

related vegetation are the largest of the three groups Scharf (1979) the other two being Subtropical Evergreen Forest and Valley Bushveld (Kruger, 1976 and Scharf, 1979). The dominant fynbos can be divided into :

- *Leucadendron eucalyptifolium* high moist fynbos
- *Protea neriifolia* high fynbos
- Grassy fynbos

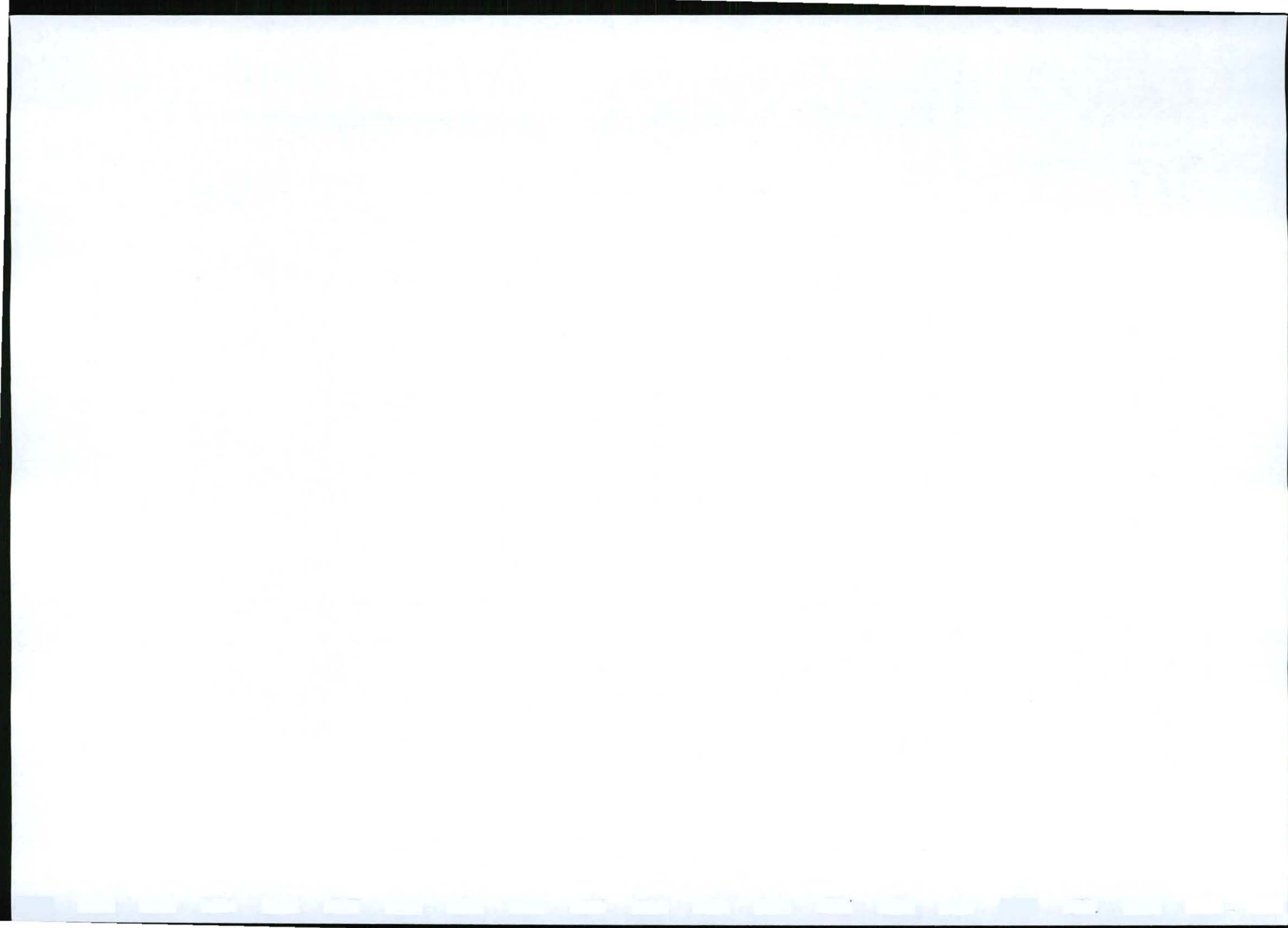
The whole Swartkops River catchment is widely invaded by a cocktail of alien invasive plants except for the Groendal area where they are either localized or sparse but widely spread. The four main species are:

- *Opuntia ficus-indica* (prickly pear)
- *Opuntia aurantiaca* (jointed cactus)
- *Acacia mearnsii* (black wattle)
- *Acacia longifolia* (longleaf wattle)
- *Pinus pinaster* (cluster pine)

These exotic plants present a substantial threat to the indigenous vegetation (at this stage *Acacia mearnsii* presents the biggest threat), as well as threatening the integrity of the catchment. These invasive species tend to encourage channel bank instability and sediment production. Large trees are often undercut and then topple into the river channel breaking the bank causing severe erosion. These species also reduce streamflow and impact negatively on instream habitat.



Figure 2 : General view of vegetation and topography on the Elandsberg at the northern end of the Otterford Plantation looking north towards the Great Winterhoek Mountains.



A number of endangered and rare faunal species occur on Groendal, and include Cape Redfin Minnow (*Pseudobarbus afer*) ; Fish Eagle (*Haliaeetus vocifer*), dwarf chameleon (*Bradypodion spp.*), leopard (*Panthera pardus*) and blue duiker (*Philantomba monticola*).

Exotic Large Mouth Bass (*Micropterus salmoides*) are found in the Groendal Dam, as well as in the Swartkops River. As they prey on the indigenous fishes, they constitute a big threat to the survival of indigenous fish species.

2.6. LAND USE

Population:

The majority of the population occurs within the urban areas of Port Elizabeth (65%), Dispatch (3%), KwaNobhule (21%) and Uitenhage (10%).

Mining:

The removal of sand and river gravel from river beds in the Swartkops catchment occurs at the following sites : in the lower KwaZunga River at Springfontein ; and in the Swartkops River above Uitenhage and above - and below Perseverance.

Farming:

Irrigation farming occurs in the upper Elands sub-catchment, including the Sand and Bulk Rivers. There is little irrigation from the Elands River. Farmers in this area tend to rely on groundwater. Intensive irrigation is practiced in the Kruisrivier area. The upper catchment of the KwaZunga is farmed, but is fairly remote and inaccessible due to the rugged nature of the terrain. The middle reaches of the KwaZunga is subject to irrigation farming and receive irrigation water from the Groendal Dam.

Forestry:

Forestry was started in the Elandsberg in 1918. The total area under commercial- and natural forest in the Swartkops Catchment is relatively small (4,23% of the total catchment area). In the Elandsberg the whole top of the mountain is forested (Longmore (3747ha) & Otterford (27300ha)).

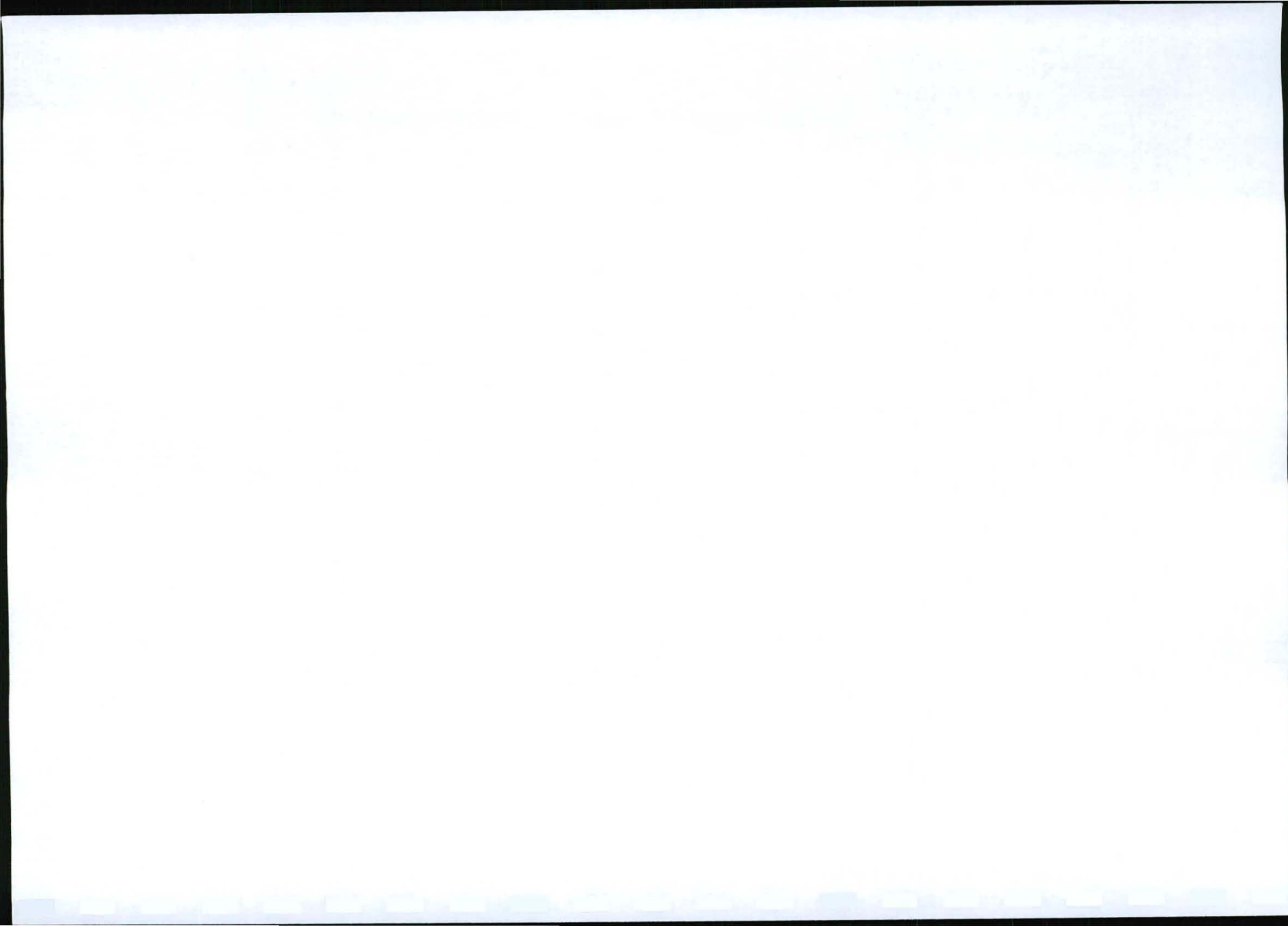




Figure 3 : Undisturbed riparian zone in new plantings in Longmore Plantation.

These plantations occur in areas where the main upland seeps of the Bulk River and Sand River were located. The Loerie catchment is also an area that has been put under plantations.

Conservation:

The Groendal Wilderness, previously known as the Elandsrivier Forest Reserve, was declared on the 14th of February 1976. It was placed under the control of the then Department of Agriculture and Forestry transferred to the Department of Environment Affairs and Forestry then to the Cape Provincial Administration and managed by the Department of Nature and Environmental Conservation in 1987. Presently Groendal and "The Island Reserve" is managed by the Directorate of Nature Conservation, of the Department of Economic Affairs, Environment and Tourism, as part of the network of natural areas in the Eastern Cape Province. The middle portion of the Swartkops Catchment consists of the pristine Groendal Wilderness Area.





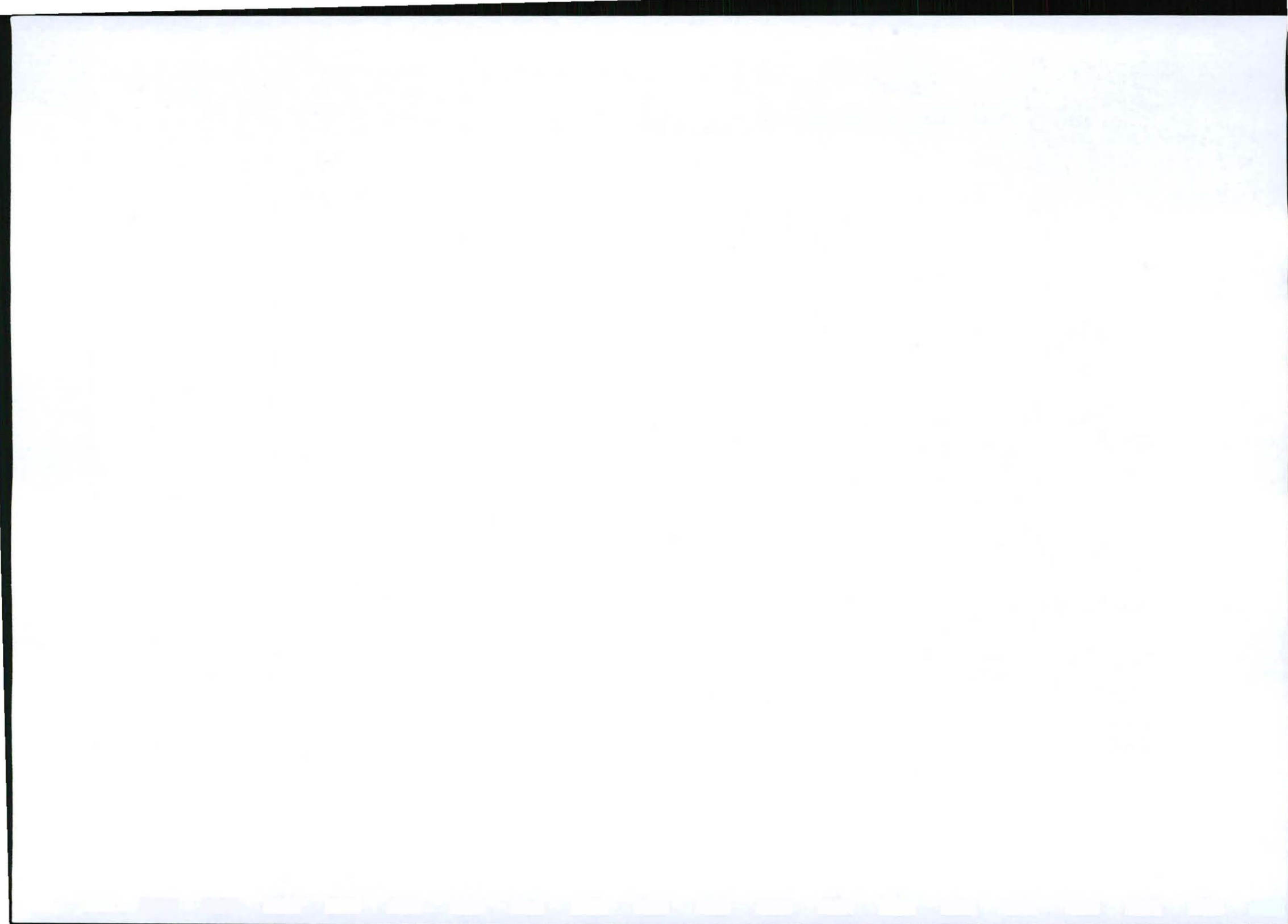
Figure 4 : The KwaZunga River as it emerges from the Groendal Gorge is the least disturbed part of the river at site 33.72°S 25.32°E.

The Swartkops Nature Reserve is situated on the northern bank of the Swartkops River to protect the valley bushveld and extends between Perseverance and the Motherwell canal. This area forms a buffer zone between the urban area and the River. The "Island Reserve" is situated on the coastal plain while there is also the Van Stadens Wildflower Reserve and the Settler Park in the area. During the late nineteen eighties additional land was purchased to the west of Groendal Dam. This considerably enlarged the extent of Groendal as well as the area of catchment of the KwaZunga River under formal conservation. It is planned that this area will form part of the Baviaanskloof Mega Reserve.

3. THE SWARTKOPS RIVER

3.1. THE ELANDS CATCHMENT

The Elands River arises in the Elandsberg that borders the Gamtoos catchment to the west and the Winterberg on the north-east. Bokkeveld shales in the Elands sub-catchment tend to be fairly erodible. This is exaggerated by the steep topography in the upper catchment. The catchment had been intensively farmed in earlier years, but farming operations appears to be scaling down. In accordance with other areas in the Southern Cape, the spread and growth of exotic vegetation appears to have had severe impact on the water resource. The appearance of exotic vegetation can cause a change in channel equilibrium, very often leading to channel instability. The changes, which are demonstrated at this site, clearly indicate degradation on in-stream habitat.



3.2. SITE 33° 48.149'S TO 25° 16.298'E.

1939:

There is a lot of in - channel vegetation (Palmiet) which has narrow channels between vegetation. Between vegetation "plugs" are large pools.

1958:

Larger trees are apparent along the channel. The river is a single channel and sandy areas are visible.

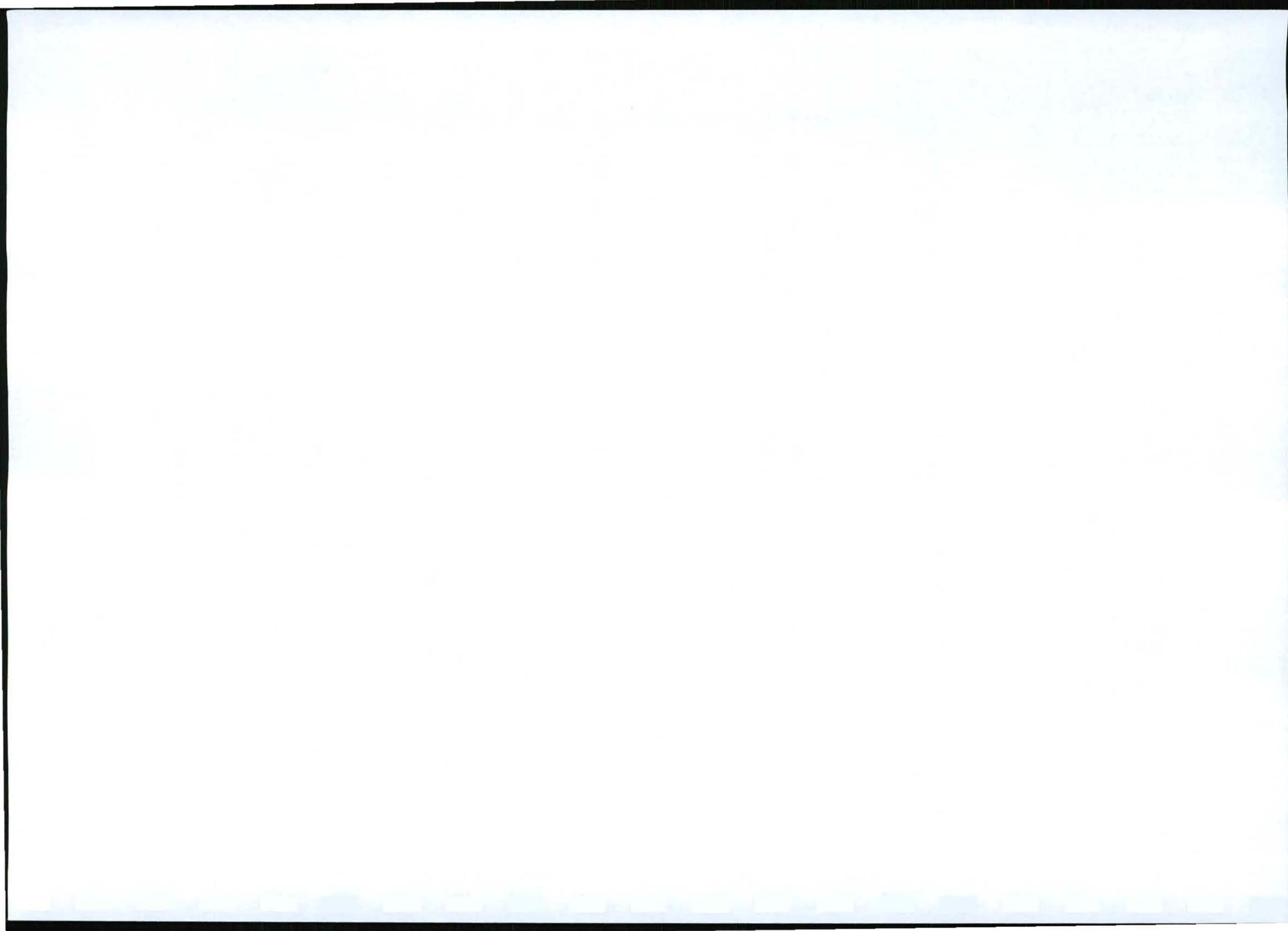
1978:

There is a dramatic change : there are large trees along the channel margin and a loss of in - stream vegetation. The river appears to be unstable and there are numerous sandy bars.

The channel at this site appears to be on a trajectory of change from a complex mixed channel to an alluvial bed. With this change, there is likely to be a loss of in-stream habitat. The Sand River Dam (1907) and the Bulk River Dam (1903) situated where the river falls over the scarp to the Elands Valley, will have reduced the volume of water to the Elands River considerably. The upper reaches of both tributaries are impacted by extensive forestry developments but fortunately several of the wetlands areas here are still in good condition. All these factors have combined to drastically reduce the natural run-off and have seriously impacted flow patterns in the previously perennial Elands River as well as altered the physical structure. This has negatively impacted on the fish populations.

3.3. THE SWARTKOPS - KWAZUNGA RIVER CATCHMENT

The KwaZunga River (site 33° 43,306'S 25°18,099'E) flows through an inaccessible, steep-sided valley, which limits any intensive farming activities or development. The river and its tributaries consist of a series of medium to large pools connected by rapids. The middle KwaZunga River flows through the rugged and inaccessible Groendal Wilderness Area where the following streams are permanent due to

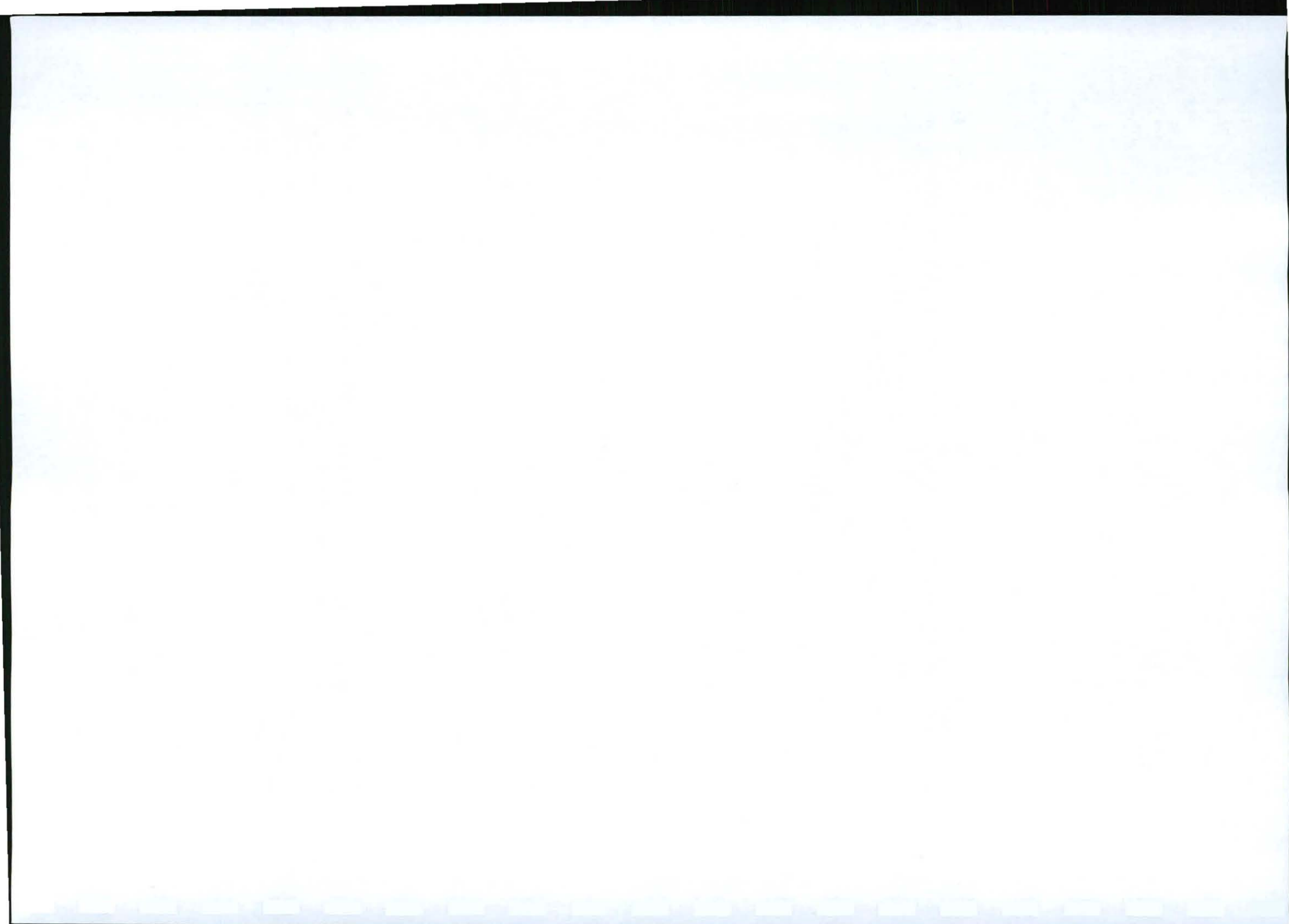


springs, from north to south : Chases's Kloof (Emerald Pool) ; then Skelmkloof leading to Blindekloof (7 pools) then Fern Kloof and Waterkloof in the south. The natural river flow (15.71 million m³) in the middle KwaZunga River is largely modified due to the presence of the Groendal Dam situated about 15 km upstream of the confluence with the Elands River (DWAF 1996). Water is released out of the Groendal Dam on a continual basis of 6 000 m³ per day to supply the Swartkops River from a small bottom outlet, as Groendal Dam has no large outlet. This ensures a constant flow of water in the river below the wall, also providing water to irrigation farmers in the Kruis Rivier Valley. Uitenhage receives water for household and industrial purposes from the dam via a pipeline. This source of water supplies approximately 63% of the water requirements of Uitenhage and amounts to approximately 12 000 m³ per day (Coetzee, pers. comm.). In the upper portions of the river the riparian zone appears natural, but the in-stream zone is apparently quite disturbed due to the operational procedures of Groendal Dam.

Historically the KwaZunga River showed complex morphology consisting of pools and runs with healthy stands of palmiet causing the channel to become braided except in the gorges where little in-stream vegetation occurred. Over a period of sixty years the stream character remained relatively similar, but the in-stream morphology changed as sediments were deposited and shifted during high flow events. Below the Groendal gorge the riverbed is in a poor state with the riverbanks being heavily impacted, although the riparian vegetation appears healthy. The presence of an upstream dam may have provided an opportunity for vegetation encroachment and channel narrowing. Below the river's exit of the mountain gorges the floodplain is impacted with physical disturbances such as municipal infrastructure ; sand and pebble mining ; man-made channels and farming activities.

After the confluence of the Elands - and the KwaZunga Rivers the Swartkops River meanders through a wide alluvial flood plain past the industrial area of Uitenhage and residential areas of Despatch to the tidal limit of the estuary located at Perseverance. The channel has cut down deeply into the sedimentary deposits. The Swartkops River upstream and downstream from Uitenhage is severely disturbed both upstream and downstream of Uitenhage. No sites could be found with natural banks due to :

- - man-made excavations
- - riparian vegetation that was removed or replaced by exotics;
- - possible very bad water quality;



- - unnaturally high flows due to the sewage effluent discharges;
- - *Eichornia* present in large areas;
- - Industrial development and pollution; and
- - Barriers to fish migration such as low causeways and weirs.

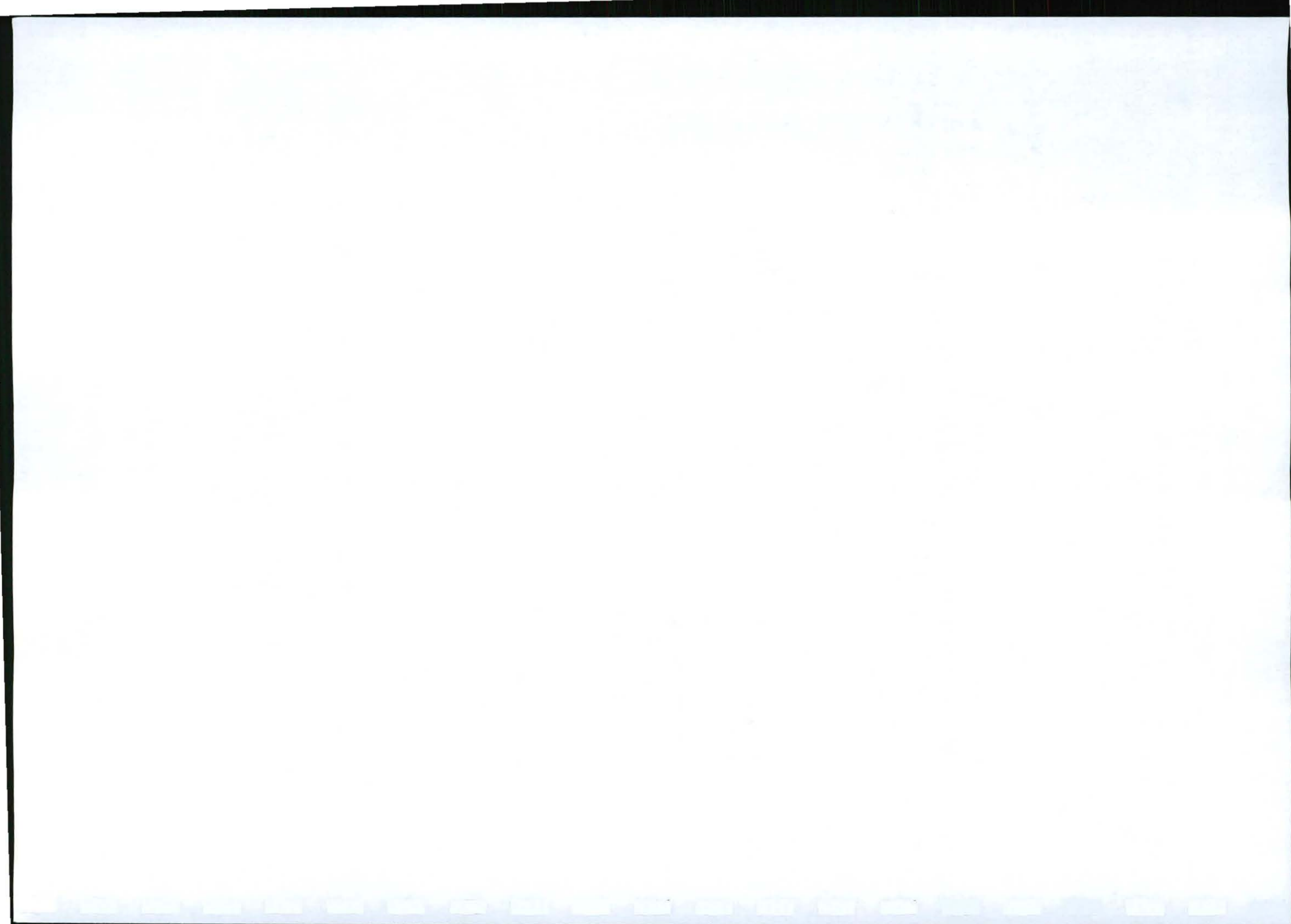
In certain parts of the river bed phragmites occur in dense beds. This reedbed acts to protect the channel boundary and often provides good overhanging habitat in pools where water is present. The Swartkops River from the confluence of the KwaZunga and Elands River up to the old Perseverance Bridge shows increases in sedimentation as a result of the Groendal Dam reducing flows and the annual flood events coupled to the decreased river slope in the natural flood plain area.

3.4. WATER QUALITY

The geology of the upper catchment of the KwaZunga (Table Mountain Quartzites), the fynbos vegetation and the absence of human influence in the upper reaches ensure that the water quality is good, with low levels of pollutants and sediment. Water draining Table Mountain Quartzites are typically mineral-deficient ; have a low pH ; are soft (weakly buffered) ; have a low silt load and are stained brown due to humic acids and tannins originating from vegetation in the catchment. As the river moves past the urban area below the confluence water quality deteriorates drastically for a range of reasons :

- Increased but fluctuating coliform bacterial counts due to urban return flows especially from inadequate sanitation provision
- Increasing a variety of salts and other mineral contents due to natural condition of the groundwater from the primary aquifer in the lower part of the catchment below Uitenhage.
- Increasing nutrient and other content due to agricultural and industrial (arsenic) return flows.
- Increasing sediment loads due to in-channel afforestation of mainly Eucalyptus trees.

This deterioration of water quality is unsuitable for domestic or broad agricultural use in these lower regions of the Elands, Brak, Chatty and Swartkops Rivers.



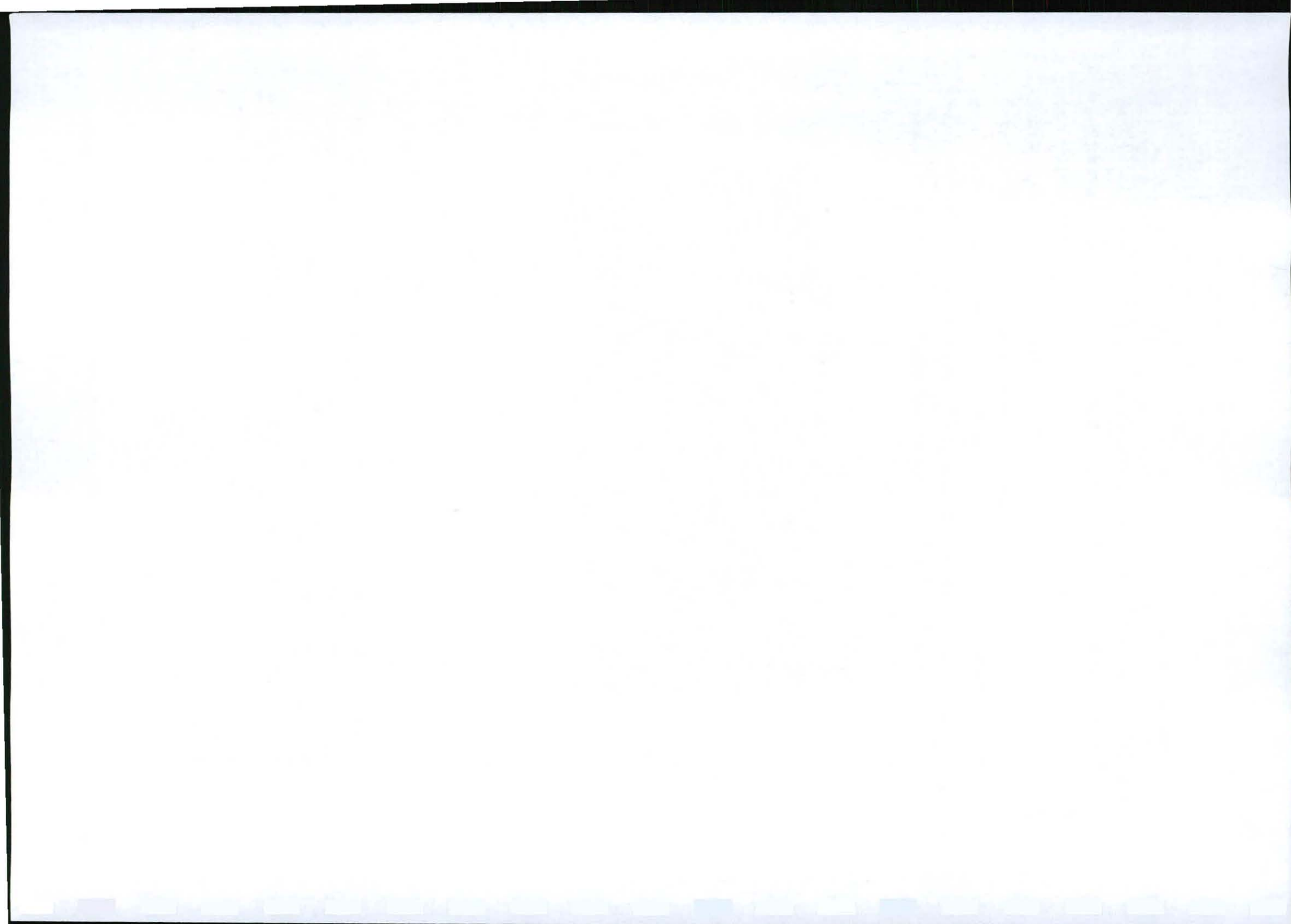
3.5. THE WETLANDS

The wetlands, which can act as water stores for this river system appear mainly in the catchment of the Bulk- and Sand Rivers. Those on the Bulk River were visited but those on the Sand were identified from aerial photographs. These are marshy seeps on the crest slopes of the Elandsberg. In the upper reaches of the Elands catchment small upper tributary seeps often below the forest pockets often flow to downstream dams and indicate the presence of springs. Over the border of the top of the catchment on the farm Kammiesvlei a large wetland seep feeds away from the Elands catchment but is an example of the type of wetland that may occur where clay pans or mudstones are located above this sandstone dominated area.



Figure 5 : Kammiesvlei over the Elands River catchment boundary. 33.63° S 24.83°E. This seep is invaded by poplars and black wattle and eroded.

The Groot Winterhoek Mountains, in which the Groendal Wilderness area is situated, was difficult to inspect due to inaccessibility. The upper catchment is very steep and rugged but well vegetated and it appears that groundwater may be the principal water supply in these areas, as the permanent streams noted above indicate. Further east, above Uitenhage in the south slopes on the farm Hillwacht, ground water springs and seeps are found on the footslopes of the hills and supply water to several farm dams. Just below this farm at the footslope adjacent to the R75 - road, "The Springs" resort has been operational for many years. These are apparently part of the Uitenhage aquifer that also used at Hillwacht and Amanzi Farms (Maclear and Woodford 1995).



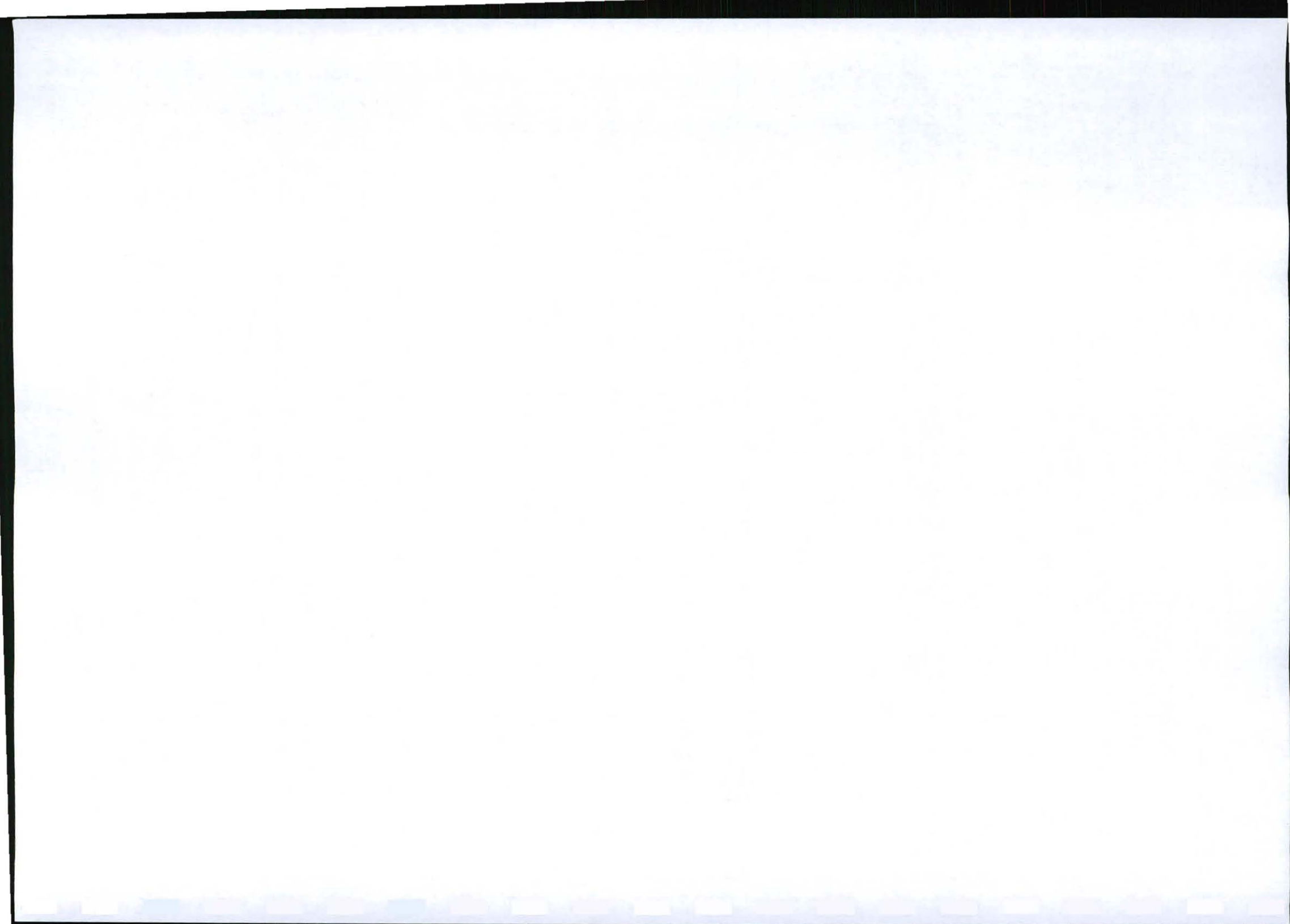
The effect of the groundwater movement on the formation and maintenance of wetlands in the area could be significant given the impenetrable nature of the Uitenhage Group formations. Lomborg *et al* (1997) constructed a map of groundwater levels and the zone of shallower occurrence coincides with areas where wetlands are visible in relatively low lying areas such as Springfield, Mount Pleasant, Lovemore Heights, Charlo and Lake Farm. The last group of wetlands that can be found in this catchment comprise endorheic pans of which there are several in the Winterberg. These are found on the plateaus and must be due to an underlying impenetrable layer of clayey soils such as that described in the Suurberg Mountains. One of the largest is the Bufflesvlei (33°46'S; 25°17'E) in the Groendal Wilderness area, which (according to Mr Hahndieck, an erstwhile reserve manager), never dries up.

4. IMPACT OF THE MINING OPERATION

4.1. MINING IN THE RIVER FLOW

The water quality could be adversely affected should the water flow velocity decreases due to siltation, or any other damming effect of the water. Conversely, the water quality could be improved should the river channel remain clear and open by deepening the river channel. The water quality is therefore proportional to both the cross sectional area of the watercourse as well as its water flow velocity given at any point in the river. This stochastic approach is used and the current status of the Swartkops River is being used as a benchmark.

As long as mining activities within the river channel do not impede upon the water flow velocity, the water quality would not be adversely affected. Cognisance must be taken of the habitats of migratory catadromous fish species : some would require deep channels and others would need shallow channels that have a low water flow velocity. Therefore, the mining activities within the river channel may not be done uniformly across the cross section of the river from embankment to embankment, but instead the shallow watercourses must be retained along the embankments of the river. The existing shallow water courses along the embankments are on average 6 m wide and hence this would be the mining limit from the edge of the embankment. Any excavation activity within this zone of shallow water would be to maintain water flow to a depth of not more



than 0,5 m. The centre of the river channel between any shallow area could be mined by deepening the river bed.

By deepening the centre of the Swartkops River channel the water quality would be improved and the risk of overflowing its embankments during flooding would be reduced. The shallow water areas along the embankments need to be monitored and if they dry up, these shallow areas would also need to be deepened to a maximum of 0,5 m depth.

4.2. MINING ON THE RIVER TERRACES

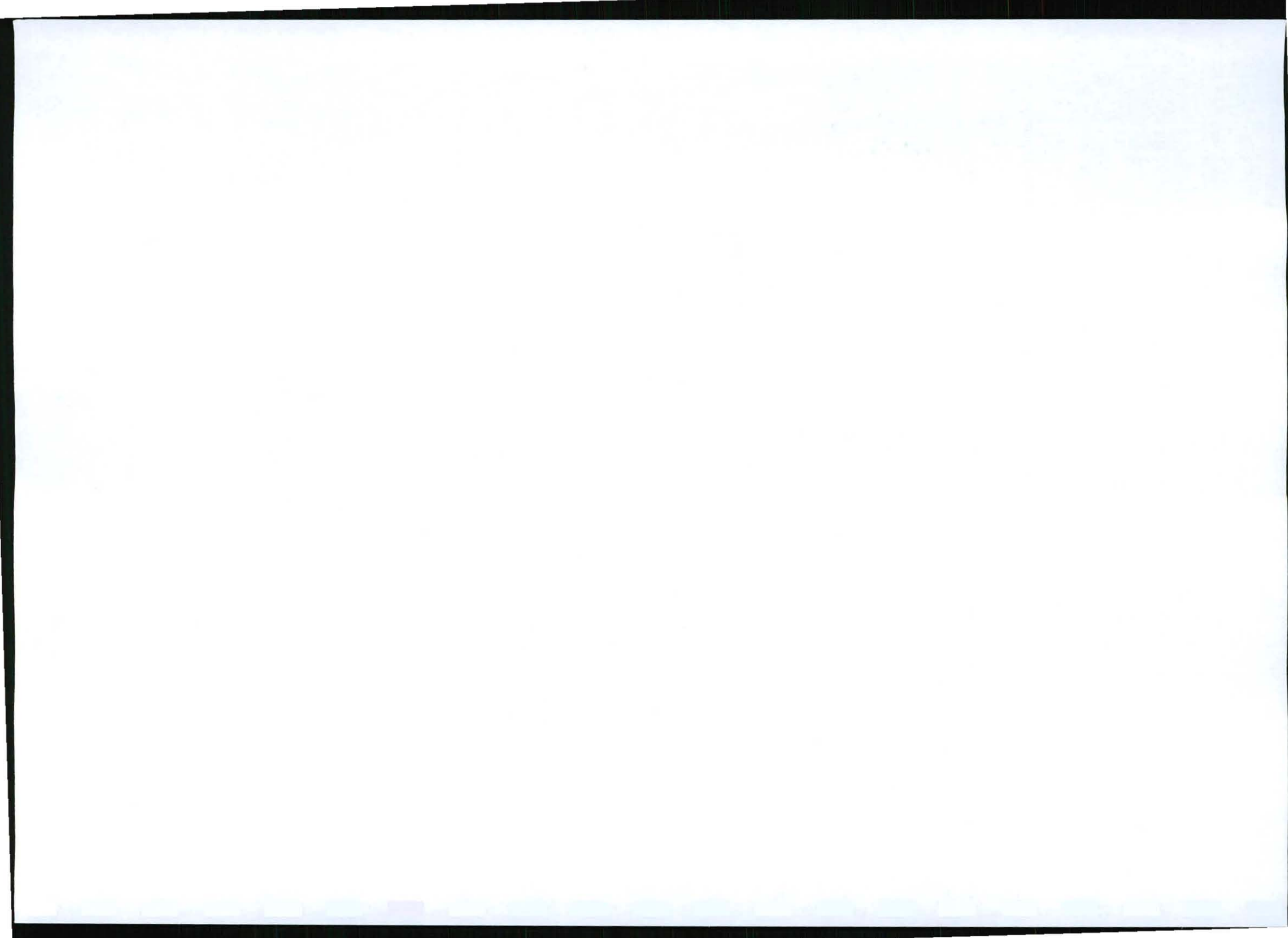
Mining on the river terraces should be avoided to maintain the river morphology of the Swartkops River.

Any mining area approaching the river terraces from the water channel side should maintain a horizontal limit of at least 6 m away from the foot of the terrace. This will ensure that the shallow water courses on the embankments are maintained for the catadromous fish species. The river morphology will also not be altered.

Any mining area approaching the river terraces from the flood plain side should maintain a horizontal limit of at least 20 m away from the crest of the terrace. This will ensure that any berm left as a mining remnant between the river embankment and the flood plain, would still be stable enough to maintain the river morphology. No risk of dangerous accumulations would occur as the flow nets indicate an earth dam to be of sufficient strength. The Eskom servitude runs parallel to the river channel and along the crest of the terrace of the Swartkops River. This servitude is 30 m wide and to maintain a safe slope of at least 30 degrees with the horizontal, the overall thickness of the footprint of the berm would be around 45 m at the bottom of a 4 m high berm. This vast thickness would be sufficient to protect the Eskom Pylons and the river morphology. It would also eliminate any risk of possible dangerous water accumulations.

4.3. MINING ON THE FLOOD PLAIN

The Swartkops River has been mined on its flood plains for many years. The alluvial sand deposits along the flat flood plains lend it as ideal mining conditions. The flood



plains also contain less sensitive areas with the least possible impact. The majority of mining activities would take place on the flood plains due to the sheer localisation of ore reserves. Mining on the flood plains should remain clear from the Swartkops Nature Conservation area covered with valley bushveld. The mine planning has indicated from the exploration results that the valley bushveld vegetation exists where the sand deposits had been contaminated with clay deposits from the surrounding areas to such an extent that it becomes uneconomical to mine the mineral resource. Hence, mining would not take place in the vicinity of valley bushveld vegetation.

4.4. STORMWATER MANAGEMENT

All possible stormwater due to river flooding of the flood plains should be channelled to be fed into the Swartkops River. Along the northern river terrace there are three natural water course ways (low topographical points) between the Despatch Bridge and the DWAF servitude housing the potable water pipeline from Motherwell to Perseverance. These natural course ways act as stormwater drains during the flooding of the Swartkops River. These areas should be cleaned of pioneer plants and maintained open and clear to facilitate the water flow back into the Swartkops River.

On the flood plains all stormwater (rain and river flooding) percolate quickly into the sandy soil to reach the shallow water table, that is marginally higher elevated than the closest water surface elevation of the Swartkops River. Hence, the water table on the flood plains are greatly determined by the hydrostatic pressure of the water in the river itself. No new stormwater channels are required as the water would not be able to be channelled in the sandy soils.

4.5. MINE GREY WATER

To prevent the contamination of stormwater and possible pollution of the Swartkops River, all rain water falling within the operational mining areas must be handled to maintain the water quality thereof. All stormwater must be channelled around the plant operational area and all stormwater falling within the operational plant area must first be treated by means of a silt trap dam before overflowing to the water courses. The mine must ensure to prevent any spillage of hydrocarbons and the location of the existing workshops that service the plant and equipment must remain off-site and well clear (at



least 100 m) of any water course. The mine must implement an emergency recovery plan to combat the accidental spillage of hydrocarbons that could pose a risk.

5. MANAGEMENT AND RECOMMENDATIONS

Alien vegetation encroachment is most probably the most damaging change in the catchment. Eradication of these plants is an opportunity for increased job creation as there are large amounts of unemployment in the catchment. The proximity of a large urban area makes the sale of firewood a viable proposition, as some of the private clearing companies have shown. The production of building materials from suitable trees is also a possible means of economic exploitation.

The next most damaging impact on the river is the pollution from industrial and domestic urban sources. The wetlands on the coastal plain have been severely degraded due to urbanisation. Some of the large floodplains are colonised by informal settlements such as at Veeplaas. This situation is not ideal either for the river or for the people that live there. However, in the upper catchment the seeps are still in good condition and should be protected.

Given that mining is undertaken in a responsible manner, the mining activities could complement the river flow dynamics. Mine management could assist in the eradication of alien vegetation and control erosion of embankments. Siltation of the river caused by poor mining practices would have an adverse effect on the water quality.

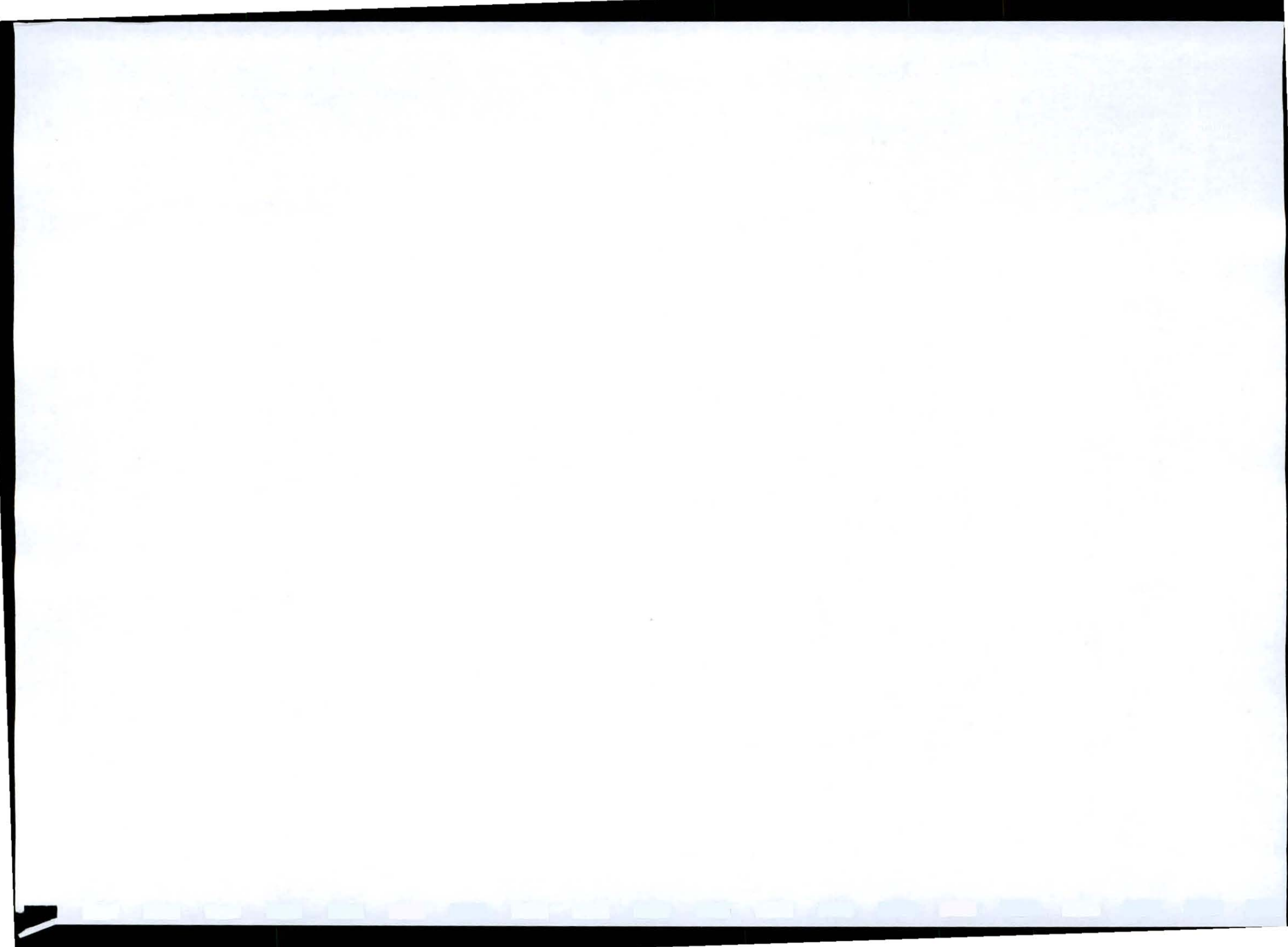
Provided that no mining activity or man-made excavations, - constructions and – infrastructure will dam up the river or stormwater in the flood plain area, no risk of static head pressure formed by water accumulations would exist.

All mining activities need to adhere to the approved Environmental Management Programmes, or Environmental Management Plans in terms of the Mineral & Petroleum Resources Development Act, Act 28 of 2002.



SANDMAN QUARRIES cc

24. ANNEXURE 2: REGULATION 2(2) PLANS



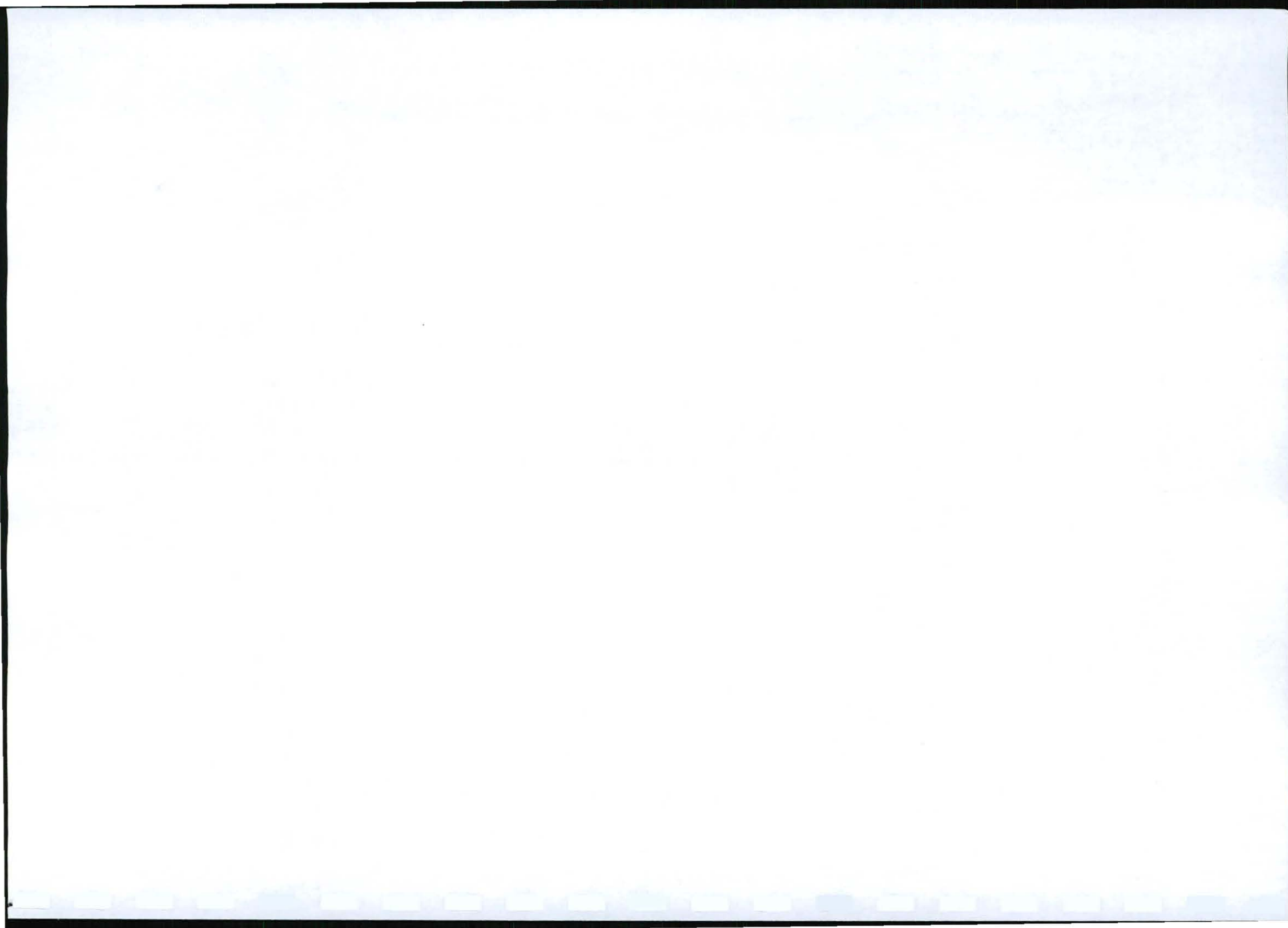
SANDMAN QUARRIES cc

25. ANNEXURE 3 : SPECIALIST STUDY ON VEGETATION

Please refer to annexure 17 of the Environmental Impact Assessment (EIA) for the specialist study on vegetation, the EIA is annexure 1 of the EMP.

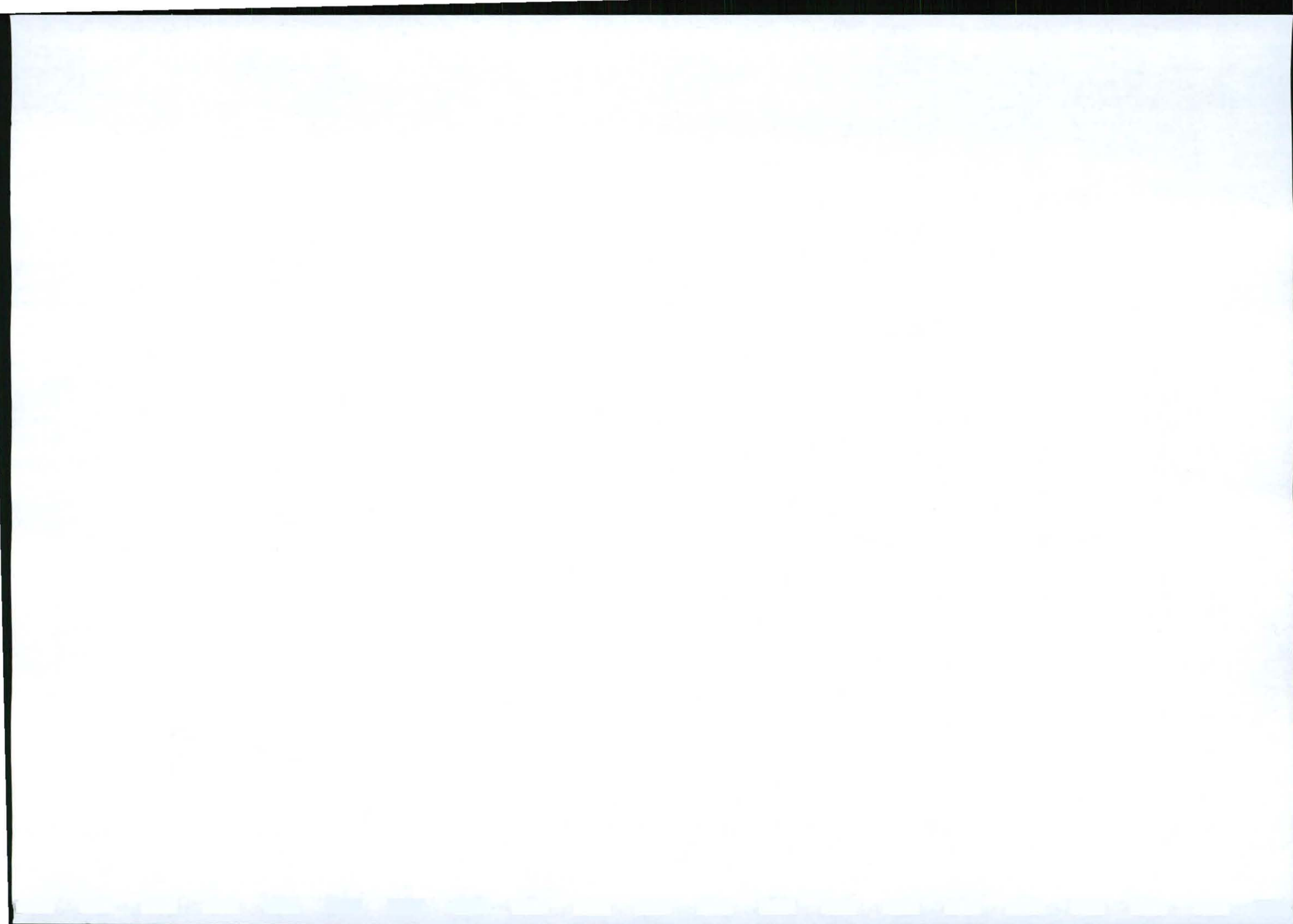
SANDMAN QUARRIES CC

26. ANNEXURE 4 : MINE CLOSURE PLAN

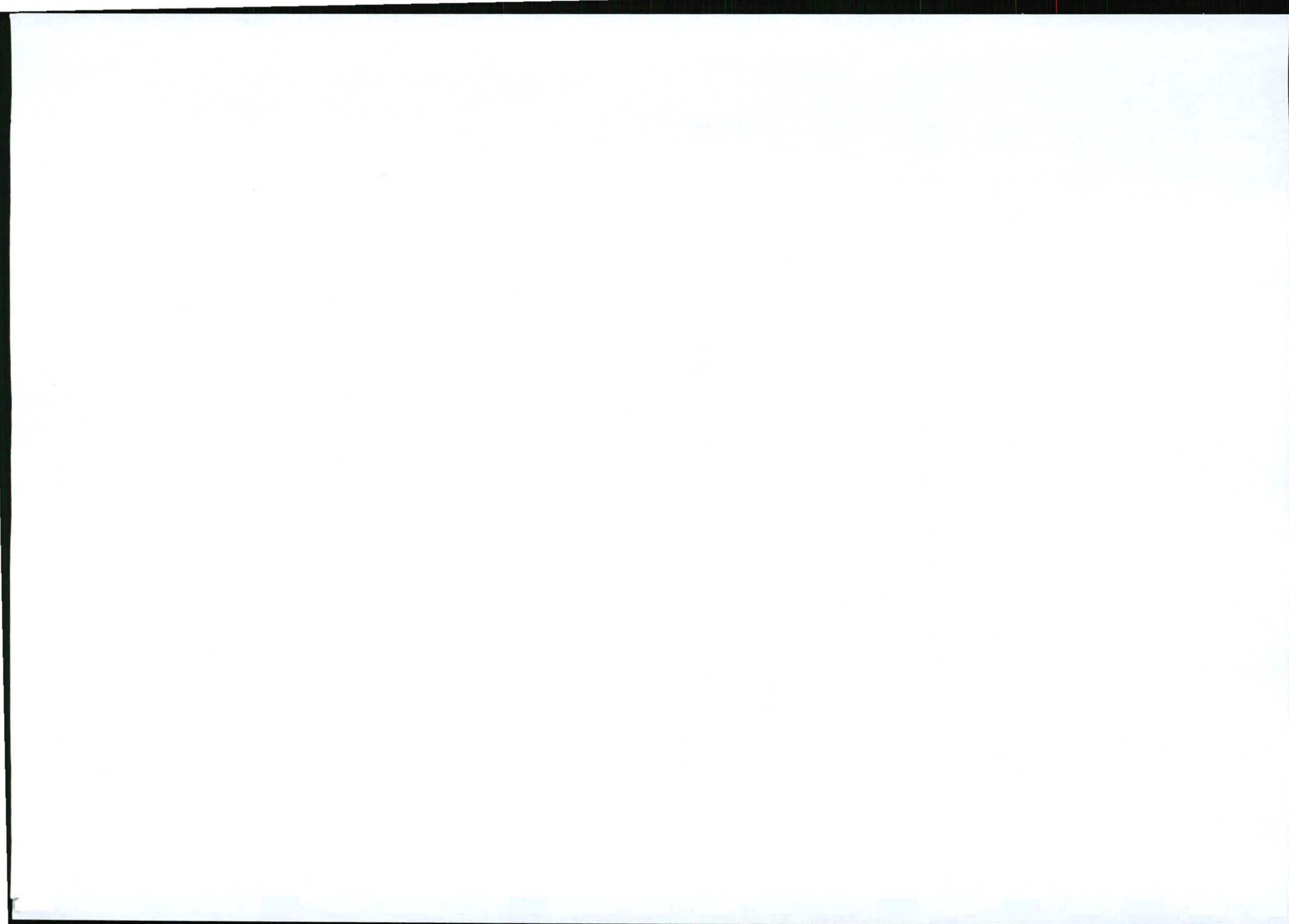


SANDMAN QUARRIES cc

**27. ANNEXURE 5 : CODE OF PRACTICE ON SAFE MINING WITHIN
100M FROM ESKOM POWER LINES.**



IN THIS ANNEXURE IS A DRAFT CODE OF
PRACTICE FOR SAFE MINING IN CLOSE
PROXIMITY TO ESKOM HIGH VOLTAGE
POWERLINES, WHICH IS PROPOSED FOR
IMPLEMENTATION BY SANDMAN
QUARRIES IF THE MINING RIGHT IS
GRANTED



SANDMAN QUARRIES



130 Cape Road Mill Park Port Elizabeth
Republic of South Africa
Telephone: National (041) 374 0824
International +27 41 374 0824
Telefax: National (086) 657 7703
International +27 86 657 7703
e-mail : mark@algoacme.co.za

CODE OF PRACTICE

SAFE MINING IN CLOSE PROXIMITY TO ESKOM HIGH VOLTAGE POWERLINES

PREPARED FOR SANDMAN QUARRIES

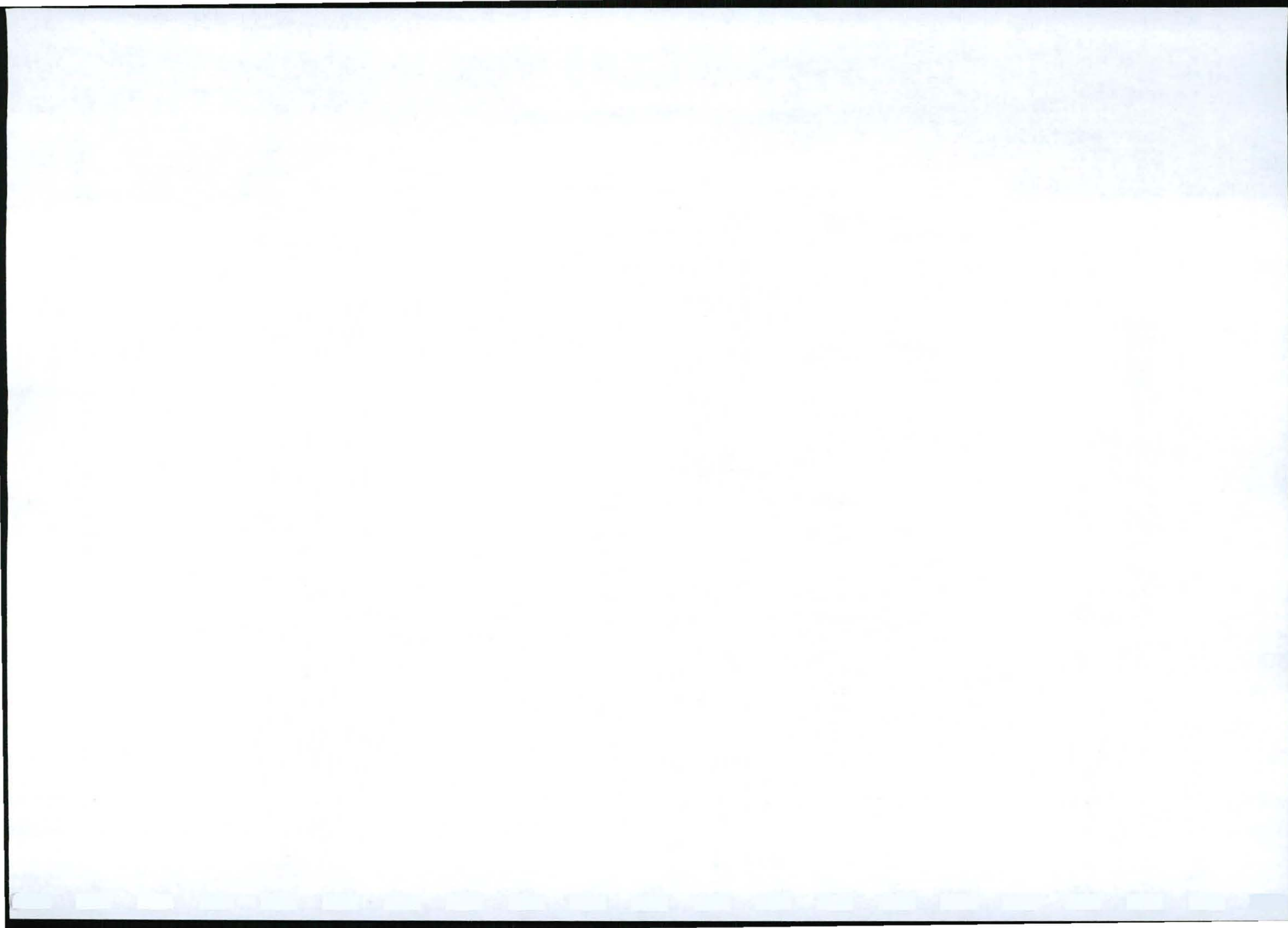
P.O. Box 313

UITENHAGE

6230

*Code of Practice relating to mining activities in the vicinity of Eskom Power Lines
GR/KU and GRU/MEL*

*Completed as part of mining right application DME Reference: (EC)
30/5/1/1/2/0208 MR*



SANDMAN QUARRIES

TABLE OF CONTENTS

1. STATUS OF CODE OF PRACTICE.....	3
2. MEMBERS OF DRAFTING COMMITTEE.....	3
3. BACKGROUND INFORMATION	4
4. PROPOSED ACTIVITIES	4
5. PARAMETERS.....	5
TYPE OF POWER LINES AND SPECIFICATIONS :	5
MINING PARAMETERS :	5
6. RISKS TO BE ADDRESSED	5
7. RISK ASSESSMENT PROCESS	6
ASSESSMENT OF RISK 1 :	6
ASSESSMENT OF RISK 2 :	6
ASSESSMENT OF RISK 3 :	7
ASSESSMENT OF RISK 4 :	8
8. OPERATING PROCEDURES TO BE IMPLEMENTED BY SANDMAN QUARRIES FOR ACTIVITIES UNDER THE ESKOM POWER LINES	9
SLOPING OF EXCAVATION SIDE WALLS TO ADDRESS RISK NUMBER 1 :	9
MANAGEMENT OF EXCAVATOR OPERATIONS TO ADDRESS RISK NUMBER 2 :	9
CONSTRUCTION TO PREVENT EROSION IN RESPONSE TO RISK NUMBER 3 :	10
ROAD ACCESS FOR ESKOM TO ADDRESS RISK NUMBER 4 :	10
9. SUMMARY OF RISKS.....	10

SANDMAN QUARRIES

1. STATUS OF CODE OF PRACTICE

This code of practice does not constitute a mandatory code of practice as defined by the Mine Health and Safety Act. This code of practice has been undertaken in accordance with regulation 17 of the Mine Health and Safety Act, which deals with mining within 100m of any infrastructure which needs to be protected. The requirement for mining within 100m is that a risk assessment is undertaken and that all restrictions determined by the risk assessment are complied with, regulation 17(6) states that:

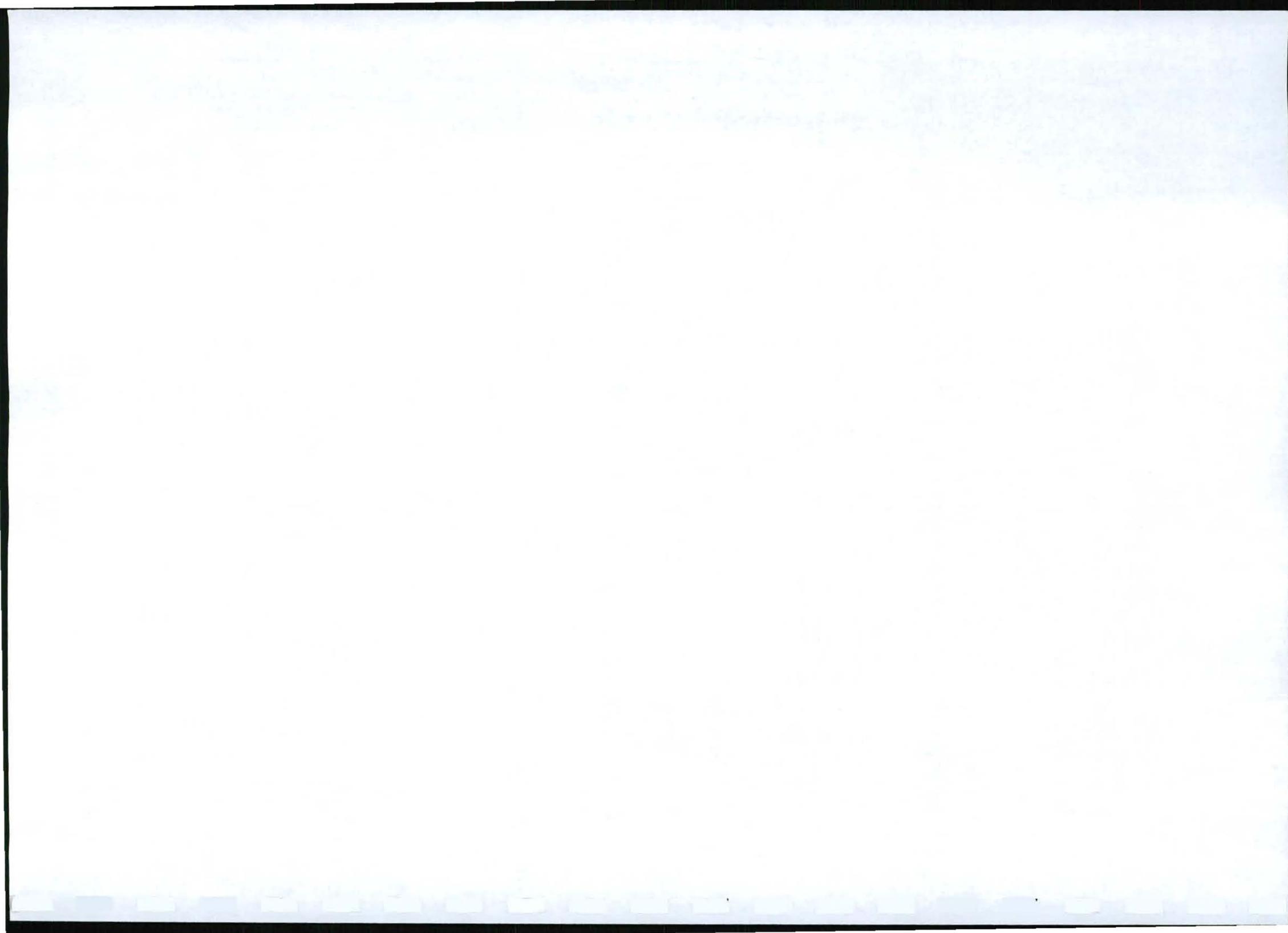
The employer must ensure that -

a) no mining operations are carried out under or within a horizontal distance of 100 (one hundred) metres from buildings, roads, railways, reserves, mine boundaries, any structure whatsoever or any surface, which it may be necessary to protect, unless a shorter distance has been determined safe by risk assessment and all restrictions and conditions determined in terms of the risk assessment are complied with;

2. MEMBERS OF DRAFTING COMMITTEE

The following persons have been involved in drafting this code of practice and will be involved in ensuring effective implementation:

Name & ID number	Company & Designation	Signature & Date



SANDMAN QUARRIES

3. BACKGROUND INFORMATION

This code of practice applies to mining undertaken in proximity to Eskom servitude 4956/1979001, which has been established to enable electrical distribution lines in the Despatch area to cross Portion 114 of the farm Zwartkops River Waagens Drift, 567.

Prior to this application mining was undertaken in close proximity to these power lines by another mining organisation. Sandman Quarries has undertaken to rehabilitate this excavation at its own expense in a manner which will reduce the risk that has been created to the power lines.

Sandman Quarries does not want to incur liability for creating damage to the power lines and as such has undertaken to mine in a manner which reduces the risk to the point where it is acceptable to all parties.

Sandman Quarries has applied for mining rights on multiple portions of the farm Zwartkops River Waagens Drift, 567, which include areas within 100m of the Eskom distribution lines on poles marked GR/KU 63 to GR/KU 68 and GRU/MEL 60 to GRU/MEL 64. According to the Mine Health & Safety Act, mining within 100m of power lines is subject to approval by the DME.

There are two power lines within this servitude which have different pylon structures. The one set of power lines consists of a frame of wooden poles whilst the other is a single steel pole structure.

4. PROPOSED ACTIVITIES

Sandman Quarries proposed to mine in an area shown in the MPRDA Regulation 2(2) plans contained in annexure 2 of the EMP. Mining will take place to a maximum depth of 4,5m using a hydraulic excavator. The final excavation is shown in Appendix 1, which is a layout of the proposed mine at mine closure after a period of mining for approximately 35 years. The mining is planned such that a minimum buffer distance of **18m** will be maintained from any part of Eskom's infrastructure, with excavations sloped such that the 18m buffer zone is untouched by mining.



SANDMAN QUARRIES

5. PARAMETERS

Type of power lines and specifications :

Voltage Rating	– 132 kV
Type	– Ring feed distribution lines
Pylon spacing	– \pm 250m apart
Minimum power line height above ground	– 6,3m
Minimum clearance to conductor	– 1,45m

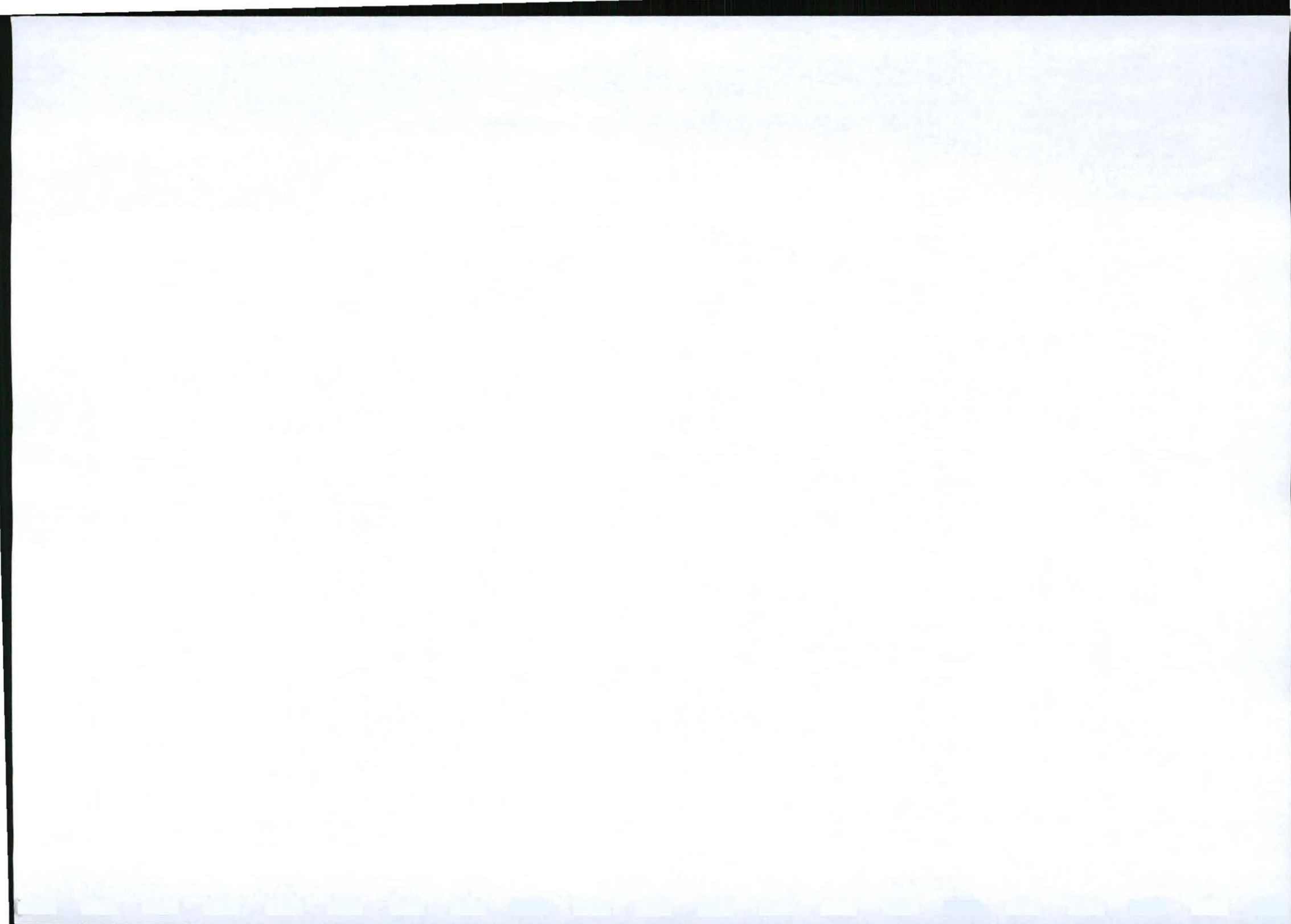
Mining parameters :

Mining close to the power lines will be done using a hydraulic excavator from ground level excavating up to 4.5m deep. The excavated material will be loaded into tip trucks which will carry the material to the plant. Prior to mining all soil will be stripped using a bull dozer in such a way that the soil can be replaced for rehabilitation purposes.

Machinery will operate within a distance of 4m from the excavation and therefore a minimum of 14m from the power lines.

6. RISKS TO BE ADDRESSED

1. Risk of structural damage of soil and sub-soil conditions resulting in collapse of pylons, stays or poles.
2. Risk of mining equipment coming in contact with power lines and or creating conditions for arcing of electrical power.
3. Risk of erosion of side walls of excavation by flooding.
4. Risk of loss of access by Eskom for maintenance purposes.



SANDMAN QUARRIES

7. RISK ASSESSMENT PROCESS

Assessment of Risk 1 :

The manner of assessment is to evaluate the geotechnical conditions required to ensure stability of in - situ material around the pylons, stays and poles.

Maximum mining depth:	4,5m
Slope angle:	18°
Number of benches:	1
Overall slope angle to be evaluated for stability:	18°

Slope factor of safety calculations

Internal angle of friction:	38°
Cohesion:	0 MPa
Relative Density of material:	1,6 ton/m ³

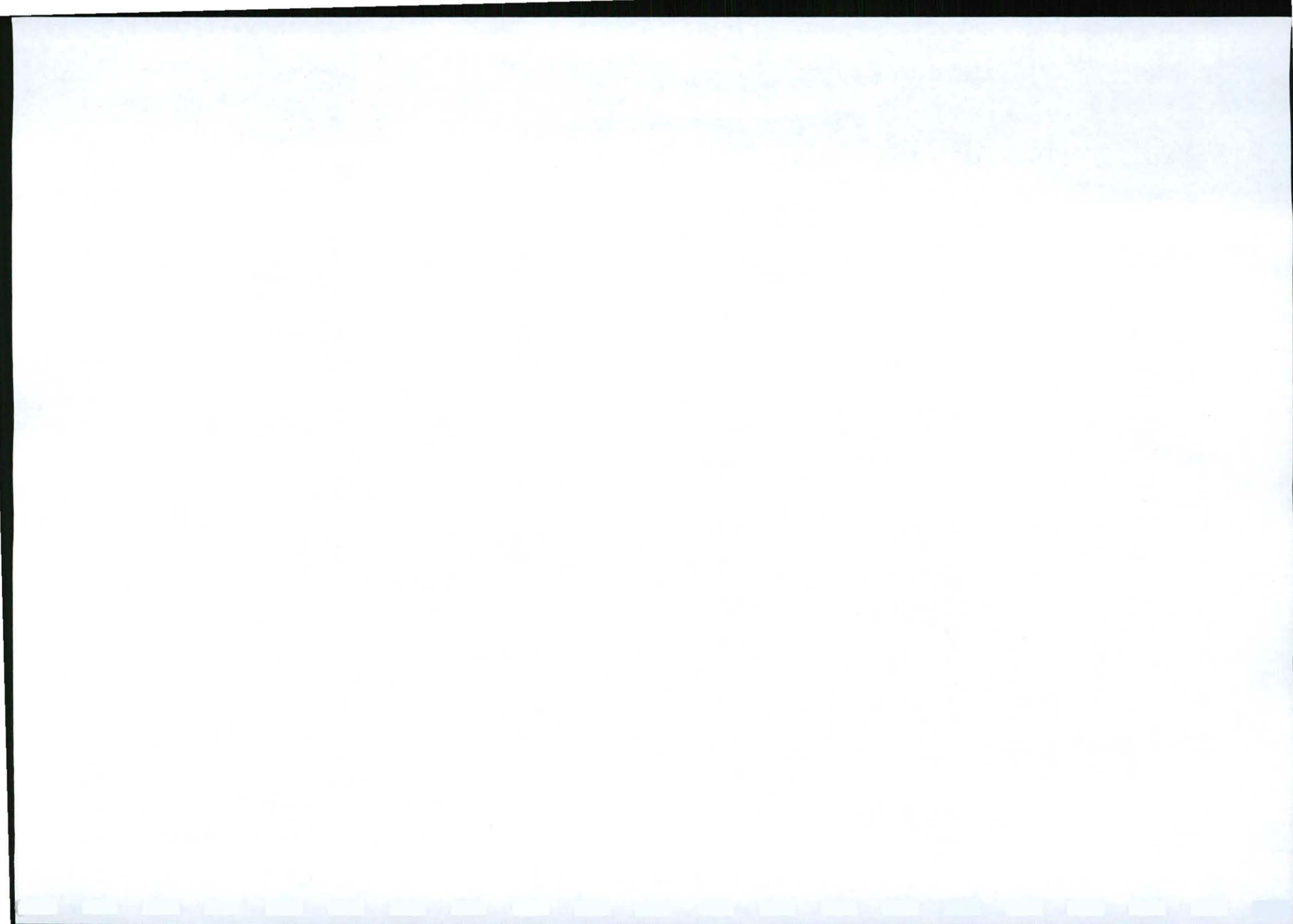
Resultant factor of safety under:

Wet conditions:	1,4
Dry conditions:	2,1

This will result in stable conditions for pylon structures and stays.

Assessment of Risk 2 :

Electrical safety guidelines suggest a minimum of 1,45m from overhead power lines. Assessing the risk category in this way results in the following table :



SANDMAN QUARRIES

For mining with an excavator at ground level

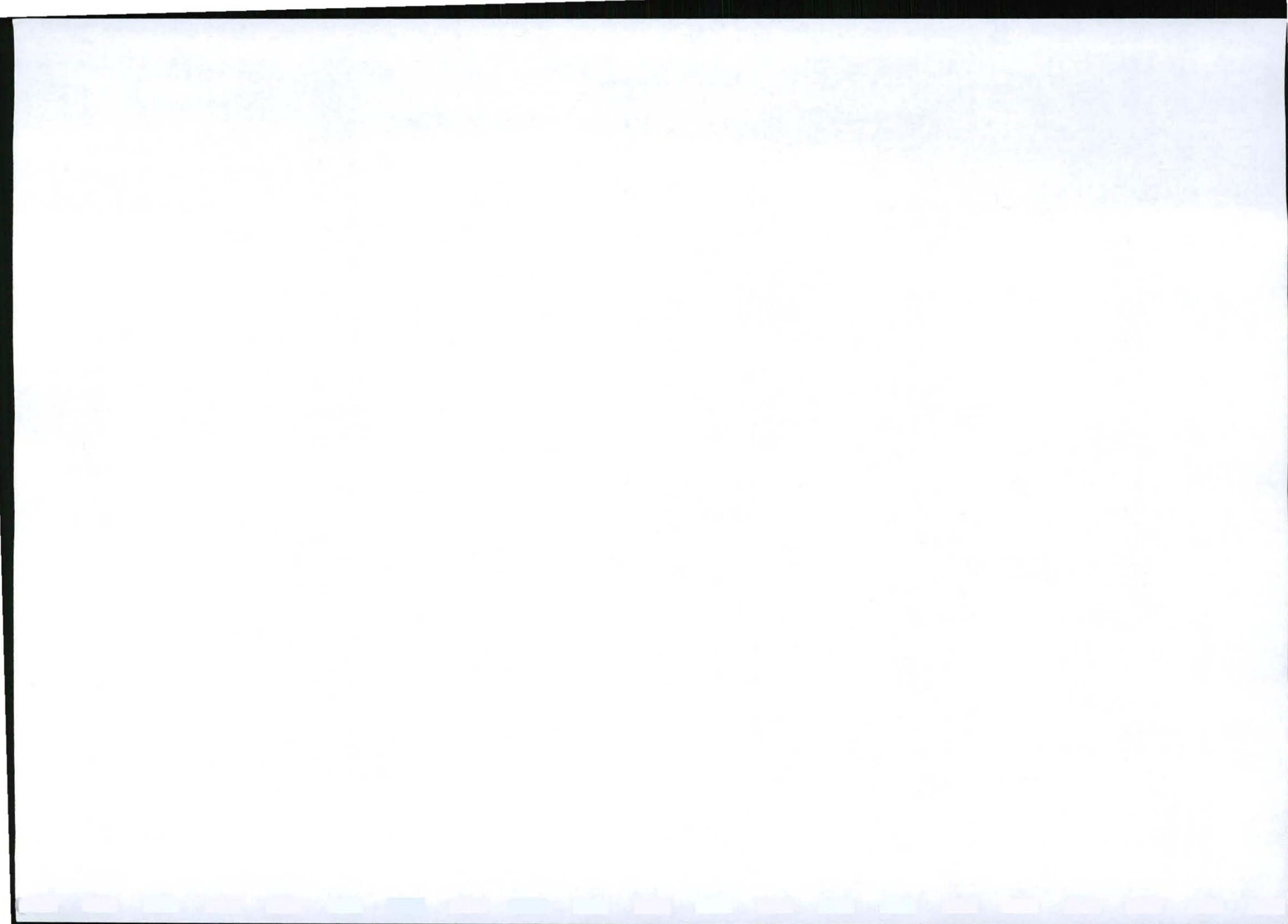
Vehicle	Max operating height	Normal operating height above ground level	Normal minimum distance to power line (min 1.45m)	Abnormal minimum distance to power line	Condition for maximum height	Likelihood of abnormal occurrence	Risk management method	Safety factor
EC240B	9.69	7.5	14m	0m	Abnormal: Excavator in unauthorised area	Not likely under supervision	Employee training	9.665
Dump truck	7.2m	3.7m	14m	0m	Abnormal: Dump truck off road in unauthorised area	Not likely	Employee training	9.665

Mining with bull dozer from ground level

Vehicle	Max operating height	Normal operating height above ground level	Normal minimum distance to power line (min 1.45m)	Abnormal minimum distance to power line	Condition for maximum height	Likelihood of abnormal occurrence	Risk management method	Safety factor
D8	3.45	3.45	14m	2.85	Abnormal: None	None	Supervision by Eskom employee	9.665

Assessment of Risk 3 :

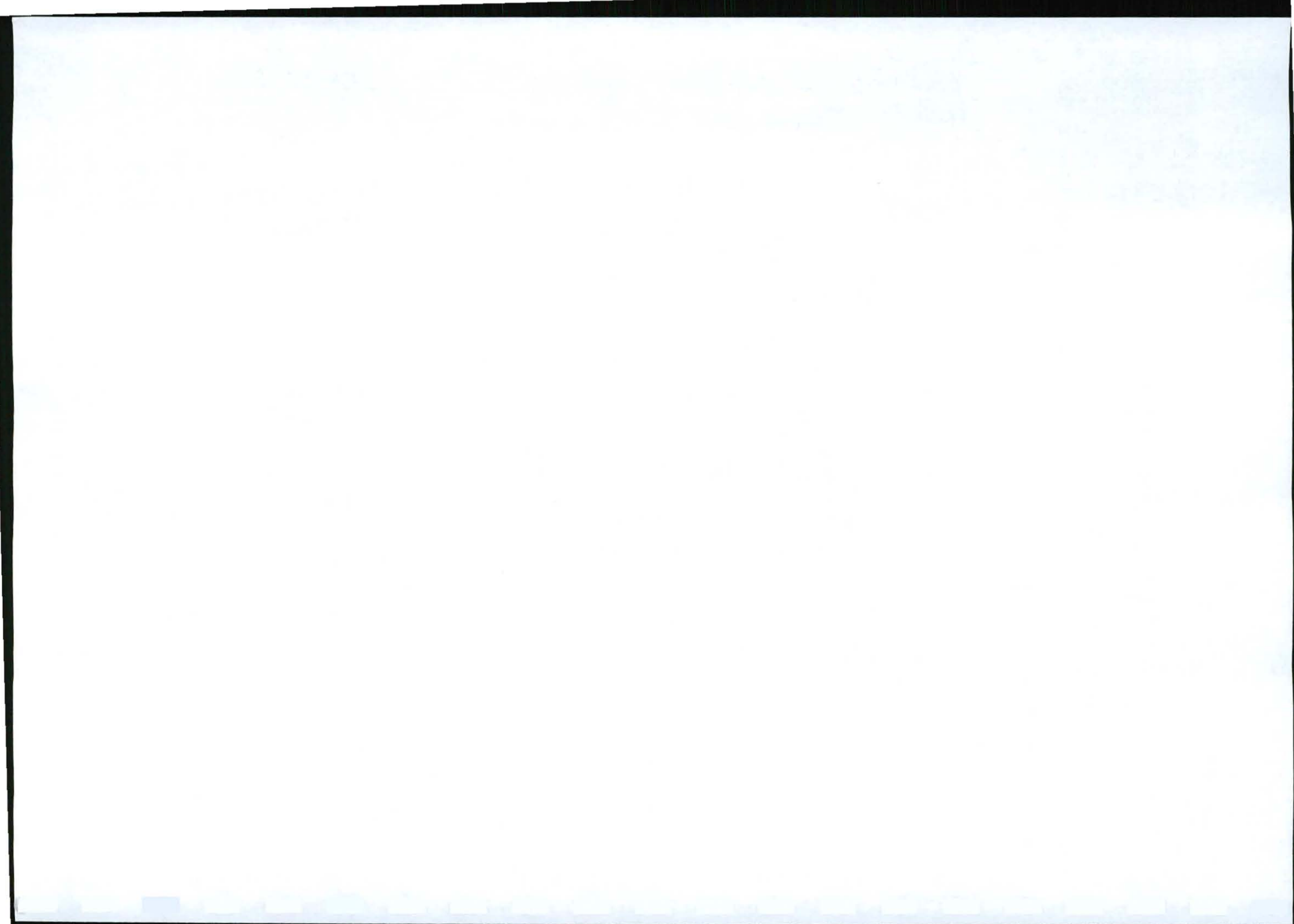
This risk has been assessed by personal communication with persons who have experience of flooding in the Swartkops River area. The owner, Mr. Hein Potgieter, has had personnel experience of the flooding and understands the risks. The risk is made greater by creation of channels for the flood to move into, the least risk option is for the flood path of the river to remain unchanged as it currently stands. The flood currently flows out of the area and into the Swartkops to the West of the mining area, where no mining will take place. All water from the mining area will be allowed to flow out through this area and no channels which will encourage erosion will be created.



SANDMAN QUARRIES

Assessment of Risk 4 :

There is a risk that during flooding, access roads used by Eskom to maintain and inspect the power lines, could be washed away such that Eskom cannot gain access to the area for maintenance purposes.



SANDMAN QUARRIES

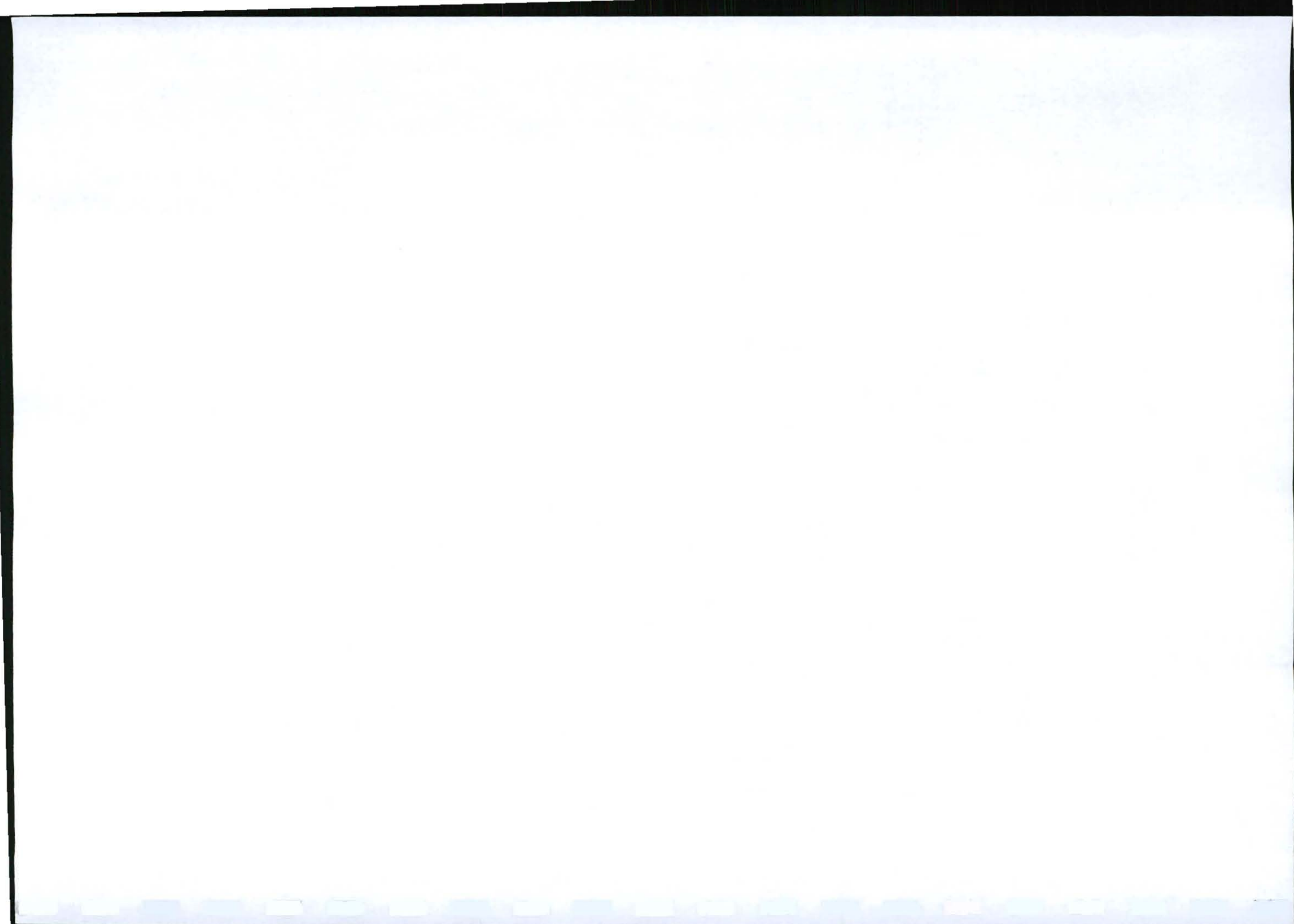
8. OPERATING PROCEDURES TO BE IMPLEMENTED BY SANDMAN QUARRIES FOR ACTIVITIES UNDER THE ESKOM POWER LINES

Sloping of excavation side walls to address risk number 1 :

Risk management measure	Responsible Persons affected	Implementation activities
All mining to stay a horizontal distance minimum of 18m from any power line pylon	Mine manager, excavator operator	Mark pegs at 18m off-set from pylons to show mining limit
All excavations close to Eskom power lines must have slope of maximum 18° from the horizontal.	Mine manager, excavator operator	Mark horizontal distance of 6m from slope final crest position for final toe position using pegs or poles. Train excavator operator to create even slopes between toe and crest

Management of excavator operations to address risk number 2 :

Risk management measure	Persons affected	Implementation activities
Supervise all excavation and construction activities under power lines	Mine Manager and Eskom personnel	Eskom to be informed of dates two weeks in advance such that a person can be allocated to supervise the work
Work from low position	Mine Manager and excavator operator	Train excavator operator on dangers of power lines and on how to excavate without raising boom higher than 4m above the ground level.



SANDMAN QUARRIES

Construction to prevent erosion in response to risk number 3 :

Risk management measure	Persons affected	Implementation activities
Ensure that the wall of the excavation on the river terraces side is a sufficiently wide (>50m) to avoid bursting	Mine manager	Implement mining plan as shown in appendix 1

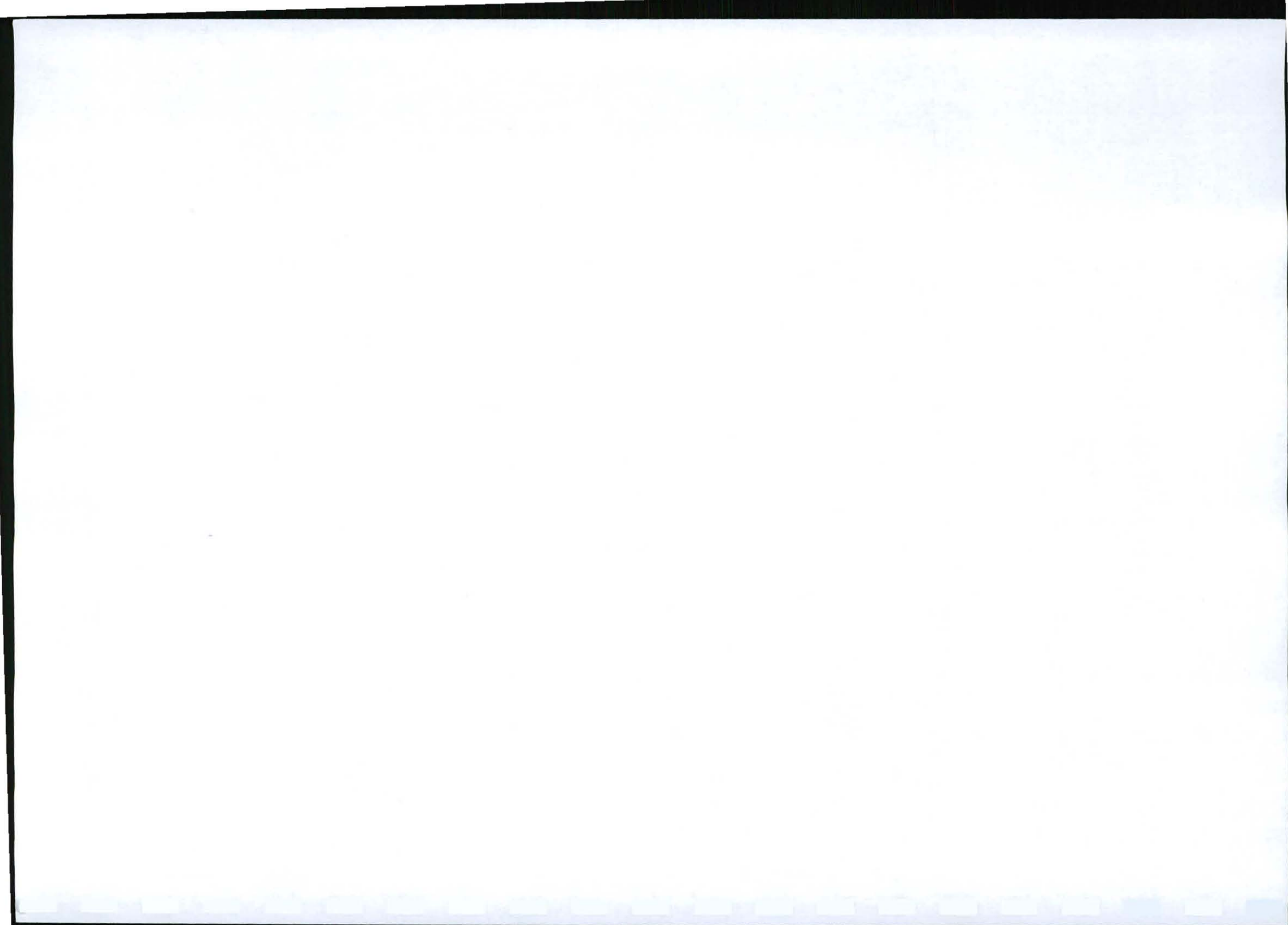
Road access for Eskom to address risk number 4 :

Risk management measure	Persons affected	Implementation activities
Maintain road pass ability for Eskom use	Mine manager	Ongoing road maintenance

9. SUMMARY OF RISKS

If the mining is carried out as planned and mining stays away from the servitude and all Eskom infrastructure by 18m (whichever is greater), then the risk of damage to the lines and of the safety of operators is minimal.

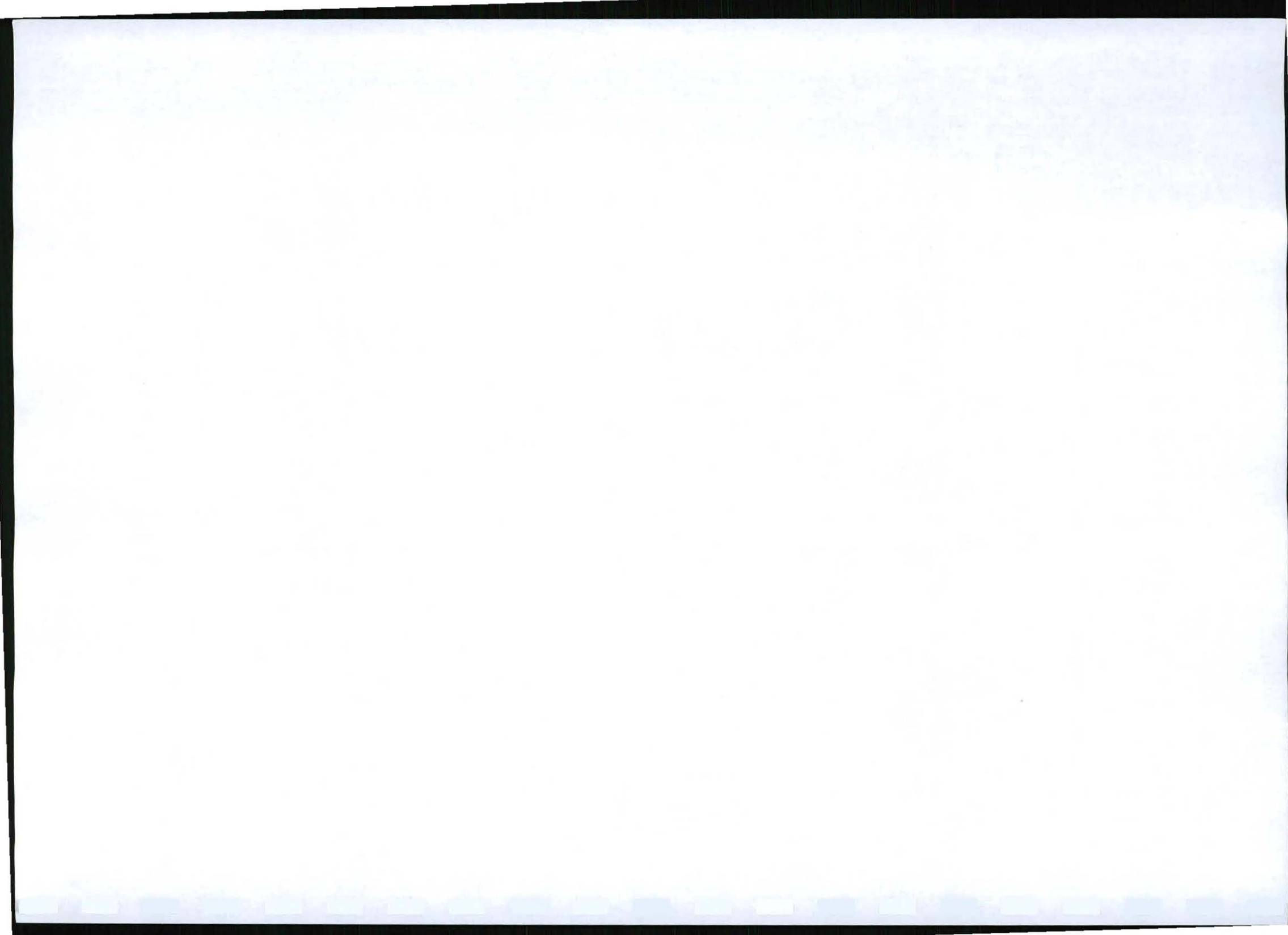
In addition, the mine manager is well aware of the risks as he has lived and farmed in the area for many years. Overall the risks to Eskom lines and employees is acceptable and mining should be allowed to proceed.



SANDMAN QUARRIES cc

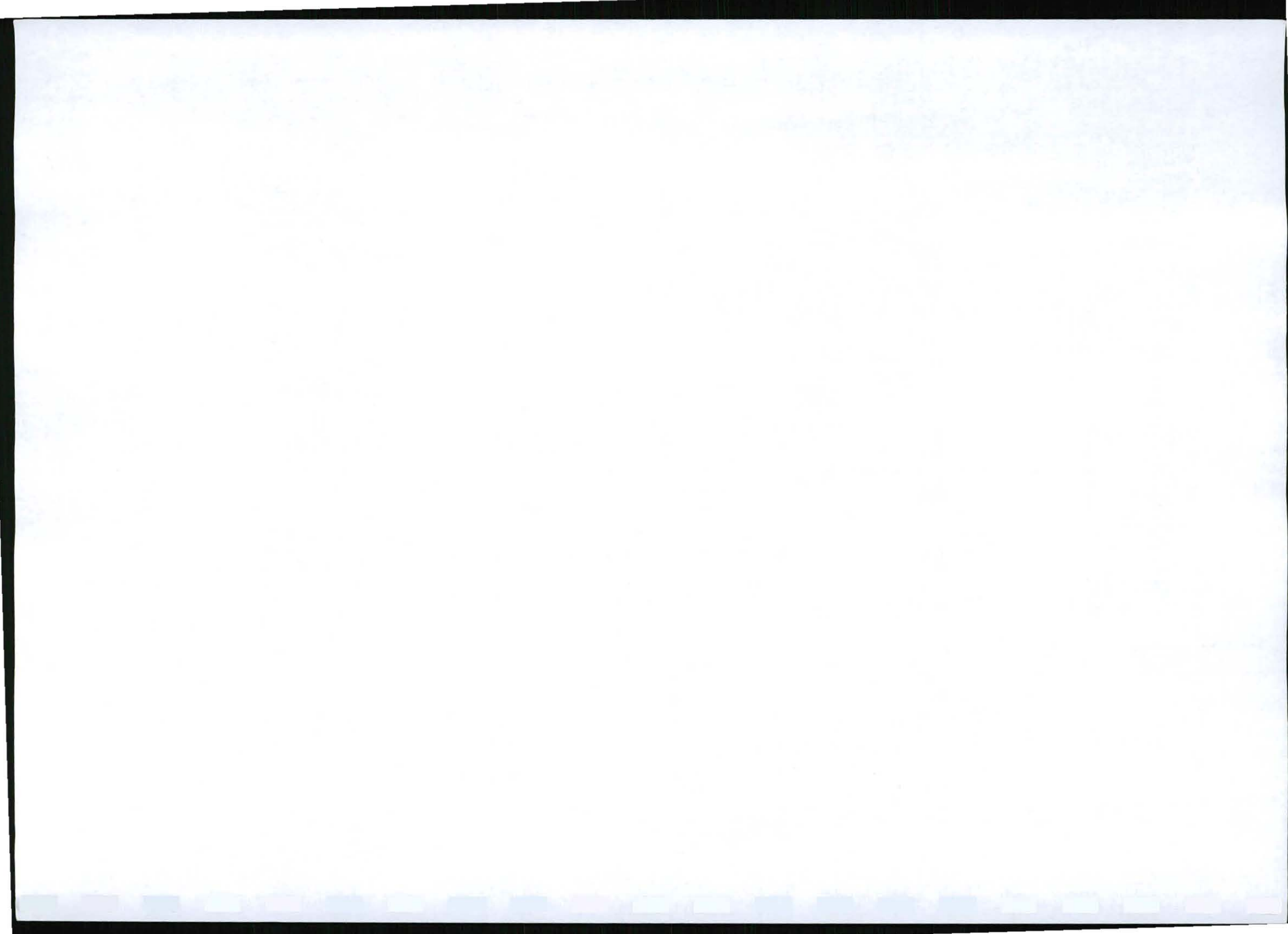
28. ANNEXURE 6 : DUST MONITORING RESULTS

Dust fallout monitoring is currently being conducted on a continuous basis. The samples are analysed on a monthly basis. The reports are generated on a quarterly basis. The capturing of this historical data started in June 2009. The second quarterly report is expected early 2010. Ebonaesar Environmental Consultants have been appointed as competent third party inspectorate conducting these tests.



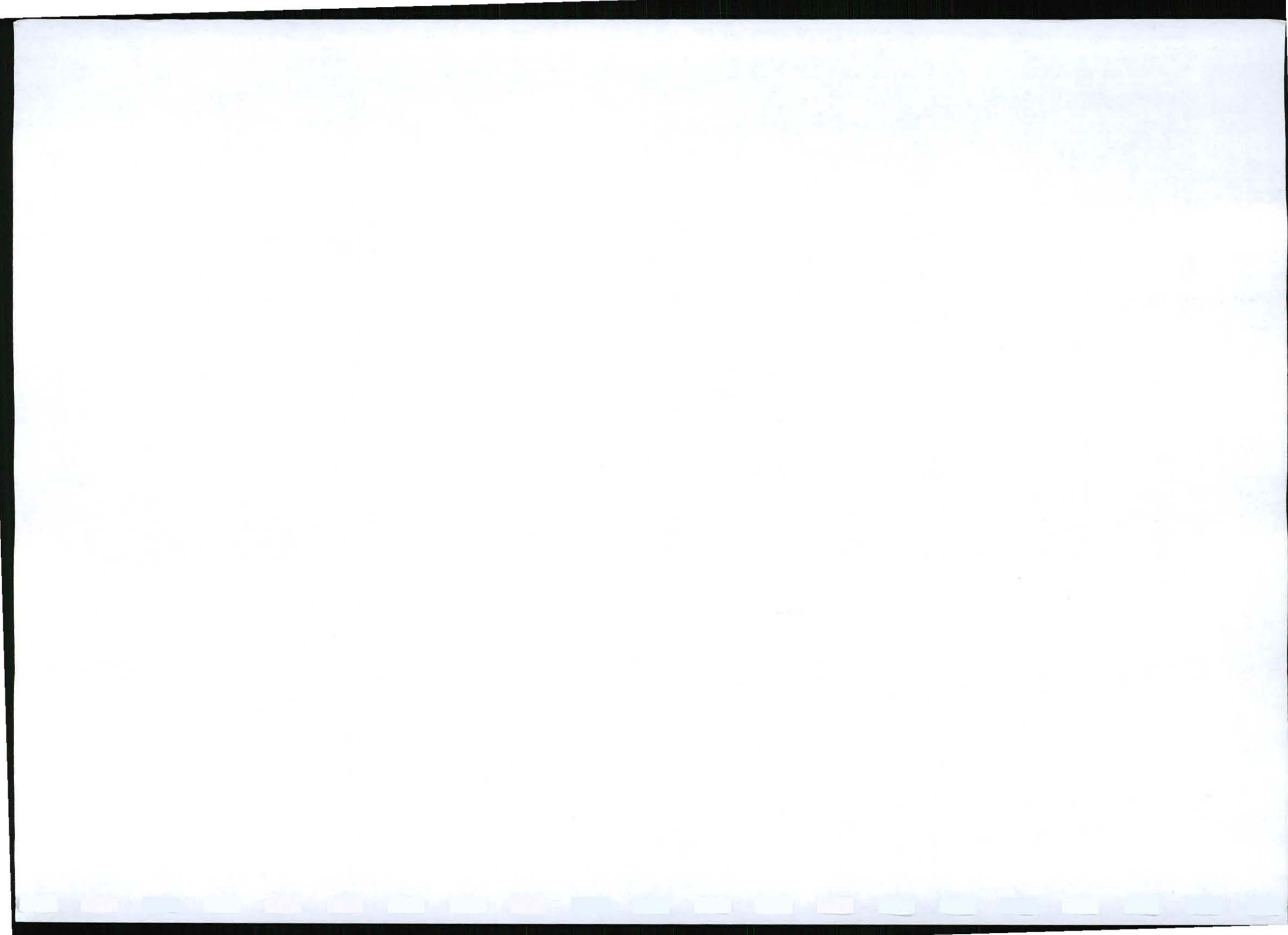
SANDMAN QUARRIES cc

29. ANNEXURE 7 : FINANCIAL QUANTA CALCULATIONS



SANDMAN QUARRIES cc

**30. ANNEXURE 8 : LETTERS , COMMENTS AND RESPONSES FROM
INTERESTED & AFFECTED PARTIES**





130 Cape Road ; Mill Park ; P.E., 6001
PO Box 16501, Emerald Hill, 6011
Republic of South Africa
Telephone: National (041) 374 0842
International +27 41 374 0842
Facsimile: National (086) 657 7703
International +27 86 657 7703
e-mail : rudi@algoacme.co.za

2009

SANDMAN QUARRIES MINING RIGHT APPLICATION - SCOPING DME Reference: EC



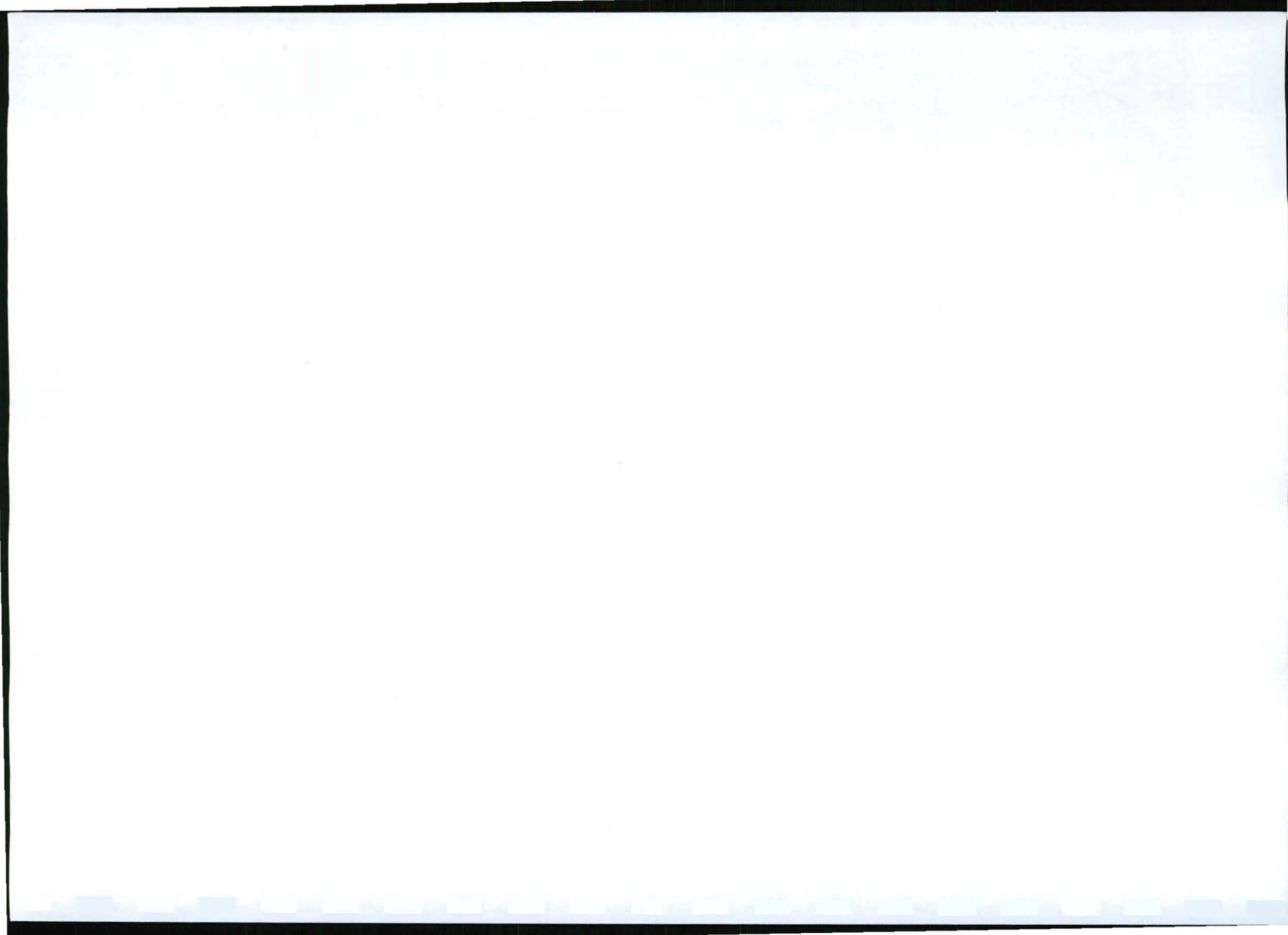
PREPARED FOR :

SANDMAN QUARRIES CC

P.O. Box 313

UITENHAGE

6230



SANDMAN QUARRIES cc

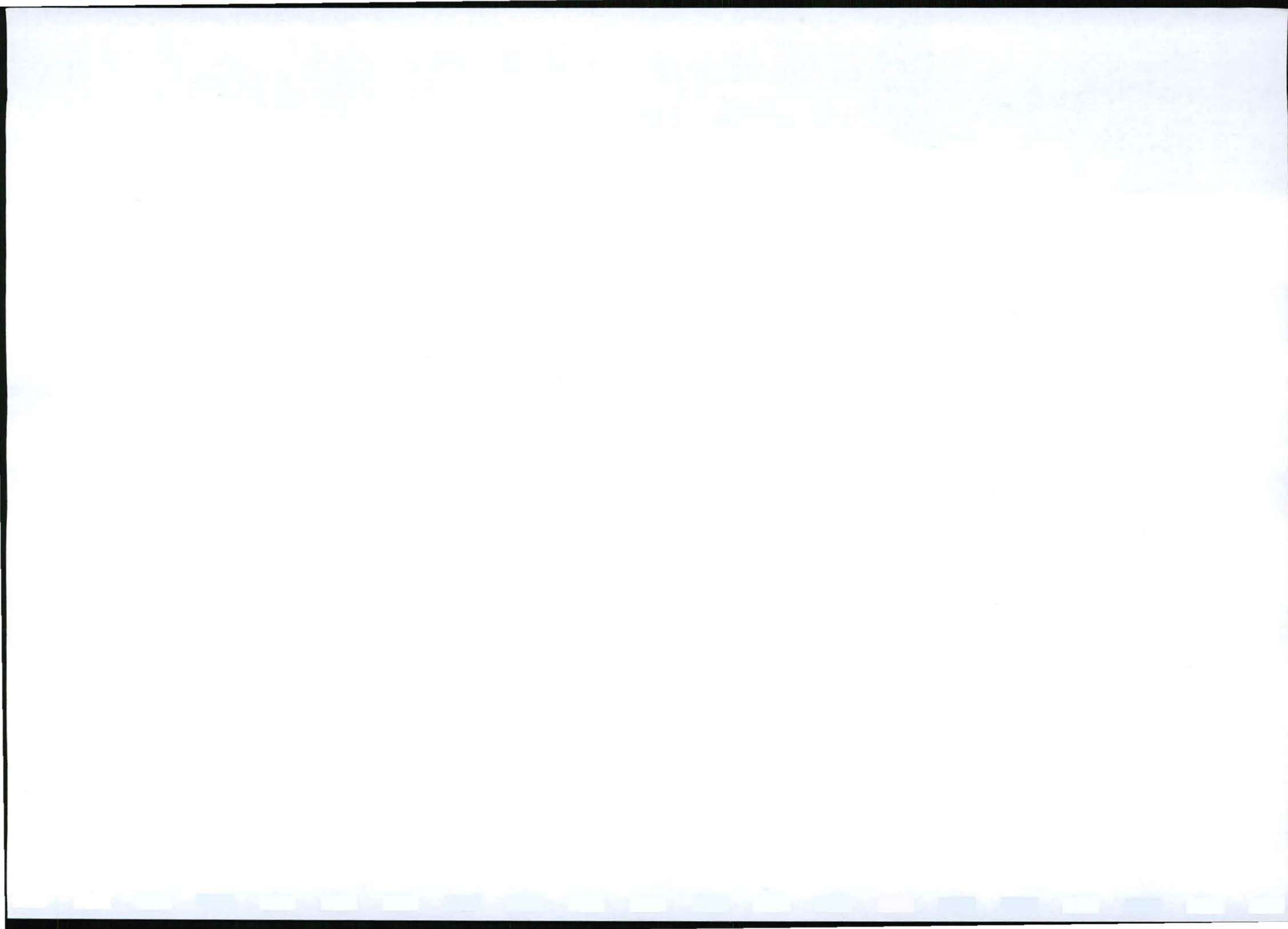
TABLE OF CONTENTS

1. Introduction.....	4
2. Background information.....	5
2.1. Contact details.....	7
2.2. Project locality.....	7
2.3. Project Description.....	8
2.3.1. Commodities	8
2.4. Mineral Resources in the Swartkops Valley.....	9
2.5. Cultural and Historic Aspects.....	10
2.6. Neighbouring Land Uses	10
2.7. Socio-Economic Status of the Area	11
3. Engagement of interested and affected parties	12
4. Engaging the Nelson Mandela Bay Municipality.....	13
4.1. Plans & Maps.....	13
4.2. Zoning of Title Deed(-s)	13
4.3. Stakeholders.....	14
4.4. Record Of Decision.....	14
5. Engaging the Neighbour , Mr L Stander	14
6. Engaging the Neighbour , Mr F Alberts.....	15
7. Engaging the Neighbour , Mr D Hattingh.....	15
8. Conclusions	15
10. Annexure 1 : PROOF OF PUBLIC PARTICIPATION	16
11. Annexure 2 : Response from N.M.B.M.	17
12. Annexure 3 : Response from Neighbour Mr. L Stander.....	18
13. Annexure 4 : Response from Neighbour Mr. F Alberts	19



SANDMAN QUARRIES cc

14. Annexure 5 : Response from Neighbour Mr. D Hattingh.....	20
15. Annexure 6 : Reply to N.M.B.M.	21
16. Annexure 7 : Reply to Neighbour, Mr. L Stander.	22
17. Annexure 6 : Reply to Neighbour, Mr. F Alberts	23
18. Annexure 6 : Reply to Neighbour, Mr. D Hattingh.....	24



SANDMAN QUARRIES cc

1. INTRODUCTION

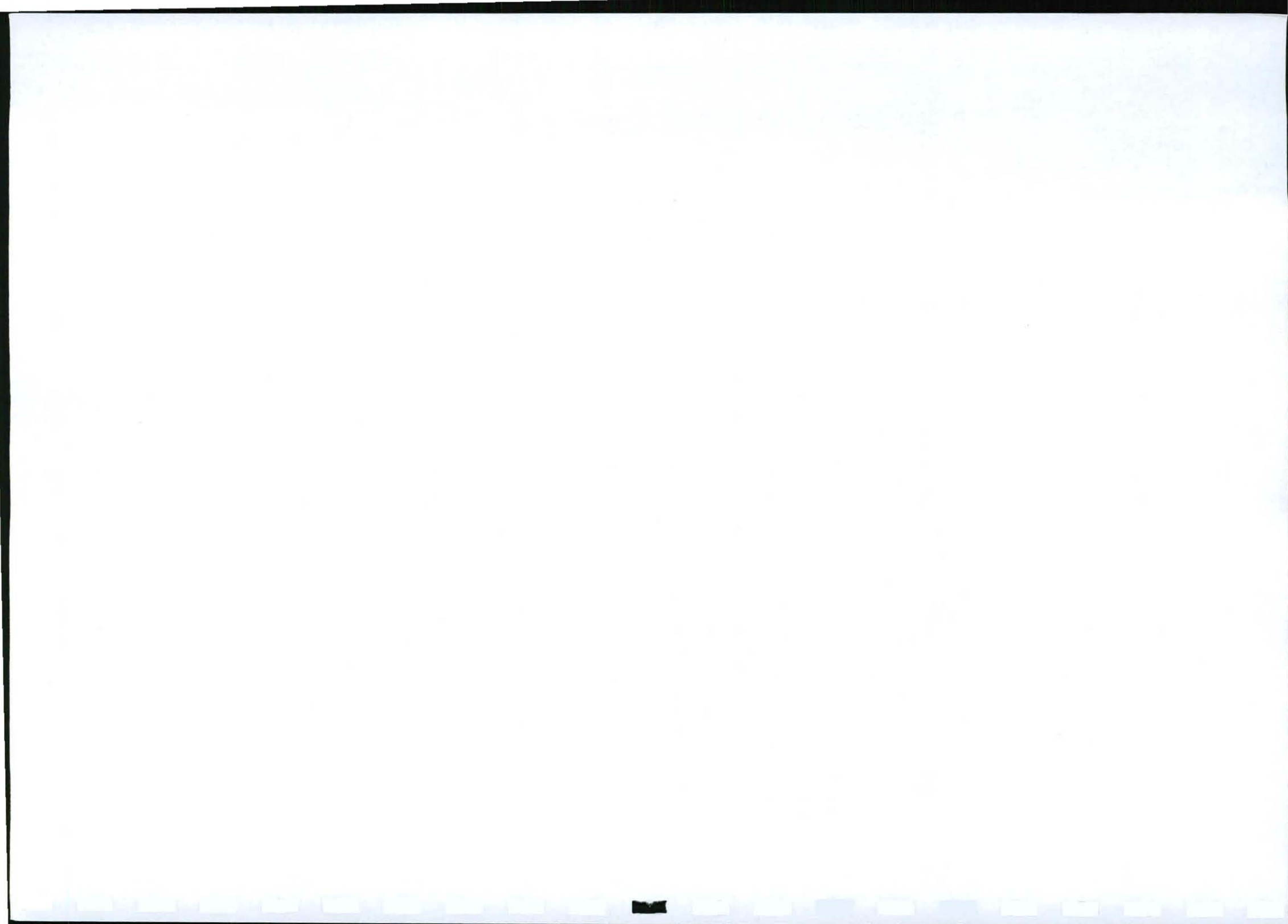
Currently sand for the construction industry in the Nelson Mandela Bay Municipal area is mainly sought from windblown Aeolian sand reserves. These reserves tend to be formed from fine grain sand, less than $70\mu\text{m}$. For larger construction projects and especially civil projects such as bridges, stadiums, road reinforcement, dams etc, where high strength of concrete is required (greater than 40MPa), a courser grain size for the sand is required. Currently, this is sourced from the mines in the Perseverance, Despatch and Uitenhage area, within the floodplain of the Swartkops River system.

Despite the construction boom experienced prior to 2008 having subsided to a large extent, there are still large scale civil projects in the Nelson Mandela Bay Area, including Coega Industrial Development Zone and the soccer stadium. Should the construction industry recover, driven by factors such as lower interest rates and lower inflationary pressures, then a shortage of quality building sand is expected. In addition, the Coega Industrial Development Zone is only in its infancy, and should the expected developments take place, then a source of quality sand close-by will be needed.

Some of the projects that will require higher strength concrete and thereby higher grade sand are:

1. Railroad infrastructure especially sidings
2. Coega refinery
3. Breakwater infrastructure (ongoing)
4. Proposed metallurgical industry

Many of the projects will take some time to develop and as such strategically the allocation of resources required for such projects must be considered for the entire life of the development.



SANDMAN QUARRIES cc

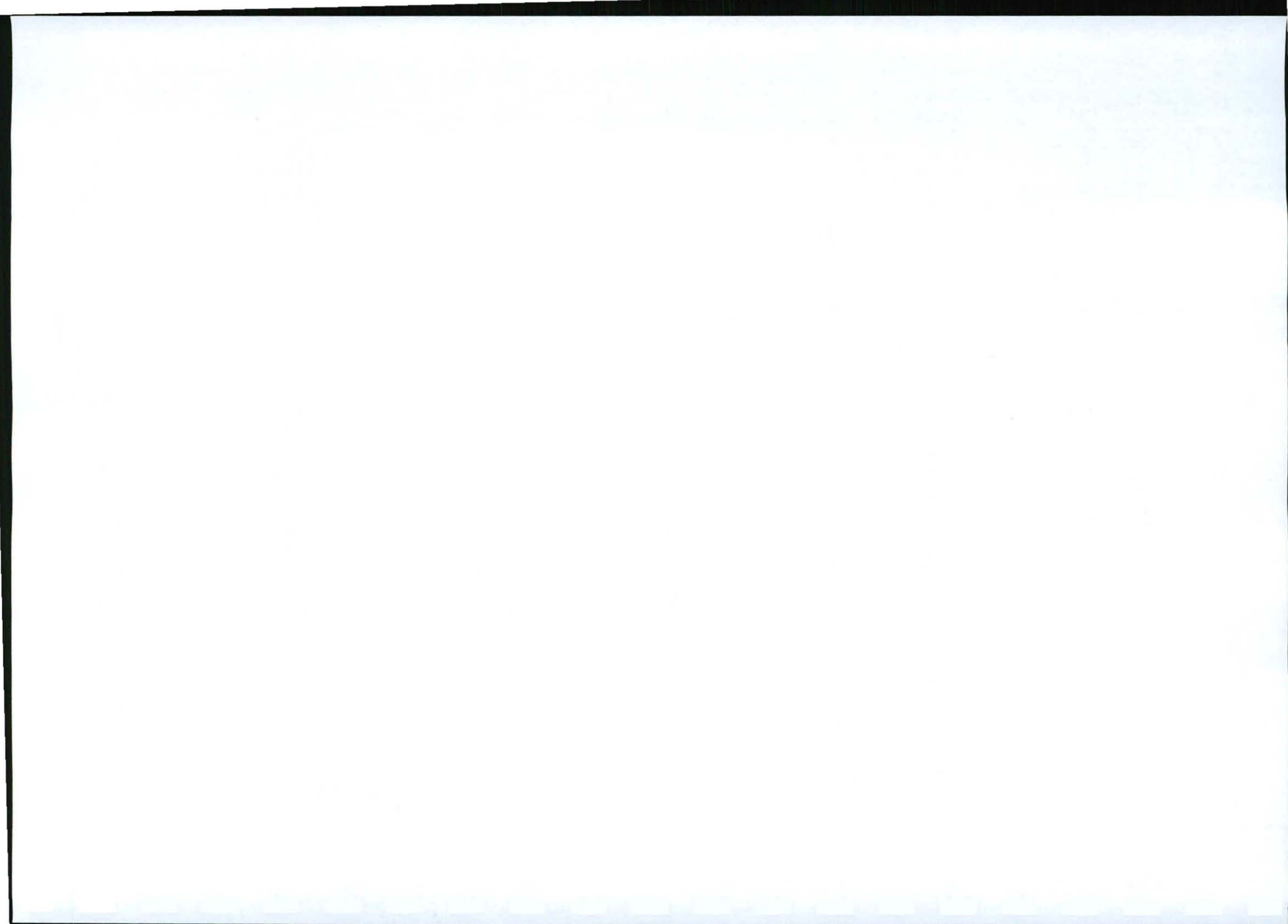
Sandman Quarries cc is owned and managed by Mr Hein Potgieter. It currently holds a mining permit over a small portion of land owned by Potgieter Properties Trust (PPT), which is currently being used for commercial agriculture. Sandman Quarries cc wants to expand their business and therefore has commenced with an application for a mining right for gravel and sand on 32 portions of the farm Zwartkops River Waagens Drift no 567 in the division of Uitenhage. The total area sought after for the mining right is 234ha, of which 88 ha will be targeted for mining over a period of 30 years. This document details the responses and involvement with interested and affected parties to this mining venture. This document has been drawn up in compliance with the Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002.

2. BACKGROUND INFORMATION

The land for which mining rights are being sought, extends over 32 farm portions, 29 of which are owned by PPT and the other three are owned by:

1. Spade Reen Sending Internasionaal
2. New Era International Trust
3. Nelson Mandela Bay Municipality

The full list of titles is shown below:



SANDMAN QUARRIES cc

Table 1: List of farm portions relevant to mining right application

List of farms which form part of proposed mining right area							
No.	Portion	Farm	Title deed no.	Owner	LPI code	District	Local Authority
1	23	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700023	Uitenhage	Despatch
2	24	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700024	Uitenhage	Despatch
3	25	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700025	Uitenhage	Despatch
4	26	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700026	Uitenhage	Despatch
5	27	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700027	Uitenhage	Despatch
6	28	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700028	Uitenhage	Despatch
7	29	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700029	Uitenhage	DIAS DC
8	30	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700030	Uitenhage	DIAS DC
9	31	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700031	Uitenhage	DIAS DC
10	32	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700032	Uitenhage	DIAS DC
11	33	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700033	Uitenhage	DIAS DC
12	34	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700034	Uitenhage	DIAS DC
13	35	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700035	Uitenhage	Despatch
14	36	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700036	Uitenhage	Despatch
15	37	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700037	Uitenhage	Despatch
16	38	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700038	Uitenhage	Despatch
17	39	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700039	Uitenhage	Despatch
18	40	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700040	Uitenhage	Despatch
19	7	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700007	Uitenhage	DIAS DC
20	8	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700008	Uitenhage	Despatch
21	9	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700009	Uitenhage	DIAS DC
22	79	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700079	Uitenhage	DIAS DC
23	80	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700080	Uitenhage	DIAS DC
24	114	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700114	Uitenhage	Despatch
25	111	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700111	Uitenhage	Despatch
26	96	567	T80192/2007	POTGIETER PROP TRUST	C07600000000056700096	Uitenhage	Despatch
27	59	567	T80194/2007	POTGIETER PROP TRUST	C07600000000056700059	Uitenhage	Despatch
28	68	567	T80192/2007	POTGIETER PROP TRUST	C07600000000056700068	Uitenhage	Despatch
29	71	567	T80193/2007	POTGIETER PROP TRUST	C07600000000056700071	Uitenhage	Despatch
30	70	567	T34894/1974	SPADE REEN SENDING INTERNASIONAAL	C07600000000056700070	Uitenhage	DIAS DC
31	74	567	T29956/1999	NEW ERA INTERNATIONAL TRUST	C07600000000056700074	Uitenhage	Despatch
32	82	567	T7821/1952	MUN NELSON MANDELA BAY METROPOLITAN	C07600000000056700082	Uitenhage	Despatch

Note that historical mining in the area owned by Spade Reen Sending Internasionaal has already taken place in the past.

SANDMAN QUARRIES cc

Of the 29 portions owned by PPT, 8 of the portions are targeted for measured mineral reserves; other portions are included with the purpose of retention for mining rights for potential mining of probable reserves and inferred resources. Most of the area targeted is currently used for grazing of cattle.

2.1. Contact details

Sandman Quarries cc is represented by Mr. Hein Potgieter.

Company Registration number No.: 2002/063801/23

Postal address: P.O. Box 313 ; Uitenhage ; 6230

Applicant telephone no.: (041) 933 2792

Applicant Facsimile: (041) 933 4959

Cell No.: 082 787 9975

Email: sandmanquarries@telkomsa.net or nwpotgieter@mweb.co.za

2.2. Project locality

The project is located to the East of Despatch, north of the Swartkops River. The site is shown on a Google image in Figure 1 below. For details of the entire mining right area please refer to the regulation 2(2) plan in the appendix 1.



Figure 1: Mining Right area shown in relation to Despatch in the West and the Swartkops River in the South.

SANDMAN QUARRIES cc

2.3. Project Description

The project will involve mining of alluvial sand and gravel in the vicinity of the Swartkops River. The mining will be done to a depth of 2.5 to 4.5m from the surface using an excavator by doing free excavation. The excavated material will then be loaded into dumpers to be taken to the plant for processing into the various products.

The processing of the mined material involves crushing of gravel, separating sand and gravel, washing out the clay fraction from the sand, screening of crushed gravel and size separation of sand to create the various products sought after in the construction industry.



Figure 2: Sand processing plant at Sandman Quarries which involves separation of fines, washing sizing and grading of the products.

2.3.1. Commodities

The commodities being sought after and processed at Sandman Quarries' crushing & screening plant are sand and gravel products for the construction industry as shown below:

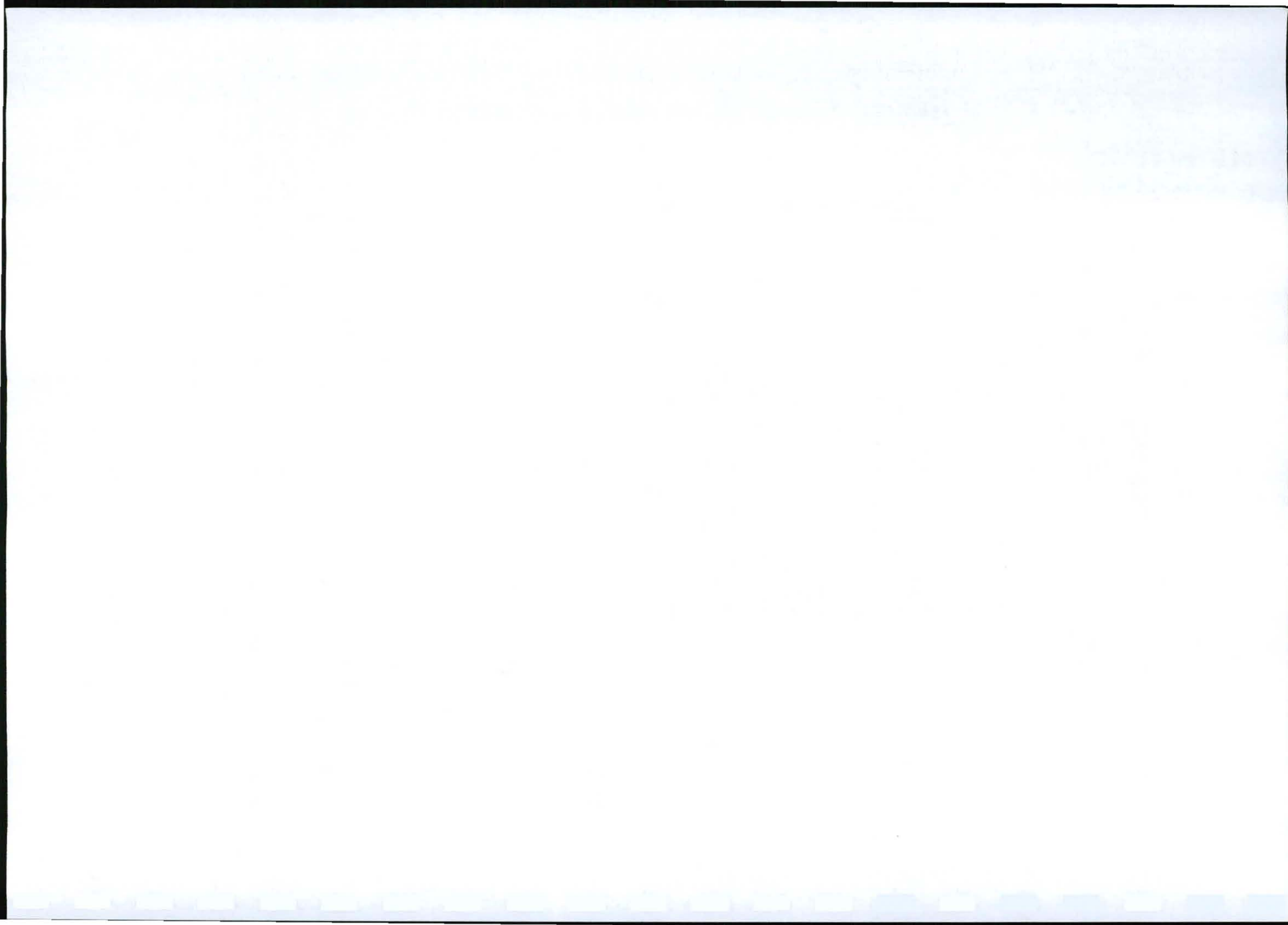
SANDMAN QUARRIES cc

Table 2: Sandman products showing the tonnages of products sold previously and the percentage makeup.

Yearly production		
Type	Tons	Percent
13mm stone	8786	5%
13mm All-in-one	1312	1%
19mm stone	23776	15%
19mm All-in-one	15193	9%
Course grit	56626	35%
Building sand	1605	1%
Plasters sand	179	0%
Washed concrete sand	53398	33%
Gabion	51	0%
Filling (sand)	1382	1%
Pebble	496	0%
	162804	
Total stone	106241	65%
Total sand	56563	35%
Run Of Mine tonnes		
Pebble/stone	106241	65%
Sand	56563	31%
Waste	6310	4%
Total Run Of Mine	169114	100%

2.4. Mineral Resources in the Swartkops Valley

During 2007 Sandman Quarries were awarded a mining permit over a small area on portion 114 of the farm 567 Waagens Drift. In order to ensure sustainability of the raw materials for the operation, which produces 168 000 tonnes of construction industry products per year, Sandman Quarries have conducted in exploration and prospecting activities to extend its mineral resources. The sand and gravel resources have been estimated according to the SAMREC code of 2007 through the execution of a prospecting right with DME Reference: (EC) 30/5/1/1/2/0078 PR. This process resulted in an understanding of the mineral reserves available to be mined. An illustration of the results is shown in Figure 3. These results plus other reconnaissance of the sand and gravel resources has resulted in an understanding of the potential of the area for sand and gravel mining in its entirety. Currently Sandman Quarries have applied for a mining right, with DME reference number EC 30/5/1/2/2/0208 MR, to ensure the sustainability of its operations for the next 30 years.



SANDMAN QUARRIES cc

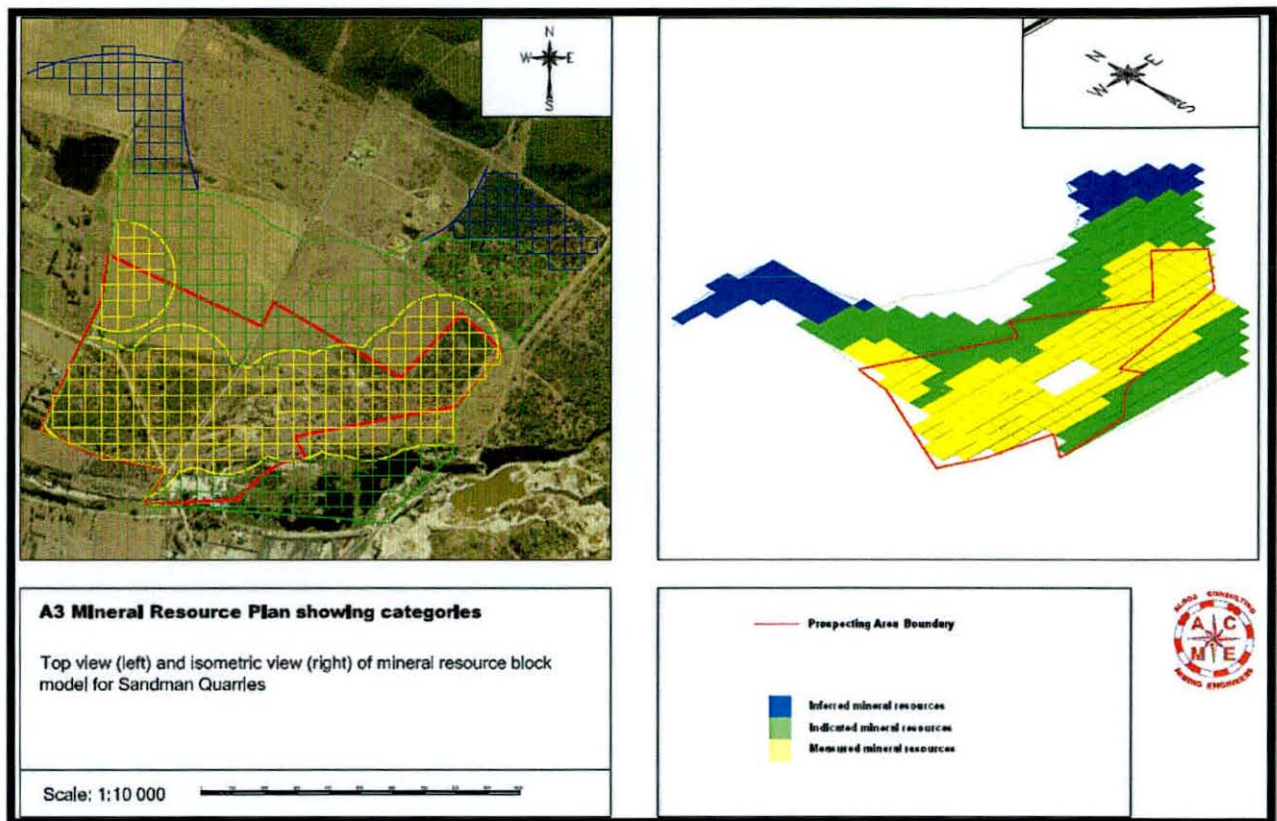


Figure 3: Mineral resource results.

2.5. Cultural and Historic Aspects

No historic building is found on the properties. Specialist studies have indicated that no other sites or objects of cultural - and historic significance are present.

2.6. Neighbouring Land Uses

The neighbouring land uses are shown in Figure 4. Note that most of the area which is not labelled, is used for agriculture much of which is owned and managed by the applicant, Mr Hein Potgieter himself.