document or Scoping Report.

Note that the Department of Mineral Resources is responsible for ensuring that the Government Departments at National level are made aware of the application.

12.2 Confirm that the nature and scope of the mining project and the typical impacts of such quarry have been explained to I&AP's including landowners, SAHRA and communities concerned.

_ As of 3 July 2012, all I&AP's have only been sent written information in the form of the Background Information Document (full copy of which is contained as Annexure A in the Scoping report) and the Scoping report.

There will be 2 open days (on the 16th and 17th July 2012) in St Francis Bay and Oyster Bay respectively. Invitations have been sent to all parties and the EMP actually lodged to the DMR will contain a report back on these meetings.

12.3 Confirm which specialists, knowledgeable institutions and knowledgeable persons have been consulted and indicate in what regard

The following specialists were tasked for their inputs:

- Heritage Impact Assessment: Archeomaps (K van Ryneveld)
- Palaeontological Impact Assessment – Dr J Almond
- Biodiversity Sensitivity Analysis – Conservation Management Services (Mr K Coetzee)
- Groundwater Assessment / Geohydrological Impact Assessment (Geoss)

In addition Ms M Galimberti of SAHRA was consulted for their requirements.

13 Details regarding the manner in which the issues raised were addressed.

13.1 Confirm whether or not the description of the environment has been compiled with the participation of the landowner, I&AP's and Communities concerned.

Yes. A description of the existing Environment was contained in both the Background Information Document (BID) and the Scoping report. Furthermore the readers of the BID were specifically asked the following questions:

1. Do you agree with the provided description of the status of existing biophysical environment (as described earlier in the BID)?
2. Do you agree with the potential impacts on biophysical environment identified as a result of the proposed mining (as described earlier in the BID)?
3. Do you agree with the provided description of the status of existing heritage /cultural environment (as described earlier in the BID)?
4. Do you agree with the potential impacts on heritage / cultural aspects identified as a result of the proposed mining (as described earlier in the BID)?
5. Do you agree with the provided description of the status of existing socio economic environment (as described earlier in the BID)?
6. Do you agree with the potential impacts on socio-economic aspects identified as a result of the proposed mining (as described earlier in the BID)?
7. Do you know of any land developments which may be impacted upon by the proposed project?
8. Do you know of any other parties which should specifically be consulted in respect of this project?

13.2 Confirm whether the potential impacts have been compiled with the participation of landowner and I&AP's

Yes. See above.

13.3 Confirm whether or not the list of potential impacts related to Social and Cultural impacts have been compiled with parties directly affected

Yes. See above.

13.4 Provide list of issues raised by I&AP's and indicate whether they have been accommodated in this document

The following table describes all the issues raised and comment on how they have been accommodated in this document:

Environmental Aspect	Impact as identified in BID	Response from I&AP in respect of ID'd impact	Response from applicant
Animal Life	No impact. Animals will be temporarily chased off site to vast tracts of similar habitat surrounding site.	Refer para below table for response from St Francis Kromme Trust	A Biodiversity Sensitivity Analysis has been conducted by Specialist. Such specialist study is attached as Annexure A and is available for further comment.
Groundwater	1. Exposure of groundwater to atmosphere 2. Pollution through Hydrocarbons	D.R Wilkie expressed concern regarding impact of mining on the springs on his farms. J Muller also expressed concern about impact on aquifer and also wetlands on Buffelsbosch.	A full geohydrological Assessment was conducted (as contained in Annexure B) and has been made available for public comment.
Dust and safety along access roads	Noted	Concern expressed by Johan Muller	Assume 20000t/month to be transported that would require 1000 laden trucks leaving the site per month. Assuming 9 hour working days this amounts to 45 trucks per day or 5 per hour in a 9 hour working day. But remember that this is only for maximum production assuming delivery to the proposed Thyspunt nuclear power plant. Should such plant not be constructed then the deliveries will take place at a much reduced rate. Also should the nuclear plant be supplied, it is unlikely that public roads would be utilised (although such possibility is not ruled out at this stage).

This is a directly quoted comment received from the St Francis Kromme Trust:

"The St Francis Kromme Trust notes the application to mine rock and aggregate on the two sites located on farms south of the St Francis-Oyster Bay road and the BID's assessment that "the animal life around the affected area will be temporarily chased away by the presence of such activities" as drilling, blasting and crushing. The BID goes on to say "There is a vast expanse of similar habitat type around every proposed activity area and it is unlikely that any impact on animal life will occur from the proposed activities." (pages 13 and 14).

The Trust advises that the coastal plain between Tsitsikamma and PE is one of the most important areas in the country for Denham's Bustard and White-bellied Korhaan, and both species are found in high density on the particular stretch of land proposed for these mining activities. These bird species are highly selective about habitat and there is not, in fact, a vast expanse of similar habitat around the area. The concentrations of Denham's Bustard, in particular, that are found in this location are not seen anywhere else. What effect will blasting have on the well-being of this species? And what effect

will these activities have on the White-bellied Korhaan, a species notoriously sensitive to human activity? The Humansdorp population of these birds is virtually isolated from the rest of the country, making it extremely important to protect.

It is essential that an assessment of the impacts specifically on the bird population be included in the environmental assessment.”

In addition the following comments have been received so far:

Ref	Comment	Response
1.	SAHRA: Require a full Heritage Impact Assessment	A specialist was charged with conducting such HIA – refer Annexure C.
2.	St Francis Kromme Trust expressed concern about the lack of information in respect of possibly affected birdlife (Denham’s Bustard and the White – bellied Korhaan) in the BID	A specialist Biodiversity sensitivity analysis was conducted by specialist. The Trust will be provided opportunity to comment on such study.
3	Kobus Reichert of Gamtkwa KhoiSan Council was concerned about the public participation in respect of the future HIA. They wish to be officially consulted during this study.	The Heritage Impact practitioner will be tasked with communicating with Mr Reichert. This process has been initiated
4	Trudi Malan was the first person to register and was concerned that Public Participation was not as broad as it should be. Ms Malan is thanked for her assistance in highlighting parties which should be registered.	Public participation has been on-going since September 2011 and we believe the documentation will show that public participation has been as broad and transparent as possible.
5	Johan Muller: Jeffreys Bay: Wished to know the following:	
	What was the purpose of the mine. For what would the aggregate be used?	Initially for Nuclear power Station but also as small commercial quarry.
	Road safety issues and road generated dust.	See table 30 Above.
	Concerned about the sand river wetlands and aquifer	Specialist Geo-Hydrological assessment has been conducted – refer Annexure B

Table 31: List of issues raised thus far

Additional comments raised in the Public Open Days will be included in the EMP to be lodged at the DMR._

14 The appropriate mitigatory measures for each significant impact of the proposed mining operation.

None. No significant impacts identified to date.

15 Arrangements for monitoring and management of environmental impacts.

The aim of monitoring and performance assessments is to ensure that the provisions of the EMP programme and any other DMR conditions are carried out during the entire life of the mine. The proposal here is to get all mine personnel involved in the monitoring and assessments, thereby providing opportunity for increased environmental awareness at all levels.

Apart from the regulated 2-year interval (Reg. 55(2)(b)), performance assessments must also be conducted at the following milestones:

- At the end of the construction phase
- At the end of decommissioning rehabilitation

The performance assessments may be conducted by site management (Reg 55(1)(a)), however if he/she does not feel comfortable conducting the assessment then independent input can be used (Reg. 55(4)). The DME may, if they feel the performance assessment has not been adequately conducted require that an independent party conduct the assessment (Reg. 55(6)(c) and 55(7)). The results of the performance assessment must be submitted as part of the reporting requirements of the operation (Reg. 55(1)(c)).

The performance assessment report must be written in accordance with the guidelines from the DME (Reg. 55(3)) and the regulations do provide the basic content of the performance assessments as follows: (Reg. 55(3)(a)-(g)):

- Information regarding the period applicable to the performance assessment
- The scope of the assessment
- The procedure used for the assessment
- The interpreted information gained from the monitoring the approved EMP programme
- The evaluation criteria used during the assessment
- The results of the assessment
- Recommendations on how and when non-compliance and deficiencies will be rectified

Environmental monitoring serves to support the environmental performance assessments as well as serving to increase environmental awareness within an overall Environmental Management System. This is achieved by allowing the employees to conduct continuous monitoring at their stations and reporting (by way of a simple form) to the site manager, say, 1/week. The site manager will once/month conduct a check of the responses received (by actually conducting the monitoring him/herself).

On site monitoring will thus consist of the following elements and programme:

- Continuous monitoring by operators and management
- Establishment of a monitoring committee consisting of at the very least the land owner, adjacent owner/s, representative from the DMR and an applicant representative.
- Such monitoring committee must conduct an environmental audit annually.

- The minutes of these meetings must be forwarded to the DMR.
- The applicant also commits to conducting an Environmental Performance Assessment every two years (in accordance with the MPRDA)

Formal monitoring of the following elements must be conducted as follows by the following parties:

Aspect to be monitored	Where	When	By Whom	Action to be taken if there are shortcomings
Surface water quality (Especially TSS) – Egress level not to exceed 25mg/ml	Overflow from silt retention ponds	On occurrence (once per season)	Water sample to be taken by quarry manager. Water samples to be sent to lab for testing. Report to be included in EPA.	Consult specialist for upgrading of silt retention ability at the quarry.
Noise	At the two closest farmsteads	During first 5 blasts. (under correct winds).	Specialist Noise Measurement Consultants	ECO or Environmental consultants to investigate and recommend additional measures
Dust	Dust monitoring stations to be placed at the two farmsteads located 650m SE and SW of the pit and at closest of the future wind turbines	Dust to be permanently monitored. Dust monitors to be placed in position at least 2 months before operation commences to measure ambient dust levels.	Dustwatch Consultants	ECO or consultants to investigate and recommend additional measures
Vibration	Vibrometers to be placed at the two farmsteads and at the two closest future wind turbines	First 5 full blasts	Vibration consultants	ECO or Environmental consultants to investigate and recommend additional measures
Oil / fuel leaks	Especially at workshop and fuel tanks. But also vehicles to be checked regularly	To be monitored constantly	Mobile Plant foreman	Clean up using effective and env friendly products
Stormwater management system	Check that all trenches and drains are clear and allow water flow. Check that silt retention ponds are clear and operate effectively.	At least once per month, quarry foreman to walk entire stormwater system (especially after heavy rains)	Quarry foreman or company ECO	Clear or repair as required
Evidence of Erosion on site	Check for erosion any slopes. Ensure cut-off trench in operation	Continuously but formally reported on once every 6 months	Quarry foreman or company ECO	
Success of operational revegetation	Any areas which may have been rehabilitated during the operational phase (including sections of excavation, topsoil heaps etc)	Once annually	By Specialist botanist	Specialist botanist recommends supplementary planting methods

Aspect to be monitored	Where	When	By Whom	Action to be taken if there are shortcomings
Alien vegetation	Entire mining right area.	Formally once every 6 months.	Formally by ECO but continuously by staff members trained during induction environmental training	Refer Annexure A which contains full spec for clearing site of aliens.
Environmental education and awareness	All quarry staff	At induction (or as required)	Company ECO or environmental consultants	Retrain
Domestic waste management	Entire quarry right area	Continuously	All staff members	Pick up and place in bins
Traffic speeds on delivery road	On delivery road	Continuously	All staff members	Report contractor to management
Emergency action plan readiness	All quarry staff	AT induction (or as required)	Company ECO or environmental consultants	Retrain
Palaeontology (fossils)	In beds of mudrock/ shale between the quartzite units	At occurrence: Should mining uncover these bands of shale or mudrock	Company ECO	Stockpile sample and contact SAHRA

Table 32: Proposed monitoring

16 Technical and supporting information.

Annexure A: Biodiversity Sensitivity Analysis compiled by K. Coetzee of Conservation Management Services

Annexure B: Specialist Geohydrological Assessment by GEOSS

Annexure C: Heritage Impact Assessment and Phase 1 AIA by K van Ryneveld of Archaeomaps

Annexure D: Palaeontological Impact Assessment by John Almond

SECTION 2: ENVIRONMENTAL MANAGEMENT PROGRAMME

17 Description of environmental objectives and specific goals for mine closure.

17.1 Environmental aspects that describe the pre-mining environment to serve as guide for setting closure objectives.

Land Capability/ Landowner Socio-economic condition:

The current land use of the site is for cattle grazing with the exception of the outcrop area which cannot be considered as serving a grazing function and must be considered as wilderness land capability rating.

The closure objective is to maximise the restoration of the area outside of the excavation for use as cattle grazing. The excavation area will be returned as wilderness area (albeit with altered topography).

Vegetation:

The vegetation on the proposed plant, stockpiling and logistical facility area in its original form is classified as vulnerable. However, it has been completely transformed and severely grazed (K.Coetzee, 2012).

17.2 Measures required to contain or remedy any causes of pollution or degradation or the migration of pollutants, both for closure of the mine and post-closure.

The only 2 possible causes of post mining pollution are:

- Hydrocarbon pollution (from earthmoving equipment utilized in decommissioning rehabilitation)
- Siltation of the veld caused by uncontrolled run-off from denuded as yet unrehabilitated areas

In addition, the potential exists for denudation of the veld through alien vegetation infestation in the mining right area.

The flowing measures are required to be put into place to prevent these occurrences:

Hydrocarbon pollution: Refer Para 20.3 for full Hydrocarbon management plan

Siltation of the veld prior to revegetation: The applicant is required to ensure the continued function of the stormwater management system put into place at establishment phase. The applicant is to continue clearing silt from such silt retention ponds until such time as the by then cleared, shaped and re-topsoiled has vegetated sufficiently to naturally prevent silt flow.

Alien Vegetation Control: The applicant is required to fully control all alien species within the mining right area (which includes access road from existing farm road) for life of mine as well as during the minimum 2 – year aftercare period, after-which such alien control will be the responsibility of the landowner. Full alien vegetation management control measures are contained in Annexure A.

18 Description of environmental objectives and specific goals for the management of identified environmental impacts emanating from the proposed mining operation. (As informed by the information provided in the EIA in terms of Regulation 50 (h)).

18.1 List of identified impacts which will require monitoring programmes.

Activity	Nature of impact	Will the impact require monitoring programme
1. PRE- ESTABLISHMENT ACTIVITIES		
1.1. Approvals (Pre-establishment)	None	NA
1.2. Site Survey to place facilities	None	NA
1.3. Demarcate No-Go areas	None	NA
2. ESTABLISHMENT ACTIVITIES		
2.1. Construct access road from existing farm track impact on:		
2.1.1. Topsoil	Topsoil disturbance will occur through removal to side of road prior to construction	Yes
2.1.2. Vegetation	Vegetation will be removed along with topsoil. No natural vegetation will be removed	No
2.1.3. Land Capability	The road length will be lost to cattle grazing and will be fenced	No
2.1.4. Noise	Earthmoving equipment during construction	No
2.1.5. Air Quality	Earthmoving equipment during construction	Yes
2.1.6. Archaeology	Possible disturbance of artefacts	Yes
2.1.7. Hydrocarbon Impact	Potential for fuel and oil leaks by earthmoving equipment	Yes
2.1.8. Traffic	Increased traffic during establishment phase	No
2.2. Provide chemical toilets for site establishment staff impact on:		

Activity	Nature of impact	Will the impact require monitoring programme
2.2.1. Groundwater	Possible leak of personnel amenities	Yes
2.3. Fence & danger signpost the site	None	
2.4. Install header tanks impact on:		
2.4.1. Visual impact	Header tanks could be visible to surrounding roads	No
2.4.2. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Yes
2.5. Connect to water supply from header tank to logistical facilities	None	
2.6. Place Genset (impact on)		
2.6.1. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Yes
2.7. Remove topsoil to berms in Plant, Stockpiling and Logistics area impact on:		
2.7.1. Soil	Topsoil will be removed to topsoil berms	Yes
2.7.2. Vegetation	Vegetation will be removed along with topsoil. Some natural vegetation will be removed	No
2.7.3. Land Capability	The area will be lost to cattle grazing and will be fenced to keep stock out	No
2.7.4. Surface Water	Contribution to drainage basin will be altered, but flow will still occur. Remember there are currently no water channels on the site	Yes. Stormwater management system will require monitoring.
2.7.5. Animal Life	Habitat will be disturbed on footprint and activity will result in less animal life in the vicinity	No
2.7.6. Noise	Earthmoving equipment during construction	No
2.7.7. Air quality	Earthmoving equipment during construction	Yes
2.7.8. Visual	Denuded area may be visible to traffic along road	No
2.7.9. Archaeology	Destruction of artefacts	Yes
2.7.10. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Yes
2.8. Construct Primary Ramp could impact on		
2.8.1. Topography	Construction of ramp to 5m in height (max)	No
2.8.2. Noise	Earthmoving equipment during construction	No
2.8.3. Dust	Earthmoving equipment during construction	Yes
2.8.4. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Yes
2.9. Construct haul road to excavation		
2.10. Construct / Place Container for office and store		
2.11. Place personnel amenities container		

Activity	Nature of impact	Will the impact require monitoring programme
2.12. Construct Workshop with oil trap		Not in construction phase, but will require monitoring during operational phase to prevent hydrocarbon pollution
2.13. Construct bunded fuel storage tank		Not in construction phase, but will require monitoring during operational phase to prevent hydrocarbon pollution
2.14. Construct domestic and industrial waste collection point		Not in construction phase, but will require monitoring during operational phase to prevent hydrocarbon pollution
2.15. Construct wash bay with oil trap		Not in construction phase, but will require monitoring during operational phase to prevent hydrocarbon pollution
2.16. Cast concrete footings for crushing plant		
2.17. Erect Crushing plant could impact on		
2.17.1. Visual aspects	Plant / portions of plant will be visible to surrounding users	
2.17.2. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	
2.18. Construct weighbridge		Not in construction phase, but will require monitoring during operational phase to prevent hydrocarbon pollution
2.19. Establish stormwater management system could impact on:		
2.19.1. Topography	Digging of trenches to 50cm deep and silt retention ponds to 1.5m deep	Yes
2.19.2. Topsoil	Topsoil will be removed to topsoil berms	Yes
2.19.3. Noise	Earthmoving equipment during construction	No
2.19.4. Air Quality	Earthmoving equipment during construction	Yes
2.19.5. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Yes
2.20. Initiate induction environmental training of staff	Positive	Yes
2.21. Install mist sprays on plant	Positive	Yes
2.22. Conduct post establishment Environmental Performance Assessment (EPA)	Positive	Yes
3. OPERATIONAL PHASE ACTIVITIES		
3.1. Topsoil removal to perimeter stockpile ahead of face advance		
3.1.1. Soil	Topsoil will be removed to topsoil berms when available between outcrop	Yes
3.1.2. Vegetation	Vegetation will be removed along with topsoil. Some natural vegetation will be removed when in place between outcrops	No
3.1.3. Land Capability	The area will be lost to cattle grazing and will be fenced. Grazing in any event unlikely in this rocky outcrop	No

Activity	Nature of impact	Will the impact require monitoring programme
3.1.4. Surface Water	Contribution to drainage basin will be altered as surface flow will enter pit. Remember there are currently no water channels on the site	Yes
3.1.5. Animal Life	Habitat will be disturbed on footprint and activity will result in less animal life in the vicinity	No
3.1.6. Noise	Earthmoving equipment	No
3.1.7. Air quality	Earthmoving equipment during construction	Yes
3.1.8. Visual	Denuded area may be visible to traffic along road	No
3.1.9. Archaeology	Destruction of artefacts	Yes
3.1.10. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Yes
3.2. Drilling		
3.2.1. Noise	Percussion drilling noise	No
3.2.2. Dust	Drilling generated dust	Yes
3.2.3. Hydrocarbon	Potential for fuel and oil leaks by drilling equipment	Yes
3.3. Blasting (i.e. Face Advance)		
3.3.1. Geology	Loss of quartzitic sandstone to development	No
3.3.2. Topography	Alteration of landscape through development of pit	No
3.3.3. Noise	Blast noise	Yes
3.3.4. Dust	Dust generated during blasting	Yes
3.3.5. Fly Rock	Fly rock produced during blasting. Possible impact on future wind turbines.	Yes
3.3.6. Visual Aspects	Visual impact to increase as face moves up the hill. Maximum face height ever exposed = 20m if viewed horizontally ¹³	No
3.3.7. Vibration	Vibration produced during blasting. Possible impact on future wind turbines.	Yes
3.4. Loading of shot rock		
3.4.1. Noise	Earthmoving equipment	No
3.4.2. Dust	Earthmoving equipment	Yes
3.4.3. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Yes
3.5. Hauling of shot rock		
3.5.1. Noise	Earthmoving equipment	No
3.5.2. Dust	Earthmoving equipment	Yes
3.5.3. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Yes
3.6. Crushing and screening of shot rock		
3.6.1. Noise	Earthmoving equipment	No
3.6.2. Dust	Earthmoving equipment	Yes
3.6.3. Hydrocarbon Pollution	Potential for fuel and oil leaks by earthmoving equipment	Yes
3.7. Stockpiling of product		
3.7.1. Noise	Earthmoving equipment	No
3.7.2. Dust	Earthmoving equipment	Yes

¹³ Will be viewed from elevation lower than front excavation rim, therefore maximum exposure is reduced.

Activity	Nature of impact	Will the impact require monitoring programme
3.7.3. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Yes
3.8. Loading of product for delivery		
3.8.1. Dust	Earthmoving equipment	Yes
3.8.2. Hydrocarbon Pollution	Potential for fuel and oil leaks by earthmoving equipment	Yes
3.9. Use of workshop		
3.9.1. Hydrocarbon Pollution	Potential for fuel and oil leaks	Yes
3.10. Use of Refueling Facility		
3.10.1. Hydrocarbon Pollution	Potential for fuel and oil leaks	Yes
3.11. Use of access/delivery road to the site		
3.11.1. Noise	Earthmoving equipment	No
3.11.2. Dust	Earthmoving equipment	Yes
3.11.3. Hydrocarbon pollution	Potential for fuel and oil leaks by delivery vehicles	Yes
3.11.4. Traffic/safety		

Table 33: List of impacts requiring monitoring

18.2 List of the source activities that are the cause of the impacts which require to be managed.

See table above in para 18.1.

18.3 Management activities which, where applicable, will be conducted daily, weekly, monthly, quarterly, annually or periodically as the case may be in order to control any action, activity or process which causes pollution or environmental degradation.

Aspect to be monitored	Where	When	By Whom	Action to be taken if there are shortcomings
Surface water quality (Especially TSS) – Egress level not to exceed 25mg/ml	Overflow from silt retention ponds	On occurrence (once per season)	Water sample to be taken by quarry manager. Water samples to be sent to lab for testing. Report to be included in EPA.	Consult specialist for upgrading of silt retention ability at the quarry.
Noise (Blast)	At 2 nearest farmsteads (650m to SE and SW)	During first 5 blasts. (under correct winds).	Specialist Noise Measurement Consultants	ECO or Environmental consultants to investigate and recommend additional measures

Aspect to be monitored	Where	When	By Whom	Action to be taken if there are shortcomings
Dust	Dust monitoring stations to be placed at the two farmsteads located 650m SE and SW of the pit and at closest of the future wind turbines	Dust to be permanently monitored. Dust monitors to be placed in position at least 2 months before operation commences to measure ambient dust levels.	Dustwatch Consultants	ECO or consultants to investigate and recommend additional measures
Vibration	Vibrometers to be placed at the two farmsteads and at the two closest future wind turbines	First 5 full blasts	Vibration consultants	ECO or Environmental consultants to investigate and recommend additional measures
Oil / fuel leaks	Especially at workshop and fuel tanks. But also vehicles to be checked regularly	To be monitored constantly	Mobile Plant foreman	Clean up using effective and env friendly products
Stormwater management system	Check that all trenches and drains are clear and allow water flow. Check that silt retention ponds are clear and operate effectively.	At least once per month, quarry foreman to walk entire stormwater system (especially after heavy rains)	Quarry foreman or company ECO	Clear or repair as required
Evidence of Erosion on site	Check for erosion any slopes. Ensure cut-off trench in operation	Continuously but formally reported on once every 6 months	Quarry foreman or company ECO	
Success of operational revegetation	Any areas which may have been rehabilitated during the operational phase (including sections of excavation, topsoil heaps etc)	Once annually	By Specialist botanist	Specialist botanist recommends supplementary planting methods
Alien vegetation	Entire mining right area.	Formally once every 6 months.	Formally by ECO but continuously by staff members trained during induction environmental training	Refer Annexure A which contains full spec for clearing site of aliens.
Environmental education and awareness	All quarry staff	At induction (or as required)	Company ECO or environmental consultants	Retrain
Domestic waste management	Entire quarry right area	Continuously	All staff members	Pick up and place in bins
Traffic speeds on delivery road	On delivery road	Continuously	All staff members	Report contractor to management
Emergency action plan readiness	All quarry staff	AT induction (or as required)	Company ECO or environmental consultants	Retrain
Palaeontology (fossils)	In beds of mudrock/ shale between the quartzite units	At occurrence: Should mining uncover these bands of shale or mudrock	Company ECO	Stockpile sample and contact SAHRA

Table 34: Proposed monitoring (repeat)

18.4 The roles and responsibilities for the execution of the monitoring and management programmes.

See table above in para 18.3

19 Description of environmental objectives and specific goals for the socio-economic conditions as identified in the social and labour plan.

19.1 Description of environmental objectives and specific goals for historical and cultural aspects.

The aim of the applicants is to:

- Abide by all prescriptions of the laws relating to heritage and cultural issues through the life of the mine.
- Minimize any impact in respect of historical and cultural issues

19.2 Environmental objectives and goals in respect of historical and cultural aspects identified in specialist studies conducted: Outline of the implementation programme

Refer Annexure C for full specialist assessment. Remember that the specialist HIA was conducted on both Sections 1 and 2 as contained in the original application. The study at section 2 (i.e. the focus of this EMP) recommended the following course of action:

Based on surface artefact quantities and specifically archaeological context, the FS1 Stone Age occurrence at Section 2 is ascribed a SAHRA *Low Significance and Generally Protected C Field Rating*. It is recommended that development in the area proceeds as applied for provided that:

- *Development proceeds under a SAHRA Site Destruction Permit* – Based on post depositional and ongoing landscape formation processes more artefacts may well be encountered during development; and
- *Development be preceded by a brief archaeological site inspection* – Disturbed artefact contexts together with low artefact densities hold little potential for future research aside from basic typological and technological descriptions, but the impact of post depositional and landscape formation processes on deposits are potentially significant specifically within the field of landscape archaeology.

In addition a specialist Palaeontological Impact Assessment (refer annexure D) was also conducted and the following recommendation emanated from that publication:

Overall, the Palaeontological sensitivity of the Peninsula Formation is considered to be low. The trace fossils are not common, partly due to the fact that surface exposures of the mudrock units are usually weathered. Notwithstanding, these trace fossils are scientifically valuable. As the quarries will be up to ~40 m deep, it is possible that fresh material could be found.

In view of the low fossil potential it is proposed that only a basic degree of mitigation is required.

It is recommended that an alert for the uncovering of fossils be included in the Mining EMP. The trace fossil assemblages preferentially occur in limited beds of mudrock/shale, between the quartzite units. Should such material be encountered, it should be inspected for the presence of trace fossils. If these are abundant, it is recommended that a good-sized sample of this rock be stockpiled. The ECO should contact SAHRA or the relevant heritage authority, providing information, particularly images of the finds. A palaeontologist must assess the information and liaise with the owner and the ECO and a suitable response formulated.

A permit from SAHRA is required to excavate fossils. The applicant should be the qualified specialist responsible for assessment, collection and reporting (palaeontologist). Should fossils be found that require collecting, application for a palaeontological permit must be made to SAHRA immediately.

The application requires details of the registered owners of the sites, their permission and a site-plan map. Samples of fossils must be deposited at a SAHRA-approved institution. However, depending on the nature and abundance of the fossils, local displays for educational (and public relations) purposes can be considered.

20 The appropriate technical and management options chosen for each environmental impact, socio-economic condition and historical and cultural aspect in each phase of the mining operation, as follows;

Activity	Nature of impact	Technical / management option chosen	Refer para for more detail
1. PRE-ESTABLISHMENT ACTIVITIES			
1.1. Approvals (Pre-establishment)	None		
1.2. Site Survey to place facilities	None	This is in itself a management option chosen to ensure that facilities are placed in accordance with the recommendation of the EMP	
1.3. Demarcate No-Go areas	None	This is a management option chose to reduce any possible impact on areas within the mining right area but outside of the proposed disturbance areas	
2. ESTABLISHMENT ACTIVITIES			
2.1. Construct access road from existing farm track impact on:			
1. Topsoil	Topsoil disturbance will occur through removal to side of road prior to construction	Topsoil removal must occur to specification	Refer para 20.1
2. Vegetation	Vegetation will be removed along with topsoil. No natural vegetation will be removed		Refer para 20.1
3. Land Capability	The road length will be lost to cattle grazing and will be fenced	Access road must be fenced with at least 4-strand 1.2m high wire fence	
4. Noise	Earthmoving equipment during construction	Ensure that vehicle silencers are in place.	

Activity	Nature of impact	Technical / management option chosen	Refer para for more detail
5. Air Quality	Earthmoving equipment during construction	Ensure dust reduction measures are put in place	Refer para 20.2
6. Heritage	Possible disturbance of artefacts and fossils	Ensure the recommendations of the specialists have been met	Refer para 19.2
7. Hydrocarbon Impact	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
8. Traffic	Increased traffic during establishment phase		
2.2. Provide chemical toilets for site establishment staff impact on:		Chemical toilets to be replaced by septic tank as part of the establishment phase.	
1. Groundwater	Possible leak of personnel amenities	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
2.3. Fence & danger signpost the site	None	This is a management option	
2.4. Install header tanks impact on:			
1. Visual impact	Header tanks could be visible to surrounding roads	None	
2. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
2.5. Connect to water supply from header tank to logistical facilities	None		
2.6. Place Genset (impact on)			
1. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
2.7. Remove topsoil to berms in Plant, Stockpiling and Logistics area impact on:			
1. Soil	Topsoil will be removed to topsoil berms	Topsoil removal must occur to specification	Refer para 20.1
2. Vegetation	Vegetation will be removed along with topsoil. Some natural vegetation will be removed		Refer para 20.1
3. Land Capability	The area will be lost to cattle grazing and will be fenced to keep stock out	Landowner will be reimbursed at agreed rate	
4. Surface Water	Contribution to drainage basin will be altered, but flow will still occur. Remember there are currently no water channels on the site	Implement stormwater management system.	Refer para 20.4
5. Animal Life	Habitat will be disturbed on footprint and activity will result in less animal life in the vicinity		Refer para 20.1
6. Noise	Earthmoving equipment during construction	Ensure vehicle silencers are in working order	
7. Air quality	Earthmoving equipment during construction	Ensure dust reduction measures are put in place	Refer para 20.2
8. Visual	Denuded area may be visible to traffic along road	None.	
9. Archaeology	Destruction of artefacts	Ensure the recommendations of the specialists have been met	Refer para 19.2
10. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
2.8. Construct Primary Ramp could impact on			

Activity	Nature of impact	Technical / management option chosen	Refer para for more detail
1. Topography	Construction of ramp to 5m in height (max)	Limit ramp height to 5m	
2. Noise	Earthmoving equipment during construction	Ensure vehicle silencers are in working order	
3. Dust	Earthmoving equipment during construction	Ensure dust reduction measures are put in place	Refer para 20.2
4. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
2.9. Construct haul road to excavation		None required. Topsoil handling already provided for in point 2.7 of this table	
2.10. Construct / Place Container for office and store		None required. Topsoil handling already provided for in point 2.7 of this table	
2.11. Place personnel amenities container		None required. Topsoil handling already provided for in point 2.7 of this table	
2.12. Construct Workshop with oil trap		Oil trap and concrete apron required for workshop	Refer para 20.3
2.13. Construct bunded fuel storage tank			Refer para 20.3
2.14. Construct domestic and industrial waste collection point			Refer para 20.3
2.15. Construct wash bay with oil trap			Refer para 20.3
2.16. Cast concrete footings for crushing plant		None required. Topsoil handling already provided for in point 2.7 of this table	
2.17. Erect Crushing plant could impact on			
1. Visual aspects	Plant / portions of plant will be visible to surrounding users	Keep plant as low as feasible	
2. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
2.18. Construct weighbridge		None required. Topsoil handling already provided for in point 2.7 of this table	
2.19. Establish stormwater management system could impact on:			
1. Topography	Digging of trenches to 50cm deep and silt retention ponds to 1.5m deep	Implement stormwater management system.	Refer para 20.4
2. Topsoil	Topsoil will be removed to topsoil berms	Topsoil removal must occur to specification	Refer para 20.1
3. Noise	Earthmoving equipment during construction	Ensure vehicle silencers are in working order	
4. Air Quality	Earthmoving equipment during construction	Ensure dust reduction measures are put in place	Refer para 20.2
5. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
2.20. Initiate induction environmental training of staff	Positive		Refer para 26.
2.21. Install mist sprays on plant	Positive		Refer para 20.2
2.22. Conduct post establishment Environmental Performance Assessment (EPA)	Positive		

Activity	Nature of impact	Technical / management option chosen	Refer para for more detail
3. OPERATIONAL PHASE ACTIVITIES			
3.1. Topsoil removal to perimeter stockpile ahead of face advance			
1. Soil	Topsoil will be removed to topsoil berms when available between outcrop	Topsoil removal must occur to specification	Refer para 20.1
2. Vegetation	Vegetation will be removed along with topsoil. Some natural vegetation will be removed when in place between outcrops		Refer Para 20.1
3. Land Capability	The area will be lost to cattle grazing and will be fenced. Grazing in any event unlikely in this rocky outcrop	Reimburse landowner at agreed rate	
4. Surface Water	Contribution to drainage basin will be altered as surface flow will enter pit. Remember there are currently no water channels on the site	Implement stormwater management system.	Refer para 20.4
5. Animal Life	Habitat will be disturbed on footprint and activity will result in less animal life in the vicinity		Refer para 20.1
6. Noise	Earthmoving equipment	Ensure vehicle silencers are in working order	
7. Air quality	Earthmoving equipment during construction	Ensure dust reduction measures are put in place	Refer para 20.2
8. Visual	Denuded area may be visible to traffic along road	None	
9. Archaeology	Destruction of artefacts	Ensure the recommendations of the specialists have been met	Refer para 19.2
10. Hydrocarbon	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
3.2. Drilling			
1. Noise	Percussion drilling noise		
2. Dust	Drilling generated dust	Ensure dill rig fitted with dust extraction equipment	
3. Hydrocarbon	Potential for fuel and oil leaks by drilling equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
3.3. Blasting (I.e. Face Advance)			
1. Geology	Loss of quartzitic sandstone to development	None	
2. Topography	Alteration of landscape through development of pit	Ensure shaping of pit as per specification	Refer para 20.5
3. Noise	Blast noise	No blasting under temperature inversion. Blast in afternoons and inform surrounding users by way of telephone or email.	
4. Dust	Dust generated during blasting	Ensure dust reduction measures are put in place	Refer para 20.2
5. Fly Rock	Fly rock produced during blasting. Possible impact on future wind turbines.	Blast design must be conducted by specialists and flyrock will be reduced through ensuring adequate burden and spacing	

Activity	Nature of impact	Technical / management option chosen	Refer para for more detail
6. Visual Aspects	Visual impact to increase as face moves up the hill. Maximum face height ever exposed = 20m if viewed horizontally ¹⁴	Ensure final face shaping, trimming and rehabilitation in accordance with spec, especially the upper 20m of the western face	Refer para 20.5
7. Vibration	Vibration produced during blasting. Possible impact on future wind turbines.	Blast design must be conducted by specialists and vibration will be reduced through ensuring adequate burden and spacing and decreasing explosives per delay	None required
3.4. Loading of shot rock			
1. Noise	Earthmoving equipment	Ensure vehicle silencers are in working order	None required
2. Dust	Earthmoving equipment	Ensure dust reduction measures are put in place	Refer para 20.2
3. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
3.5. Hauling of shot rock			
1. Noise	Earthmoving equipment	Ensure vehicle silencers are in working order	None required
2. Dust	Earthmoving equipment	Ensure dust reduction measures are put in place	Refer para 20.2
3. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
3.6. Crushing and screening of shot rock			
1. Noise	Earthmoving equipment	Ensure vehicle silencers are in working order	None required
2. Dust	Earthmoving equipment	Ensure dust reduction measures are put in place	Refer para 20.2
3. Hydrocarbon Pollution	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
3.7. Stockpiling of product			
1. Noise	Earthmoving equipment	Ensure vehicle silencers are in working order	None required
2. Dust	Earthmoving equipment	Ensure dust reduction measures are put in place	Refer para 20.2
3. Hydrocarbon pollution	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
3.8. Loading of product for delivery			
1. Dust	Earthmoving equipment	Ensure dust reduction measures are put in place	Refer para 20.2
2. Hydrocarbon Pollution	Potential for fuel and oil leaks by earthmoving equipment	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
3.9. Use of workshop			
1. Hydrocarbon Pollution	Potential for fuel and oil leaks	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
3.10. Use of Refueling Facility			
1. Hydrocarbon Pollution	Potential for fuel and oil leaks	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
3.11. Use of access/delivery road to the site			
1. Noise	Earthmoving equipment	Ensure vehicle silencers are in working order	None required
2. Dust	Earthmoving equipment	Ensure dust reduction measures are put in place	Refer para 20.2

¹⁴ Will be viewed from elevation lower than front excavation rim, therefore maximum exposure is reduced.

Activity	Nature of impact	Technical / management option chosen	Refer para for more detail
3. Hydrocarbon pollution	Potential for fuel and oil leaks by delivery vehicles	Ensure that the Hydrocarbon Control policy is put in place	Refer para 20.3
4. Traffic/safety			

Table 35: Appropriate technical and management options chosen to reduce / eliminate impact

20.1 Topsoil handling

The management of topsoil is of utmost importance. Without topsoil management, the disturbed area is subject to several other potential long terms impacts such as lack of revegetation, dust generated off denuded areas and potential visual scarring.

Topsoil management must consist of the following elements:

- All topsoil must be removed prior to any development taking place. In this case such topsoil removal will particularly take place ahead of access road development and development of plant, stockpiling and logistical facilities.
- All topsoil must be removed along with existing vegetation.
- All topsoil to depth of at least 30cm must be removed in these areas, however, the excavation is located in rocky outcrop and topsoil is generally absent. Whatever topsoil is available in the excavation area between the outcrops must also be removed ahead of development.
- All topsoil removed shall be stored in perimeter topsoil preservation berms being maximum 2m in height in order to preserve as much of its soil characteristics as possible. Topsoil berms must be allowed to revegetate (and as such the side slopes must be kept to 1:2 slopes) so that they do not suffer the effects of wind erosion or generate dust
- A full stormwater management system must be put in place on site to manage silt contaminated run-off and topsoil loss (as well as prevent erosion) as described in para 20.4.
- Topsoil will be replaced over affected areas during both ongoing and decommissioning rehabilitation as follows:
 - i. Scarify hardened area to approximately 20cm deep
 - ii. Spread topsoil over scarified area to original depth
 - iii. Revegetate.

20.2 Dust reduction measures

Attention is drawn to paragraph 4.8.4 of the extract from SANS regarding recognition that certain enterprises need to operate within “band 3” by virtue of “the practical operation of the enterprise...” provided that the best available control technology is applied for the duration”.

“DUST FALL STANDARDS SANS 1929:2004

4.8 Dust Deposition

4.8.1 General

The four-band scale to be used in the evaluation of dust deposition is given in 4.8.2 and target, alert and action levels indicated in 4.8.3. Permissible margins of tolerance are outlines in 4.8.4 and exceptions noted in 4.8.5

4.8.2 Evaluation Criteria for Dust Deposition

Dust deposition rates shall be expressed in units of mg m² day⁻¹ over a 30-day averaging period. Dust deposition shall be evaluated against a four-band scale as presented in Table 9.

Table 9 – Four-band scale evaluation criteria for dust deposition

Band number	Band description label	DUSTFALL RATE (D) (mg m ² day ⁻¹ 30-day average)	Comment
1	Residential	D < 600	Permissible for residential and light commercial.
2	Industrial	600 < D < 1 200	Permissible for heavy commercial and industrial.
3	Action	1 200 < D < 2 400	Requires investigation and remediation if two sequential months lie in this band, or more than three occur in a year.
4	Alert	2 400 < D	Immediate action and remediation required following the first exceedance. Incident report to be submitted to relevant authority.

4.8.3 Target, Action and Alert Thresholds are given in Table 10

Table 10 – Target, action and alert thresholds for dust deposition

Level	DUSTFALL RATE (D) (mg m ² day ⁻¹ 30-day average)	Averaging period	Permitted frequency of exceedances
Target	300	Annual	
Action residential	500	30 days	Three within any year, no two sequential months
Action industrial	1 200	30 days	Three within any year, no two sequential months.
Alert threshold	2 400	30 days	None. First exceedance requires remediation and compulsory report to authorities.

4.8.4 Margin of Tolerance

An enterprise may submit a request to the authorities to operate within Band 3 (ACTION Band), as specified in Table 9, for a limited period, providing that this is essential in terms of the practical operation of the enterprise (for example the final removal of a tailings deposit) and provided that the best available control technology is applied for the duration.

No margin of tolerance will be granted for operations that result in dustfall rates which fall within Band 4 (ALERT Band) as specified in Table 9.

4.8.5 Exceptions

Dustfalls that exceed the specified rates but that can be shown to be the result of some extreme weather or geological event shall be discounted for the purpose of enforcement and control. Such event might typically result in excessive dustfall rates across an entire metropolitan region, and not be localised to a particular operation. Natural seasonal variations, such as dry windy period during the Highveld spring will not be considered extreme events for this definition”

Note further that in addition to the measures described below, **dust will be continually monitored and analysed through the use of a DustWatch system.** Such system consists of a series of directional dust monitoring units. The four-bucket units are used to monitor prevailing wind directions with opposing winds as controls. This allows for an assessment of import / export fall-out dust quantification (in other words, the dust generated by the quarry can be quantified as well dust generated by other sources in the area) and standard services include the regular sample collection, filtration and data analysis as well as data reporting of the findings (Monthly Fallout & Trends Analysis).

The following is a list of measures that must be implemented at the quarry to prevent any impact of dust on surrounding land uses or users.

Activity	Attenuation Measure(Internal)
Traffic along portions of access roads	<ul style="list-style-type: none"> Water cart wetting of the road must occur (particularly during dry and / or windy conditions) – Consider surfacing if dust becomes an issue
Use of unsurfaced roadways	<ul style="list-style-type: none"> Water cart wetting of roads during dry and / or windy conditions Install permanent sprinkler system on long term routes such as haul roads if dust becomes an issue
Topsoil removal	<ul style="list-style-type: none"> Pre-wet topsoil Avoid high wind conditions, specifically NE and NW winds Schedule in the wet season
Drilling	<ul style="list-style-type: none"> Supply masks where applicable. Fit dust extraction equipment to drill rigs
Blasting (Excavation Advance)	<ul style="list-style-type: none"> Avoid blasting under extreme winds. Apply best available blasting practice
Hauling	<ul style="list-style-type: none"> Wet haul road with water cart but preferably permanent sprinkler system
Primary Tipping and Crushing	<ul style="list-style-type: none"> Semi-enclosure of hopper. Install mist spray system at primary intake hopper. Install dust extraction plant to bag filters on all crushers as a last option Supply masks where applicable for employee health protection
Screening	<ul style="list-style-type: none"> Supply masks where applicable for employee health protection Screens and crushers to be housed. Mist sprays at transfer points and on stockpile product walls. Dust extraction equipment to be fitted to plant as last option
Transfer points	<ul style="list-style-type: none"> Apply mist sprays at all belt transfers and screens. Enclose transfer points.
Stockpiling	<ul style="list-style-type: none"> Wall stockpiles where ever possible Provide sprinkler systems on walled or other stockpiles where wetting of product can take place
Loading and despatch	<ul style="list-style-type: none"> Sprinkler wet stockpile to maintain moisture content Cover delivery trucks carrying dust generating loads
Monitoring of dust	<p>Initial Dustwatch monitors must be placed at:</p> <ul style="list-style-type: none"> The two residences (SE and SW of the excavation) At the two closest wind turbines <p>Based on such monitoring the respective attenuation measures will be applied until compliance is achieved</p>

Table 36: Dust reduction measures to be implemented

20.3 Hydrocarbon control measures

Industrial and Domestic Waste handling

All domestic waste will be collected in bins located strategically around the site (i.e. at the office, the crushing plant and at the workshops). The domestic waste is to be collected on a daily basis and placed in the designated temporary storage area to be constructed as shown in the diagram below. Such waste will be periodically collected and disposed of at a suitable municipal waste disposal site.

The proposed waste temporary storage facility as shown below includes a facility for used oil and fuel waste handling. This facility must have a concreted floor and be constructed with a low ridge at the leading edge, guiding run-off water into an oil trap. All used oil, leaked oil/fuel saturated soil, oil contaminated spares, oily rags etc must be placed in facilities as provided and marked. From there the oil / waste will either be:

- Collected by oil recycling company (such as Oilkol or the Rose Foundation) or,
- Transported by the applicant to a suitable regional licensed hazardous waste handling facility dependant on the nature of the material.

The facility shall be roofed to ensure proper functioning of the oil trap without flooding by rain.

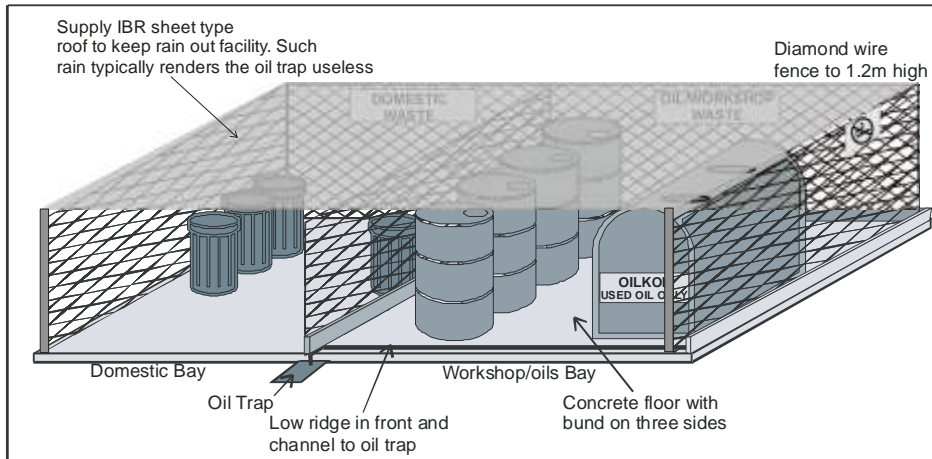


Figure 13: Design Guidelines for industrial and domestic waste temporary storage facility

Fuel receipt, storage and dispensing:

In the management of fuel supply, receipt, storage and use, the following procedures will be followed, cautions taken and facilities built to properly manage this operational sector:

The fuel delivery bowser driver will be cautioned to adhere to safe driving speeds and drive cautiously at the mine and along the access road.

The fuel tank at the mine must be developed according to the following design guidelines:

- Construction of a bund wall capable of holding 1.1 x the full capacity of the tanks within it as per the diagram below.
- Construction of a concreted floor.
- Construction of a concreted service apron sufficiently large to catch minor fuel spills during receipt and supply of fuel. The apron to be dished concrete to lead rain-water or wash-water to drain pit (sump) for collection of oily-run-off and suitable decontamination / disposal thereof as shown hereafter.

During dispensing of fuel to field vehicles via fuel trailer, the dispensing vehicle is to be fitted with suitable pumps and funnel extensions to reduce the risk of spillage in the transfer of fuels.

Note that in terms of reg 4(d) of the “REGULATIONS ON USE OF WATER FOR MINING AND RELATED ACTIVITIES AIMED AT THE PROTECTION OF WATER RESOURCES”, “no sanitary convenience, fuel depots, reservoir or depots for any substance which causes or is likely to cause pollution of a water resource may be located within the 1:50 year flood-line of any watercourse or estuary”. In this case the stream channels are small and the 1:50 year flood line would be located very close to the bank of the stream. In order to avoid any possible contravention of the regulations, it is

proposed that any fuel tanks be located in excess of 100m from any stream channel or borehole.

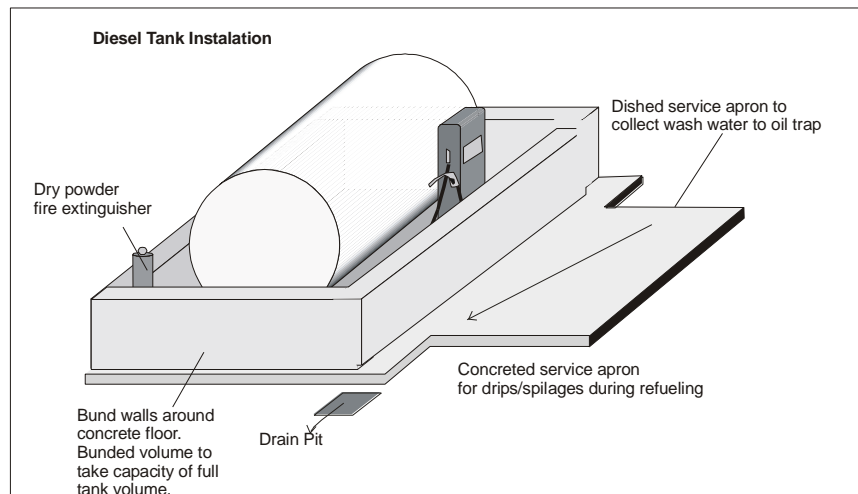


Figure 14: Design guidelines: Bunded fuel tank

On-site repairs:

Routine servicing of vehicles as well as major overhauls can be conducted at the workshops which will be located on site as shown in Figure 10. The workshop must be constructed with a reinforced sloped concrete apron and shallow dished drain leading polluted water to oil trap.

Emergency repairs on site:

In the event of a breakdown with repair being required in the field, the staff should be trained in use of drip trays and suitable funnels (not to drain oil into the sand) for filling and draining of lubricants and the staff shall be provided with such equipment to prevent oil contamination.

In addition:

- Used/replaced filters, hoses, belts, cloths, etc. are to be placed in a bin for return to the used oil and lubricant storage area which is to be constructed as shown above. Used filters are not to be buried at the site of repair (nor discarded in the excavation to be backfilled).
- In the event of soil contamination, the soils are to be treated with a suitable decontaminant such as the OT8 or Spillsorb range of products. Such product to be available on site at all times.

All staff involved in mobile plant operation and maintenance are to be made aware of these oil and lubricant procedures. Staff will require instruction in the:

- Deleterious effects of oil / fuel on the environment
- Neutralization of oil leaks on the concrete apron
- The operation of the oil trap (including the temporary storage of recovered oil); and
- Use of OT8 / Spillsorb products.

Vehicle wash Bay

The vehicle wash bay to be established on site must be built according to the design principles as shown below:

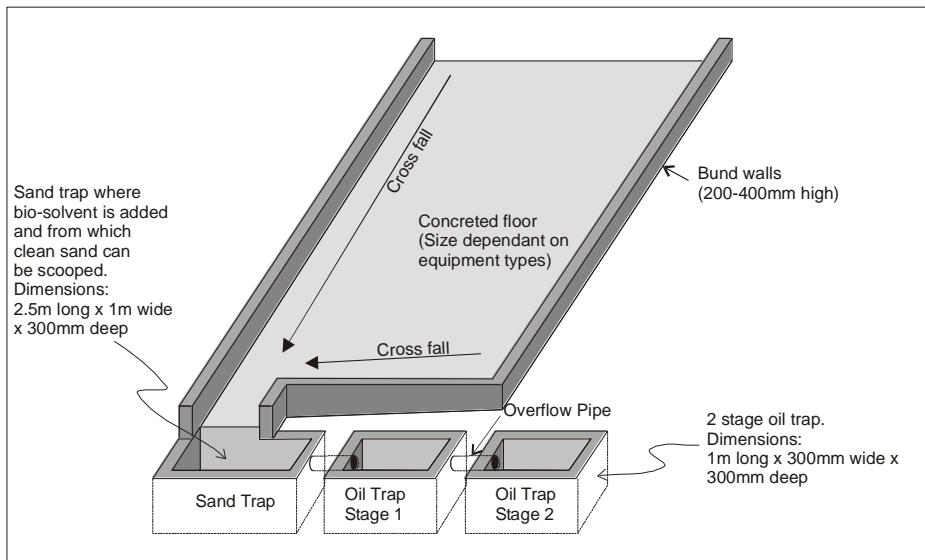


Figure 15: Design guidelines: Vehicle washbay

General Provisions

- All operators are to check their equipment for leaks and report such leaks on a daily basis.
- No used oils are to be used as dust suppressants on manoeuvring areas.
- All staff to be instructed to report oil spills immediately and be trained in fire fighting and the use of biodegradable solvents such as OT8 or Spillsorb or similar products in the clean-up operation

20.4 Stormwater Management System

The stormwater management system must be put into place to prevent silt laden water entering the natural surface water system. While the mist sprays on the plant and dust suppression sprinklers on the roadways and stockpiles do not generate free-flow from these areas, it is the periodic rainfall and associated stormwater run-off which occurs in the dust-laden areas which poses the risk of silt-load into the natural drainage system

Storm water will result in silt laden runoff from the logistical facility, plant and stockpiling areas. The stormwater system consequently consists of the following elements (refer figure 10):

1. Stormwater is prevented from entering any denuded areas by way of **stormwater cut-off trench above the affected site.**
2. Any stormwater which does flow from denuded areas is potentially silt laden and must be prevented from entering the natural water system. Such prevention is through the provision of **silt cut off drains below the affected area** to lead water away.

It is imperative that silt laden water is fed into silt retention ponds which facilitate silt settlement before (clear) water is allowed to enter the natural surface water

system. The silt retention pond also serves to facilitate seepage into the rock/soil as recharge and to reduce run-off and allow the re-use of the clear water. There must be access to front end loader to remove collected silt from the silt traps. Such collected silt will be mixed into sub base product

Mitre drains must be provided along the access road and long term internal roads

The dimensions of each of the abovementioned elements is as follows:

1. All drains and trenches need only be shallow channels, 30-50cm deep by 60cm wide.
2. The silt retention pond: The small intermediate ponds must be at least 5m x 5m and 1.5m deep with 500mm freeboard above their discharge pipe.

The stormwater management system must be periodically checked (especially after rains) and all silt retention ponds must be regularly cleared of silt and the silt mixed into the sub-base product. Monitoring of runoff by sampling during high run-off spates and testing to ensure that TSS (Total Suspended Solids) does not exceed the DWAF standard of 25mg/l above ambient is imperative.

20.5 Excavation edge shaping

Operational bench advance along the perimeter will be conducted towards achieving the following final perimeter configuration. This is especially true of the upper western faces which would be subject to visual exposure from the NE:

Final Face Profile along western edge

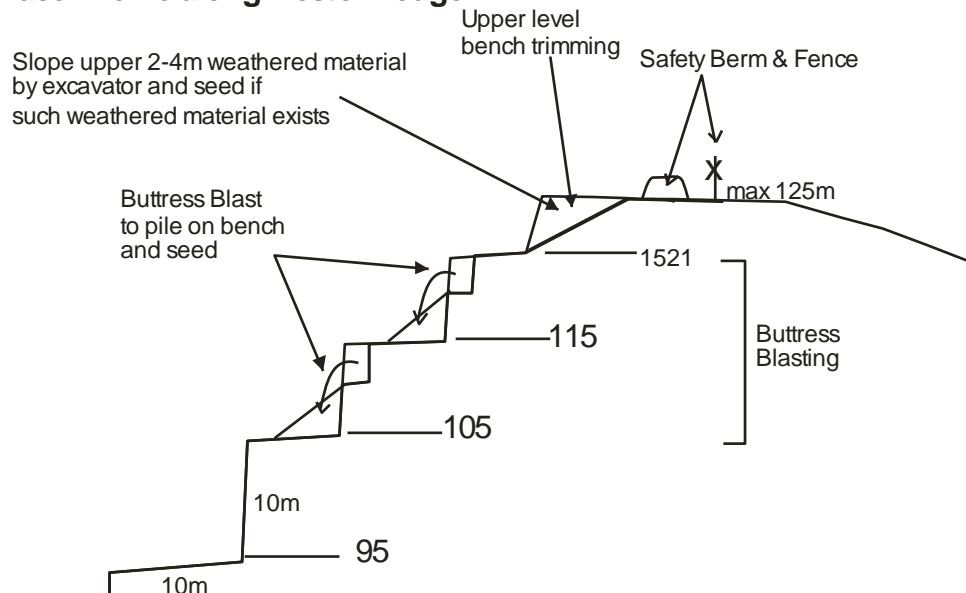
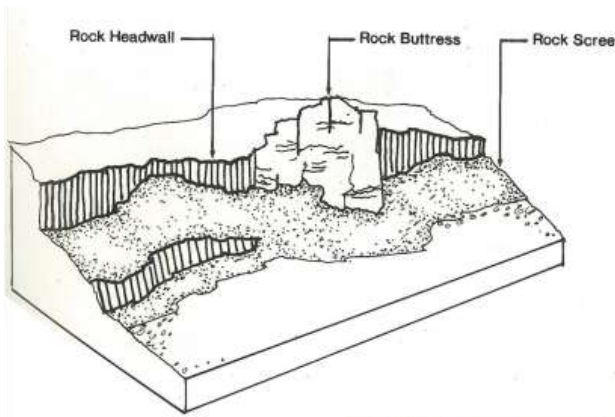


Figure 16: Final edge pit configuration

Buttress blasting consists of the alternate blasting of lengths of final face and allowing the slumped blasted material to remain in place, thereby breaking the appearance of unnatural linear patterns:



Source: Amenity Reclamation of Mineral Workings, Her Majesty's Stationary Office, 1992
Figure 17: Buttress blasting proposal explained

21 Action plans to achieve the objectives and specific goals contemplated in Regulation 50 (a).

The time frames for the implementation of each of these activities is as per general phase plan as indicated in Para 7.3

21.1 Establishment phase

All establishment phase activities to be completed within 6 months as per para 2.3.

21.2 Operational Rehabilitation

NOTE: It is incumbent on the applicant to provide a rehabilitation fund guarantee to cover the costs of decommissioning rehabilitation. Such guarantee must be lodged prior to the Mining Right being issued. The fund has to be calculated:

1. At application stage and annually during the life of mine
2. As if the quarry were to shut down immediately at the time of highest impact
3. As if all work had to be conducted by outside contractors

It is therefore advantageous to the applicant to continuously conduct operational rehabilitation during the life of mine to reduce the size of the “immediate closure fund” and the decommissioning rehabilitation costs. Most operational rehabilitation is geared toward reducing the amount and value of decommissioning rehabilitation of the site but some is geared toward maintaining a neat and effective quarry site.

As such, operational rehabilitation will consist of at least the following elements:

- General housekeeping of the site must be of high order and the site must be kept neat at all times. Grassing of certain areas and banks, demarcation of movement areas etc all contribute to a pleasing aesthetic.
- Whenever faces have reached their final configuration, work must begin on the rehabilitation of especially the upper western faces. Such rehabilitation will consist of trimming, buttress blasting and vegetation of the affected faces
- Continual monitoring of the site by management and staff
- Conducting of Environmental Performance Assessments every two years during full production (more often during construction phase).

21.3 Decommissioning rehabilitation

The closure objective requires that:

1. The excavation is to be shaped to meet safety requirements and provide suitable profile to facilitate revegetation for reduction of visual impact of exposed upper western faces. The upper bench will require a safety berm/trench and must be trimmed in accordance with the Figure 15 in para 20.5.
2. The proposal at this stage is to “buttress blast” the upper faces as per para 20.5. This entails alternating slump-blasted sections with remaining vertical faces and facilitates revegetation of the resultant slopes.
3. To topsoil remaining upper benches and revegetate through a mix of seeding, shrub and tree planting and promote long-term natural revegetation by seed transfer
4. The excavation be shaped, made safe and buttress blasted and left with its faces as roosting sites for predator birds while the floor floods with seepage & rain as a breeding pond for water fowl. The excavation will thus form a conservation feature.
5. All structures and roads not required by the landowner be removed

6. All hardened areas outside of the excavation will be ripped/scarified, topsoiled and revegetated.
7. The stockpiling area will have as much crushed stone removed from the stone contaminated soil as possible before the resultant area is topsoiled and vegetated.
8. All plant and unnecessary buildings, foundations and footings will be removed.

Decommissioning will entail the following actions:

Excavations

Complete rehabilitation of the excavation through:

- Completion of the buttress blasting which would have been commenced in the operational phase. For the purposes of rehabilitation cost calculation (as contained in Part 20.5), it is assumed that one buttress blast will take place every 40m and that 75% of the buttress blasting would have been completed prior to decommissioning rehabilitation.
- Completion of perimeter upper bench trimming. For the purposes of rehabilitation cost calculation (as contained in Part 20.5), it is assumed that half of the trimming would have been completed prior to decommissioning rehabilitation.
- Ensuring the 1m high perimeter safety bench is in place around the entire excavation
- Cover top benches with at least 15cm topsoil
- Seed topsoiled benches with the seed gathered in similar nearby environment
- Construct safety fence and safety berm and place danger signboards around excavation

Plant, Stockpile and Logistical Facility Area

- Remove all plant, structures, foundations and footings (including all pipelines and cables)
- Remove all stockpiles
- Remove all buildings (not required for future use), structures, footings & floors
- Remove as much stone contamination as feasible by dozer
- Remove all retaining structures
- Profile the area to within 1,5m of original profile
- Re-topsoil with topsoil ex topsoil berm and revegetate by supplementing seeding with wind break fences if required

For all areas

Rip/scarify all hardened areas parallel to the slope (to 20cm deep), cover with stockpiled topsoil ex topsoil berms and allow area to revegetate naturally. Supplementary seeding must be conducted using grass seed mix indicated by landowner.

General

- Retain fence around mining authorization area
- Retain stormwater management system for duration of aftercare period
- Allow floor to flood from seepage & rain catchment to form reedbed and water fowl habitat

22 Procedures for environmentally related emergencies and remediation.

Only two high evidential risk probabilities/possibilities are identified namely:

- (i) fuel/oil spills; or
- (ii) veld fires.

To this end the following procedures must be brought to the attention of all staff and suitable material/equipment provided to deal with them.

(i) Fuel/oil spills

The reporting procedure in terms of which any person on site who sees an oil/fuel spill occurring must:

- Ensure the safety of any person nearby by evacuating such person from the danger area.
- Having assessed the volume of the spills and if safe, then:
 - Report the spill to the office personnel who shall notify the manager
 - Use either shovels or mechanical equipment (loader, etc.) to either dig a low trench or construct a wall to contain the spill and especially to restrict it from draining into the soil or veld.
- The manager (plant production manager or mobile plant manager) shall implement the product specifications as to the methods of clearing up the spill and treating the affected soil.

In addition, all staff must report oil/fuel leaks from mobile equipment no matter how small the leaks are.

The manger shall ensure that oil spill treatment product is held in stock and available at all times and that a notice for its use be posted in the storage area where it is kept.

(ii) Fire

Should any fire derived from the quarry or elsewhere be noted in the veld, the manager must immediately be notified, whereupon he shall notify the land owner and adjacent land owner and muster all available persons recruited on site to beat the fire or use the water cart if available to assist.

The relevant telephone numbers including after hours & emergency numbers must be clearly displayed.

When appropriate they should then notify the local authority's fire department.

23 Planned monitoring and environmental management programme performance assessment.

Refer part 15

24 Financial provision in relation to the execution of the environmental management programme:

24.1 Plan showing the location and aerial extent of the aforesaid main mining actions, activities, or processes anticipated.

Refer Figure 10.

24.2 Annual forecasted financial provision calculation:

To be calculated _ Will not impact on EMP content

24.3 Confirmation of the amount that will be provided should the right be granted.

To be calculated _ Will not impact on EMP content

24.4 The method of providing Financial provision contemplated in Regulation 53.

The fund will be supplied by financial guarantee

25 Environmental Awareness Plan (Section 39 (3) (c))

Section 39(3)(c) requires that an applicant who prepares an EMP programme or EMP plan must “develop an environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risks which may result from the work and the manner in which the risks must be dealt with in order to avoid pollution and degradation of the environment”.

Environmental Awareness is required not only for management and employees (as described in Section 39(3)(c)) but also for visitors to the site. To this end, the following strategies and plans will be put into place for each of the parties.

25.1 Visitor Environmental Awareness:

Visitor/sub-contractor environmental awareness will be generated through the handing out of simple pamphlets describing very briefly the environmental considerations applicable to them. The pamphlet should contain the following information:

- Statement of the applicant’s commitment to environmental principles.

- List of the “rules” to which the visitor must abide. This will include:
 - No littering. Dispose of all waste in the bins provided.
 - No fires
 - Stay on demarcated roadways and paths only
 - Kindly report any environmental infringements they may notice
 - Check your vehicle/equipment for diesel/oil leaks
- A signed commitment by the visitor stating that he/she has read the rules and will abide by them

These pamphlets should be handed to the visitor at the security kiosk or at the office and collected when they leave the site.

This pamphlet should form part of the indemnity a visitor signs which will also contain his/her undertaking to adhere to all health & safety precautions.

Staff of sub-contractors must also be given Environmental Induction Training as per Annexure E.

25.2 Senior and Middle Management Environmental Awareness:

Achieving environmental awareness at upper levels of management is slightly different from the process at the operational level. There is often a fair level of the general value of environmental awareness but site-specific issues will most often need to be communicated. This will be achieved by:

- The management must make themselves fully au fait with the EMProgramme.
- Ensuring that there is a spare copy of the approved EMProgramme at his/her disposal. The management is encouraged to make notes in the document regarding the difficulty / ease of implementing the environmental management measures. These notes should be sent to the consultants to assist in future revisions of the EMProgramme
- If the manager feels comfortable conducting the environmental performance assessments (required in terms of the Act), then he/she should do them. However should outside help be required then the manager must be avail him/herself to accompany the environmental performance assessment team on their rounds.
- The manager must ensure that the operators perform regular monitoring of their workstations / areas.

In the management’s execution of their daily activities/being at the site, the management must be constantly aware of and observant of especially the following:

- | | | |
|----------------------|---|--------------------------------------|
| - dust levels | - | movement outside of demarcated areas |
| - noise levels | - | stormwater/erosion control |
| - litter management | - | general housekeeping |
| - topsoil management | - | fuel/oil management/leaks/changes |

25.3 Operator / Workforce Environmental Awareness:

Achieving environmental awareness amongst the operators and labour is probably the most important because they are usually present at the place where most environmental transgressions take place or in fact cause them. It is the aim of increased environmental awareness to reduce any such environmental transgressions.

Increasing environmental awareness at these levels can be achieved through the following strategies:

- **Induction environmental training:** (As per the draft Environmental Induction Training document in Annexure E) should a new operator/labourer be employed from outside of the company, then the site manager must briefly go through the environmental issues which would apply to that persons post as part of the induction of that person.
- **Training:** Each and every employee must go through an environmental training process where at least the following items area covered:
 - The oil/fuel management policy must be explained to the employees. The reason for the policy must also be explained (i.e. to not impact on groundwater, surface water, soil quality etc).
 - The domestic and industrial waste management policy & method must also form part of the training
 - The topsoil handling method and the reasons for preserving topsoil (i.e. post mining revegetation, erosion prevention etc)
 - Alien vegetation management: How to recognize and remove such species
 - Protection of the natural veld by not driving/manoeuvring or walking through the demarcated protection areas. Reporting that demarcation posts/tape is broken or removed
 - Emergency management procedures such as dealing with oil spills or fires must also be drilled
 - Such training will, in this case, be carried out by the site manager/resident engineer or the designated Environmental Control Officer (ECO)
- **Monitoring:** Management should design forms for use by the operators to conduct regular environmental monitoring of their stations and procedures. The site manager must retrieve the forms on a regular basis and check their responses against what is seen on site. A discussion of the differences between the responses received and what is seen on site will highlight areas where additional environmental training and awareness is required.

(Refer Annexure E for preliminary Induction Training manual)

26 Attachment of specialist reports, technical and supporting information. (Provide a List)

Annexure A: Biodiversity Sensitivity Analysis compiled by K. Coetzee of Conservation Management Services

Annexure B: Specialist Geohydrological Assessment by GEOSS

Annexure C: Heritage Impact Assessment and Phase 1 AIA by K van Ryneveld of Archaeomaps

Annexure D: Palaeontological Impact Assessment by John Almond

27 SECTION 39 (4) (a) (lii), Capacity to manage and rehabilitate the environment

Impuma Quarries (Pty) Ltd form part of the Denron group of companies. Denron have as their focus the supply of material and transport and have in their several decades of business acquired all the personnel and equipment to ensure that all aspects of this Environmental Management Programme can successfully be put in place.

CV's of the relevant personnel as well as technical ability of the company was demonstrated as part of the Mining Work Programme which has to be lodged with the application

28 UNDERTAKING

28.1 The Environmental Management Programme will, should it comply with the provisions of section 39 (4) (a) of the Act and the right be granted, be approved and become an obligation in terms of the right issued. As part of the proposed Environmental Management Programme, the applicant is required to provide an undertaking that it will be executed as approved and that the provisions of the Act and regulations thereto will be complied with.

29 IDENTIFICATION OF THE REPORT

Signature_