Start

Case ID: 372

Working Together

Project Applicant: **ANGLO AMERICAN INYOSI COAL (PTY) LTD**

Project: **Phola-Kusile Overland Coal Conveyor**

Report Name: **ENVIRONMENTAL IMPACT ASSESSMENT REPORT**
Volume 1: Main Report, Appendix A and B
(of 4 volumes)

Report Status: **(Draft)**

Revision No: 00

Report Date: October 2011

Report Number: S0403-PK-EIR-01
ENVIRONMENTAL-IMPACT-ASSESSMENT-REPORT

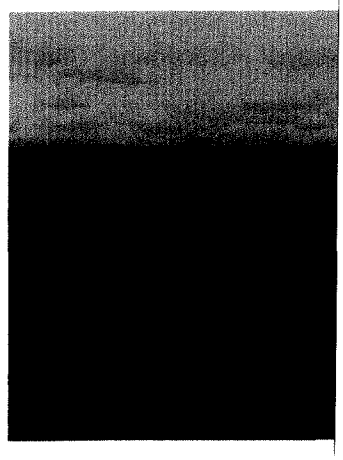
Prepared by: Mari Wolmarans, Marline Medallie, Vivienne Vorster, Claire Jarvis

Issued by: Mari Wolmarans

For Submission to: Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET), as part of the EIA in terms of the National Environmental Management Act.

Department of Water Affairs (DWA), as part of the Water Use License Application in terms of Section 21 of the National Water Act.

Reference No: MDEDET: 17/2/3 N-13
DWA: 16/2/7/B200/K524



Volume 1, Main Report, Appendix A + B of (4 Volumes) FINAL on SAHRIS

STATUS: Studies Pending

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PROJECT INFORMATION SHEET

PROJECT:

Phola-Kusile Overland Coal Conveyor

REPORT DETAILS:

Report Name: **Phola-Kusile Overland Coal Conveyor: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

Report Number: S0403-PK-EIR-01
Report Status: DRAFT
Revision No: 00
Date: October 2011

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ANGLO AMERICAN INYOSI COAL (PTY) LTD

Phola-Kusile Overland Coal Conveyor

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (Draft)

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

LIST OF APPENDICES

Appendix I: Air Quality Specialist Assessment
Appendix J: Traffic Specialist Opinion
Appendix K: Noise Specialist Assessment
Appendix L: Heritage Resources Specialist Assessment
Appendix M: Visual Specialist Assessment
Appendix N: Social Specialist Assessment
Appendix O: Economic Specialist Assessment
Appendix P: Agricultural and Land Use Potential Specialist Assessment

TERMS AND ABBREVIATIONS

~	approximately
AA	Anglo American
AAIC	Anglo American Inyosi Coal (Pty) Ltd
AEMFC	African Exploration Mining and Finance Corporation
dBA	decibels adjusted (measurement for determining the sound exposure of humans)
DAFF	Department of Agriculture, Forestry and Fisheries
DARDLA	Mpumalanga Department of Agriculture, Rural Development and Land Administration
DMR	Department of Mineral Resources
DPWRT	Mpumalanga Department of Public Works, Roads and Transport
DRPW	Department of Roads and Public Works
DWA	Department of Water Affairs
DWEA	Department of Water and Environmental Affairs (National)
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
GGP	Gross Geographic Product
GN	Government Notice
GNR	Government Notice Regulation
ha	hectare
HH1 to HH45	Homesteads and buildings along the conveyor route (Table 7-2).
I&AP	Interested and/or Affected Party
km	kilometre
Kusile	Eskom's Kusile Power Station
kV	kilovolt
LED	Light-emitting diode (a type of energy-saving light)
m	metre (measurement for distance)
m^2	square metre (measurement for surface area)

m^3	cubic metre (measurement for volume)
mg	milligram
Mℓ	mega litres
MDEDET	Department of Economic Development, Environment and Tourism (Mpumalanga)
MPRDA	Mineral and Petroleum Resources Development Act (No 28 of 2002)
NDEA	Department of Environmental Affairs (National)
NEMA	National Environmental Management Act (No 107 of 1998)
NEMAQA	National Environmental Management: Air Quality Act (No 39 of 2004)
NEMWA	National Environmental Management: Waste Act (No 59 of 2008)
NWA	National Water Act (No 36 of 1998)
PM10	Particular matter smaller than 10 microns (<10 µm)
Phola CPP	Phola Coal Processing Plant
pillars	Support structures for Environmental Gantries
R/E	remaining extent
SANBI	South African National Biodiversity Institute
SAHRA	South African Heritage Resources Agency
SANS	South African National Standards
Synergistics	Synergistics Environmental Services (Pty) Ltd
TS	Transfer Station
WCS	Wildlife Conservation Society
y	year

GLOSSARY OF TERMS

Aquiclude

Solid, impermeable area underlying or overlying an aquifer. If the impermeable area overlies the aquifer, pressure could cause it to become a confined aquifer.

Baseline Environment

Pre-development environmental conditions. The prevailing environmental conditions (or status quo) prior to the start of an activity or project, including current / existing environmental damage / degradation.

Baseline Impacts (Existing Impacts)

The current level of environmental degradation associated with existing developments, including those currently under construction. Determination of the current level of degradation associated with existing developments is essential to understand and enable the assessment of cumulative impacts.

Represents the alternative / option that is preferred from a purely environmental viewpoint, with all environmental components integrated, but not giving consideration to technical, financial cost, timing and other developer (project proponent) objectives and constraints.

Individual Component Preferable Alternative / Option

Represents the alternative / option that is preferred based on single individual environmental component, not considering other environmental components. This is therefore not an integrated Environmentally Preferable Alternative / Option and it does not consider technical, financial cost, timing and other developer (project proponent) objectives and constraints.

Cumulative Impacts

Combined impacts of two or more activities, or the combined impacts of an activity with that of current activities. For this report, cumulative impacts are described as:

Existing Impacts + Incremental Impacts of the Project = Cumulative Impacts

Conveyor Flight

A section of the overland conveyor which runs in a relatively uniform direction between two points (these points can be transfer stations or a start and end point if no direction change is needed). When materials are conveyed over a long distance, the overland conveyor is divided into sections (or conveyor flights) due to mechanical and topographical limitations.

Conveyor Transfer Station

The structure where materials are transferred from the end of one conveyor flight onto the beginning of the next conveyor flight, in a series, usually as a result of the need to change direction. The transfer station houses a transfer chute to control the flow of coal between two conveyor flights. It also houses mechanical items including drives, pulleys and maintenance facilities.

Deluge Fire Protection System

A fire protection suppression system that has all sprinklers connected to the water piping system open at all times. The sprinklers are connected to a dry pipe that is connected to a main water supply. A fire detection device controls the main valve. When it is activated, the valve opens, allowing large amounts of water to flow through all of the sprinklers. The purpose of a deluge system is to quickly wet down an entire hazard area to prevent a fire from spreading.

Environment

Surroundings in which organisms operate, including air, water, land, natural resources, flora, fauna, humans and their inter-relations (includes bio-physical and socio-economic components) as defined in NEMA.

Environmental Impact Assessment (EIA)

An EIA is an assessment of the positive and negative environmental consequences of the proposed project. The primary objective of the EIA is to aid decision-making by providing factual information on the assessment of these impacts, and determining their significance, as well as making valued judgements in choosing one alternative over another. For this EIA a combination of checklists, overlays and mapping, scoping and professional experience will be used to identify the possible negative and positive impacts on the environmental components.

Environmental Gantry

Specially designed conveyor section spanning (bridging) across streams and wetlands raised higher than the 1:100 year floodline, with additional freeboard. The gantries will be supported on pillars located at intervals long the gantry. The gantries are provided with a roof, partial side screens for minimizing fugitive wind blown coal dust from conveyor, and an impervious floor for capturing coal spills, drip-off and wash- down water. During shut-off, spilled coal can be picked up from the gantry floor and put back onto the conveyor and, if required, water that collected in the gantry can be manually removed.

Ephemeral

Ephemeral water bodies (wetlands, springs, streams, rivers, ponds or lakes), are found in semi-arid to arid upland areas, that only flow (exist) for a brief period of time during and shortly after rain. The banks of these water bodies have scattered riparian vegetation including trees, shrubs, and grasses, but often with incomplete or discontinued tree canopy cover.

It is not the same as intermittent, seasonal or non-perennial water bodies, which exist for longer periods, but not all year round.

Fatal Flaw

A factor or situation, which prevents the development of an environmentally acceptable project, except at prohibitive cost. These are critical issues with the ability to stop a project's implementation.

Existing Impacts

See Baseline Impacts.

Incremental Impact

This is the impact of an activity looked at in isolation (impact of an individual activity), thus not considering the combined, cumulative or synergistic impacts of the activity, or the cumulative impacts of the activity with other activities or the current level of degradation. For this report, incremental impacts refer to impacts associated with the conveyor development only.

Interested and Affected Parties (I&APs)

These are individuals or groups concerned with, or affected by the environmental impacts and performance of a project. Interested groups include those exercising statutory environmental control over the project, local residents/communities (people living and/or working close to the project), the project's employees, customers, consumers, investors and insurers, environmental interest groups, the general public, etc.

Microgram

One millionth (1/1 000 000) of a gram, or equivalently one thousandth (1/1 000) of a milligram.

Micrometre / Micron

One millionth (1/1 000 000) of a metre, or equivalently one thousandth (1/1 000) of a millimetre.

Mineral (as defined in the MPRDA)

Any substance, whether in solid, liquid or gaseous form, occurring naturally in or on the earth or in or under water and which was formed by, or subjected to, a geological process, and includes sand, stone, rock, gravel, clay, soil and any material occurring in residue stockpiles or in residue deposits, but excludes: Water, other than water taken from land or sea for the extraction of any material from such water; Petroleum; or Peat.

Mining (as defined in the MPRDA)

Mining is the making of any excavation for the purpose of winning a mineral, and it includes any other associated activities and processes (MPRDA).

Mining Area (as defined in the MPRDA)

The area for which a mining authorisation/permission to mine has been granted. It includes:

- Any adjacent surface of land;
- any non-adjacent surface of land, if it is connected to such an area by means of any road, railway line, powerline, pipeline, cableway or conveyer belt; and
- any surface of land on which such road, railway line, power line, pipeline, cableway or conveyer belt is located, under the control of the holder of such permit or authorisation and which the holder is entitled to use in connection with the operations performed or to be performed under such permit or authorization (MPRDA).

Proposed Alternative / Option

Represents the alternative / option chosen by the developer to fulfil the objectives of the project, giving consideration to economic, environmental, technical, timing and other developer (project proponent) objectives and constraints.

The concept of the proposed alternative / option is different from the 'Environmentally Preferable Alternative / Option' although in some cases one alternative may be both. The proposed alternative / option is identified so that authorities and interested and affected parties can understand the developer's orientation and objectives.

The reasons for selection of the proposed development alternative and for eliminating certain alternatives should be carefully documented and provided in the EIA report, typically under the heading 'Development Alternatives'.

Pedocrete

An infertile and compact soil structure which formed through the concentration of minerals due to terrestrial weathering which enclosed, cemented or replaced the original soil.

PM10

Fine inhalable particles (smaller than 10 μm) found in the air. When inhaled, PM10s could cause damage to the lower airways and lungs.

Receptor

A receptor is the target or object on which the impact, stressor or hazard is expected to have an effect.

Sensitive Area

A sensitive area or environment can be described as an area or environment where a unique ecosystem, habitat for plant and animal life, wetlands or conservation activity exists. Sensitive areas are often associated with eco-tourism activities or have a high potential for future eco-tourism.

Significant Impact

An impact can be deemed significant if scientific environmental studies, consultation with the relevant authorities and other interested and affected parties, in the context and intensity of its effects, provide reasonable grounds for mitigating measures to be included in the environmental management report and environmental management programme. The onus will be on the proponent to include the relevant authorities and other interested and affected parties in the consultation process. Present and potential future, cumulative and synergistic effects, should all be taken into account.

S0403-PK-EIR-01 October 2011

ANGLO AMERICAN INYOSI COAL (PTY) LTD

Phola-Kusile Overland Coal Conveyor

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (Draft)

Executive Summary

Introduction and Project Description

Anglo American Inyosi Coal (Pty) Ltd (AAIC) is proposing to construct an overland conveyor system, the Phola-Kusile Overland Coal Conveyor, to transport coal from the Phola Coal Processing Plant (Phola CPP) to Eskom's Kusile Power Station (Kusile) in the Mpumalanga Province, to meet the demand for coal at the Kusile Power Station that is under construction.

The Kusile Power Station is a coal-fired power station currently under construction just south of the N4 highway between Bronkhorstspruit and Witbank (Emalahleni). It will consist of six units of 800 megawatts (MW) capacity each and a total capacity of 4800 MW. Kusile will require approximately 17 million tons of coal a year, depending on the quality of the coal.

The proposed Phola-Kusile Overland Coal Conveyor will fall within the Nkangala District Municipality, and the Victor Khanye (Delmas) and Emalahleni (Witbank) Local Municipalities. The towns in close proximity to the proposed conveyor are Wilge (~4 km east), Phola (~3 km southeast), Ogies (~5 km south-southeast) and Emalahleni (~25 km east).

The Phola Coal Processing Plant is an existing operation located approximately 20 kilometres south-east of Kusile, between the Kendal Power Station, Ogies and Phola. The plant is a 50/50 joint venture between BHP Billiton (BECSA) and AAIC and has been in operation since 2009. It has capacity to beneficiate (wash and sort) 16 million tonnes per annum and receives coal from Klipspruit (BECSA), and Zibulo (AAIC) mines. The primary coal products from the Phola Coal Processing Plant are exported and the secondary products (or middlings coal) are dispatched to various Eskom power stations.

The Phola-Kusile Overland Coal Conveyor will be designed to transport 8.4 to 11.5 million tonnes of coal per year from the Phola Coal Processing Plant to the Kusile Power Station. A 30 metre wide[1] servitude will be registered for the conveyor. The servitude will be fenced, and there will be a service road, a 22 kV power line and a storm water management system along the conveyor belt.

[1] The scoping report stated that the servitude will be 25 m wide. Please note the servitude width has been increased from 25 m to 30 m to accommodate the power line.

An estimated 300 people will be employed during the construction phase and approximately 16 people during the operational phase.

Purpose of the Report

This report presents the results of the environmental impact assessment process undertaken for the project. It provides a description of the proposed Phola-Kusile Coal Conveyor and associated activities and the various alternative developments and conveyor route alternatives that were evaluated. It presents the conveyor route that is proposed by Anglo American Inyosi Coal (Pty) Ltd (AAIC), that was proposed based on an evaluation of environmental and technical considerations and the Environmental Assessment Practitioner' integration of the various specialists' studies into the report and it presents an assessment of all impacts and a draft environmental management programme for mitigation of impacts. The specialist studies that are were conducted as part the EIA process are appended to the main report.

The report is in four volumes:

- Volume 1: Main Report, Appendix A and B
- Volume 2: Appendix C (Public Participation Documentation)
- Volume 3: Appendix D to H (Specialist Reports)
- Volume 4: Appendix I to P (Specialist Reports)

Project Need and Desirability

The majority of South Africa's electricity is generated from coal. The Kusile Power Station forms part of the **South African National Government strategy** to supply much needed electricity to the South African national electricity grid. Eskom has made a multi-billion rand investment to construct the new Kusile Power Station.

The Ministry of Energy and Eskom maintain that:

> *"In the absence of Kusile there will not be enough power into the South African electricity grid"* (Ministry of the Energy spokesperson Bheki Khumalo[1]).
>
> *"Without the additional power from Kusile from 2014, there could be constraints on South Africa's economic growth"* (Eskom's Finance Director, Paul O'Flaherty[2]).

Eskom has identified the **middlings coal from the Phola Coal Processing Plant** to be an **important future source of coal to be fed to the Kusile Power Station**.

2 Media release compiled by the Government Communication and Information System, 26 Aug 2010. http://www.buanews.gov.za/rss/10/10082611151001

Development Alternatives

Alternative transportation options were considered (road, rail and overland conveyor) and **the conveyor was found to be the proposed transportation option**.

The purpose of the proposed overland conveyor is therefore to **ensure a timeous and secure supply of coal to Kusile** and therefore ultimately, electricity to the national electricity transmission grid. In order to prepare the Kusile Power Station for commercial operations, delivery of the first coal via the Phola-Kusile Coal Conveyor is planned for October 2013 (subject to all relevant approvals being obtained).

Should the Phola-Kusile Coal Conveyor not be approved, **coal will have to be supplied to the power station** via other means, such as road transport, which was found to have far more significant environmental and economic impacts as indicated in the discussion regarding project alternatives. There will also be a significant loss to Eskom, and the country, as the construction of Kusile was a strategic development to assist with the electricity shortages of South Africa and if coal cannot be supplied consistently, the power station will not be able to operate effectively.

Three alternative conveyor corridors were assessed during the scoping phase (Figure 1-3), of which two were eliminated at the end of scoping. Various route options along the preferred corridor were investigated during the EIA phase (Figure 1-2). **The alternative routes were evaluated and a proposed route was identified and optimised, based on an integrated assessment of all environmental components**. The location of the proposed route for the Phola-Kusile Coal Conveyor is presented in Figure 1-1.

A project of this nature and scale will obviously impact on the environment. The EIA process as described in this report found that, with appropriate mitigation measures in place, all significant impacts can be mitigated to within acceptable levels (refer to Table 8-1, in Section 8 at the back of the report).

No-Go Development

The no-go development will have high negative impacts on the cost and timing of coal supply to Kusile Power Station, delivery of electricity to the national grid, and associated impacts on national economy and it is therefore assumed that if the proposed Phola-Kusile Coal Conveyor is not allowed to be developed, an alternative coal supply and transportation of that coal supply will have to be found.

The Environmental Assessment Practitioner is of the opinion that the transportation options (Section 4.1) and the alternative conveyor corridors investigated during scoping phase (Section 4.2) will have impacts equal to or more significant than those of an overland coal conveyor along the proposed route.

The two alternative conveyor corridors that were investigated during the scoping phase impacted on more extensive wetland areas and a larger number of stream crossings. There are no feasible routes for the conveyor between the Phola Coal Processing Plant and Kusile Power Station that would not cross a number of streams and wetlands.

Outstanding Issues

The Environmental Assessment Practitioner for this project is of the opinion there are no notable uncertainties and knowledge gaps that could affect decision making.

The following outstanding issues are expected to be in place at the time of the submission of the final EIA report:

- AAIC's discussions with affected landowners and servitude owners over which the proposed conveyor route crosses are in process and landowner consent for all properties should be in place at the time when the final EMP is submitted.

- Synergistics is in the process of consulting with affected landowners and servitude owners (over which the proposed conveyor route crosses) to discuss specific issues pertaining to their properties and to discuss the need for pedestrian and road/livestock crossings. This process is dependent on, and driven by, the availability of the different owners, but it is anticipated that this process should be concluded prior to the submission of the final EIA report.

- I&APs still need to comment on the proposed route as presented in the draft EIA report, the impacts as assessed by the specialists and the mitigation measures presented in the. These comments will be captured and addressed in the final EIA report.

Conclusions, Key Findings and Recommendations

A project of the scale and nature of the proposed Phola-Kusile Coal Conveyor will obviously impact on the environment – one of the more significant impacts associated with this project, is the impact at stream and wetlands crossings. A study of the area between the Phola Coal Processing Plant and the Kusile Power Station, the area over which a route for the conveyor had to be found, revealed that the area is traversed by various streams and wetlands, as illustrated in Figure 3-1. Various conveyor route corridors were evaluated during the scoping phase and it was found that all potential routes would have to cross streams and wetlands. Selection of a route corridor also had to take in consideration existing infrastructure such as roads, pipelines, built-up areas, land owned by third-parties and not by AAIC, as well as existing and future mining areas.

The conveyor route corridor that was selected at the end of the scoping phase was the one that impacted on the smallest number of stream and wetland crossings – but it still requires three stream crossings associated with valley bottom wetlands as well as a number of hillslope seepage wetlands depicted on Figure 5-5. The design of the conveyor includes various measures to protect streams and wetlands and to avoid flooding of the conveyor, which could result in coal washing down the steams. Key mitigation measures incorporated into the design, to minimise the impacts on streams and wetlands, include:

- Stream crossings will be provided with environmental gantries – specially designed conveyor sections on pillars and bridging across streams and wetlands raised higher than the 1:100 year floodline and provided with a roof, partial side screens for minimizing fugitive wind blown coal dust from conveyor, and an impervious floor for capturing coal spills, coal fines, drip-off and wash-down water. During conveyor shut-down, spilled coal can be picked up from the gantry floor and put back onto the conveyor.

- The conveyor will be equipped with scrapers at transfer stations and there will be belt turn overs to avoid coal fines spilling and falling to the ground along the conveyor and into hillslope seepage wetlands that are not equipped with environmental gantries.

- The service road crossings to be engineered so that the flow of the water through the wetlands (hydrological continuity) is not significantly disrupted, that impacts on wetland function is minimised and erosion risks are minimised.

- Each transfer station will be equipped with a bunded area for capturing of coal spills, dirty water dripping from the conveyor due to dust control sprays, and dirty water when the area is washed down or during rain. The bunded areas will drain towards a silt trap and an evaporation dam. The bunded area, silt trap and evaporation dams will be lined to avoid seepage and equipped with a seepage detection sump.

- The conveyor will have a metal cover (called 'doghouse sheeting'), which will prevent rainwater coming into contact with the coal on the conveyor and contamination of clean rain water, and reduce the amount of water washing down / dripping down at the transfer stations.

- The metal cover will be placed in accordance with the prevailing wind direction and will act as mitigation to reduce windblown coal dust from entering streams and wetlands along the conveyor route.

In addition to the impact on streams and wetlands, a wide spectrum of impacts were assessed by the various specialists and then integrated into the impact assessment section of this report (Section 7). The various specialists made suggestions and recommendations for mitigation measures, which were all considered and evaluated by the Environmental Assessment Practitioner and, where found appropriate to the project and the affected environment, incorporated into the EMP (Section 12).

The EIA process as described in this report found that, with appropriate mitigation measures as proposed on the EMP in place, potential significant impacts can be mitigated to be within acceptable levels.

The EIA report, EMP and the various specialist reports (appended) contains all information that is necessary for:

- MDEDET to make an informed decision about the environmental impacts of the Phola-Kusile Coal Conveyor and to issue an environmental authorisation for the project.

- DWA to make an informed decision about the impacts associated with water uses in terms of the NWA and waste activities in terms of the NEMWA. Read in conjunction with the following reports, the DWA would have sufficient information to evaluate and issue a decision on the water use license application for the project.
  - Phola-Kusile Overland Coal Conveyor: Integrated Water and Waste Management Plan (draft, October 2011).
  - Phola-Kusile Overland Coal Conveyor: Integrated Water Use Licence Application Report (draft, October 2011).

It is deemed that the environmental process followed to date meets the requirements of the applicable legislation and that this report (volume 1 to 4) presents all relevant information needed for the competent authorities to make an informed decision on the environmental acceptability of the project.

Environmental Assessment Practitioner Recommendations

It is recommended that the development be authorised along the route as proposed by AAIC, that management and mitigation measures identified in the EMP be implemented, and that the outstanding issues listed in Section 8.6 be addressed within the specified timeframes.

S0403/SR01 October 2011

ANGLO AMERICAN INYOSI COAL

Phola-Kusile Overland Coal Conveyor

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (Draft)

Preliminaries

Purpose of the Report

The purpose of this draft EIA report for the Phola-Kusile Coal Conveyor is to present the results of the environmental impact assessment process undertaken for the project.

The report provides a description of the proposed Phola-Kusile Coal Conveyor and associated activities and the various conveyor route alternatives that were evaluated. It presents the conveyor route that is proposed by Anglo American Inyosi Coal (Pty) Ltd (AAIC), based on an evaluation of environmental and technical considerations and the Environmental Assessment Practitioner' integration of the various specialists' studies into the report. All the specialist studies are appended to the main report.

Report Volumes

The report is in four volumes:

- Volume 1: Main Report, Appendix A and B
- Volume 2: Appendix C (Public Participation Documentation)
- Volume 3: Appendix D to H (Specialist Reports)
- Volume 4: Appendix I to P (Specialist Reports)

List of Reports Completed for The Project to Date

The following reports have been completed to date:

- Phola-Kusile Overland Coal Conveyor: Background Information Document (Oct 2010).
- Phola-Kusile Overland Coal Conveyor: Draft Environmental Scoping Report (Dec 2010).
- Phola-Kusile Overland Coal Conveyor: Final Environmental Scoping Report (Jun 2011).
- Various specialist assessment reports, as appended to this report (refer List of Appendices).
- Phola-Kusile Overland Coal Conveyor: Integrated Water and Waste Management Plan October (draft, October 2011).

- Phola-Kusile Overland Coal Conveyor: Integrated Water Use Licence Application Report (draft, October 2011).
- Phola-Kusile Overland Coal Conveyor: Draft Environmental Impact Assessment Report (October 2011, THIS REPORT).

Report Distribution List

The DEIR and IWWMP will be available on the websites and at the places listed in the table below. You are most welcome to request us to send you a CD of the report.

Contact	Location	Contact
Printed Copies		
Suzie Wolvaardt	El Toro Restaurant on the R545 near the Kendal Power Station.	Tel: 013 648 1688
Ms Ntombi Jela	Ogies Public Library, 61 Main Street, Ogies	Tel: 013 643 1150 or 643 1027
Cindy Smith	Anglo American Inyosi Coal Environmental Services offices, Witbank.	Tel: 013 691 5117
Lierieka Cuyler	Synergistics Environmental Services. 64 Wessels Street, Rivonia, Johannesburg.	Tel: 011 807 8225
Electronic Copies		
Lierieka Cuyler	www.synergistics.co.za (click on "Reports" and scroll down to Phola-Kusile Coal Conveyor EIA)	Tel: 011 807 8225
Andre Joubert	www.zitholele.co.za - Kusile conveyor	011 207 2077
Andre Joubert	Available on CD n request via email from Zitholele Consulting.	Phone 011 207 2077, or send email request to andrej@zitholele.co.za, or complete the enclosed form.

All registered I&APs (as listed below) will be notified about the availability of the review period of the draft EIA report and will be invited to a public feedback meeting to discuss and comment on the results of the EIA process, the specialist studies and the content of the EMP.

List of Registered I&APs

	NAME	DESIGNATION	ADDRESS
1	Addison, Graeme	South African River Residents Association	
2	Ah Shene Verdoorn, Carolyn	Birdlife South Africa	RANDBURG
3	Bakker, Andre	Corridor Gazette	NELSPRUIT
4	Batchelor, Garth	Department of Economic Development Environment and Tourism	NELSPRUIT
5	Beech, Candice	Kusile Power Station	MORELETA PARK
6	Beetge, Andre	Working for Wetlands: SANBI	KRANSPOORT
7	Boonzaaier, H J	Fraser Alexander Bulk Mech	JET PARK
8	Botha, Amanda	Witbank News	WITBANK
9	Botha, Hannes	Mpumalanga Tourism and Parks Agency	GROBLERSDAL
10	Botha, Ida	Kungwini Local Municipality	BRONKHORSTSPRUIT
11	Butcher, Ruth	Cabanga Concepts for Homelands	RANDPARK RIDGE
12	Campbell, Graeme	Streeknuus	BRONKHORSTSPRUIT
13	Cherry, André	Klipfontein 568	KENDAL
14	Chipu, Sonia	Department of Mineral Resources	WITBANK
15	Claassen, Koot	Mpumalanga Agricultural Union	DELMAS
16	Clark, Sharon	BHP Billiton Energy Coal South Africa Limited	MARSHALLTOWN
17	Cogho, Vik	Optimum Coal Holdings	PULLENS HOPE
18	Cuyler, Lierieka	Synergistics Environmental Services	RIVONIA

	NAME	DESIGNATION	ADDRESS
19	de Beer, Willie	Transnet	JOHANNESBURG
20	de Klerk, Jan	Eskom: Transmission Lands & Rights	JOHANNESBURG
21	de Lange, S.	Metsweding District Municipality	BRONKHORSTSPRUIT
22	Deysel, Rouxdene	Department of Agriculture, Conservation, Environment and Land Affairs	JOHANNESBURG
23	Dhlamini, Eddie	Anglo American Inyosi Coal	LERAATSFONTEIN
24	Dlamini, Mbali	Department of Water Affairs	NELSPRUIT
25	Doman, Barry	Klipfontein Ptn 568 & 34	VOLTAGO
26	Donaldson, Kevin	Anglo Coal	LERAATSFONTEIN
27	Dongwana, S X A	Department of Public Works	PRETORIA
28	du Plessis, Deon	Department of Mineral Resource	WITBANK
29	du Plessis, Jacob	Anglo American Thermal Coal	LERAATSFONTEIN
30	Du Toit, Burger	Shanduka Coal (Pty) Ltd	SANDTON
31	du Toit, Steve	Anglo Coal ACGS	LERAATSFONTEIN
32	Duvenage, Annamie	Bronkhorstspruit and Wilge River Conservancy	BRONKHORSTSPRUIT
33	Duvenage, Daan	Hoewe 32	KENDAL
34	Duvenage, Simon	Plot 13	KENDAL
35	Elliott, Michael	Kusile Mining	WITBANK
36	Engelbrecht, Adam	Emalahleni Local Municipality	WITBANK
37	Euripidou, Rico	GroundWork - Friends of the Earth South Africa	PIETERMARITZBURG
38	Fenyane, Priscilla	Emalahleni Local Municipality	WITBANK
39	Finger, G.	Tswelopele Womens Project	BRONKHORSTSPRUIT
40	Floyd, Brian	Witbank Chamber of Commerce	WITBANK
41	Frazer, Joe	Manco Aurecon JV (For SANRAL Properties)	CENTURION
42	Friedman, Yolanda	Endangered Wildlife Trust	PARKVIEW
43	Gobodo, Nomfundo	Legal Resources Centre	JOHANNESBURG
44	Gondo, Joe	National African Farmers Union (NAFU)	KORINGPUNT
45	Govender, Jayshree	South African National Roads Agency Limited (SANRAL)	LYNNWOOD RIDGE
46	Govender, Len	Petronet - Witbank and Kendal	WITBANK
47	Grobler, Japie	Agri SA	CENTURION
48	Groenewald, Mariet		KENDAL
49	Groenewold, Reinder	Topigs SA (Pty) Ltd	MENLO PARK
50	Grosvenor, Cathy	Springs Advertiser (Springs Chamber of Commer)	SPRINGS
51	Gwambe, Thabiso	Emalahleni Local Municipality	OGIES
52	Hanly, David		RIVONIA
53	Haven, Claude	Kusile Mining (PTY) LTD	
54	Herbst, Deidre	Eskom	JOHANNESBURG
55	Hertzog, Barry & Heleen	Witbank District Agricultural Union	BRONKHORSTSPRUIT
56	Hlahla	Mpumalanga Economic Empowerment Corporation	NELSPRUIT
57	Hlatshwayo, Bongani	Mpumalanga News	NELSPRUIT
58	Hlatshwayo, Petrus		KENDAL
59	Hlatswayo, John		KENDAL
60	Hoffman, Andre	Mpumalanga Tourism and Parks Agency	GROBLERSDAL
61	Höll, Tinkie	Eskom	JOHANNESBURG
62	Hudson, Carla	Wildlife and Environment Society of South Africa (WESSA)	FERNDALE
63	Jacobs, Johan	Ferret Coal	WITBANK
64	Jansen van Vuuren, Stefan	Anglo American Thermal Coal - Project Services	LERAATSFONTEIN
65	Jansen van Vuuren, Vere	Telkom South Africa	MIDDELBURG
66	Jela, Ntombi	Ogies Public Library	OGIES
67	Joubert, Arthur	Plot 52	KENDAL
68	Kabini, Robert	Kusile mining	LERAATSFONTEIN
69	Kadiaka, Mamogala	Department of Water Affairs (DWA)	NELSPRUIT
70	Keet, Marius	Department of Water Affairs (DWA)	PRETORIA
71	Kekana, Mpho	Kungwini Local Municipality	BRONKHORSTSPRUIT
72	Kekana, Seoketsa	Kungwini Local Municipality	BRONKHORSTSPRUIT
73	Kemp, Piet	Transvaal Agricultural Union of SA	ERMELO
74	Kgobe, Lesiba	Department of Water Affairs and Forestry	BRONKHORSTSPRUIT
75	Khan, Zaheeb	Middelburg Herald	MIDDELBURG
76	Khanyile, Siziwe	GroundWork	PIETERMARITZBURG
77	Khomo, Sello	National African Federated Chamber of Commerce and Industry (NAFCOC)	SCHOONGEZICHT
78	Khoza, Alfred	Metsweding District Municipality	BRONKHORSTSPRUIT
79	Kisten, Kuben	Ziwakuphi Trading t/a ZKT	BETHAL
80	Kleyn, David	Department of Agriculture, Forestry and Fisheries (DAFF)	PRETORIA
81	Koen, Marinus	Ruukki South Africa	CENTURION
82	Krüger, Henro	Witbank Chamber of Commerce and Industry	WITBANK
83	Labuschagne, LeBeau	Department of Mineral Resources	PRETORIA

	NAME	DESIGNATION	ADDRESS
84	Lamprecht, Lampies	Anglo American Thermal Coal	LERAATSFONTEIN
85	Lebelo, Shirley	Metsweding District Municipality	BRONKHORSTSPRUIT
86	Leegemaad, C.	Bronkhorstspruit District Agricultural Union	RAYTON
87	Lewis, Mary	Klipkop Land Owners Association	WELBEKEND
88	Liefferink, Mariette	Federation for a Sustainable Environment (FSE)	RIVONIA
89	Love, Janet	Legal Resources Centre	JOHANNESBURG
90	Mabuza, David	Mpumalanga Province Office of the Premier	NELSPRUIT
91	Macevele, Stanford	Department of Water Affairs (DWA)	NELSPRUIT
92	Makgalemele, Mokhine	Anglo American	MARSHALLTOWN
93	Makola, TC	Nkangala District Municipality	MIDDELBURG
94	Makula, Richard	Kungwini Local Municipality	BRONKHORSTSPRUIT
95	Malatjie, L M	Emakhazeni Local Municipality	WITBANK
96	Malesa, Jacob	Department of Water Affairs (DWA)	BRONKHORSTSPRUIT
97	Malinga, Meshack	Department of Agriculture, Rural Development and Land Administration	NELSPRUIT
98	Mans, Louis	Fraser Alexander Coal	WITBANK
99	Marothi, Simon	Waterfontein Boerdery	ROSSLYN
100	Martin, Leslie	Anglo American Thermal Coal	LERAATSFONTEIN
101	Marx, Karin	Wildlife and Environment Society of South Africa (WESSA)	FERNDALE
102	Maseko, Lorraine	Emalahleni Local Municipality	WITBANK
103	Maselela, Elias	Victor Khanye Local Municipality	DELMAS
104	Mashilo, Speedy	Nkangala District Municipality	MIDDELBURG
105	Matabane, Vincent	Spoornet	BRAAMFONTEIN
106	Mautjana, Lerato	Department of Water Affairs (DWA)	BRONKHORSTSPRUIT
107	Mavimbela, Mbali	Emalahleni Local Municipality	eMALAHLENI
108	Mazibuko, Mandla	Department of Economic Development, Environment and Tourism	NELSPRUIT
109	Mazibuko, Nomsa	Nonotsi-Vakasha JV Projects	eMALAHLENI
110	Medallie, Marline	Synergistics Environmental Services	RIVONIA
111	Meulenbeld, Paul	Department of Water Affairs	PRETORIA
112	Meyer, Bok	Plot 59	KENDAL
113	Meyer, Hendrik	Plot 59 Kendal	KENDAL
114	Mkhabela, Freddy Chris	Emalahleni Local Municipality	OGIES
115	Mkhwanazi, A D	Emalahleni Local Municipal Council	eMALAHLENI
116	Mlambo, Busisiwe	South African National Roads Agency Limited (SANRAL)	SCOTTSVILLE
117	Mlondobodzi, Agnes	Metsweding District Municipality	BRONKHORSTSPRUIT
118	Mnguni, TRC	Department of Water Affairs (DWA)	PRETORIA
119	Mntambo, Fanyana	Department of Water Affairs (DWA)	NELSPRUIT
120	Mochalibane, Lucky	Department of Public Works	PRETORIA
121	Mohlasedi, Kgopana	Department Public Works, Roads and Transport: Mpumalanga	NELSPRUIT
122	Moila, Agnes	Department of Labour	WITBANK
123	Mokoena, Norman	Economic Development, Environment and Tourism (Mpumalanga)	NELSPRUIT
124	Mokonyane, Nomvula	Gauteng Provincial Government	MARSHALLTOWN
125	Mondlane, Musa	Mpumalanga Department of Agriculture and Land Administration (MDALA)	WITBANK
126	Monyeke, George	Environmental Justice Networking Forum (EJNF)	BRAAMFONTEIN
127	Mthembu, Dumisani	Department of Environmental Affairs (DEA)	PRETORIA
128	Ndlovu, Mqondisi Sonnyboy	Victor Khanye Local Municipality	DELMAS
129	Ndobochani, Nonofho	South African Heritage Resources Agency (SAHRA)	CAPE TOWN
130	Nel, Yolandi	Streeknuus	SUNWARD PARK
131	Nesidoni, John	Department of Agriculture and Rural Development (GDARD)	JOHANNESBURG
132	Neveling, Lareze	Streeknuus	BRONKHORSTSPRUIT
133	Nieuwoudt, Henri	Anglo American	MARSHALLTOWN
134	Nkabinde, Erald	Emalahleni Local Municipality	WITBANK
135	Nkoana, Tom	Ikangala Water Board	BRONKHORSTSPRUIT
136	Nkonyana, Thuli	Department of Economic development, Environment and Tourism	WITBANK
137	Nkosi, Oscar	Emakhazeni Local Municipality	BELFAST
138	Nkosi, Vusi	Ekasi News Reporter	SECUNDA
139	Nkwane, Oupa	City of Tshwane Metropolitan Municipality	PRETORIA
140	Noormohamed, Nazeer	Laudium Sun	PRETORIA
141	Nthangeni, Thanyani	Anglo American Thermal Coal	
142	Ntuli, Goody	Eskom	JOHANNESBURG
143	Oliver, Jan	National Roads Agency Northern Section	LYNNWOOD RIDGE
144	Olivier, Jan	JJRC Famillie Trust	SASOLBURG
145	Owen, Philip	Gearsphere NGO (S A Water Caucus)	NELSPRUIT
146	Penyane, Priscilla	Emalahleni Loacal Municipality	WITBANK
147	Perreira, Michael	Nunos Agostinhos Ferreira	KENDAL
148	Peverelle, Sylvester	Authorised representative of INGWE Surface Holdings Ltd	MARSHALLTOWN

	NAME	DESIGNATION	ADDRESS
149	Phakathi, Kate		VOLTARGO
150	Phakathi, Lindiwe	Anglo American Thermal Coal	ACKERVILLE
151	Pieterse, Eben	Fraser Alexander Coal	WITBANK
152	Pillay, Nava	Metsweding District Municipality	BRONKHORSTSPRUIT
153	Pohl, Rita	Bullseye Magazine	BRONKHORSTSPRUIT
154	Potgieter, J L	Ogies Business Forum	OGIES
155	Pretorius, Annelien	Eskom	MENLO PARK
156	Pretorius, Koos	Federation for a Sustainable Environment (FSE)	BELFAST
157	Prinsloo, N P	Klipfontein 658 Ptn 36	LERAATSFONTEIN
158	Prinsloo, R A	Klipfontein 36	
159	Rajlal, Pavan	Anglo American Thermal Coal	LERAATSFONTEIN
160	Ramokgopa, Kgosientsho	City of Tshwane Metropolitan Municipality	PRETORIA
161	Rapatsa, Jack	Victor Khanye Local Municipality	DELMAS
162	Ratema, Magadi	Telkom Head Office	PRETORIA
163	Riba, Sonnyboy	Victor Khanye Local Municipality	DELMAS
164	Rossouw, Pierre	Nkangala District Municipality	MIDDELBURG
165	Rudd, Kevin	Manco-Aurecon JV for SANRAL	
166	Scheepers, Anton	Mpumalanga Economic Empowerment MEGA Growth Agency	NELSPRUIT
167	Scrooby, Jeff	Transnet Pipelines	DURBAN
168	Segami, Yolanda	Victor Khanye Local Municipality	DELMAS
169	Sekhukhune, Sidney	Anglo American	LERAATSFONTEIN
170	Shabane, Love	Department of Agriculture Forestry & Fisheries	NELSPRUIT
171	Sibanyoni, Agriba	South African National Roads Agency Limited	LYNNWOOD RIDGE
172	Sibayi, Dumisani	South African Heritage Resource Agency (SAHRA)	CAPE TOWN
173	Silver, Gavin	Homeland Mining & Energy SA	WITBANK
174	Sithole, Mabutho	Mpumalanga Province Office of the Premier	NELSPRUIT
175	Sithole, Nelisiwe	Department of Agriculture, Rural Development and Land Administration	NELSPRUIT
176	Sitole, Busi	Shanduka Coal (Pty) Ltd	SANDTON
177	Smit, Gert	Agri Mpumalanga	WITBANK
178	Smit, Hennie	Department of Water Affairs (DWA)	PRETORIA
179	Solomon, Jethro	Homeland Mining & Energy SA	EL JUDOR EXT 4
180	Stander, Jan	Telkom South Africa	MIDDELBURG
181	Stapelberg, Leon	Eskom	MIDDELBURG
182	Steele, Teresa	Anglo American Thermal Coal	MARSHALLTOWN
183	Steenkamp, Jan	Victor Khanye Local Municipality	DELMAS
184	Steyn, Andries	Transvaal Agricultural Union of SA	BRONKHORSTSPRUIT
185	Stoop, Janine	Telkom SA	MIDDELBURG
186	Struwig, Monty	Eskom	
187	Swart, Dan	Kendal Plot 37	KENDAL
188	Thabethe, Peter	Department of Agriculture, Forestry and Fisheries (DAFF)	NELSPRUIT
189	Thugwana, Master	O.P.TA	TASBET PARK
190	Tjaart, V N	Klipfontein 56 Ptn 33	BRAKPAN NOORD
191	Troskie, Ian	Cabanga Concepts	NORTH RIDING
192	Truter, Christie	Truter Boerdery Trust	OGIES
193	Tshabalala, E K	Nkangala District Municipality	MIDDELBURG
194	Tshabidi, Tefo	Department of Water Affairs (DWA)	BRONKHORSTSPRUIT
195	van Aswegen, Johann	Department of Water Affairs (DWA)	BRONKHORSTSPRUIT
196	van Bulderen, Robert	Transnet Pipelines	STANDERTON
197	Van Dam, Jenny & Anton	JJRC Famillie Trust	SASOLBURG
198	van den Berg, Tobie	Middelburg Observer/Daller	MIDDELBURG
199	Van Der Merwe, Eric	Transnet	NORKEM PARK
200	van Rooyen, A M	Balmoral Boerevereniging	BRONKHORSTSPRUIT
201	van Rooyen, Ken	Highveld Techno Park	RANDBURG
202	van Vuuren, Wilma	Ridge Times/The Echo	SECUNDA
203	Venter, Pieter	Bronlaw Properties/ Vlakfontein Plot 20	KENDAL
204	Vermaak, Stefan	Topigs SA (Pty) Ltd	MENLO PARK
205	Vertue, Mike	Anglo American Thermal Coal	LERAATSFONTEIN
206	Wentzel, Carol	Bronkhorstspruit and Wilge River Conservancy	ASTON MANOR
207	Wolmarans, Mari	Synergistics Environmental Services	HUMEWOOD
208	Wolvaardt, Suzie	El Toro Restaurant on the R545	
209	Worthington, Richard	WWF South Africa	BENMORE
210	Xaba, Sibusiso	Economic Development and Planning	MARSHALLTOWN
211	Yorke-Hart, Michael	South African National Roads Agency Limited (SANRAL)	LYNNWOOD RIDGE
212	Zitha, Langa	Department of Agriculture, Forestry and Fisheries (DAFF)	NELSPRUIT
213	Zulu, Zonke	Victor Khanye Local Municipality	DELMAS

	NAME	DESIGNATION	ADDRESS
214	Zwane, Ben	ANCYL	PHOLA LOCATION

1. Introduction to the Project

1.1 Project Motivation and Location

Anglo American Inyosi Coal (Pty) Ltd (AAIC) is proposing to construct an overland conveyor system, the Phola-Kusile Overland Coal Conveyor, to transport coal from the Phola Coal Processing Plant (Phola CPP) to Eskom's Kusile Power Station (Kusile) in the Mpumalanga Province, to meet the demand for coal at the Kusile Power Station that is under construction.

The Kusile Power Station is a coal-fired power station currently under construction just south of the N4 highway between Bronkhorstspruit and Witbank (Emalahleni). It will consist of six units of 800 megawatts (MW) capacity each and a total capacity of 4800 MW. Kusile will require approximately 17 million tons of coal a year, depending on the quality of the coal.

The proposed Phola-Kusile Overland Coal Conveyor will fall within the Nkangala District Municipality, and the Victor Khanye (Delmas) and Emalahleni (Witbank) Local Municipalities. The towns in close proximity to the proposed conveyor are Wilge (~4 km east), Phola (~3 km southeast), Ogies (~5 km south-southeast) and Emalahleni (~25 km east).

The Phola Coal Processing Plant is an existing operation located approximately 20 kilometres south-east of Kusile, between the Kendal Power Station, Ogies and Phola. The plant is a 50/50 joint venture between BHP Billiton (BECSA) and AAIC and has been in operation since 2009. It has capacity to beneficiate (wash and sort) 16 million tonnes per annum and receives coal from Klipspruit (BECSA), and Zibulo (AAIC) mines. The primary coal products from the Phola Coal Processing Plant are exported and the secondary products (or middlings coal) are dispatched to various Eskom power stations.

1.2 Project Need and Desirability

The majority of South Africa's electricity is generated from coal. The Kusile Power Station forms part of the **South African National Government strategy** to supply much needed electricity to the South African national electricity grid. Eskom has made a multi-billion rand investment to construct the new Kusile Power Station.

The Ministry of Energy and Eskom maintain that:

> *"In the absence of Kusile there will not be enough power into the South African electricity grid"* (Ministry of the Energy spokesperson Bheki Khumalo[1]).
>
> *"Without the additional power from Kusile from 2014, there could be constraints on South Africa's economic growth"* (Eskom's Finance Director, Paul O'Flaherty[3]).

Eskom has identified the **middlings coal from the Phola Coal Processing Plant** to be an **important future source of coal to be fed to the Kusile Power Station**.

3 Media release compiled by the Government Communication and Information System, 26 Aug 2010. http://www.buanews.gov.za/rss/10/10082611151001

Alternative transportation options were considered (road, rail and overland conveyor) and **the conveyor was found to be the proposed transportation option**.

The purpose of the proposed overland conveyor is therefore to **ensure a timeous and secure supply of coal to Kusile** and therefore ultimately, electricity to the national electricity transmission grid. In order to prepare the Kusile Power Station for commercial operations, delivery of the first coal via the Phola-Kusile Coal Conveyor is planned for October 2013 (subject to all relevant approvals being obtained).

Should the Phola-Kusile Coal Conveyor not be approved, **coal will have to be supplied to the power station** via other means, such as road transport, which was found to have far more significant environmental and economic impacts as indicated in the discussion regarding project alternatives. There will also be a significant loss to Eskom, and the country, as the construction of Kusile was a strategic development to assist with the electricity shortages of South Africa and if coal cannot be supplied consistently, the power station will not be able to operate effectively.

Three alternative conveyor corridors were assessed during the scoping phase (Figure 1-3), of which two were eliminated at the end of scoping. Various route options along the preferred corridor were investigated during the EIA phase (Figure 1-2). **The alternative routes were evaluated and a proposed route was identified and optimised, based on an integrated assessment of all environmental components**. The location of the proposed route for the Phola-Kusile Coal Conveyor is presented in Figure 1-1.

A project of this nature and scale will obviously impact on the environment. The EIA process as described in this report found that, with appropriate mitigation measures in place, all significant impacts can be mitigated to within acceptable levels (refer to Conclusions, Key Findings and Recommendation in Section 8.7 at the back of the report).

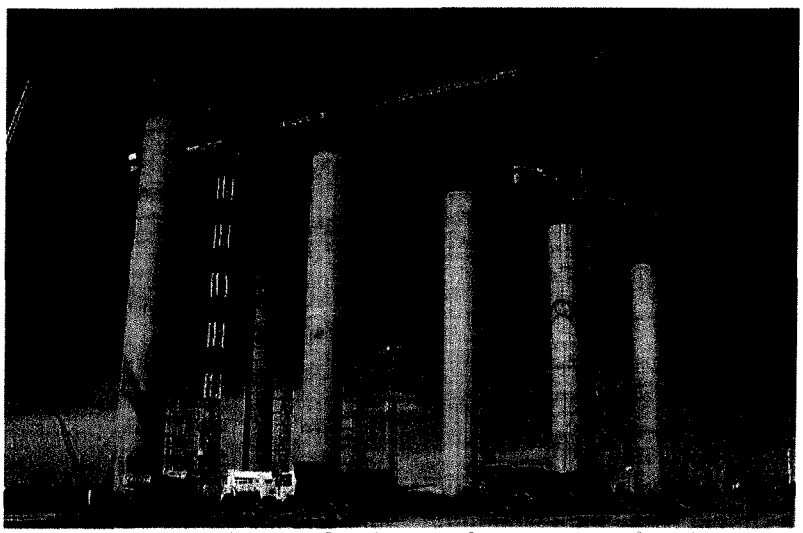


Plate 1-1: Kusile Power Station under construction (January 2010) (CONVEYOR DESTINATION)

Plate 1-2: Phola Coal Processing Plant (CONVEYOR START POINT)

1.3 Environmental Legal Requirements

1.3.1 Environmental Impact Assessment and Environmental Management Programme in terms of the National Environmental Management Act (No 107 of 1998)

The proposed Phola-Kusile Coal Conveyor requires an environmental impact assessment (EIA), environmental management programme (EMP) and environmental authorisation in terms of the National Environmental Management Act (No 107 of 1998) (NEMA) before construction of the conveyor may commence. Activities listed in terms of the NEMA and which are triggered by the proposed Phola-Kusile Coal Conveyor are described in Table 1-1 below.

Table 1-1: GNR 544, 545 and 546 Listed Activities Applicable to the Phola-Kusile Coal Conveyor

Listed Activity		Applicability to the Project
Activities requiring a Basic Assessment in terms of GNR 544 (Listing 1)		
544-11	**The construction of:** (i) canals; (ii) channels; **(iii) bridges;** (iv) dams; (v) weirs; (vi) bulk storm water outlet structures; (vii) marinas; (viii) jetties exceeding 50 square meters in size; (ix) slipways exceeding 50 square meters in size; (x) buildings exceeding 50 square meters in size; or **(xi) infrastructure or structures covering 50 square meters or more** **where such construction occurs within a watercourse or within 32 meters of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.**	The conveyor structure, service road and water supply pipeline will cross streams associated with wide valley bottoms, thus requiring bridges (culverts for the service road and bridges to carry the conveyor) to span the valleys. Structures at stream crossings would exceed 50 square metres.
544-13	**The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic meters [80000 to 500000 litres];**	A typical diesel bowser / construction site diesel installation is 30 cubic metres [30000 litres]. If three bowsers are used during construction, this activity would be triggered. Should construction take place concurrently at different places along the length of the conveyor, it is likely that three or more bowsers would be used. Site construction vehicles will have to be refuelled close to the construction area (i.e. water bowser, graders, dozers, etc.).

	Listed Activity	Applicability to the Project
544-18	**The infilling or depositing of any material of more than 5 cubic meters into, or the dredging, excavation, or removal or moving of soil, sand, shells, shell grit, pebbles or rock from** **(i) a watercourse;** (ii) the sea; (iii) the seashore; (iv) the littoral active zone, an estuary or a distance of 100 meters inland of the high-water mark of the sea or an estuary, whichever distance is the greater-but excluding where such infilling, depositing, dredging, excavation, removal or moving (i) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or occurs behind the development setback line.	The conveyor structure, service road and water supply pipeline will cross streams associated with wide valley bottoms, thus requiring bridges (culverts for the service road, and bridges to carry the conveyor) to span the valleys. Stream crossings would require earthworks (excavation / fill) of more than 5 cubic metres.
544-22	**The construction of a road, outside urban areas,** **(i) with a reserve wider than 13,5 meters or,** **(ii) where no reserve exists where the road is wider than 8 meters,** or for which an environmental authorization was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	The servitude for the conveyor, including the service road is 25 m wide. Service road could disturb an area wider than 8 m during construction.
544-26	**Any process or activity identified in terms of section 53(2) of the National Environmental Management: Biodiversity at, 2004 (Act No. 10 of 2004) (NEMBA).**	There are currently no legally binding ecological / biodiversity sensitivity classification systems in Mpumalanga Province. The following are used as general guidelines: Mpumalanga Biodiversity Management Plan (MBCP): In terms of the MBCP, all the conveyor route alternatives will traverse habitats listed as IMPORTANT & NECESSARY. Vegetation Type Sensitivity: All three routes traverses the following THREATENED ECOSYSTEMS, based on information obtained from SANBI: • Eastern Highveld Grassland • Rand Highveld Grassland
Activities requiring a full Environmental Impact Assessment in terms of GNR 545 (Listing 2)		
545-5	**The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent** and which is not identified in Notice No: 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 *Act No: 59 of 2008) in which case that Act will apply:	Various water uses require licensing (listed in Table 1-4) and this activity is therefore triggered.

1.3.2 Waste Management License for the Development of a Mobile Waste Water Treatment Plant on Portion 1 of the Farm Klipfontein 566 JR, Nkangala District, Mpumalanga, to treat water from old underground mine workings

Various alternative options to supply water to the Phola-Kusile Coal Conveyor during the operational phase of the conveyor were investigated in the EIA process for the Phola-Kusile Coal Conveyor (Section 4.4). The proposed option, which is also the environmentally preferred option, is to abstract and treat excess water from flooded old underground mine workings found in the area. This excess mine water currently decants to the surface and/or is pumped into the nearby pan.

Based on groundwater monitoring conducted between 2006 and 2011, it is estimated that ~1.5 Mℓ/day of water is generated in the old underground workings (pers. Comm. Jaco van den Berg, JMA groundwater specialist responsible for the ground water monitoring programme for AAIC). Limiting the abstraction and treatment to 1.5 Mℓ/day will avoid aggravating the risk of spontaneous combustion in the mine workings due to the lowering of the water table.

The water treatment plant triggers the need for a waste management license in terms of the National Environmental Management: Waste Act (No. 59 of 2008) (NEMWA). Although this proposed option to supply water to the Phola-Kusile Coal Conveyor was only identified subsequent to the submission of the final scoping report for review by I&APs and authorities, it should be noted that:

- The impacts of the mobile plant and associated wastes were assessed in this EIA for the Phola-Kusile Coal Conveyor and discussed in the scoping assessment for the New Largo Colliery. It was found that the mobile water treatment plant will have positive impacts on the quality of the excess water from the old underground mine workings that currently decants or is pumped to a nearby pan, and that it would have minimal impact on other environmental components due to its small footprint and strict engineering design controls for management of wastes associated with the treatment plant.
- I&APs, MDEDET, DWA and organs of state were consulted about the installation of a mobile water treatment plant as part of the scoping process for New Largo Colliery EIA process.
- At the water focus meeting and the authorities meeting that were held as part of the New Largo Colliery EIA process, there was general support for the installation of a mobile water treatment plant to treat water from the old underground mine workings.
- Registered I&APs for the Phola-Kusile Coal Conveyor EIA were notified about the proposed development of the mobile water treatment plant in letter sent to them in October 2011 as part of the review of this draft EIA report.
- The public participation that will be conducted around this draft EIA process (outlined in Section 2.4) will include matters related to the mobile water treatment plant.
- All the impacts of the mobile water treatment plant are assessed in this EIA report and management measures are documented in the EMP attached to this report.
- The designs and management measures for the package sewerage plant and mobile water treatment plant will, by default, be reviewed by the DWA as part of the water use license application process.

The National Department of Environmental Affairs (NDEA) is the competent authority to administrate and review the application for a waste management license in terms of the NEMWA. Waste management licenses revert to the national department if it involves waste regarded as hazardous, i.e. the brine which may be produced at the proposed mobile water treatment plant.

Based on discussions[4] with the NDEA (Appendix C), the waste management license process under the NEMWA will be a completely separate process. The waste management license will only be for the proposed mobile water treatment plant on Portion 1 of the Farm Klipfontein 566 JR, Nkangala District, Mpumalanga, to treat water from old underground mine workings, and not for the Phola-Kusile Coal Conveyor itself.

Should this mobile water treatment plant not be developed, or if there are delays with the approval of the waste management license, one of the alternative water supply options as discussed in Section 4.4 will have to used to supply water to the Phola-Kusile Coal Conveyor.

To avoid compromising the start-up of Kusile Power Station and the planned supply of power to the national electricity grid, construction of the conveyor is planned to start as soon as the MDEDET environmental authorisation and DWA approval of construction-related water uses are in place, and the installation of the mobile water treatment plant is planned to start as soon as the NDEA approval of the waste management license is in place.

The NEMWA waste activities associated with the operation of the proposed mobile water treatment plant are listed in below.

Table 1-2: List of NEMWA listed waste activities associated with the Development of a Mobile Waste Water Treatment Plant on Portion 1 of the Farm Klipfontein 566 JR, to treat water from old underground mine workings

Activity Number	Activity description	Applicability to the Project	Timing of Waste Activity and explanation of when Waste Management License is Required
Category A: Activities requiring a Basic Assessment as per the National Environmental Management Act (No 107 of 1998) process and Approval in terms of NEMWA (GNR 718)			
A3	A person who wishes to **commence, undertake or conduct an activity** listed under this Category, must conduct a basic assessment process, as stipulated in the environmental impact assessment regulations made under section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as part of a waste management license application.		
Storage of Waste			
A3(2)	The storage including the temporary storage of hazardous waste at a facility that has the capacity to store in excess of 35 cubic metres (m^3) (35 000 litres) of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons.	Storage of 1.5 mega litres (Mℓ) (1 500 cubic metres) mine water prior to treatment. Temporary storage of gypsum waste prior to off-site disposal/storage at a licensed facility (characteristics of the gypsum is dependent on classification of the gypsum waste)	Installation of mobile water treatment plant.
Reuse, recycling and recovery			
	None		

[4] Meeting with NDEA on 30 September 2011 (in Appendix C).

Activity Number	Activity description	Applicability to the Project	Timing of Waste Activity and explanation of when Waste Management License is Required
Treatment of Waste			
A3(11)	The treatment of effluent, wastewater or sewage with an annual throughput capacity of more than 2 000 cubic metres but less than 15 000 cubic metres.	Maximum treatment of 4 Mℓ/day of mine water at the proposed water treatment plant (Activity B4(7) triggered)	Installation of mobile water treatment plant.
Disposal of Waste			
	None		
Storage, treatment and processing of animal waste			
	None		
Construction, expansion or decommissioning of facilities and associated structures and infrastructure			
A3(18)	The construction of facilities for activities listed in Category A of this Schedule (not in isolation to associated activity).	Basic Assessment triggered for the operation of the mobile water treatment plant	
Category B: Activities requiring Scoping and Full Environmental Impact Assessment as per the National Environmental Management Act (No 107 of 1998) process and Approval in terms of NEMWA			
B4	A person who wishes to commence, undertake or conduct an activity listed under this Category, must conduct an environmental impact assessment process, as stipulated in the environmental impact assessment regulations made under section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as part of a waste management licence application.		
Storage of hazardous waste			
B4(1)	The storage including the temporary storage of hazardous waste in lagoons.	The disposal of brine in an engineered brine disposal facility, suitable for storage of hazardous waste in a lagoon. The production of brine is dependent on the water treatment technology.	Operation of mobile water treatment plant.
Reuse, recycling and recovery of waste			
B4(2)	None triggered		
Treatment of Waste			
B4(7)	The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic metres or more *[15 Mℓ/annum]*.	The maximum treatment of 4 Mℓ/day of impacted mine water and average throughout of 1.5 Mℓ/day (average = 525 Mℓ/annum or 525 000 cubic metres/annum) (more than the threshold of 15 *Mℓ/annum or 15000* cubic metres/annum).	Operation of mobile water treatment plant.
Disposal of waste on land			
B4(9)	The disposal of any quantity of hazardous waste to land.	The disposal of brine in an engineered brine disposal facility, suitable for storage of hazardous waste in a lagoon (thus not to land). The production of brine is dependent on the water treatment technology.	Operation of mobile water treatment plant.
Construction of facilities and associated structures and infrastructure			
B4(11)	The construction of facilities for activities listed in Category B of this Schedule (not in isolation to associated activity).	Installation of mobile water treatment plant.	

1.3.3 General Authorisation and Water Use License in terms of the National Water Act

An application for a general authorisation for certain water uses during construction, and a water use license application for additional construction water uses and operational water uses will be submitted to the Department of Water Affairs (DWA) for the anticipated water uses tabled below. A number of these water uses are solely associated with the recently introduced option to abstract and treat excess water from flooded old underground mine workings for supplying water to the conveyor's fire protection and dust suppression systems.

Table 1-3: List of water uses requiring General Authorisations or a Water Use License

Activity Number and Description	Applicability to the Phola-Kusile Coal Conveyor	Timing of Water Use and explanation of Water Use License is Required
General Authorisation		
Section 21(a): Taking water from a water resource:	- Approximately 160 m³/day ground water will be abstracted from three boreholes for construction purposes.	Construction: - for general construction water supply.
	- During the initial construction phase, water for potable use during construction will be abstracted boreholes at maximum of 60 m³/day. This water use will be replaced by the use of the spring once the water use license for that use is in place (see below).	Construction: - for potable water supply.
Water Use License		
Section 21(a): Taking water from a water resource:	- Water abstracted from three farm dams.	Construction: - for general construction water supply. Operation: - for water supply prior to installation of the mobile water treatment plant, or - for supply during operation if mobile water treatment plant is not developed.
	- Potable water during construction will be abstracted from a spring at maximum of 60 m³/day. This water use will cease once the mobile water treatment plant is commissioned,	Construction: - for potable water supply. Operation: - for water supply prior to installation of the mobile water treatment plant, or for supply during operation if mobile water treatment plant is not developed.
	- Water will be abstracted from the old underground workings and treated to potable water standards. Abstraction will be via one of three boreholes.	Operation: - for water supply to fire protection and dust suppression systems.
Section 21(b): Storage of water:	- Each of the seven conveyor transfer stations will have 2 x 20 m³ (therefore 40 m³ total) JoJo tanks to store clean water for dust- and fire suppression	Operation: - Storage of water in JoJo water tanks.

Activity Number and Description	Applicability to the Phola-Kusile Coal Conveyor	Timing of Water Use and explanation of Water Use License is Required
	- The proposed mobile water treatment plant, located adjacent to the pan on property Klipfontein 566 JR, portion 1, will have a 1 Mℓ potable water reservoir. The potable water will then be pumped to a 250 m^3 elevated tank before it is distributed for end use at the transfer stations	Operation: - Storage of water in reservoir and tanks.
	- The operation will have two deluge fire suppression systems, one at the Phola Coal Processing Plant and one at Kusile Power Station. Each system will have 2 x 420 m^3 tanks to store water of potable quality for fire suppression during an emergency	Operation: - Use of storage tanks for fire protection system.
Section 21(c): Impeding or diverting the flow of water in a watercourse:	- The conveyor system and its associated service road, will cross three streams, as well as passing through, or close to, several wetlands	Construction and operation: - Construction and operation of conveyor sections crossings streams and wetlands.
Section 21(f): Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit:	- Discharging the excess treated water from the mobile water treatment plant into the Klipfonteinspruit, a tributary of the Wilge River	Operation: - Operation of mobile water treatment plant.
Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource:	- Each transfer stations will have a lined evaporation dam to collect dirty water runoff and silt (coal fines)	Operation: - Collection of coal spillages (dirty runoff) in evaporation dams at transfer stations.
	- The proposed mobile water treatment plant may have a brine disposal facility, if required (depending on the type of treatment plant used)	Operation: - Disposal of brine produced at mobile water treatment plant.
	- A gypsum collection pad will be used for the storage of gypsum prior to final, off-site disposal, at a licensed waste disposal/storage facility	Operation: - Storage of gypsum produced at mobile water treatment plant.
	- The mobile water treatment plant will have a total of 1.5 Mℓ pre-treatment water storage capacity, sufficient for one day storage to be treated for fire and potable water requirements	Operation: - Storage of pre-treated water at mobile water treatment plant.
Section 21(i): Altering the bed, banks, course or characteristics of a watercourse:	- The conveyor system and its associated service road, will cross three streams, as well as passing through, or close to, several wetlands	Construction and operation: - Construction and operation of conveyor sections crossings streams and wetlands.
	- Excess treated water from the mobile water treatment plant will be discharged into the Klipfonteinspruit, a tributary of the Wilge River	Operation: - Release of treated water during the operation of mobile water treatment plant.

1.3.4 Structure of the Environmental Impact Assessment Report, the Environmental Management Programme and Specialist Studies

The environmental impact assessment, the environmental management programme and specialist studies were structured in accordance with GNR 543 regulation 31, 33 and 32 respectively and includes the consolidated results of the public participation and authority consultation processes conducted to date. The three tables below provide a summary of the requirements of GNR 543, with cross references to the report's sections where these requirements have been addressed.

Table 1-4: Environmental Impact Assessment Report Structure in terms of GNR 543 Section 31

Legal and Regulatory Requirement	Cross Reference to Report Section
GNR 543 Section 31	
Environmental impact assessment reports	
1. If a competent authority accepts a scoping report and advises the EAP in terms of regulation 30 (1) (a) to proceed with the tasks contemplated in the plan of study for environmental impact assessment, the EAP must proceed with those tasks, including the public participation process for environmental impact assessment referred to in regulation 28 (1) (h) (i)-(iv) and prepare an environmental impact assessment report in respect of the proposed activity. [Subreg. (1) amended by GN R1159/201]	This report.
2. An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision contemplated in regulation 35, and must include-	All sections of this report and Section 8.
(a) Details of- (i) the EAP who compiled the report; and (ii) the expertise of the EAP to carry out an environmental impact assessment;	Section 2.5.
(b) A detailed description of the proposed activity;	Section 1 and Section 3
(c) A description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is- (i) a linear activity, a description of the route of the activity; or (ii) an ocean-based activity, the coordinates where the activity is to be undertaken;	Section 7.1
(d) A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity;	Section 5
(e) Details of the public participation process conducted in terms of sub-regulation (1), including- (i) steps undertaken in accordance with the plan of study;	Section 2.4
(ii) a list of persons, organisations and organs of state that were registered as interested and affected parties	Preliminaries (in front of report).
(iii) a summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; and	Section 6
(iv) copies of any representations and comments received from registered interested and affected parties;	Appendix C
(f) A description of the need and desirability of the proposed activity;	Section 1.1
(g) A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;	Section 4.

Legal and Regulatory Requirement	Cross Reference to Report Section
(h) An indication of the methodology used in determining the significance of potential environmental impacts;	Appendix A
(i) A description and comparative assessment of all alternatives identified during the environmental impact assessment process;	Section 4.
(j) A summary of the findings and recommendations of any specialist report or report on a specialized process;	Incorporated into Section 7 and Appendix B
(k) A description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;	Incorporated in Section 7 and Appendix A
(l) An assessment of each identified potentially significant impact, including- (i) cumulative impacts; (ii) the nature of the impact; (iii) the extent and duration of the impact; (iv) the probability of the impact occurring; (v) the degree to which the impact can be *reversed*; (vi) the degree to which the impact may cause irreplaceable loss of resources; and (vii) the degree to which the impact can be mitigated;	Incorporated into Section 7 and Appendix A (Detailed Impact Assessment of Proposed Development Option)
(m) A description of any assumptions, uncertainties and gaps in knowledge;	Section 2.8 and Section 2.9
(n) A reasoned opinion as to whether the activity should or should not be authorized, and if the opinion is that it should be authorized, any conditions that should be made in respect of that authorization;	Section 8.8
(o) An environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; and (ii) a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;	Section 8
(p) A draft environmental management programme containing the aspects contemplated in regulation 33;	Section 12
(q) Copies of any specialist reports and reports on specialized processes complying with regulation 32;	Appendices to this report
(r) Any specific information that may be required by the competent authority; and	None identified by authorities
(s) Any other matters required in terms of sections 24 (4) (a) and (b) of the Act.	Not applicable
3. The EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24 (4) (b) (i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 31 (2) (g), exist.	Not applicable. Alternatives discussed and assessed in Section 4.

Table 1-5: Environmental Management Programme Structure in terms of GNR 543 Section 33

Legal and Regulatory Requirement	Cross Reference to Report Section
GNR 543 Section 33	
Content of draft environmental management programme	
A draft environmental management programme must comply with section 24N of the Act and include-	Section 12

Legal and Regulatory Requirement	Cross Reference to Report Section
(a) Details of- (i) the person who prepared the environmental management programme, and (ii) the expertise of that person to prepare an environmental management programme;	Preliminaries and Section 2.5
(b) Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of-	EMP Table Column B.
(i) planning and design;	EMP Table Column Q (combined under "Pre-Construction")
(ii) pre-construction and construction activities;	EMP Column D
(iii) operation or undertaking of the activity;	Column E
(iv) rehabilitation of the environment; and	Combined under Column F and Column V
(v) closure, where relevant.	
(a) A detailed description of the aspects of the activity that are covered by the draft environmental management programme;	Provided under each main headings of the EMP table
(b) An identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b);	EMP Table Column G to K
(c) Proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon;	EMP Column O
(d) As far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development, including, where appropriate, concurrent or progressive rehabilitation measures;	EMP Column V
(e) A description of the manner in which it intends to	
(i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Various Sections of the EMP Table under Column B
(ii) remedy the cause of pollution or degradation and migration of pollutants;	Various Sections of the EMP Table under Column B
(iii) comply with any prescribed environmental management standards or practices;	Not applicable
(iv) comply with any applicable provisions of the Act regarding closure, where applicable;	Not applicable
(v) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Not applicable
(f) Time periods within which the measures contemplated in the environmental management programme must be implemented;	EMP Table Column C
(g) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity;	Various Sections of the EMP Table under Column B
(h) An environmental awareness plan describing the manner in which- (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment;	EMP Table Section 2 (TRAINING, AWARENESS AND COMPETENCE)
(i) Where appropriate, closure plans, including closure objectives.	EMP Table Column F and Column V

Table 1-6: Structuring of the Specialist Studies in terms of GNR 543 Section 32

Legal and Regulatory Requirement	Cross Reference to Report Section
GNR 543 Section 32	
Specialist reports and reports on specialized processes	
1. An applicant or the EAP managing an application may appoint a person to carry out a specialist study or specialized process.	Appendices to the EIA report
2. The person referred to in sub-regulation (1) must comply with the requirements of regulation 17 [declaration of independence]	Declaration of independence signed by specialists provided at back of each specialist report
3. A specialist report or a report on a specialized process prepared in terms of these Regulations must contain-	See copy of this table attached to the back of each specialist report (Appendix D to Appendix P).
(a) Details of- (i) the person who prepared the report; and (ii) the expertise of that person to carry out the specialist study or specialized process;	
(b) A declaration that the person is independent in a form as may be specified by the competent authority;	
(c) An indication of the scope of, and the purpose for which, the report was prepared;	
(d) A description of the methodology adopted in preparing the report or carrying out the specialized process;	
(e) A description of any assumptions made and any uncertainties or gaps in knowledge;	
(f) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment;	
(g) Recommendations in respect of any mitigation measures that should be considered by the applicant and the competent authority;	
(h) A description of any consultation process that was undertaken during the course of carrying out the study;	
(i) A summary and copies of any comments that were received during any consultation process; and	All issues received to date included in Section 6 of the EIA main report
(j) Any other information requested by the competent authority.	Not applicable

The environmental assessment process that was executed for this project to date is described in Section 2 (Study Approach and Methodology) of this report.

1.3.5 Responsible Authorities and Administration of the Approval Processes

1.3.5.1 Environmental Impact Assessment Process and Environmental Management Programme

MDEDET is the competent authority in terms of the NEMA and EIA Regulations. An application form for environmental authorisation was submitted to the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) on 2 November 2010 and accepted by MDEDET on 16 November 2010. The MDEDET accepted the application and issued a reference number for the project (17/2/3 N-13).

This environmental impact assessment report (EIA report) will be submitted to MDEDET in terms of the NEMA and EIA Regulations.

1.3.5.2 *Water Use License Application Process and Integrated Water and Waste Management Plan*

The Department of Water Affairs (DWA) will administrate and review the application for an integrated water use license. The scoping report was submitted to the DWA as the first phase in the water use license application process. This EIA report will also be submitted to the DWA for comment and for consideration in their review of water use license documentation. In addition the following documents will also be submitted:

- Phola-Kusile Overland Coal Conveyor: Integrated Water and Waste Management Plan
- Phola-Kusile Overland Coal Conveyor: Integrated Water Use Licence Application Report

Table 1-3 indicates the timing of when the general authorisation and various components of the water use license have to be in place. Due to the time differences in processing the various components of the water uses license, it has been proposed that the approval by DWA be done in a phased approach.

1.3.5.3 *Waste Management License for the Mobile Water Treatment Works on Portion 1 of the Farm Klipfontein 566 JR, Nkangala District, Mpumalanga*

The National Department of Environmental Affairs (NDEA) is the competent authority to administrate and review the application for a waste management license for the proposed mobile water treatment plant on Portion 1 of the Farm Klipfontein 566 JR, Nkangala District, Mpumalanga, to treat water from old underground mine workings, one of the water supply options for the Phola-Kusile Coal Conveyor.

The waste management license is only required for the mobile water treatment plant and is to be dealt with as a separate legal process.

1.4 Other Legal Requirements

In addition to the abovementioned key legal requirements, the project will also have to comply with other relevant legislation.

Should graves require relocation, there will be a consultation process and permits will have to be obtained from the police, Department of Health as well as SAHRA in terms of the National Heritage Resources Act (No. 25 of 1999).

AAIC is in the process of discussing details of servitudes with the relevant affected landowners and the necessary servitudes will be registered. Town planning considerations are being investigated by AAIC. Both these processes are separate to the EIA process.

2. Study Approach and Methodology

2.1 Study Area

The study area can be roughly defined as the area of land between the Phola Coal Processing Plant and the Kusile Power Station, the area over which a route for the conveyor has to be found, as illustrated in Figure 1-1.

2.2 Scoping Phase

2.2.1 Scoping Process and Study Outcomes

A scoping study was conducted as the first phase in the EIA process. During the scoping phase:

- Project and baseline environmental information were collated. Baseline information for this scoping report was gathered through visual inspections of the project area and surroundings, desktop studies and review of existing reports.
- Landowners, adjacent landowners, local authorities, environmental authorities, as well as other stakeholders which may be affected by the project, or that may have an interest in the environmental impacts of the project were identified.
- Interested and affected parties (I&APs) were informed about the proposed project.
- Public meetings were arranged and I&AP issues and concerns were identified.
- Environmental authorities were consulted to confirm legal and administrative requirements.
- Environmental issues and impacts were identified and described.
- Development alternatives were identified and evaluated, and non-feasible development alternatives were eliminated.
- The nature and extent for further investigations and specialist input required in the EIA phase was identified.
- The draft and final scoping reports were submitted for review by authorities, relevant organs of state and I&APs.
- Key I&AP issues and concerns were collated into a issues and response report for consideration in the EIA phase.

The draft scoping report was submitted in December 2010 and the final scoping report was submitted in June 2011. The final scoping was accepted by MDEDET.

2.2.2 Consideration of Alternatives

Development alternatives identified and evaluated during scoping are discussed in Section 4.1 (Alternative Developments) and Section 4.2 (Alternative Conveyor Corridors), with a motivation as to why some of these were eliminated and the proposed corridor was selected. At the end of scoping, the Blue Conveyor Corridor (Figure 1-1 and Figure 1-3) was the proposed development option.

2.3 EIA Phase

2.3.1 EIA Process

The EIA component of the study includes:

- Specialist investigations were undertaken in accordance with the terms of reference established in the scoping assessment (plan of study for EIA appended to the scoping report). It should be noted that due to the small scale of impacts for some specialists' fields, the specialist studies' scope was adapted and limited accordingly to the nature and scale of the project impacts.
- An evaluation of development alternatives and identification of a proposed option.
- An assessment of existing impacts (no-go development option), environmental impacts that may be associated with the proposed project option, and cumulative impacts using the impact assessment methodology as described in Section 2.3.6 and Appendix A.
- Identification of mitigation measures to address these environmental impacts and development of actions required to achieve the mitigation required.
- Consultation with I&APs.
- Incorporation of public comment received during scoping into the draft EIA report.
- Issuing of the draft EIA report for review.
- Once the draft EIA report has been reviewed, further comments received will be incorporated in the final EIA report and final EMP.

The EIA assessment process has been developed to ensure that it complies with GNR 543 Sections 26 to 33 and the associated guidelines (see Section 2) and appropriate review periods have been allowed for.

2.3.2 EIA Programme and Opportunities for I&AP and Authority Involvement

The EIA process and opportunities for I&AP and authority involvement are illustrated below, with specific reference to the opportunities for consultation and participation for I&APs, Competent Authorities, and relevant State Departments and Organs of State.

Completed activities are indicated in light yellow (□), current activities in bright yellow (□) and future activities in blue (■).

Table 2-1: Simplified EIA Process with Explanation of Opportunities for Involvement

EIA Phase			Opportunities for Consultation and Participation		Schedule	
			Competent Authorities (MDEDET and DWA and NDEA	I&APs, State Departments and Organs of State		
Completed	Project Announcement and Application Phase	Specialist Baseline Studies	Initial telecommunication.	Project notification to affected landowners.	Oct-10	2010
				Advertisements and project notifications to potential interested and affected parties.	Oct-10 to Nov-10	
			Submit NEMA application form to MDEDET. MDEDET acceptance of application.		Nov-10	
			Initial consultation with authorities.		Nov-10 to Dec-10	
	Scoping Phase		Focused consultation with MDEDET and DWA.	Initial public meetings. Focused consultation with SANBI.	Nov-10 to Dec-10	
			Draft scoping report to MDEDET and DWA. Meetings with MDEDET and DWA during scoping. Final scoping report to MDEDET and DWA. Review and acceptance of final scoping report (COMPLETED)	Review of draft scoping report (40 days, ±6 weeks). Public meeting and authority meeting during scoping (14 days notice). Review of final scoping report (21 days, ±3 weeks). (COMPLETED)	Feb-11 to May-11	2011
Current	EIA Phase EMP Development	Specialist Assessments	Meetings with MDEDET and DWA to discuss specialist studies. Consult with NDEA to confirm administrative process for the WML in terms of the NEMWA. Submit draft EIA report to MDEDET and DWA. Submit draft IWWMP to DWA. Meetings with MDEDET and DWA during EIA.	Results of specialist assessments and recommendations made available for review Review of draft EIA report (40 days, ±6 weeks) Review of draft IWWMP (40 days, ±6 weeks) Public and authority meeting during EIA phase(14 days notice)	Aug-11 to Feb-12	
Future	Authorisation and Authorisation Phase		Final EIA report to MDEDET and DWA. SUBMit IWWMP with IWULA to DWA. MDEDET Acceptance of EIA report (60 days). Environmental Authorisation Granted / Refused (45 days). IWULA approved / rejected by DWA.	Review of final EIA report (21 days, ±3 weeks). Review of Final IWWMP (21 days, ±3 weeks). Notifications to I&APs regarding environmental authorisation (granted or refused).	Feb-12 to May-12	2012
	Appeal Phase / Pre-Construction Period		Consultation during processing of appeal.	Consultants to provide guidance regarding the appeal process as and when required.	variable	

Table 2-2: Simplified Project Implementation Programme with Explanation of Opportunities Continued Consultation and Participation

Project Phase	Opportunities for Participation by Competent Authorities, I&APs, State Departments and Organs of State	Schedule	
Planning Phase	EIA and Water Use License Public Participation Process and Authority Consultation Process	Current to July-13	2010 2011 2012
Construction Phase	EMP Implementation Monitoring	Aug-12 to Sep-13	2013
First Coal Delivered to Kusile	EMP Implementation Monitoring	Oct 2013	
Operation of the Phola-Kusile Coal Conveyor	EMP Implementation Monitoring	For the Life of Kusile Power Station	beyond 2070

Table 2-2 lists the start of the construction phase as August 2012. However, should the necessary approvals be in place at an earlier date, AAIC would start with construction as soon as possible in order to avoid any potential delays to the delivery of coal to Kusile and to maximise construction during the drier months of the year (i.e. May to August), which would minimise the impacts on affected streams and wetlands. It goes without saying that construction would only commence in accordance with approval conditions relating to, amongst other things, notification of commencement.

2.3.3 EIA Phase Alternatives Investigated

Development alternatives identified and evaluated during the EIA phase are discussed in Section 4.3 to Section 4.5, with a motivation as to why some of these were eliminated and why the proposed development is regarded as the preferred development alternative.

2.3.4 Identification and Description of Impacts

The identification and assessment of environmental impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with the proposed project. The process involves consideration of, *inter alia*: the purpose and need for the project; views and concerns of interested and affected parties; social and political norms, and general public interest.

The methodology used for assessing impacts associated with the proposed project follows the philosophy of environmental impact assessments, as described in the booklet Impact Significance, Integrated Environmental Management Information Series 5 (DEAT, 2002b). The philosophy is summarised by the following extracts:

- "The impact magnitude [or intensity] and significance should as far as possible be determined by reference to legal requirements, accepted scientific standards or social acceptability. If no legislation or scientific standards are available, the EIA practitioner can evaluate impact magnitude based on clearly described criteria. Except for the exceeding of standards set by law or scientific knowledge, the description of significance is largely judgemental, subjective and variable. However, generic criteria can be used systematically to identify, predict, evaluate and determine the significance of impacts." (DEAT, 2002b).

- "Determining significance [of impacts] is ultimately a judgement call. Judgemental factors can be applied rigorously and consistently by displaying information related to an issue in a standard worksheet format." (Haug et al., 1984 taken from DEAT, 2002b).

For each environmental component (i.e. visual, air quality, health), impacts will be identified and described in terms of: detectability / visibility of the impact, exposure of receptors to the impact, compliance with legislation and standards, other applicable targets, limits or thresholds of concern, the level of change / intrusion imposed, and receptor sensitivity.

The perceived sensitivity of receptors (people and/or receiving environment) will be professionally judged based on available scientific data (fact) and feedback from public participation processes (views, opinions, attitudes, and concerns) as documented in the Public Consultation Documentation and the Impact Rating criteria described in Section 2.3.6. The following impacts will be described:

2.3.4.1 Existing Impacts (Impacts of Existing Developments within Project Impact Area)

The proposed coal conveyor is located in an area affected by various existing developments including mining, processing, agriculture, residential, major roads and highways and other linear infrastructure as well as the construction of the Kusile Power Station. The current level of environmental degradation (existing impacts) associated with existing developments, including those currently under construction, will be described in the environmental impact report. Defining the current level of degradation associated with existing developments is essential to understand and enable the assessment of cumulative impacts (see Section 2.3.4.4 below). The assessment of existing impacts is qualitative and limited to the area of impact for the individual environmental components.

2.3.4.2 Incremental Impacts (All Conveyor Route Alternatives)

Incremental impacts refers to the impacts of an activity looked at in isolation (impacts of an individual activity), thus not considering the combined, cumulative or synergistic impacts of the activity, or the cumulative impacts of the activity with other activities or the existing impacts. The environmental impact report will describe the incremental impacts of all three conveyor route alternatives.

2.3.4.3 No-go Development Impacts

The no-go development is considered as an alternative in the evaluation of development alternatives. In the environmental impact assessment the no-go development impacts would be similar to the existing impacts.

The no-go development will have high negative impacts on the cost and timing of coal supply to Kusile Power Station, delivery of electricity to the national grid, and associated impacts on national economy and it is therefore assumed that if the proposed Phola-Kusile Coal Conveyor is not allowed to be developed, an alternative coal supply and transportation of that coal supply will have to be found to supply Kusile.

2.3.4.4 Cumulative Impacts

For this project, cumulative impacts will be determined as:

Existing Impacts	**+**	***Incremental Impacts***	**=**	***Cumulative Impacts***
Existing impacts within the project area of impact for individual project components (current level of degradation) associated with existing developments		Impacts of the proposed Phola-Kusile Coal Conveyor		Existing impacts (current level of degradation) associated with existing developments and developments under construction combined with the impacts of the proposed Phola-Kusile Coal Conveyor

In the assessment above, existing impacts often also represent the impacts of the no-go development option.

Potential future projects such as the proposed New Largo Colliery Project and Eskom Ash Disposal Facility, for which the environmental impacts are currently undefined, cannot be included in the cumulative impact assessment and will have to be assessed in separate environmental impact assessment processes for these projects.

2.3.5 Mitigation Measures

The significance of environmental impacts are rated before and after the implementation of mitigation measures. The impact rating system considers the confidence level that can be placed on the successful implementation of the mitigation.

2.3.6 Rating the Significance of Environmental Impacts and Mitigation Measures

The system used for evaluating impact significance and mitigation failure risks is explained below in Table 2-3 and in Appendix A.

Table 2-3: Impact Rating System

Impact Rating Criteria (Symbol / Short Description)					Explanation of Rating Criteria
Nature of the Impact					Description of the direct and indirect effect of human actions and activities on the environment, and impacts of the environment on development.
Mitigation					Environmental Management Programme Framework. Measures designed to avoid, reduce or remedy adverse potential negative impacts, including compensation for residual impacts and measures designed to expand and augment the effect of potential positive impacts for consideration during development of the final environmental management programme.
Impact Status				Negative	Impacts with a potential negative / adverse effect.
				Neutral	Neutral, no impact.
				Positive	Impacts with a potential positive / beneficial effect.
Consequence (Severity + Scale)	**Severity** (Intensity + Duration + requency)	**Intensity** (*Negative Impacts*)	1	low	Slight change, disturbance or nuisance. Targets, limits and thresholds of concern never exceeded. Impacts are rapidly and easily reversible. Require no or only minor interventions or clean-up actions. No complaints expected when the impact takes place.
			2	moderate	Moderate change, disturbance or discomfort. Real but not substantial. Targets, limits and thresholds of concern may occasionally be exceeded. Impacts are reversible but may require some effort, cost and time. Sporadic complaints can be expected when the impact takes place.
			3	high	Prominent change, disturbance or degradation. Real and substantial. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Regular complaints can be expected when the impact takes place.
			4	very high	Severe change, disturbance or degradation. May result in illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Interest group / community mobilisation against project can be expected when the impact takes place. May result in legal action if impact occurs.
		Intensity (*Positive Impacts*)	1	low	Slight change or improvement. Minor benefits.
			2	moderate	Moderate change or improvement. Real but not substantial benefits.
			3	high	Prominent change or improvement. Real and substantial benefits. General community support.
			4	very high	Considerable and large-scale change or improvement. Real and considerable benefit. Widespread support.
		Duration	Refers to the total length of time (i.e. number of years) that the impact source or risk will be present.		
			1	low	Short-term. May occur for weeks or a few months and are rapidly reversible.
			2	moderate	Medium-term. May occur for the first few years of the project, during construction, up to three years. Impacts reversible within a three year period.
			3	high	Long-term. May occur throughout the life of the mine, but will cease after operations ceases either because of natural processes or human intervention.
			4	very high	Permanent and irreversible. Residual impacts will remain after decommissioning and closure.
		Frequency	Refers to the time intervals and how often (i.e. number of days per year) the impact would manifest over the entire duration of the impact.		
			1	low	Seldom. Impact would be intermitted, limited to a few days a year (occurs 0-10 % of the time).
			2	moderate	Occasional. Impact would occur now and again, not more than seven days a month (occurs 10-25% of the time).
			3	high	Often. Impact would be present more than fourteen days a month (occurs >50% of the time).
			4	very high	Continuous. Impact would occur all the time (occurs 100% of the time).
	Scale / Extent		0	none	None. Impact will not occur anywhere.
			1	low	Site impact. Small area. No sensitive receptors outside property affected.
			2	moderate	Local. May affect immediate neighbours, never nearby townships. Small area or small number of sensitive receptors affected.
			3	high	Widespread impact. Affects nearby townships. Large area or large numbers of sensitive receptors affected.
			4	very high	National or international impact. Impacts over a vast area or over vast numbers of sensitive receptors.
Probability			0	none	Never (0 % likelihood).
			1	low	Conceivable. Will only happen in exceptional circumstances (<10 % likelihood).
			2	moderate	Plausible. Could happen and has occurred here or elsewhere (11-40 % likelihood).
			3	high	Probable (>40-80 % likelihood).
			4	very high	Expected. Highly likely to happen (>80 % likelihood).
Significance (Consequence + Probability)					Widespread negative effect. Negative impact that is of the highest order. Potential fatal flaw.
					Substantial negative impact.
				Neg Moderate	Negative impact that is real but not substantial.
				Neg Low	Low to negligible negative impact with little real effect.
				Non	No discernible impact.
				Pos Low	Low to insignificant positive impact.
				Pos Moderate	Positive impact that is real but not substantial.
				Pos High	Substantial positive impact.
					Widespread / substantial beneficial effect. An alternative means to achieve the same benefits not possible.

Impact Rating Criteria (Symbol / Short Description)				Explanation of Rating Criteria
Impact Status		Negative		Impacts with a potential negative / adverse effect.
		Neutral		Neutral, no impact.
		Positive		Impacts with a potential positive / beneficial effect.
Project Phase		Planning		Activities, impacts and mitigation measures applicable to the planning (or pre-implementation) phase.
		Construction		Activities, impacts and mitigation measures applicable to the construction phase, including decommissioning of existing infrastructure.
		Operational		Activities, impacts and mitigation measures applicable to the operational phase.
		Decommissioning / Closure		Activities, impacts and mitigation measures applicable to decommissioning (closure, removal, rehabilitation). For this project, the impacts associated with the decommissioning very similar to that of the construction phase. Due to the long project life (60+ years), the impacts are not discussed separately.
Precautionary Weighting (Value Judgement)	***(Negative Impacts)***	Used when there is a potential understatement of the significance of an negative impact to increase the significance rating.		
		0	none	No weighting required. Significance rating is a true reflection of the potential effect of the impact.
		1	low	There may be a slight understatement of the significance of the impact. Impact significance adapted to be slightly higher.
		2	moderate	There may be a moderate understatement of the significance of the impact. Impact significance adapted to be higher.
		3	high	The impact significance rating is highly understated. Impact significance adapted to be higher.
		4	very high	The impact significance rating is severely understated. Impact significance adapted to be higher.
	(Positive Impacts)	Used when there is a potential overstatement of the significance of a positive impact to reduce the significance rating.		
		0	none	No weighting required. Significance rating is a true reflection of the potential effect of the impact.
		1	low	There may be a slight understatement of the significance of the impact. Impact significance adapted to be lower.
		2	moderate	There may be a moderate understatement of the significance of the impact. Impact significance adapted to be lower.
		3	high	The impact significance rating is highly understated. Impact significance adapted to be lower.
		4	very high	The impact significance rating is severely understated. Impact significance adapted to be lower.
Degree to which impacts can be mitigated		Calculated as the difference between the rating of Unmitigated Impacts and Mitigated Impacts, assuming mitigation will be implemented successfully and in full.		
		None / Not applicable		Not applicable - no impacts to be mitigated. None - impacts cannot be mitigated (no difference between the rating of 'Unmitigated Impacts' and 'Mitigated Impacts'.
		Low		The difference between the impact rating of 'Unmitigated Impacts' and 'Mitigated Impacts' is Low. Low potential to mitigate impacts even if mitigation is implemented successfully and in full.
		Moderate		The difference between the impact rating of 'Unmitigated Impacts' and 'Mitigated Impacts' is Moderate. Moderate potential to mitigate impacts if mitigation is implemented successfully and in full.
		High		The difference between the impact rating of 'Unmitigated Impacts' and 'Mitigated Impacts' is High. High potential to mitigate impacts if mitigation is implemented successfully and in full.
		Very High		The difference between the impact rating of 'Unmitigated Impacts' and 'Mitigated Impacts' is Very High. Very High potential to mitigate impacts, assuming mitigation is implemented successfully and in full.
Risk of Mitigation Failure		The likelihood of mitigation failure rated based on: - research and technology, - timing, and thus secondary potential of outside influences occurring over time (i.e. climate change, political instability, inter/national economic instability). - financial considerations, - skills and labour availability and potential for human error.		
		0	No / Very Low Risk	Less than 10% likelihood that mitigation measures could fail. Mitigation implemented quickly and easily to implement, proven technology used, no special labour skills required. More than 90% likelihood that impacts will be reversed.
		1	Low Risk	10-30% likelihood that mitigation measures could fail.
		2	Moderate Risk	30 to 60% likelihood that mitigation measures could fail.
		3	[redacted]	60 to 80% likelihood that mitigation measures could fail.
		4	[redacted]	>80% likelihood that mitigation measures could fail. May need research and new technologies to be developed, and/or may have to take place over many years after closure, and/or may involve exorbitant/prohibitive expenses to implement successfully, and/or may require highly skilled personnel with special training, and/or have a high risk of human error during the execution of the mitigation.
Impact Reversibility		The degree to which an impact can be reversed when impact source is removed.		
		[redacted]		Impact less than 10% reversible even if source of impact is removed.
		[redacted]		Impact 10-30% reversible. Difficult to reverse impact once source of impact is removed.
		Moderate Reversibility		Impact 30 to 60% reversible. Impact can be partially reversed once source of impact is remove.
		[redacted]		Impact 60 to 80% reversible. Easy and possible to reserve most of the impacts once source of

Impact Rating Criteria (Symbol / Short Description)			Explanation of Rating Criteria
			impact is removed.
			Impact more than 90% reversible, in essence the impact is reversible once source of impact is removed.
Impact on Irreplaceable Resources			Positive impact or reduction in the impact on irreplaceable resources.
	None		No impact on irreplaceable resources.
	Neg Low		Negative low impact on irreplaceable resources.
	Neg Moderate		Negative moderate impact on irreplaceable resources.
			Negative high impact on irreplaceable resources.
			Negative very high impact on irreplaceable resources.
Impact Rating Methodology	Formula	Example	Rating Criteria
	I	2.0	Intensity (I)
	D	2.0	Duration (D)
	F	2.0	Frequency (F)
	S=(I+D+F)/3	2.0	Severity (S) = (Intensity + Duration + Frequency) / 3
	E	2.0	Scale (Extent) (E)
	C=(S+E)/2	2.0	Consequence (C) = (Severity + Extent) / 2
	P	3.0	Probability (P)
	S1=(C+P)/2	2.3	Significance (S1) = (Consequence + Probability) / 2
	W	1.0	Precautionary Weighting (W)
	S2=(S+W/2)	2.8	Significance with Precautionary Weighting (S2) = (S1 + W)
Overall Risk / Benefit	Calculated based on the rating for Unmitigated Impacts and Mitigated Impacts, the degree to which the impacts can be mitigated and the likelihood for the mitigation measures failing.		
Impact Rating (and Risk / Benefit Rating)	Formula	Level	Level
	<=	-3.3	
	<=	-2.9	
	<=	-2.0	Neg Moderate
	<	0.0	Neg Low
		0.0	None
	>	0.0	Pos Low
	>=	2.0	Pos Moderate
	>=	2.9	
	>=	3.3	
Assessment Confidence	Complete		No information gaps exist. Decision-making can go ahead.
	Adequate		Minor information deficiencies exist but this does not affect decision-making. Decision-making can still go ahead.
	Incomplete		Not enough information for decision-making. Current data to be supplemented with further monitoring or research.
IAP Interest			Widespread concern and/or concerns of very high importance. Concerns difficult to be addressed to satisfaction of authorities or concerned parties. Appeals against project anticipated if not addressed.
			Several concerns and/or concerns of high importance. Real and substantial.
	Neg Moderate		Limited concerns. All concerns addressed. Real but not substantial.
	Neg Low		Very minor or minor concerns.
	Neutral / None		No interest.
	Not defined		Level of interest has not been tested.
	Pos Low		Very little support for project.
	Pos Moderate		Limited support for project.
			General support. May be associated with high community expectations.
			Widespread support. May be associated with extremely high community expectations.
	Diverse Low		Minor interest. Some support. Some concerns.
	Diverse Moderate		Limited interest. Some support. Some concerns.
	Diverse High		General interest. Some support. Some concerns.
	Diverse Very High		Widespread interest. Some support. Some concerns.

2.4 Public Participation and Authority Consultation Conducted to Date

2.4.1 Identification of Interested and Affected Parties

Potential I&APs were identified through networking and the use of the existing AAIC and Eskom I&AP databases that have been developed since 2006. The existing databases included landowners, neighbouring landowners and people who participated in previous EIA processes in the area. Press advertisements and site posters were used to identify new I&APs (Section 2.4.4).

A list of all parties that were consulted during the public participation and authority consultation process is provided in Appendix C2 as well as in the front of this report.

2.4.2 Notifications to Interested and Affected Parties

Potential I&APs were notified about the project and the public participation process by means of:

- Direct letters to affected landowners along all three conveyor corridor routes considered during the scoping phase (refer to lists in the scoping report).
- Press advertisements and site notices (Section 2.4.4) during both the project announcement phase and the scoping phase.
- Individual notifications to people who may be affected by the proposed conveyor development on the existing New Largo and Kusile Power Station I&AP databases (via telephone, email and/or fax (Appendix C 6) during both the project announcement phase and the scoping phase.
- Individual meetings with holders of mining or prospecting rights along the infrastructure routes (Section 2.4.8) during both the project announcement phase, scoping phase and EIA phase.
- Meetings with owners of land along and adjacent to the infrastructure routes (Section 2.4.7 and Section 2.4.8).
- Individual written notifications to all registered I&APs (by registered mail), in accordance with sub-regulation 54 2(b) of GNR 543.
- Individual written notifications to Victor Khanye Local Municipality, previously Delmas (Mayor and Councillor), Emalahleni Local Municipality, previously Witbank (Municipal Manager), and Nkangala District Municipality (Mayor and Municipal Manager).
- Notifications will be sent to all registered I&APs about the review of the draft EIA report, the public feedback meetings, as well as the review of the final scoping report.
- Notifications will be sent to all registered I&APs when the environmental authorisation has been issued to inform them of the decision and subsequent appeal process.

2.4.3 Notifications to Relevant Authorities

The following provincial government departments were notified about the project, invited to a general public announcement meeting and the review periods of the draft and final scoping reports:

- The Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET).

- The Department of Environmental Affairs (DEA), part of the Department of Water and Environmental Affairs (DWEA).
- The Department of Agriculture, Forestry and Fisheries (DAFF).
- The Mpumalanga Department of Agriculture, Rural Development and Land Administration.
- The Mpumalanga Department of Public Works, Roads and Transport (DPWRT).
- The Department of Public Works.
- The Department of Mineral Resources.
- The Department of Water Affairs (DWA), part of the DWEA.
- The South African Heritage Resources Agency (SAHRA).
- Mpumalanga Tourism and Parks Agency.
- The Mpumalanga Department of Labour.
- South African National Botanical Institute (SANBI).
- The National Department of Environmental Affairs (waste licensing) was added to the list of relevant authorities due to the introduction of the proposed mobile water treatment plant and thus the need for a waste management license application.

All of these authorities will be notified of and given the opportunity to review of the draft and final EIA report as well as the authority decisions on the NEMA EIA process, the water use license application process and waste management license application process.

2.4.4 Press Advertisements and Site Notices

Press advertisements were placed in the following newspapers in November 2010 and again in March 2011.

- Streeknuus;
- Corridor Gazette;
- Ekasi News;
- Witbank News;
- Mpumalanga News;
- Middelburg Herald;
- Middelburg Observer;
- Ridge Times;
- The Echo; and
- Springs Advertiser.

Site notices (posters) were placed at the following locations during the week of 15 to 19 November 2010:

- Turn-off to the Kusile Power Station on the R545.
- T-junction near Kendal Power Station.
- Road near Heuwelfontein, west of Kendal Power Station.
- Van Dykspruit, west of Kendal Power Station where the proposed alternative routes turn north.
- Turn-off to the N12 south of the Kusile Power Station.
- Road south of the Kusile Power Station.
- Northern alternative route at the turnoff to the N12.
- Road east of Kendal Power Station.
- Entrance to Phola Coal Processing Plant.

Copies of the advertisements and site notices (with photographs of site notice as proof) are included in Appendix C3.

2.4.5 Registration of Interested and Affected Parties

People and/or organisations were registered as I&APs for the project if they:

- Attended one of the consultation meetings.
- Responded to notification letters and documentation, press advertisements or site posters.
- Own land along and adjacent to the proposed infrastructure routes.
- Hold mining or prospecting rights along the infrastructure route.
- Own, operate or administrate infrastructure affected by the project.
- Contacted Zitholele and/or Synergistics telephonically, or via fax, e-mail or post.

2.4.6 Background Information Document

A background information document (Appendix C4) was circulated to all landowners either personally or via registered mail, while all the identified I&APs received an electronic copy via E-mail. The document included a response sheet and a request for written comments by 8 December 2010.

2.4.7 General Public Meetings

General public announcement meetings were held on 24 and 25 November 2010 at the El Toro Conference Facilities, situated next to the Kendal/Balmoral road.

Two more meetings were held at Ons Huisie Conference Facilities on 22 and 23 March 2011. Minutes of the meetings are included in Appendix C6.

2.4.8 Consultation with Landowners and Mining / Prospecting Right Holders

Properties affected by the proposed conveyor route are listed in Table 7-1 and Table 7-2. AAIC is currently in discussion with the owners of the affected properties. Details of the progress of those discussions are presented in Table 7-1.

The proposed conveyor routes crosses a section of **Vlakfontein Colliery** where African Exploration Mining and Finance Corporation (AEMFC) holds the mining right. **AEMFC** was registered as an I&AP and has received the relevant public participation notifications and documentation issued to date. Representatives from AAIC and Synergistics met with Mr Mpho Tlala (**AEMFC**) on 14 January 2010, to discuss the implications of the conveyor route across its mining right area. Minutes of the meeting are attached in Appendix C10. Subsequent to the meeting, AAIC relocated the route to minimise impacts on AEMFC and AAIC is investigating a compensation for the remaining impacts on the AEMFC coal resources. Compensation is likely to be in the form of a coal reserve swap between AAIC and AEMFC.

Some of earlier conveyor routes investigated (Section 4.2) affected coal mineral rights held by **Homelands** and **Shanduka**. Representatives from AAIC met with representatives from **Homelands** and **Shanduka** mining to discuss the conveyor route running across their properties and mining areas. A site visit with the respective parties was held on 31 March 2011. AAIC has undertaken to meet again with representatives from **Shanduka** and **Homelands** to address their queries. The proposed conveyor route no longer affect **Homelands** and **Shanduka**.

Mr Cherry, an adjacent landowner and farmer suggested (at a public meeting, see Appendix C6 for meeting details) that the one of the transfer stations be moved to avoid the overland coal conveyor fragmenting a piece of land owned by **Truter Boerdery Trust** that is used for maize cropping. AAIC undertook to investigate this further and to provide feedback. According to AAIC, they are unable to move the transfer point, as Mr Cherry requested, as this would either require the installation of an additional transfer station and supporting infrastructure at an extra cost (around R 52 million) or else, sterilise approximately 1.2 million tonnes of minable coal.

AAIC discussed the conveyor alignment options with **Mr Truter (from Truter Boerdery Trust)**, a directly affected landowner. AAIC has reported that Mr Truter gave his consent to the conveyor crossing his property, subject to AAIC providing compensation to **Truter Boerdery Trust**. At the time of writing this report, details of the compensation measures were being discussed between AAIC and Mr Truter.

BECSA (BHP Billiton) objected to the initial conveyor alignment options for flight 1 due to sterilisation of its coal resources. However, BECSA has given verbal consent for the conveyor along the final proposed route alignment, which follows the Eskom 132 kV power line, on condition that AAIC provides a crossing for BECSA mining equipment (haul road crossing) as compensation. Details of the compensation measures were being discussed at the time of writing this report.

Eskom has given consent for the conveyor along the final proposed alignment. AAIC is in discussion with Eskom regarding finalisation of servitude agreements.

AAIC is in discussion with SANRAL regarding the registration of a servitude on properties belonging to SANRAL along the proposed conveyor route (see Table 7-1 for property owned by SANRAL).

Synergistics is endeavouring to contact all affected landowners on an individual basis to discuss the specific impacts on their properties. This process is on-going and will continue during the remainder of the EIA process. Updates of information will be included in the final EIA report.

2.4.9 Focused Authority Meetings

A meeting was held with Mr Garth Batchelor of the MDEDET on 17 November 2010. The purpose of the meeting was to:

- Inform MDEDET about the planned Phola-Kusile Overland Coal Conveyor.
- Obtain clarification on the environmental legal requirements for the conveyor and the environmental authorisation, and the EIA process to be followed.

MDEDET official, Ms Thuli Nkonyana and the Deputy Director Ms Dineo Tswai, visited the project site on the 8th of December 2010. They were afforded the opportunity to visit and view the project site and to discuss the scope of the project and development alternatives with the AAIC project management team, and discuss the EIA process with Synergistics.

A meeting was held with the Department of Water Affairs (DWA) in Bronkhorspruit on 25 November 2010. The purpose of the meeting was to:

- Inform DWA about the planned Phola-Kusile Overland Coal Conveyor.
- Obtain clarification on the environmental legal requirements for the conveyor and the water use license process to be followed.

Records of meetings are provided in Appendix C10.

2.4.10 Consultation about the proposed Mobile Water Treatment Plant and the Waste Management License Application Process

The need for a waste management license was only identified after submission of the final scoping report for the Phola-Kusile Overland Coal Conveyor. However, I&APs and authorities were consulted about the proposed mobile water treatment plant during the public participation process conducted during the scoping phase of the New Largo Colliery EIA, since the same mobile water treatment plant is proposed as part of the New Largo Colliery project. In essence, the inclusion of the mobile water treatment plant into the Phola-Kusile Coal Overland Conveyor project presents an opportunity to start with the treatment of excess water form old underground workings earlier than anticipated, if the mobile water treatment plant is to be developed as part of the New Largo Colliery project. A separate EIA is being undertaken for the New Largo Colliery.

2.4.11 Review of the Draft and Final EIA Report

The draft EIA report will be made available for public and authority review in October 2011 for 6 weeks (40 calendar days). All registered I&APs will be notified in writing of the availability of the document for review and will be requested to submit comments.

Electronic versions of the reports will be published on www.synergistics.co.za and www.zitholele.co.za and they will be circulated to all landowners and registered I&APs who provided an email address. Hard copies will be made available at AAIC offices near Witbank, at the venue of the public meetings for the project, and at the Synergistics offices in Johannesburg. Additional copies can be made available on request.

The final EIA report will be made available for 3 weeks (21 calendar days).

2.4.12 Review of the Integrated Water and Waste Management Plan

The integrated water and waste management plan will be made available for public and authority review in October 2011 for 6 weeks (40 calendar days). All registered I&APs will be notified in writing of the availability of the document for review, and they will be requested to submit comments.

Electronic versions of the reports will be published on www.synergistics.co.za and www.zitholele.co.za and will be circulated to all landowners and registered I&APs who provided an email address. Hard copies will be made available at AAIC offices near Witbank, at the venue of the public meetings for the project, and at the Synergistics offices in Johannesburg. Additional copies can be made available on request.

2.4.13 Public Feedback Meeting during the EIA phase

During the EIA phase of the study, a public meeting will be arranged to present the results of the specialist studies and the results of the route selection process, the EMP and the integrated water and waste management plan. Registered I&APs will be directly invited to attend the meeting.

2.4.14 Consultation with Competent Authority, State Departments and Organs of State

2.4.14.1 Authorities Meetings

As mentioned in Section 2.4.9, individual meetings were held with MDEDET and DWA to discuss the proposed project. The authorities were again contacted after distribution of the draft scoping report to arrange additional meetings. The authorities indicated that they will contact the EAP's office if they have any information requirements or further questions. A combined meeting with the competent and commenting authorities is planned once the draft EIA report is available.

During the authority meeting for the New Largo Colliery on 26 July 2011, the proposed introduction of the mobile water treatment works was discussed (see New Largo Colliery Final Scoping Report on www.synergistics.co.za or www.zitholele.co.za).

2.4.14.2 Review of the EIA Report

In terms of the requirements of regulation GNR 543, organs of state and state departments were allowed six weeks (forty calendar days) for the review of the draft scoping report and will be given the same amount of time for the review of the draft EIA report. The review period for the final EIA report will be three weeks (21 calendar days). Review periods for the competent authority are in accordance with GNR 543 for the scoping and EIA reports.

Where the DWA must approve designs of waste management facilities, 60 calendar days will be provided for review as per GNR 543 clause 56(8). However, it should be noted that the DWA will be reviewing the design and management measures for all NEMWA waste activities as part of their review of the water use license application process.

2.5 Study Team

Synergistics Environmental Services (Pty) Ltd (Synergistics) has been appointed by AAIC as the independent environmental consultant to undertake the EIA for the Phola-Kusile Overland Coal Conveyor.

Mari Wolmarans, the project leader, is an Environmental Assessment Practitioner (EAP) certified by the interim certification board of South Africa and was responsible for the environmental impact assessment and development of the environmental management programme. Her qualifications and experience include:

- BL Arch, UP, 1991.
- Environmental Assessment Practitioner (EAP) Certified by the Interim Certification Board (EAPSA).
- Professional member South African Institute of Ecologists & Environmental Scientists (SAIE&ES).
- 20 years' environmental management and assessment experience, specifically in the mining, processing and infrastructure development sectors.
- Environmental Impact Assessment: Project Management.

The environmental study team members and specialists that will be involved in the environmental impact assessment are listed in Table 2-4. Their roles and responsibilities on the project and their qualifications are provided.

Table 2-4: Study Team

Name and Affiliation	Qualification	Role
Environmental Study Team		
Mari Wolmarans Independent Environmental Assessment Practitioner	BL Arch, MSAIEE EAPSA	- Project Leader - EIA report and EMP
Marline Medallie Synergistics Environmental Services	B.Sc Biological Sciences B.Sc (Hons) Botany M.Sc Botany	- Project Coordinator - EIA report and EMP
Bheki Khumalo Synergistics Environmental Services	B.Sc Geology and Applied Geology B.Sc (Hons) Environmental Modelling and Monitoring	- GIS and Mapping
Vivienne Vorster Synergistics Environmental Services	B.A Hons Environmental Management	- EIA report and EMP

Name and Affiliation	Qualification	Role
Claire Jarvis Synergistics Environmental Services	B.Sc Environmental Management	- EIA report and EMP
Anelle Lötter Zitholele Consulting	National Diploma in Journalism	- Public Consultation
Marius van Zyl Jones and Wagener	B.Sc Environment Analysis and Management B.Sc (Hons) Biochemistry B.Sc(Hons) Biochemistry and Environmental Management Pr.Sci.Nat	- Hydrological Baseline and Impacts Assessment - Integrated Water Use License Application - Integrated Water and Waste Management Plan
Jaco van den Berg JMA	B.Sc Geology/Geochemistry B.Sc (Hons) Geochemistry M.Sc Geohydrology	- Hydrogeological Impact Assessment
Ian Jones Earth Science Solutions	B.Sc (Geol) Pr.Sci.Nat EAPSA	- Soil Impact Assessment
Tony Rorke BME Blasting Technology	B.Sc Engineering (Mining Geology) M.Sc Geology (Seismology)	- Vibrations and Blasting Specialist Input
Renee von Gruenewaldt Airshed Planning Professionals	BSc Atmospheric Sciences: Meteorology BSc (Hons) Environmental Management and Impact Assessment MSc Meteorology Pri.Sci.Nat	- Air Quality Impact Assessment
Willem de Frey EkoInfo	M.Sc Wildlife Management Pr.Sci.Nat (Botanical & Ecological Science)	- Terrestrial Vegetation Survey - Ecological Impact Assessment
Dewald Kamffer Ecocheck	M.Sc Grassland Conservation Biology	- Faunal Survey - Ecological Impact Assessment
Samuel Laurence Luke Verburgt Enviro-Insight	M.Sc Zoology	- Nocturnal Mammals - Herpetofauna
Gina Walsh Michiel Jonker Ecotone	M.Sc Zoology MSc Aquatic Health	- Aquatic Survey - Ecological Impact Assessment
Allan Batchelor Wetland Consulting Services	M.Sc Zoology Pr.Sci.Nat (Botanical and Ecological Science)	- Wetland Survey - Ecological Impact Assessment

Name and Affiliation	Qualification	Role
Johnny van Schalkwyk McGregor Museum	BA (Hons) Archaeology BA (Hons) Anthropology Post Graduate Diploma in Museum Science MA Anthropology D Litt et Phil (Anthropology)	- Heritage Survey
Graham Young Newtown Landscape Architects	PrLArch	- Visual Impact Assessment
Ben van Zyl Freelance Consultant	PhD (PrEng)	- Noise Survey - Noise Impact Assessment
Rod Strong WSP SA Civil and Structural Engineers	MSc (Transportation Planning and Engineering) B.Eng (Civil) Senior Engineer	- Traffic Impact Assessment
Hein du Toit Demacon	BTRP MSc Real Estate Certificate in Shopping Centre Management	- Economic Impact Assessment
Ilse Aucamp Ptersa	BA Social Work MSc Environmental Management	- Social Impact Assessment
Teresa Steele Anglo American Inyosi Coal	B.Sc (Hons) Geology	- Sustainable Development Manager – Projects - Applicant Environmental Representative
Cindy Smith Anglo American Inyosi Coal	B Tech Environmental Management	- Applicant Environmental Representative
Technical Study Team		
Dimitri Simigiannis LSL	BSc Engineering MSc Civil Engineering	- Technical Design and Layout
Lampies Lamprecht Anglo American Inyosi Coal	Pr.Cert. Eng Pr. CPM	- Project Manager - Technical Design and Layout - Applicant Technical Representative

2.6 Review and Utilisation of the results of Specialist Studies undertaken prior to the acceptance of the Scoping Report and Plan of Study for EIA

It is common practice for proposed development projects to initiate the collection of baseline environmental information well before the official start date of the legal environmental authorisation processes, in order to ensure a rigorous assessment of seasonal baseline conditions over more than one year, and, to define definitive environmental trends applicable to the study area.

AAIC has commissioned various specialist baseline studies and public consultation meetings in the broader study area since 2006, as part of the environmental studies for the proposed New Largo Colliery, and, have proceeded with additional surface and ground water sampling and analysis as well as seasonal ecological surveys in 2010 and early 2011.

Since the environmental impact assessment study areas for the New Largo Colliery and the Phola-Kusile Coal Conveyor overlap, AAIC intends to apply for exemption from part of Section 31(1) of GNR 543. The exemption application will seek permission from the competent authority to allow for the utilisation of the results of specialist studies, conducted prior to the acceptance of the scoping report and plan of study for environmental impact assessment, and the inclusion of these results in the final EIA report. These studies include:

General

- Anglo Coal South Africa. 2007. Baseline Report for the Proposed New Largo Open Cast Coal Mine, Mpumalanga Province. Oryx Environmental.
- Anglo Coal South Africa. 2007. Public Consultation Report: Scoping Phase for the New Largo open cast coal mine between Kendal and Balmoral, Mpumalanga Province. Golder Associates.

Surface Water and Groundwater

- Surface water sampling and analysis by Jones and Wagener undertaken during 2010 to 2011.
- Ground water baseline studies (hydro-census, borehole testing, water quality analysis) by JMA during 2010 to 2011.
- Ground water sampling and analysis undertaken by AAIC during 2006 to 2011.
- Jones and Wagener. 2007. Surface Water Inputs to the EMPR For New Largo Opencast Mine.

Ecology and Biodiversity

- De Frey, W.H. 2010. Specialist Report: Ecological Assessment (Flora, Fauna, Aquatic) for the New Largo Coal Development - Mpumalanga EkoInfo.
- De Frey, W.H. 2008. Flora Specialist Report: Vegetation Assessment on New Largo Update Area Northwest of Ogies, Mpumalanga. EkoInfo CC Environmental & Wildlife Management Consultancy.
- Kamffer, D. T. Mostert. 2007. New Largo Faunal Study. Faunal Species Incorporated.
- Batchelor, A. 2007. Wetland Baseline and Impact Assessment: New Largo. Wetland Consulting Services (Pty) Ltd.
- Palmer, R. 2006. New Largo Project – Baseline Assessment – Aquatic Ecology, Nepid Consultants.

Soils

- Vermaak, P.S; Jones, I.P.C. 2006. New Largo Project Baseline Soils and Land Capability Survey. Earth Science Solutions.

Air Quality

- Annegarn, H.J. 2007. New Largo Annual Air Quality Monitoring Report for the Period November 2006 to October 2007.
- Von Gruenewaldt, R.G.; H. Liebenberg-Enslin. 2010. Air Quality Baseline Assessment For The Proposed New Largo Opencast Coal Mine In The Kendal Area. Airshed Planning Professionals.
- Von Gruenewaldt, R.G.; Liebenberg-Enslin, H. 2010. Air Quality Baseline Assessment For The Proposed New Largo Opencast Coal Mine In The Kendal Area. Airshed Planning Professionals.
- Thomas, R.G.; Liebenberg-Enslin, H. 2006. Air Quality Baseline Assessment For The Proposed New Largo Opencast Coal Mine In The Kendal Area. Airshed Planning Professionals.

Heritage Resources

- Van Schalkwyk, J., 2006. Heritage Impact Scoping Assessment for the Proposed New Largo Mining Development, Witbank Area, Mpumalanga. National Cultural History Museum.

Visual Resources

- Young, G. 2007. Visual Assessment for New Largo Open Cast Coal Mine in the Kendal/Balmoral Area. Newtown Landscape Architects.

2.7 Specialist Studies

The various specialist studies conducted as part of the Phola-Kusile Coal Conveyor EIA process are listed below, and are appended to the draft EIA report. The scope of work of the individual studies is explained in each specialist report. Where relevant, specialist reports were structured in terms of GNR 543 Section 32 and the specialists have each signed a declaration of independence.

- Ecology and Biodiversity (including Natural Vegetation and Animal Life)
- Wetland Delineation
- Soils
- Air Quality
- Traffic (specialist opinion)
- Noise
- Heritage Resources
- Surface Water and Water Use License
- Groundwater
- Visual Aspects
- Social and Economic
- Agricultural and Land Use Potential

2.8 Assumptions, Exclusions and Limitations

- The conveyor will be in operation for ~60 years. For this project, the impacts as well as the mitigation measures associated decommissioning phase is very similar to that of the construction phase. None of the specialist studies identified any notable impacts that are notably different or more severe during the decommissioning phase than the construction phase or any decommissioning issues that would in any way affect decision making about the environmental acceptability of the project. The EIA and EMP therefore focus on the construction and operation phases. Eventual decommissioning of the conveyor will be dealt with in a future EIA and EMP amendment. Impacts described as applicable to the construction phase will eventually apply to the deconditioning phase.

- The last section of conveyor flight 7 (known as CVY015 on the engineering design drawings) at Kusile Power Station is owned by Eskom. This section will be constructed by AAIC and during construction, AAIC will manage environmental impacts in terms of the EMP measures in this report. However, the operation of this will be managed by Eskom in terms of their own operational EMP and management procedures. AAIC will not assume responsibility for Eskom-owned infrastructure beyond the construction phase.

- Various options for water supply to the Phola-Kusile Coal Conveyor were investigated (Section 4.4), but the proposed option, which is also the environmentally preferred option, is to abstract and treat excess water from old underground mine workings at a mobile water treatment plant. This specific option was only identified after the submission of the scoping report and requires a waste management license. As explained in Section 1.3.2, the impacts of water treatment plant is seen as a positive development. Sufficient information about the impacts of the mobile water treatment plant has been incorporated into this EIA report for MDEDET to authorise the water treatment plant in terms of NEMA. The issuing of the waste management license for the mobile water treatment plant by NDEA is seen as a separate approval process. As such, there is no reason for the MDEDET review and authorisation process to be delayed or compromised by the waste management license application process for the mobile water treatment plant.

- A specialist Air Blasting and Ground Vibration study was not undertaken as part of the Phola-Kusile Coal Conveyor EIA as blasting is not envisaged for the project. Should blasting be required due to unforeseen geotechnical conditioned encountered during construction, blasting operations will be strictly managed in consultation with the owners of the infrastructure and building owners, and specialist advice will be sourced where required, on a case by case basis.

- The various specialists (Appendix D to Appendix P) have made suggestions and recommendations for mitigating impacts as applicable to their various fields of expertise. However, some of the suggestions were not always appropriate and feasible when viewed in an integrated way in that what is suggested by one specialist on one environmental component may conflict with the requirements of another environmental component. The mitigation measures adopted in the EMP (Section 12 and Appendix B) reflects an integration of mitigation measures appropriate to the project, based on the professional judgement of the EAP and constraints associated with the specific project and the environment in which the project is situated.

2.9 Uncertainties and Knowledge Gaps

- The Environmental Assessment Practitioner for this project is of the opinion there are no notable uncertainties and knowledge gaps that could affect decision making and that the information presented in this EIA report, EMP and the various specialist reports (appended) is sufficient for:

    - MDEDET to make an informed decision about the environmental impacts of the Phola-Kusile Coal Conveyor and to issue an environmental authorisation for the project.

    - DWA to make an informed decision about the impacts associated with water uses in terms of the NWA and waste activities in terms of the NEMWA. Read in conjunction with the following reports, the DWA would have sufficient information to evaluate and issue a decision on the water use license application for the project.
        - Phola-Kusile Overland Coal Conveyor: Integrated Water and Waste Management Plan (draft, October 2011).
        - Phola-Kusile Overland Coal Conveyor: Integrated Water Use Licence Application Report (draft, October 2011).

    - Providing the NDEA with an understanding of the impacts and mitigation measures for the proposed mobile water treatment plant, in support of the separate application for a waste management license application process for the mobile water treatment plant. A separate EIA report will be submitted to the NDEA for the mobile water treatment plant. The report will utilise the assessment of the mobile water treatment plant impacts in this report.

- AAIC's discussions with affected landowners and servitude owners over which the proposed conveyor route crosses are in process and landowner consent for all properties should be in place at the time when the final EMP is submitted.

- Synergistics is in the process of consulting with affected landowners and servitude owners (over which the proposed conveyor route crosses) to discuss specific issues pertaining to their properties and to discuss the need for pedestrian and road/livestock crossings. This process is dependent on, and driven by, the availability of the different owners, but it is anticipated that this process is expected to be concluded prior to the submission of the final EIA report.

- I&APs still need to comment on the proposed route as presented in the draft EIA report, the impacts as assessed by the specialists and the mitigation measures presented in the. These comments will be captured and addressed in the final EIA report.

3. Project Description

3.1 Project Design and Proposed Route

The Phola-Kusile Overland Coal Conveyor will be designed to transport 8.4 to 11.5 million tonnes of coal per year from the Phola Coal Processing Plant to the Kusile Power. The conveyor will start at the Phola Coal Processing Plant and it will end at the coal stockyard of the Kusile Power Station. Various alternatives conveyor routes were evaluated but the AAIC proposed route is approximately 23 km in length.

There will be seven[5] conveyor flights and seven transfer stations (TS1 to TS7). There will be five conveyor flights between TS1 at Phola Coal Processing Plant and TS6 at ta point outside of Kusile, and a further two conveyor flights (called CVY 614 and CVY 615 in engineering design terms) between TS6 and TS7 at Kusile. The last of flights (CVY 615) will be owned by Eskom. CVY 605 will be constructed by AAIC and will be handed over to Eskom during the operational phase (see EMP for responsibilities and environmental management arrangements for Eskom-owned infrastructure, Section 12 and Appendix B).

The Phola Coal Processing Plant is an existing beneficiation plant located approximately 20 kilometres south-east of Kusile Power Station, between Kendal Power Station, Ogies and Phola. The plant is a joint venture between BHP Billiton (BECSA) and Anglo American Inyosi Coal. It has the capacity to beneficiate 16 million tonnes per annum, and it receives coal from Klipspruit (BECSA), and Zibulo (Anglo) mines. The primary products from the Phola Coal Processing Plant are exported. Eskom anticipates that the secondary products (or middlings coal) from the Phola Coal Processing Plant will be supplied to Kusile Power station via the Phola-Kusile Coal Conveyor over the life of the Kusile Power Station (thus 60+ years).

Together with the middlings coal from the Phola Coal Processing Plant, a minimum of one million tonnes of coal from the Vlakfontein Colliery (owned by African Exploration Mining and Finance Corporation (AEMFC)), will be loaded onto the conveyor belt for transportation to Kusile each year. The loading point for AEMFC will be at a point, mutually agreed on between AAIC and AEMFC, and within the conveyor servitude. Other loading points may be developed along the conveyor route to load coal onto the conveyor in future. Environmental authorisations required for infrastructure developed by Vlakfontein will be separate to the EIA for Phola-Kusile Coal Conveyor.

The conveyor will be a maximum of 1.35 metres wide and will run at an average speed of approximately 4.5 metres per second. It will have a metal cover (called 'doghouse sheeting'), which is open on one side to allow servicing. The conveyor belt will be equipped with on-line quality and mass monitoring equipment.

Preliminary GPS Coordinates for the proposed route are tabled below (please note that there may be minor changes to these points as the alignment is refined and optimised).

5 The scoping report stated that there area five flights but this excluded the last two flights into Kusile Power Station (called CVY 614 and CVY 615 in engineering design terms).

Table 3-1: GPS Coordinates for the Proposed Phola-Kusile Coal Conveyor Route (Figure 1-1)

Corner / Bend Point	Southern Coordinate	Eastern Coordinate
1	28° 55.731' E	25° 55.758' S
2	28° 56.475' E	25° 55.445' S
3	28° 56.303' E	25° 55.844' S
4	28° 55.715' E	25° 57.623' S
5	28° 54.754' E	25° 58.902' S
6	28° 55.474' E	26° 0.208' S
7	28° 57.528' E	26° 0.987' S
8	28° 57.506' E	26° 1.175' S
9	28° 58.798' E	26° 1.207' S
10	29° 0.203' E	26° 1.925' S
11	28° 59.838' E	26° 3.246' S
12	28° 59.672' E	26° 3.194' S
13	28° 59.949' E	26° 3.338' S

Affected properties are listed in Table 3-2 and illustrated on Figure 1-1 and Figure 5-20.

Table 3-2 :Properties along the Proposed Conveyor Route

Property description		Landowner	Contact Person
Farm	Portion		
Smaldeel 1 IS	5	Ingwe Surface Holdings	Johan Muller/ Vikesh Dhanooklal
Bankfontein 216 IR	R/E	Ingwe Surface Holdings	As above.
Bankfontein 216 IR	7	Truter Boerdery Trust	Christy Truter.
Bankfontein 216 IR	11	Truter Boerdery / Ingwe Surface Holdings (to be verified - based on information received from Mr Truter, this portion is owned by Truter Boerdery)	As above.
Bankfontein 216 IR	10	Truter Boerdery Trust	As above.
Heuwelfontein 215 IR	11	Truter Boerdery Trust	As above.
Vlakfontein 569 JR	22	Truter Boerdery Trust / SANRAL (to be verified - based on AAIC records this property is owned by SANRAL).	Christy Truter (Truter Boerdery Trust) / Ockert Stevens and Kevin Rudd (SANRAL).
Vlakfontein 569 JR	11	Truter Boerdery Trust	As above.
Vlakfontein 569 JR	3	Anglo American Inyosi Coal (AAIC), previously Anglo Operations Limited (AOL).	Henry Niewoudt
Klipfontiein 568 JR	14	AAIC, previously AOL	As above.
Klipfontiein 568 JR	59	SANRAL	Hermans and Roman Property Solutions
Klipfontiein 568 JR	13	AAIC, previously AOL	As above.
Klipfontiein 568 JR	12	AAIC, previously AOL	As above.
Klipfontein 568 JR	15	AAIC, previously AOL	As above.
Klipfontein 568 JR	16	AAIC, previously AOL	As above.
Klipfontein 568 JR	1	AAIC, previously AOL	As above.
Klipfontein 568 JR	29	AAIC, previously AOL	As above.

Property description		Landowner	Contact Person
Farm	Portion		
Klipfontein 568 JR	36	AAIC, previously AOL	As above.
Klipfontein 568 JR	35	AAIC, previously AOL	As above.
Klipfontein 568 JR	34	AAIC, previously AOL	As above.
Klipfontein 568 JR	33	AAIC, previously AOL	As above.
Klipfontein 568 JR	32	Truter Boerdery Trust	As above.
Klipfontein 566 JR	9	Eskom Holdings Ltd	Jan De Klerk, Tinkie Holl
Klipfontein 566 JR	66	AAIC, previously AOL	As above.
Klipfontein 566 JR	53	Eskom Holdings Ltd	As above.
Klipfontein 566 JR	54	Eskom Holdings Ltd	As above.
Klipfontein 566 JR	52	Eskom Holdings Ltd	As above.
Klipfontein 566 JR	50	Eskom Holdings Ltd	As above.
Klipfontein 566 JR	48	Eskom Holdings Ltd	As above.
Klipfontein 566 JR	31	AAIC, previously AOL	As above.
Klipfontein 566 JR	17	AAIC, previously AOL	As above.
Hartbeesfontein 537 JR	7	Eskom Holdings Ltd	As above.
Hartbeesfontein 537 JR	6	Eskom Holdings Ltd	As above.
Hartbeesfontein 537 JR	RE	AAIC, previously AOL	As above.

The following photographs of conveyor structures provide an indication of the design of the Phola-Kusile Overland Coal Conveyor. These photographs are for information purposes only – the design of the Phola-Kusile Overland Coal Conveyor will be similar to the conveyors in these photographs but minor design differences and changes are anticipated.

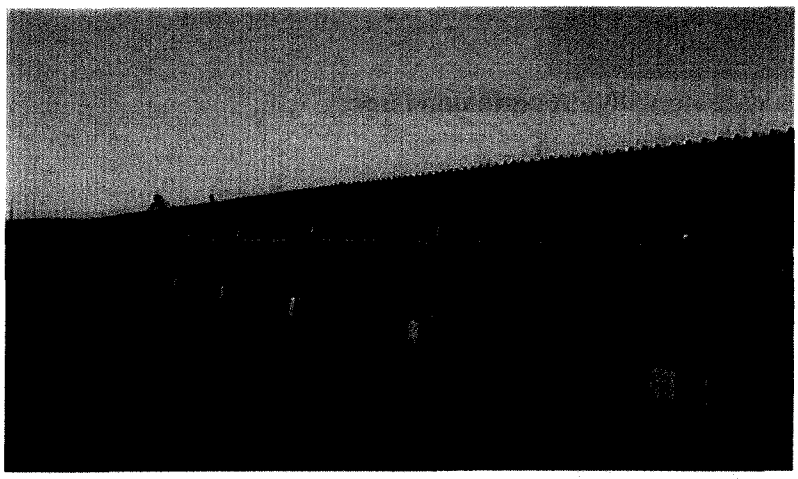


Plate 3-1: Example of typical coal conveyor from the side

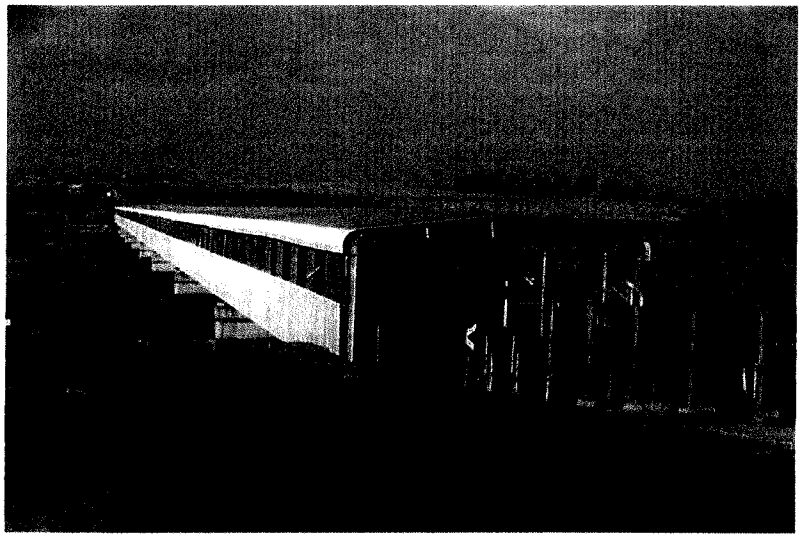


Plate 3-2: Example of typical wetland crossing (conveyor suspended on pillars, covered and with solid floor for collection of coal spills)

Plate 3-3: Example of a typical stream crossing with impermeable floor

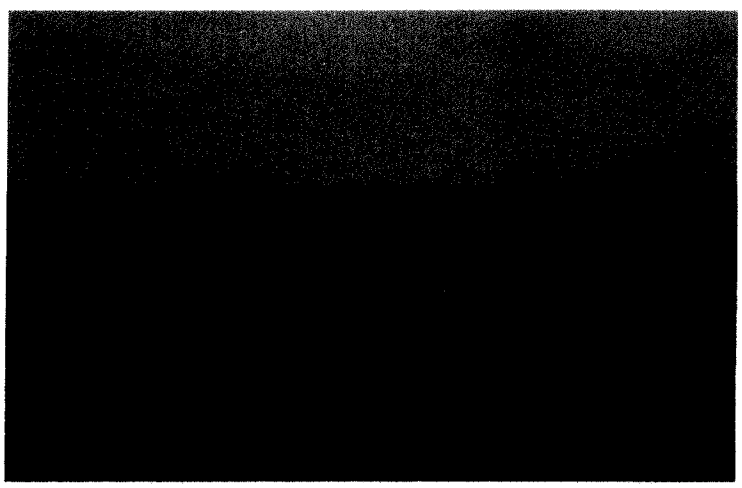


Plate 3-4: Example of a typical metal cover for conveyor belt

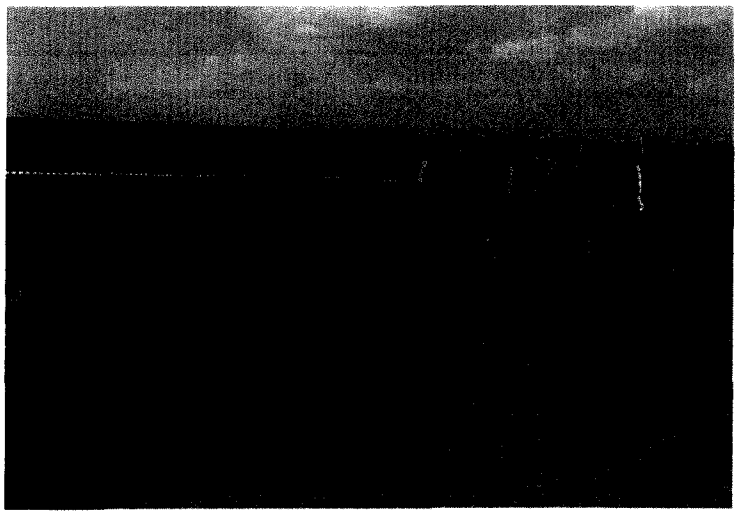


Plate 3-5: Example of a typical farm road crossing over conveyor

3.2 Servitude

A 30 metre wide[6] servitude will be registered for the conveyor. The servitude will be fenced, and there will be a service road and a storm water management system along the conveyor belt.

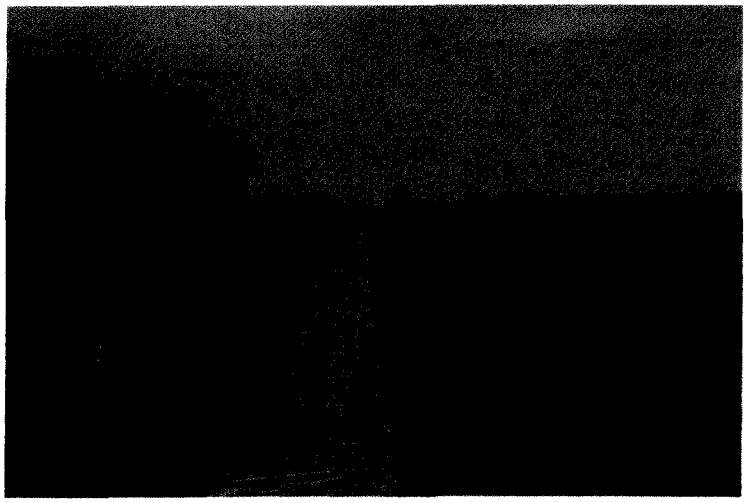


Plate 3-6: Typical example of a fenced servitude with conveyor belt and service road

3.3 Pedestrian and Vehicle/Livestock Crossings

Pedestrian and vehicle / livestock crossings will be provided where required. The positions of the crossings will be determined via consultation with landowners on a case by case basis and will be finalised as part of the detailed design of the project.

6 The scoping report stated that the servitude will be 25 m wide. Please note the servitude width has been increased from 25 m to 30 m to accommodate the power line.

3.4 Power Supply

Power will be supplied via an overhead 22 kV power line.

3.5 Ablutions and Sewerage Treatment

A packaged sewage treatment plant is proposed to treat domestic sewage (Lilliput unit). The plant has been sized to treat domestic effluent for 80 people at 70ℓ per person per day, a total of 5.6 cubic metres per day (maximum 1960 cubic metres per annum).

The treated waste water will be used for dust suppression un-surfaced roads. The plant will treat the water to comply with GNR 399 of 26 March 2004, section 2.7(c) (i) quality limits set for irrigation with sewage water, as tables below.

Table 3-3: Sewerage effluent water quality standards

Parameter	GN 399 Limits
Faecal Coliforms (per 100 ml)	< 1000
Chemical Oxygen Demand (mg/l)	< 75
pH	5.5-9.5
NH_4 as N (mg/l)	3
NO_3 as N (mg/l)	15
Cl (mg/l)	0.25
SS (mg/l)	25
EC (mS/m)	< 70 above intake to maximum of 150
Ortho-phosphates as P (mg/l)	10
Soap, oil and grease (mg/l)	2.5

The packaged sewerage treatment plant will be used during construction and operation phase of the project. Chemical toilets will also be used until the packaged sewerage treatment plant as been installed. Contractors will use chemical toilets along the conveyor route. At the administrative areas a conservancy tank will be used. The conservancy tank and chemical toilets will not be located near streams and wetlands and will be regularly emptied by a 'honey sucker' collection system and the sewage will be taken to an appropriate sewerage treatment facility.

3.6 Borrow Pits

A large portion of the useable borrow material in the area has already been utilised over the years for construction of the various roads (i.e. the N4, N12, and R545) as well more recently for construction of Kusile as well new road associated with Kusile (location of roads and Kusile illustrated on Figure 3-2). In additional, borrow material within the footprint of the sand mines found in the area has also been already removed. Due to this, there is general shortage of borrow material. Three borrow pits have been identified to supply borrow materials for construction of the Phola-Kusile Coal Conveyor and according to the AAIC engineers that identified these, alternative options are not available within the area around the conveyor route. The three borrow pits are illustrated on Figure 1-1 and in more detail on Figure 3-3 to Figure 3-7. The positions and sizes of these borrow pits are preliminary and will be finalised based on the outcome of a geotechnical investigation.

3.7 Storm Water Management and Pollution Control along Conveyor Route and at Transfer Stations

Clean storm water runoff will be allowed to drain freely underneath the conveyor. The conveyor will be covered by a metal cover, the 'doghouse sheeting'. The sheeting will prevent rain from coming into contact with the coal.

Potentially dirty runoff areas at transfer stations, where coal spillages could occur, will be bunded, and runoff directed to a silt trap and suitably lined evaporation dam. The evaporation dams will be designed in accordance to the principles of GN 704 and GNR 77 to accommodate the 1:50 year event as a minimum (i.e. 2% risk of spillage) with 800 mm freeboard. Each evaporation dam will be equipped with a spillway. Clean runoff will be diverted around the transfer stations. The evaporation dams will be lined and equipped with seepage detection systems, which will be monitored on a regular basis to detect any possible contamination of soil and groundwater.

Borrow pits will also be managed with suitable storm water management measures in place, including the diversion of clean runoff and the containment of dirty runoff, with special attention to silt control measures.

3.8 Water Supply

3.8.1 Construction Phase

Potable water demand during construction is estimated at 60 m^3/day as there could be between 200 to 300 people on site at any one time. The water abstracted for potable purposes will be boreholes and from a spring on the property Hartbeestfontein 537 JR. This particular spring has very good quality water, suitable for human consumption.

General construction water demand is estimated at 160 m^3/day and this water will be abstracted from nearby farm dams and boreholes.

These water uses will only be required for a limited time until the mobile water treatment plant is commissioned. However, these water uses will continue until such time as the waste management licence is approved.

3.8.2 Operation Phase

Various water supply options were evaluated (refer Section 4.4), but AAIC's proposed option is to abstract and treat excess water from flooded old underground mine workings found nearby. This option is widely considered as a measure that would notably improve the current quality of water decanting and pumped from the old underground mine workings. This excess water currently decants to surface and/or is pumped into the pan on the property Klipfontein 566 JR. A portion of the water treated will be used for consumption, fire protection and dust suppression and the balance released to the catchment. The abstracted mine water will be treated at a proposed mobile water treatment plant to comply with SANS 241 drinking water standards or with relevant regional water quality objectives as set by the DWA. Therefore there should be no concerns regarding the quality of the released water. On the contrary it will most likely have a positive impact on the system and improve the water quality in the Wilge River (refer Appendix F: Hydrological Specialist Report and Appendix G: Geohydrological Specialist Opinion).

Although the Olifants River catchment is stressed and abstractions are strictly controlled, the quality of the water to be abstracted has been impacted on by historical mining, as shown in water quality monitoring results, and will be treated to potable standards. The overall impact will be positive as a portion of the treated water will be released back to the catchment, improving the water quality of the Wilge River system. Less water will decant from the mine workings as well, thereby further reducing the current negative impact.

3.9 Pre-Treatment Storage Facility

The water that is to be treated by the mobile water treatment plant will be pumped from the old underground workings and stored in a 1.5 Mℓ pre-treatment storage facility. From here, the water will be pumped to the mobile water treatment plant to be treated to potable standards.

3.10 Mobile Water Treatment Plant

The mobile water treatment plant will treat the water abstracted from old underground mine workings. It will have a capacity to treat a maximum of 4 Mℓ/day, and an average of 1.5 Mℓ/day, since the volume of excess water is estimated to be ~1.5 Mℓ/day (pers. Comm. Jaco van den Berg, JMA groundwater specialist). Limiting the abstraction to 1.5 Mℓ/day will avoid aggravating the risk of spontaneous combustion in the mine workings due to the lowering of the water table.

According to a study for water management options[7], the water quality of the water abstracted from the old underground mine workings, before treatment, will be as given in tabled below.

[7] Golder Associates Africa, 2011. Pre-Feasibility Study Mine Water Management New Largo Project. Report No.: 13054-10360-1.

Table 3-4: Quality of Water Abstracted from Underground Mine Workings

Parameter	Unit	Regional Water Quality Objectives (RWQO)	Current quality
pH		6.5-8.5	
EC	mS/m	40	290
Sulphate (SO_4)	mg/ℓ	60	2130
Iron (Fe)	mg/ℓ	1.0	
Aluminium (Al)	mg/ℓ	0.02	
Manganese (Mn)	mg/ℓ	0.18	2.4
Sodium (Na)	mg/ℓ	20	32
Magnesium (Mg)	mg/ℓ	20	196
Fluoride (F)	mg/ℓ	0.5	0.8
Chloride (Cl)	mg/ℓ	20	
Total Dissolved Solids (TDS)	mg/ℓ	280	3309
Potassium (K)	mg/ℓ	10	
Calcium (Ca)	mg/ℓ	25	568
Ammonia	mg/ℓ as N	0.007	0.06

Note: The values highlighted in red do not comply with regional water quality objectives as set by the DWA, while those in blue do.

3.11 Treated Water Release

A portion of the 1.5 Mℓ/day treated at the mobile water treatment plant will be used along the conveyor system for the deluge fire protection system and the sprinkler dust suppression system, and a small portion for potable purposes. The remainder of the treated water will be discharged to the catchment. The release point of water from the mobile treatment water plant will be designed to ensure adequate energy dissipation / attenuation of water to reduce water velocities and the potential for erosion and to minimise impact on streams. The volumes of water released will not exceed a maximum of 4 mega litres (4000 cubic metres) a day as per the water use license application.

The water will be discharged to the Klipfonteinspruit, a tributary of the Wilge River.

The volumes of water released will be very small and are not expected to exceed 0.046 m^3/s, which is likely to be less than the 1:2 or 1:5 year flood event (the 1:20 year event is 43 m^3/s). There is a minimal risk of erosion, but a concrete lined canal will be used to prevent erosion of the stream bank where the water is released and a flow attenuation structure will be provided at the release point to avoid erosion.

3.12 Water Reticulation and Storage

There will be a water pipeline, with a system of water tanks and storage reservoirs, from the water supply point (proposed mobile water treatment plant) to all the transfer stations along the length of the conveyor route. Each transfer station will be provided with elevated JoJo tanks for potable water storage. The water from these tanks will be used for dust suppression, fire suppression and wash-down.

3.13 Deluge Fire Protection

The conveyor system will have deluge systems for fire protection at the Phola Processing Plant surge bin and conveyor 501 point and at the transfer point at the New Largo distribution bin. Each deluge system will have two 420 m^3 tanks to store potable water for fire suppression during an emergency. A deluge system has all sprinklers connected to the water piping system open at all times. The sprinklers are connected to a dry pipe that is connected to a main water supply. A fire detection device controls the main valve. When it is activated, the valve opens, allowing large amounts of water to flow through all of the sprinklers. The purpose of a deluge system is to quickly wet down an entire hazard area to prevent a fire from spreading. The system requires potable (clean) water to prevent clogging of the sprinkler nozzles.

3.14 Dust Suppression and Control

The conveyor system will have sprinkler dust suppression systems at all transfer stations to suppress dust at the transfer station. It will also dampen the coal that is transported along the conveyor flights. There are seven transfer stations along the conveyor routes where the coal will be dampened. The sprinkler system requires potable (clean) water to prevent clogging of the nozzles.

The doghouse sheeting will be placed in accordance to the prevailing wind direction and will act as mitigation to reduce windblown dust along the length of the conveyor.

Treated waste water from the package sewerage plant will be used for dust suppression on the haul roads during construction and potentially on the service road during operation, however, due to the limited number of vehicles expected to be used on along the service road during normal operations, this is likely to be only required in the case of extensive maintenance operations.

3.15 Mobile Water Treatment Plant Waste Management

A water treatment plant will generally produce two waste streams, namely brine and gypsum.

3.15.1 Brine Disposal Facility

With the technology available and the quality of the water to be treated, it is anticipated that no brine will be produced. However, in the interests of responsible business, AAIC will construct a brine pond to store any brine that may be produced as a result of water quality fluctuations or design changes. The brine pond will be designed according to hazardous waste lagoon standards (for more detail please refer to the DWA's second edition 'Minimum Requirements for waste disposal by landfill', DWA).

The detailed designs for the liners, drains and leakage detection systems are provided in the water use licence application documentation for submission to the DWA.

3.15.2 Gypsum Disposal Facility

Due to the quantities of water being treated, very little gypsum waste is expected. For this reason, AAIC will ensure that it is the responsibility of the mobile water treatment plant contractor to dispose of this waste. It will be stipulated that the gypsum be disposed of at a licensed waste facility capable of handling gypsum waste.

The temporary gypsum waste storage facility that will be located within the footprint of the treatment plant, will act as a storage pad from where the contractor can collect and remove the waste. The storage pad will be designed to contain impacted water generated on it. The storage pad will also be designed to prevent the ingress of clean surface water from the catchment area. The design will cater for at least the 1:100 rainfall event and must prevent the seepage of impacted water into the environment.

3.16 Hazardous Waste Management

Hazardous waste produced may include hydrocarbon waste from workshops and servicing areas, used petroleum products, used cleaning materials and other materials used in the maintenance of the conveyor system, light bulbs (including fluorescent tubes which is regarded as hazardous) and electronic waste, which will be removed off site by an appropriate licensed waste company for disposal. The qualities of hazardous wastes will be fairly small and will not trigger the need for a waste management license.

3.17 General Waste Management

General waste will include general office waste such as paper and other degradable materials which will be disposed of offsite at a licensed facility. The qualities of general wastes will be fairly small and will not trigger the need for a waste management license.

3.18 River and Wetland Crossings

The conveyor system will cross streams and wetlands along its route from the Phola Coal Processing Plant to the Kusile Power Station. At each of the stream crossings, the conveyor system will be fully enclosed with environmental gantries – specially designed conveyor sections bridging streams and wetlands raised higher than the 1:100 year floodline and provided with a roof, partial side screens for minimizing fugitive wind blown coal dust from conveyor, and an impervious floor for capturing coal spills, drip-off and wash-down water. During shut-off, spilled coal can be picked up from the gantry floor and put back onto the conveyor. Since the environmental gantries are covered, water collecting in the gantries is should be minimal. Any water collecting in the gantries will evaporate or can be manually removed.

For the Phola-Kusile Coal Conveyor, the gantries will be elevated to above the level of the 1:200 year floodline so as to not encroach into the wetlands and the riparian zone. The elevated conveyor system will be supported by concrete pillars. These pillars will be protected from scour with clean dump rock and riprap (unpolluted by carbonaceous material). Belt turn overs will be provided between transfer points in order to ensure that the dirty belt runs on top of the return idlers in order to eliminate coal spills dropping onto the ground.

The area where the conveyor or road crosses a watercourse will have erosion protection measures in place in the form of 300 mm riprap as well as gabion mattresses on either end of the service road and drifts. All facilities need to accommodate at least the 1:50 year event in accordance with principals of GNR 704 and GNR 77.

The service road crossings of these streams will be in the form of drifts (low water bridge where the road surface follows the contours of the river bed), thereby minimising restrictions on water flow. Sub-surface drains are provided to ensure hydrological continuity.

3.19 Area Lighting

Energy efficient lighting will be provided in and around at the transfer points. In addition, start-up safety lights will be provided along the conveyor at 100 metre intervals. The function of these area lights is to provide a visual warning to people working in close proximity to the conveyor each time the conveyor starts up (i.e. after the conveyor was stopped for maintenance purposes). LED lights will be used to specifically light up the area directly adjacent to the conveyor, while minimizing light pollution, glare and eliminating sky glow. This is also to improve visibility at transfer stations where work needs to be conducted.

3.20 Start-up Sirens / Alarms

Start-up sirens will be provided at regular 100 metre intervals along the conveyor to provide an audible warning to all people operating/working inside the conveyor servitude if the conveyor is stopped or started up for any reason, for example maintenance, inspections etc. The alarms will have a certain tone and intensity level (not more than 85 dB) in order to comply with nuisance and health and safety laws and regulations.

3.21 Service / Maintenance Road

A service road will be provided in the servitude to provide access for maintenance and emergency purposes as well as to act as a fire break.

3.22 Diesel Storage

Temporary diesel tanks will be provided during construction along the conveyor servitude. These tanks will be provided with impervious spill containment (bunding). The storage tanks used for this project will be self-contained tanks, which incorporates overspill bunds integrated into the design of the tanks.

3.23 Construction Laydown Areas

During construction, the contractor will require areas to use as laydown areas for construction equipment and project components and as administration areas. These laydown areas will be positioned at strategic locations along the conveyor routes. The footprint of the proposed mobile water treatment plant will also be utilised as a laydown area as the installation of the treatment plant will only occur towards the end of the construction phase; this will limit the footprint area affected.

3.24 Rail, Public Roads, Pipelines, Power Lines and Other Infrastructure

The road network around the study area is illustrated in Figure 3-2. The R545 provincial tar road currently provides a north-south link between the N4 and the N12 highways. Approximately 12 km to the south of the N4 interchange the R545 diverts to the east, towards Wilge Village. The D686 continues to the south to form the north-south link between the R545 (from the point of diversion) to the N12 interchange, and Kendal further south (the D686 is often referred to as the southern extension of the R545). A new road, known as the Kusile road, is currently under construction to the west of the Kusile Power Station. The road will provide future access to the Kusile Power Station.

Two major public roads with high traffic demands, the N12 and the D686 (R545 southern extension south of the N12), will be crossed. For the road crossing at the N12, an existing unused railway line culvert under the N12 highway will be used. Transnet has given consent for construction of the conveyor through the culvert (Appendix C). At the D686 (R545 southern extension) crossing, the conveyor will bridge across the road.

There are a number of pipelines, including petroleum pipelines, and power lines in the vicinity of the Phola-Kusile Coal Conveyor routes.

AAIC is in ongoing discussions with the various infrastructure owners to discuss and finalise arrangements for protection of the infrastructure during the construction and operation of the conveyor and the avoid service interruptions.

AAIC is also in discussions with prospecting / mining right holders, i.e. BECSA and AEMFC, regarding the provision of haul road crossings along sections of the conveyor where access to current and future mining areas will have to be provided. The provision and details of these haul road crossings as well as the location and design of pedestrian and farm vehicle / livestock crossings will be dealt with on a case by case basis and in consultation with the affected land owners, occupiers of the land and prospecting / mining right holders.

3.25 Employment

An estimated 300 people will be employed during the construction phase and approximately 16 people during the operational phase.

3.26 Project Cost

The estimated capital cost to develop the Phola-Kusile Coal Conveyor is R 1,4 billion.

3.27 Project Implementation Schedule

The preliminary implementation schedule for the Phola-Kusile Overland Coal Conveyor is tabled below.

Table 3-5: Simplified Project Implementation Programme

Project Phase	Schedule	
Planning Phase	2010 to July-2012	2010 2011
Construction Phase	Aug-2012 to Sep-2013	2012
First Coal Delivered to Kusile	Oct 2013	2013
Operation of the Phola-Kusile Coal Conveyor	For the Life of Kusile Power Station	beyond 2070

The table above lists the start of the construction phase as August 2012. However, should the necessary approvals be in place at an earlier date, AAIC would start with construction as soon as possible in order to avoid any potential details to the delivery of coal to Kusile and to maximise construction during the drier months of the year (i.e. May to August), which would minimise the impacts on affected streams and wetlands.

Table 2-1 on page 27 and Table 2-2 on page 28 provide more detail on the EIA process and future opportunities for consultation and participation over the life of the project.

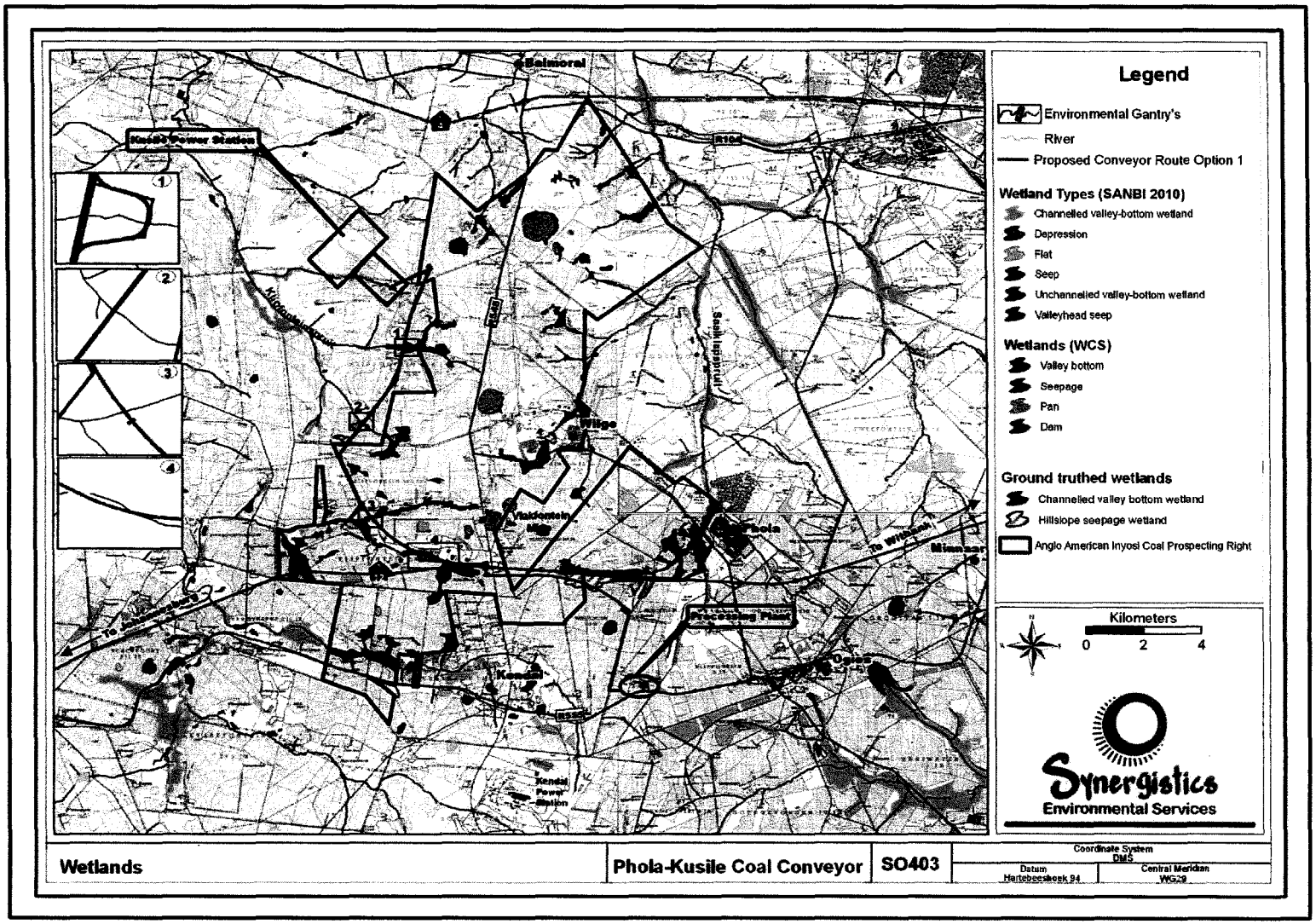


Figure 3-1: AAIC Proposed Conveyor Route in relation to streams and wetlands, showing locations of proposed environmental gantries

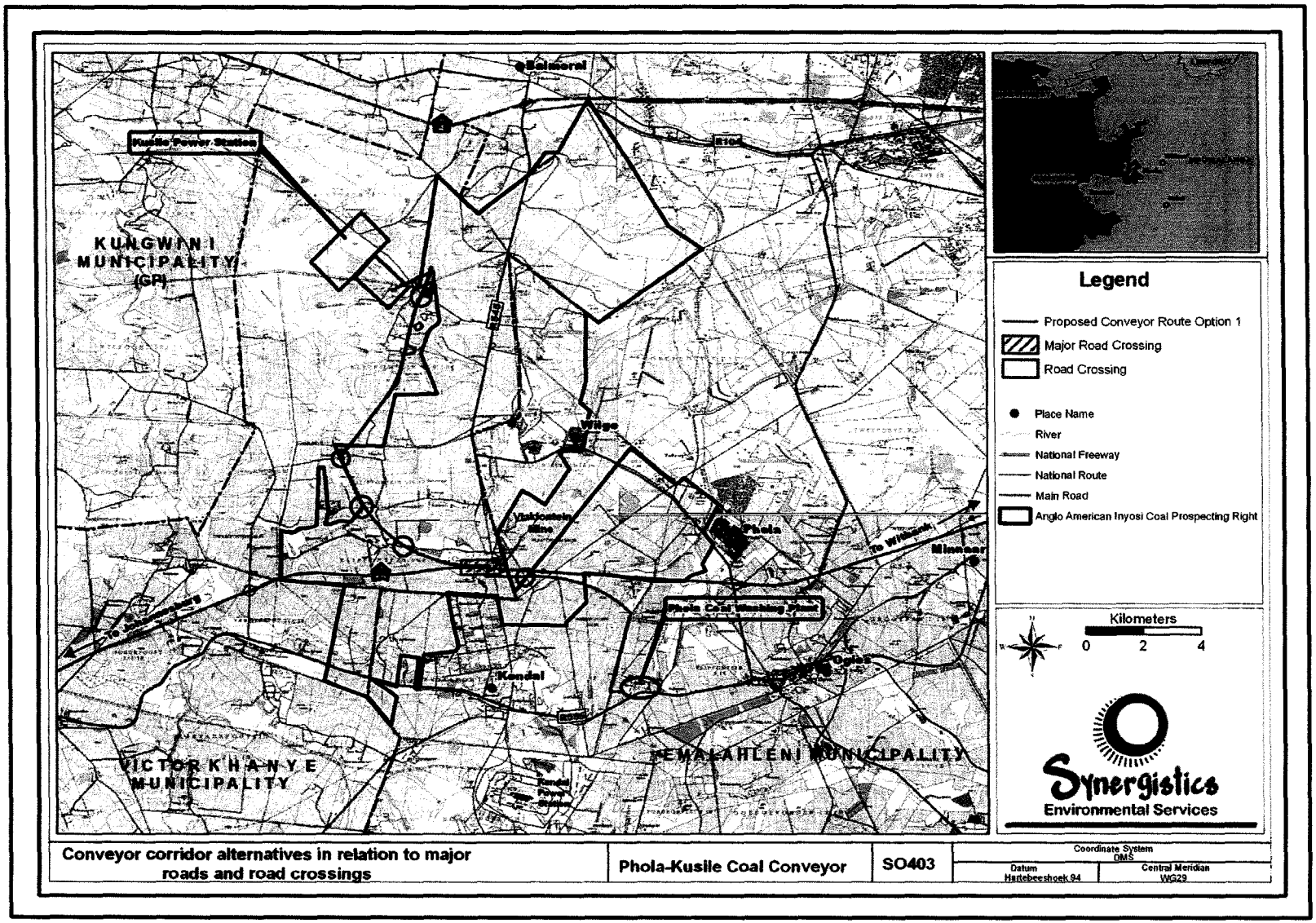


Figure 3-2: AAIC Proposed Conveyor Route in relation to major roads and road crossings

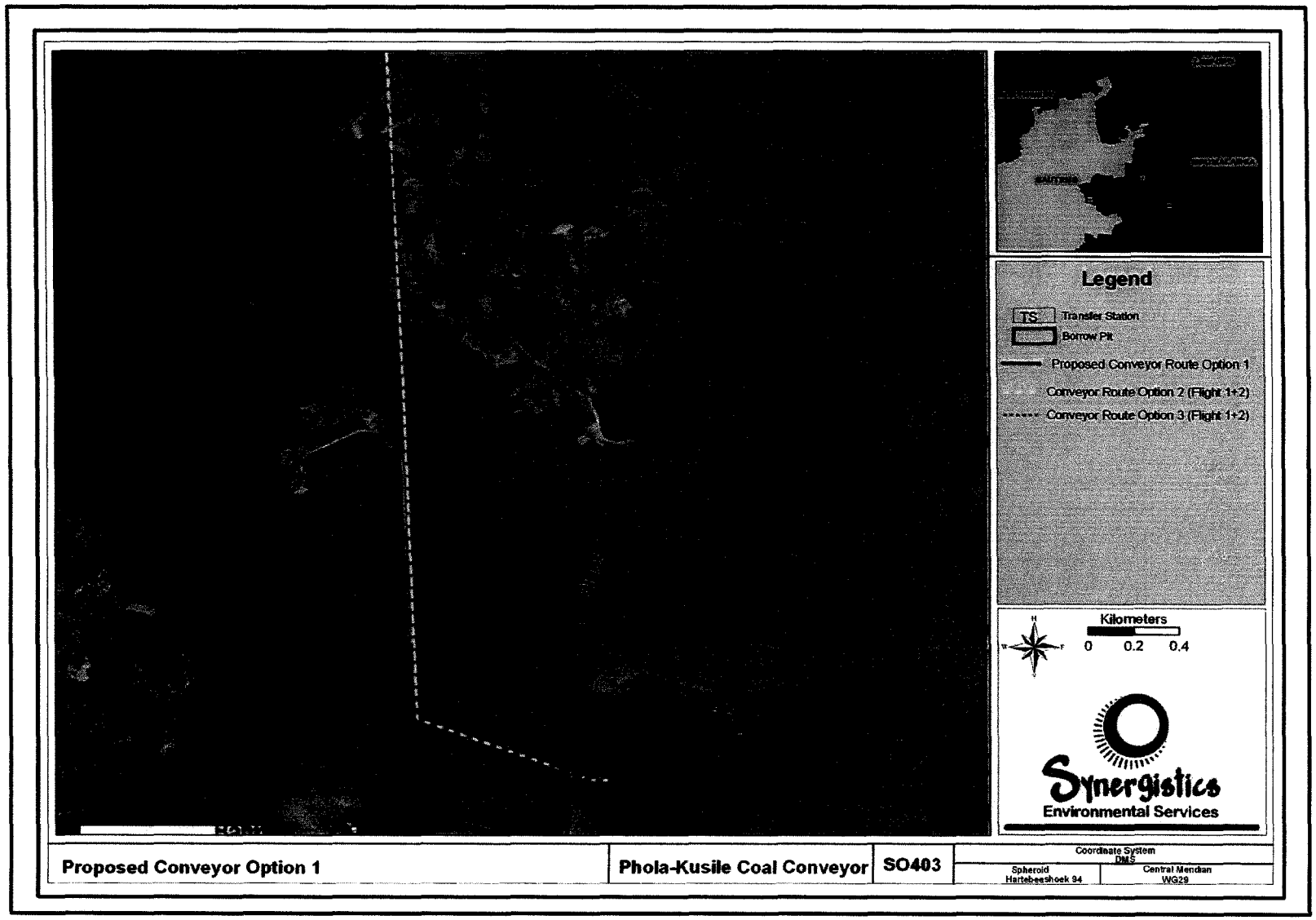


Figure 3-3: Details of Conveyor Flight 1 (the first flight from Phola Coal Washing Plant)

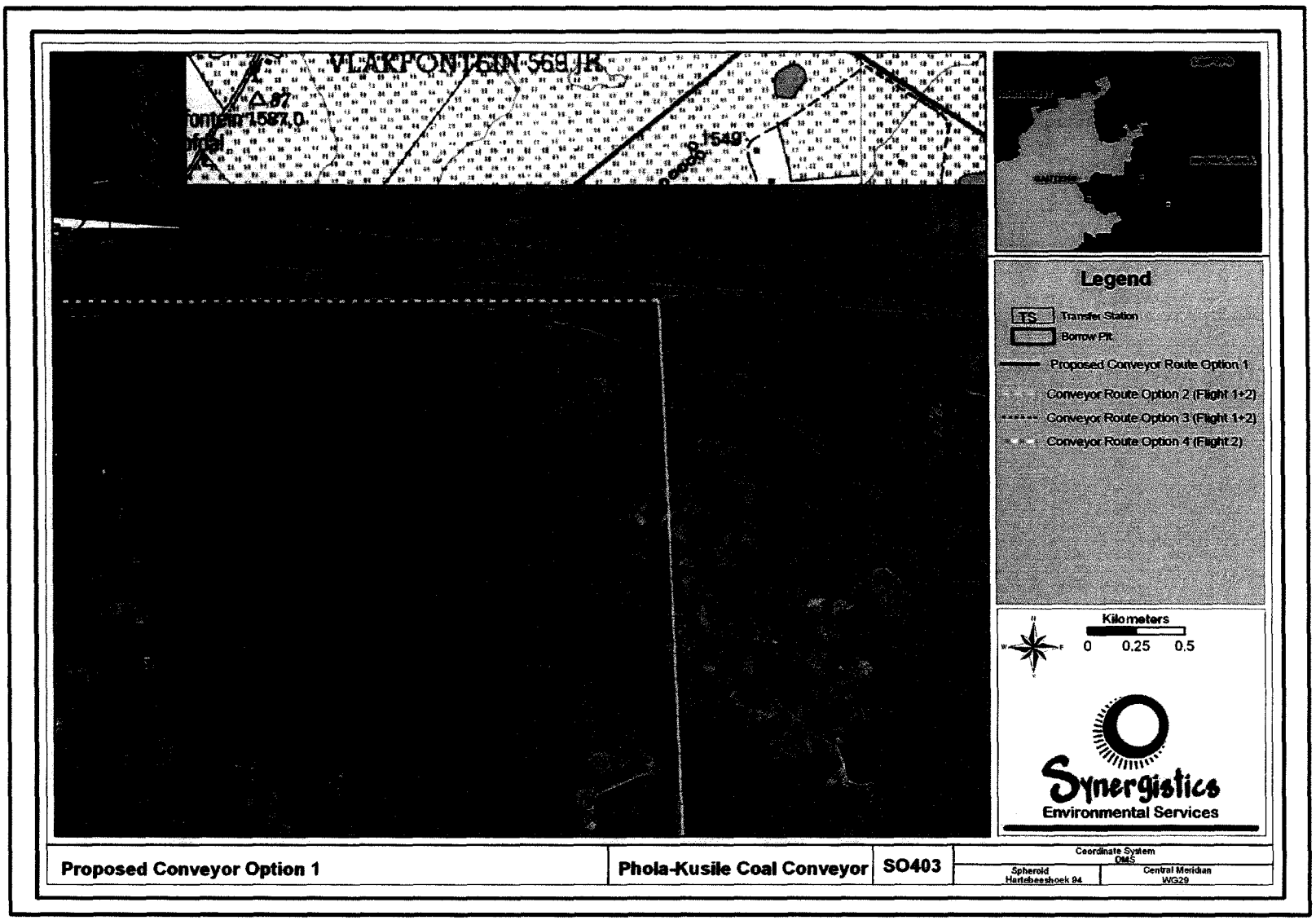


Figure 3-4: Details of Conveyor Flight 2

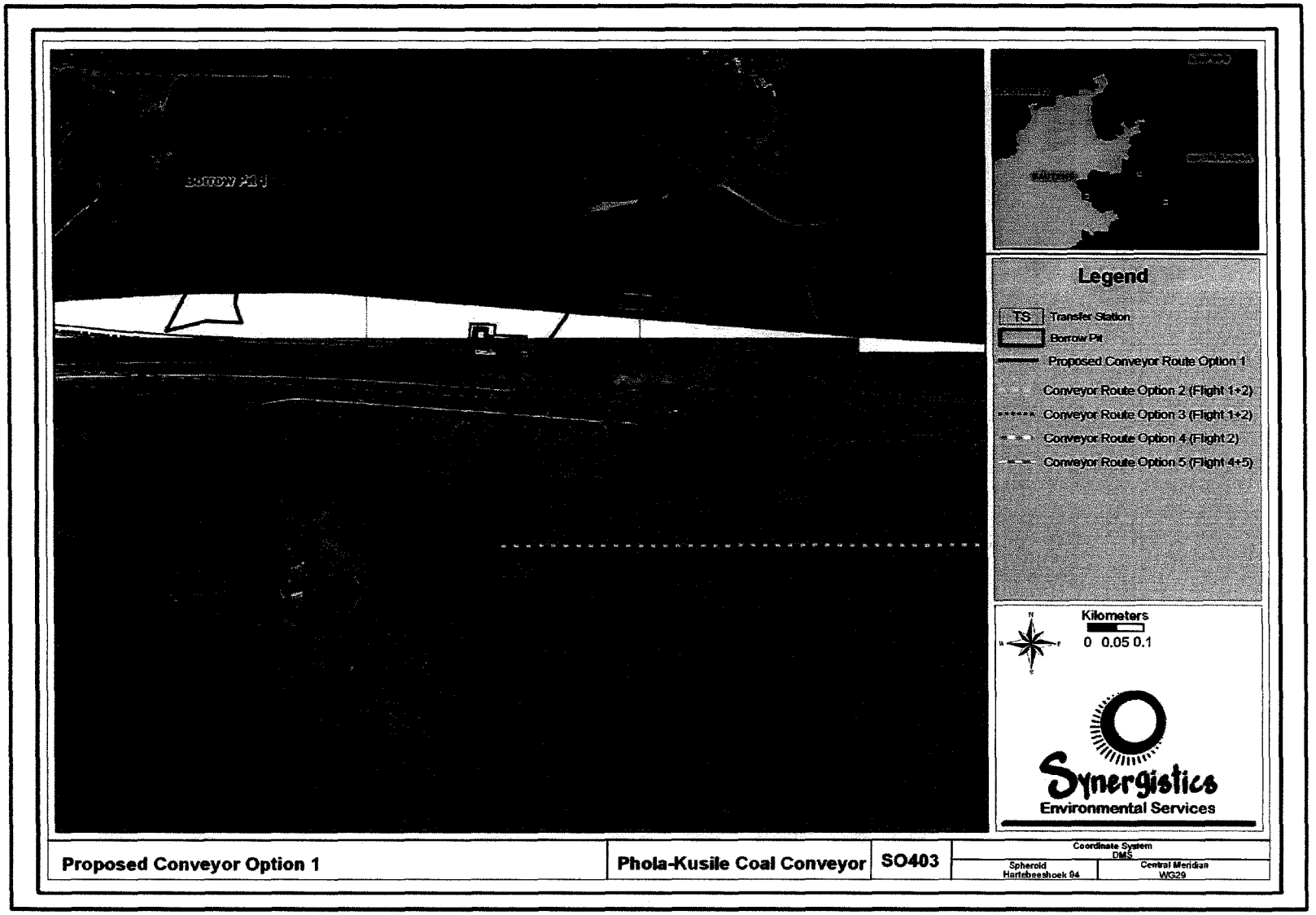


Figure 3-5: Details of Conveyor Flight 3

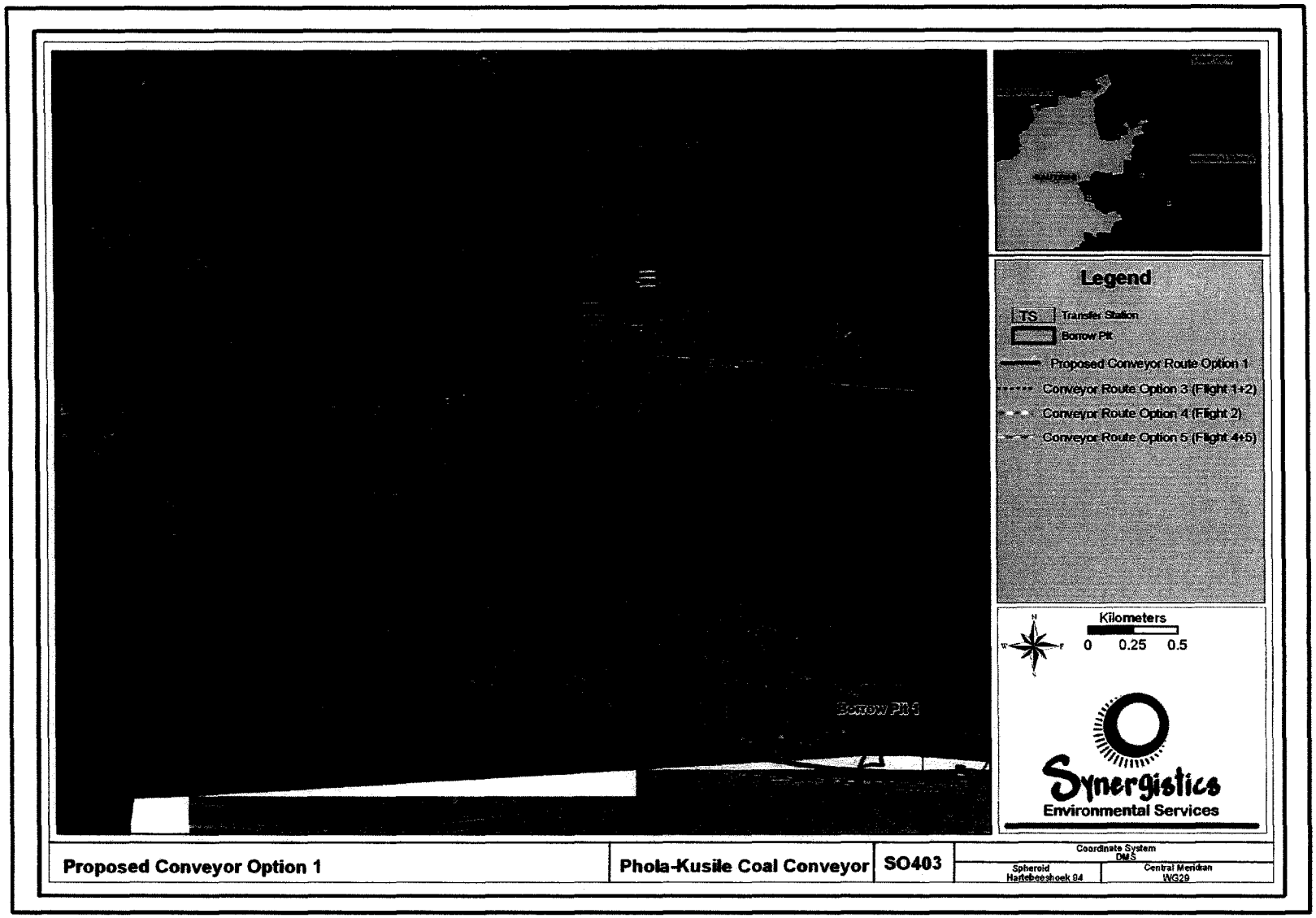


Figure 3-6: Details of Conveyor Flight 4

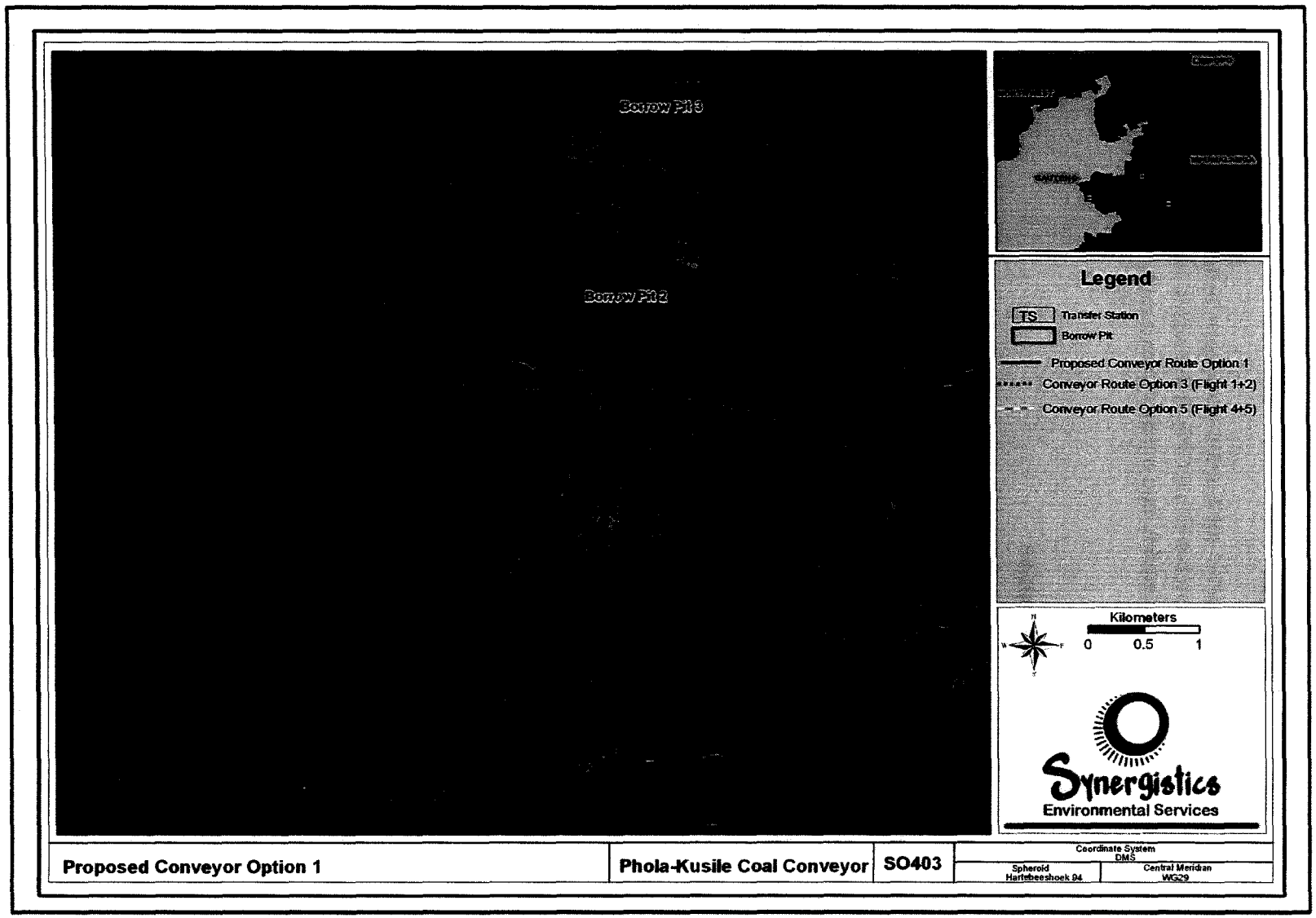


Figure 3-7: Details of Conveyor Flight 5 and Flight 6 and 7 (lasts flight into Kusile Power Station)

4. Development Alternatives

4.1 Alternative Developments

The AAIC project team has investigated road and rail transport options as alternatives to the overland conveyor option to transport coal from the Phola CPP to the Kusile Power Station, but none of the other transport options were regarded as feasible and will therefore not be taken further into the EIA phase of the project.

4.1.1 Railway Transport Alternative

Three railway options were investigated (see Figure 4-1) namely:

- The new Arbour private siding of 18.3 km in length from the south. Kusile chose to bring in lime from the north of the power station and therefore did not build the southern section of the line which would have been required for this option.
- The new Balmoral private siding of 12.9 km in length. A total rail distance longer than 50 km would be required in order to link with the railway line via Witbank and back to Kusile.
- An independent system would need to cross over the proposed New Largo Colliery and therefore sterilise coal reserves.

AAIC does not regard rail transport a feasible option for further investigation due to prohibitively high costs and the incompatibility with Eskom's requirements and the Kusile load-out facilities as no provision for coal trains has been incorporated into the design of the power station.

4.1.2 Road Transport Alternative

AAIC investigated various road transport options (see Figure 4-2) but road transport was not regarded as a feasible option for further investigation due to the high coal tonnages to be transported over long distances and the high frequency of trucks that will be required. The impacts on the road network, air quality impacts, as well as the technical and safety constraints due to the high frequency of trucks are regarded as fatal flaws to this option.

4.1.3 Conveyor Transport Alternative

AAIC regards an overland conveyor system as a feasible and the most suitable solution for transportation of coal from the Phola Coal Processing Plant to the Kusile Power Station. This decision took into account the fact that the overland conveyor option will:

- Have significantly less dust impacts than the road transport option.
- Have significantly less disruption on existing roads and road traffic than the road transport option.

- Be economically feasible and cost effective (capital and operating costs).
- Be easier to implement than the other transport options.

In addition, there were general agreements from I&APs that the conveyor transport alternative was in fact the best option for transporting coal to Kusile (refer Section 6). They did however stress that local impact on affected properties should not be ignored.

4.1.4 No-Go Development Alternative

AAIC maintains that the no-go development alternative:

- Will jeopardise the supply of a timeous and secure supply of coal to Kusile, especially since other options for transporting coal to Kusile (road and rail) were not found to be feasible.
- Prevent Kusile from being able to provide power to the national electricity grid on schedule.
- Create power shortages in the national grids since there are no short to medium term options to replace Kusile's energy generation capacity on a national level.
- Will have negative impacts on national economic growth and development.

4.1.5 Synthesis and Ranking of Alternative Developments, including the No-Go Development Option

Development Alternatives	Conveyor Transport of coal to Kusile	Rail Transport of coal to Kusile	Road Transport of coal to Kusile	No-Go Development (coal not taken to Kusile)
	Alterative Development 1 **PROPOSED DEVELOPMENT**	Alterative Development 2	Alterative Development 1	No-Go Development
Ranking of Options		2	3	4

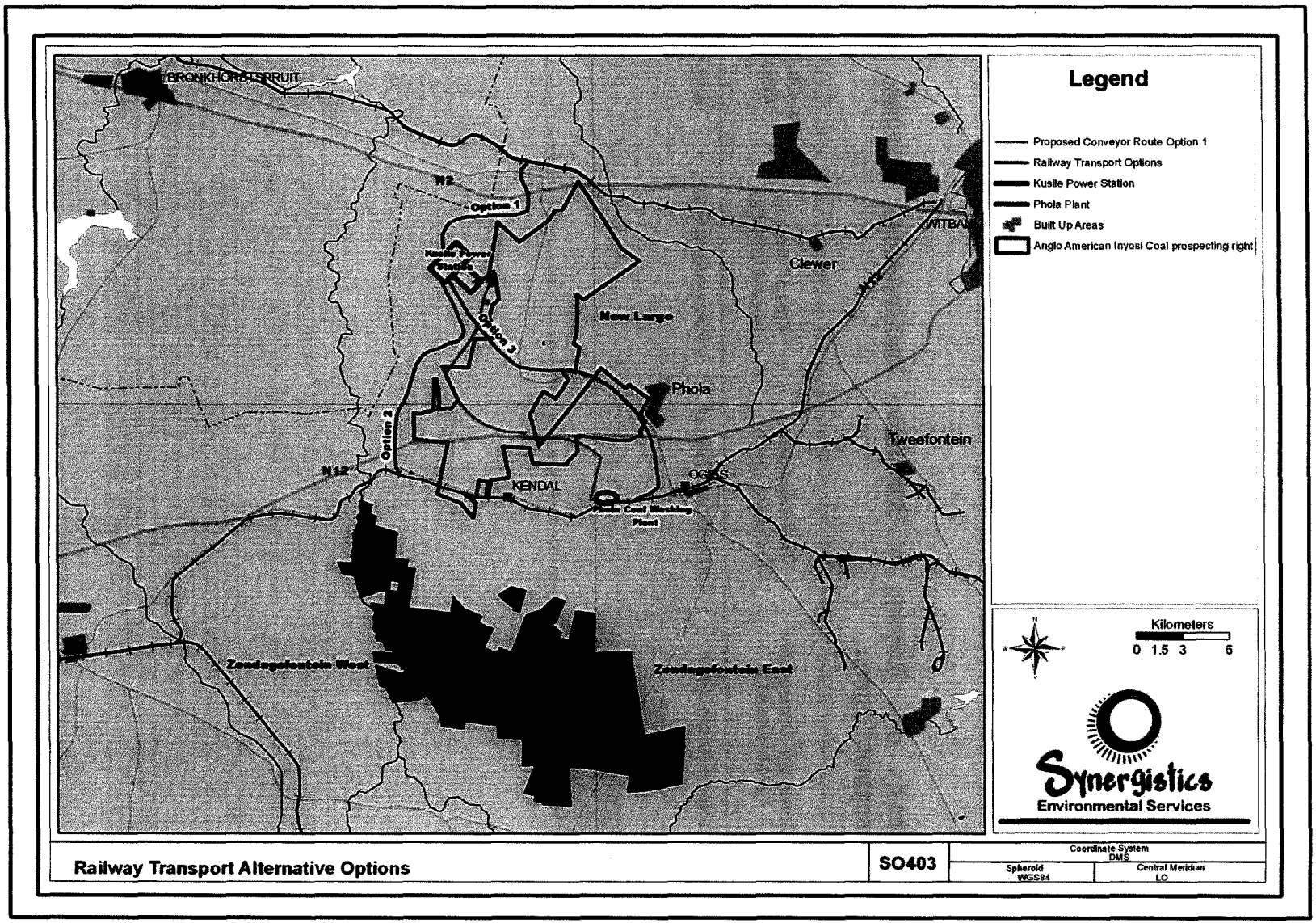


Figure 4-1: Railway transport alternative options

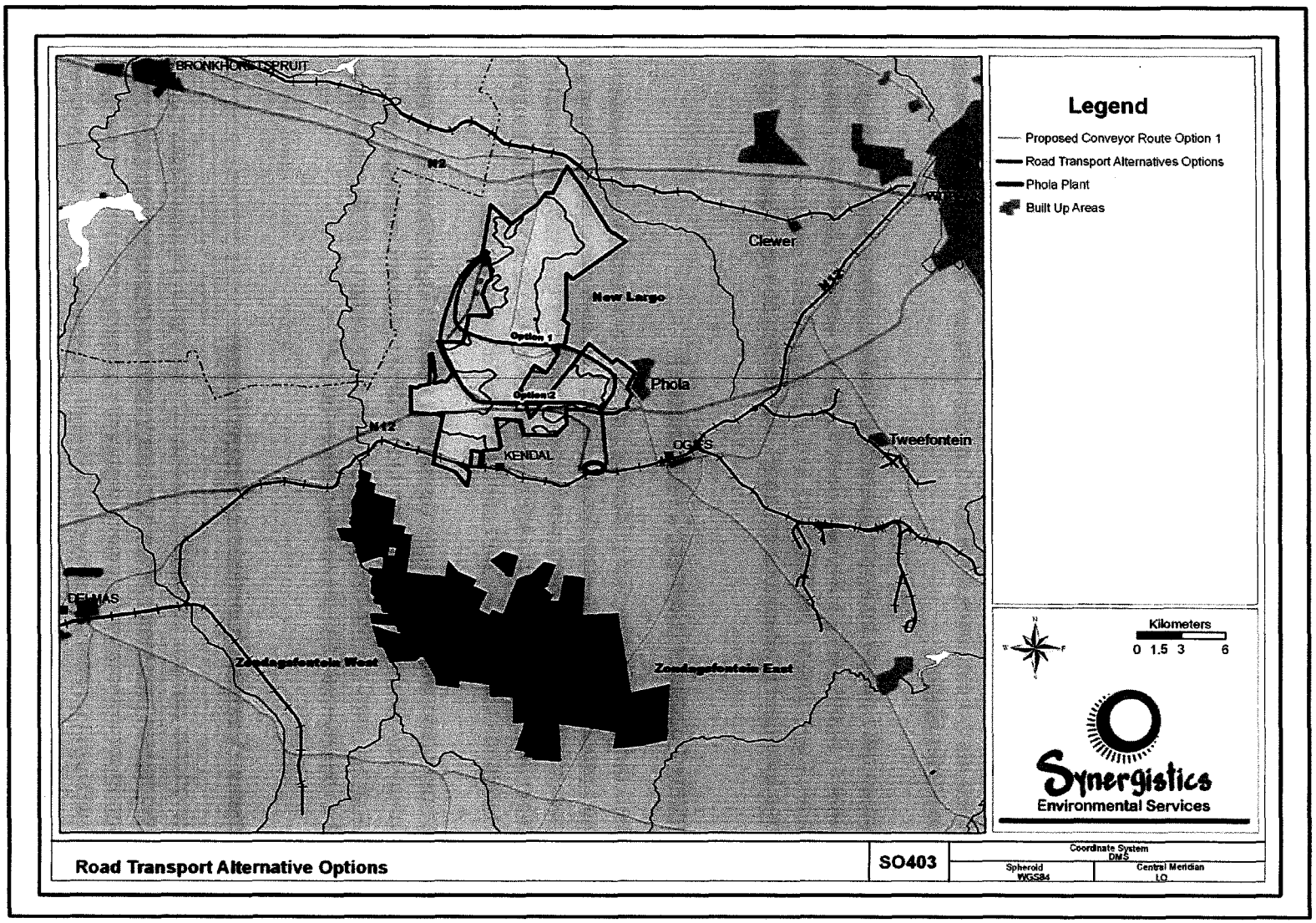


Figure 4-2: Road transport alternative options

4.2 Alternative Conveyor Corridors

Three alternative corridor routes for the conveyor were originally identified. The corridor routes are illustrated in Figure 1-3.

4.2.1 Proposed Corridor (Corridor 1 - Blue Route)

The proposed corridor takes the Phola-Kusile Coal Conveyor across the southern section of the AAIC New Largo prospecting right area along the N12 highway – thus along an area where coal resources are already sterilised by other east-west running linear infrastructure.

The route starts at the Phola Coal Processing Plant in the south, running in a northerly direction towards the N12, where-after it will turn west to run parallel to the N12. The initial alignment was to the north of the N12 but due to the implications of the conveyor route crossing and thus sterilising the mineral resource area of AEMFC, an alternative alignment along the south of the N12 was identified.

After the route crosses the N12, the route will turn northwest until it reaches the western perimeter of the AAIC prospecting area. From here it will run in a north-easterly direction until it reaches the stockyard near the Kusile Power Station.

This route crosses land owned by Anglo Operations Limited, Ingwe Surface Holdings, Truter Boerdery, Bronlaw Properties, South African National Roads Agency Limited (SANRAL), Waterfontein Boerdery, Frazer Alexander Coal, Eskom Holdings Ltd and privately owned farms. From south to north it runs across the farms Smaldeel IS, Bankfontein 216 IR, Vlakfontein 569 and Klipfontein 568 JR.

4.2.2 Alternative Corridor (Corridor 2 - Red Route)

Corridor 2 takes the Phola-Kusile Coal Conveyor around the southern and western perimeter of the AAIC New Largo prospecting rights area, thus avoiding this area completely. It starts at the Phola Coal Processing Plant in the south, running westwards parallel to the R555 where-after it will follow the existing powerline servitude northwards. After the route crosses the N12, it will turn in a north-easterly direction until it reaches the coal stockyard near the Kusile Power Station.

This route runs over land owned by Anglo Operations Limited, Truter Boerdery, Ferret Coal, Homeland Mining and Energy SA, Shanduka Coal (Pty) Ltd, SANRAL, Eskom Holdings Ltd and privately owned farms. From south to north it runs across the farms Bankfontein 216 IR, Heuvelfontein 215 IR, Van Dyksput 214 IR, Dwaalfontein 565 JR and Klipfontein 566 JR.

4.2.3 Alternative Corridor (Corridor 3 - Purple Route)

The first section of this corridor is similar to corridor 2, thus taking Phola-Kusile Coal Conveyor around the southern and western perimeter of the AAIC New Largo prospecting rights area. It starts at the Phola Coal Processing Plant in the south, running westwards parallel to the R555. After the route crosses the N12, the route will turn in a north-easterly direction until it reaches the coal stockyard near Kusile.

The route runs over land owned by Anglo Operations Limited, Truter Boerdery, Ferret Coal, Homeland Mining and Energy SA, Shanduka Coal (Pty) Ltd, SANRAL, Eskom Holdings Ltd and privately owned farms. From south to north it runs across the farms Bankfontein 216 IR, Heuvelfontein 215 IR, Van Dyksput 214 IR, Dwaalfontein 565 JR and Klipfontein 566 JR.

4.2.4 Synthesis and Ranking of Alternative Conveyor Corridors

Development Alternatives	Corridor 1 (Blue Route) **PROPOSED CORRIDOR**	Corridor 2 (Red Route)	Corridor 3 (Purple Route)
Ranking of Options		Discarded. Not Feasible.	Discarded. Not Feasible.

The blue route corridor was identified as the preferred route from an environmental viewpoint. The costs of the three route corridors are not significantly different and therefore are not the main decision-making factor. The decision to adopt the blue route corridor as the proposed option was therefore mainly based on environmental grounds such as:

- Minimising the sterilisation of prospecting and mining rights held by external parties and not by AAIC.
- Minimising alignments over previously mined areas.
- Minimising alignments over critical biodiversity areas.
- Minimising stream and wetland crossings.
- Minimising alignments over private land and disruption to landowners (veldt fires, theft, security, movement, agricultural practices).
- Minimising impacts on human settlements.

At the public meetings on 22 and 23 March 2011, the public agreed that the Blue Route Corridor be adopted and that the Red and Purple Route Corridors be discarded (Appendix C6) and list of issues and responses in Section 6.2.

4.3 Alternative Conveyor Alignments Along the Proposed Conveyor Corridor

Once the Blue Conveyor Corridor was identified as the proposed conveyor corridor (as described in Section 4.2.4), various conveyor route alternatives were investigated along the proposed conveyor corridor. These are discussed in a series of tables below.

Table 4-1: Evaluation of Alternative Route Options for Conveyor Flights 1 and 2

PHYSICAL PROPERTIES	PROPOSED ROUTE (OPTION 1)	ROUTE OPTION 2	ROUTE OPTION 3	ROUTE OPTION 4
Refer Figure 1-2	Pink Route (Curved Route Flight 1 & 2) *Refer Figure 3-3 and Figure 3-4*	Yellow Route (Western Route Flight 1 & 2) *Refer Figure 3-3 and Figure 3-4*	Orange Route (Eastern Route Flight 1 & 2) *Refer Figure 3-3 and Figure 3-4*	Green Route (Northern Route) *Refer Figure 3-3 and Figure 3-4*
General description.	Start at Phola Coal Processing Plant. From TS1 it follows the Eskom power line servitude north to a point ~1.3 km south of the N12 at TS2. From here the second flight curves north-westwards towards the N12 highway and runs parallel to the highway in a western direction until it reaches TS3 at an existing culvert underneath the N12 just west of the intersection of the N12 and R545 road.	Start at Phola Coal Processing Plant. From TS1 it runs northwards along the boundary of Ferret Coal and Ingwe to TS3 just south of the N12 highway. From here the second flight runs west and remains parallel to the N12 highway until it reaches TS3 at an existing culvert underneath the N12 just west of the intersection of the N12 and R545 road.	Start at Phola Coal Processing Plant. From TS1 it follows the Eskom power line servitude north to just south of the N12 at TS2. From here the second flight runs west and remains parallel to the N12 highway until it reaches TS3 at an existing culvert underneath the N12 just west of the intersection of the N12 and R545 road.	This option involves a route running northwards (from Option 2) to cross the N12 highway, then turning westwards.
Delays to delivery of coal to Kusile.	No known factors to delay project.	Some of the mining areas (Homelands, West Coal, and Shanduka) along this route has not been rehabilitated and won't be rehabilitated for a number of years. This route is therefore unfeasible to supply coal to Kusile at the dates expected by Eskom.	No known factors to delay project.	Requires a new crossing under the N12. Complications with the jacking under road surface could result in construction time delays, which could compromise timeous delivery of coal to Kusile.

PHYSICAL PROPERTIES	PROPOSED ROUTE (OPTION 1)	ROUTE OPTION 2	ROUTE OPTION 3	ROUTE OPTION 4
Landowner consent.	Southern Section Subsequent to an initial objection raised by BECSA about sterilisation of their coal resources, an agreement has been put in place between AAIC and BECSA in which BECSA agreed to a route for the conveyor closely following the existing Eskom 132 kV power line, and on condition that AAIC provides a crossing for BECSA mining equipment.	Unfeasible due to mining areas that have not yet been rehabilitated (Homelands, West Coal, and Shanduka).	Southern Section Subsequent to an initial objection raised by BECSA about sterilisation of their coal resources, an agreement has been put in place between AAIC and BECSA in which BECSA agreed to a route for the conveyor closely following the existing Eskom 132 kV powerline, and on condition that AAIC provides a crossing for BECSA mining equipment.	A route north of the N12 would impact significantly on AEMFC (Vlakfontein) mining areas and was regarded as unfeasible by AEMFC. AEMFC requested the route be moved to the south of the N12 – see Option 1 to 3.
	Northern Section Discussions underway with Truter Boerdery Trust regarding compensation for impact on agricultural use of the land. Compensation is likely to be in the form of a land swap.		Northern Section Discussions underway with Truter Boerdery Trust regarding compensation for impact on agricultural use of the land. Compensation is likely to be in the form of a land swap.	
Total footprint area of impact.	Smallest footprint area affected, shortest route.	Second largest footprint area.	Largest footprint area.	Similar to Option 2.
Impact on dams, wetlands and streams. (see Figure 5-5 and Figure 3-1)	Biggest impact on wetlands (HGM-1) of the four options.	Does not impact on streams and wetland (HGM—1) affected by Option 1.		
	This route was identified as an alternative to Option 3 in order to avoid streams and large wetland (HGM-2) areas further north and along the N12 (Figure 5-5).	Does not impact on streams and wetlands to the east affected by Option 3.	Not recommended as this route impacts on a number of streams and wetlands (HGM-2) in the area to the south of the N12, in the area east of Option 1 and 2 (Figure 5-5).	Does not impact on streams and wetlands to the east affected by Option 3.
	Smallest impact on hydro-geomorphic unit 3 (HGM) of the four options, as the line is located further south and along the edge of the wetland.	Bigger impact on HGM-3 than Option 1, as these routes run through the centre of the wetland and for a longer distance.		Biggest impact on HGM-3 of the four options, as the line runs through the centre of the wetland and for a much longer distance than options 2 and 3 (Figure 5-5).
Ecological sensitivity.	No notable difference between the impacts along the different route options.			Not assessed as route was regarded as unfeasible.

PHYSICAL PROPERTIES	PROPOSED ROUTE (OPTION 1)	ROUTE OPTION 2	ROUTE OPTION 3	ROUTE OPTION 4
Impact on cultural and heritage resources.	No impacts on known heritage sites or graves.			
Alignments along existing linear infrastructure and disturbed areas.	No notable difference between the occurrences of infrastructure crossings along the different route options.			Impact on existing infrastructure located to the north of the N12.
Cost of construction.	Lowest cost.	Second highest cost.	Highest cost.	Similar to Option 2.
Economic impact on affected properties:	No notable difference between the impacts along the different route options.			Not assessed as route was regarded as unfeasible.
Visual impacts.	Second lowest impact significance. This is due to the route option following a longer distance in an existing utilities corridor than route Options 2 and 4.	High impact significance. This is due to the route option running through green fields and following a shorter distance in an existing utilities corridors than route options 1 and 3.	Lowest impact significance. This is due to the route option following the longest distance in an existing utilities corridor of all the route options.	Similar to Option 2.
Sterilisation of coal reserves and avoid future opencast mining areas.	Affects mining activities of BESCA. Impact minimised by keeping the route as close as possible to the Eskom 132kV power line. A short section of the conveyor runs across AEMFC (Vlakfontein) and will affect a small section of their coal reserve. AAIC and AEMFC is in the process to discuss compensation in the form of a like for like coal reserve swap. AAIC has completed geological drilling on a potential area for the swap.	Affects mining areas controlled by three mining houses (Homelands, West Coal, and Shanduka) and is regarded as unfeasible. Affects the same section of AEMFC (Vlakfontein) as for option 1.	Affects mining activities of BESCA. Impact minimised by keeping the route as close as possible to the Eskom 132kV power line. A short section of the conveyor runs across AEMFC (Vlakfontein) and will affect a small section of their coal reserve. AAIC and AEMFC is in the process to discuss compensation the form of a like for like coal reserve swap. AAIC has completed geological drilling on a potential area for the swap.	A route north of the N12 would impact significantly on AEMFC (Vlakfontein) mining areas and was regarded as unfeasible by AEMFC. AEMFC requested the route be moved to the south of the N12 – see Options 1 to 3.

PHYSICAL PROPERTIES	PROPOSED ROUTE (OPTION 1)	ROUTE OPTION 2	ROUTE OPTION 3	ROUTE OPTION 4
RANKING AND ENVIRONMENTALLY PREFERRED ROUTE OPTION	From an environmental point of view, Option 1 is preferred, mainly due to the following: • It presents the smallest total footprint area of impact. • It has the least impact on streams and large wetland areas near the N12. • The route option follows a longer distance in an existing utilities corridor (the N12 and 132 kV power line), and thus has a lower visual impact significance and the least impact on sterilisation of coal reserves.			
	[redacted]	3	2	3
	[redacted]			
AAIC PROPOSED OPTION	AAIC Proposed Route	Unfeasible	Not preferred	Unfeasible

Table 4-2: Evaluation of Alternative Route Options for Conveyor to cross N12 Highway

PHYSICAL PROPERTIES	PROPOSED ROUTE (OPTION 1)	JACKING UNDER N12 (OPTION 4)
Figure 1-2 and Figure 3-5	Pink Route (Figure 3-5) (Old Transnet cutting under N12 highway – Flight 3)	Green Route (Figure 3-5) (Alternative crossing of N12 along Option 4)
General description.	The third flight from TS3 to TS4 is a short section passing perpendicular south to north under the N12 through an existing, unused railway culvert, directly west of the intersection between the N12 and the R545 road.	After this route option crosses the N12 highway perpendicular south to north, it curves westwards around the intersection of the N12 highway and the R545 road, running parallel to the highway until it reaches flight 4.
Financial and technical.	The Phola-Kusile Coal Conveyor has to cross the N12 highway. This option makes use of an old unused Transnet railway. Costs reductions due to use of existing unused crossing. Technically this option is preferred as it avoids jacking of a new crossing underneath the N12.	More expensive due to new crossing needed underneath the N12. Jacking underneath the N12 technically difficult.
Delays to delivery of coal to Kusile.	No known factors to delay project.	Requires a new crossing underneath the N12. Complications with the jacking under road surface could result in construction time delays, which could compromise timeous delivery of coal to Kusile.
Alignments along existing linear infrastructure	Uses existing railway culvert and minimises potential impacts on the N12.	Risks to N12 during jacking process.

PHYSICAL PROPERTIES	PROPOSED ROUTE (OPTION 1)	JACKING UNDER N12 (OPTION 4)
and disturbed areas.		
Discussion of potential environmental impacts.	Does not impact on streams and wetlands that are affected by Option 4.	High impact on wetland HGM 3, as the line runs through the centre of the wetland and for a long distance (Figure 5-5).
Ecological sensitivity.	Moderate sensitivity areas along the route option.	Very high sensitivity areas along the route option.
Economic impact on affected properties:	Medium impact on affected property and farming activity.	Not assessed as route was regarded as unfeasible.
Visual impacts.	Low impact significance. This is due to the route option following its entire distance in an existing utilities corridor.	High impact significance. This is due to the route option running through green fields and following a shorter distance in an existing utilities corridors.
RANKING AND ENVIRONMENTALLY PREFERRED ROUTE OPTION	From an environmental point of view, Route Option 1 is preferred due to the following: • No impacts on dams, wetlands and/ or streams due to no crossings occurring along the route; and • Less ecological sensitive areas along the route option. • Medium economic impact on affected property and farming activity. • Route option follows its entire distance in an existing utilities corridor, therefore lower visual impact significance and minimised impact on sterilisation of coal reserves.	
		2
AAIC PROPOSED OPTION	AAIC Proposed Route	**Unfeasible**

Table 4-3: Evaluation of Alternative Route Options for Conveyor Flights 4 and 5

PHYSICAL PROPERTIES	PROPOSED ROUTE (OPTION 1)	ROUTE OPTION 5	ROUTE OPTION 6
Refer Figure 1-2, Figure 3-6 and Figure 3-7	Pink Route (Figure 3-6 and Figure 3-7)	Black Dashed Route (Figure 3-6 and Figure 3-7)	Brown Dashed Route (Figure 3-6 and Figure 3-7)
General description.	The fourth flight from TS4 to TS5 curves away from the N12 highway in a north-western direction in such a way as to avoid the western side of the coal reserve. From here the fifth flight s-curves in a north-eastern direction towards the New Largo distribution bin until it reaches TS6.	The fourth flight from TS4 to TS5 curves away from the N12 highway in a north-western direction in such a way as to avoid the western side of the coal reserve. From here the fifth flight s-curves in a north-eastern direction towards the New Largo distribution bin until it reaches TS6.	The fourth flight from TS4 to TS5 curves away from the N12 highway in a north-western direction in such a way as to avoid the western side of the coal reserve. From here the fifth flight heads straight in a north-eastern direction towards the New Largo distribution bin until it reaches TS6.
Technical design considerations.	Two flights between TS4 and TS6.	Three flights between TS4 and TS6.	Two flights between TS4 and TS6.

PHYSICAL PROPERTIES	PROPOSED ROUTE (OPTION 1)	ROUTE OPTION 5	ROUTE OPTION 6
	S-curved shape which is a complex design and therefore less desirable, due to more pronounced elevation changes (higher density of contours in regions along route).		Straight lined shape, which is a simpler design and therefore more desirable, due to less pronounced elevation changes (lower density of contours in regions along route).
	Additional gantries of ~ 150 m required for steep gradients along horizontal curves.		Construction of shorter bridges.
Delays to delivery of coal to Kusile.	Longer construction time.		Shorter construction.
Landowner consent.	<u>Southern Section</u> No notable difference between land ownership along the different route options.		
	<u>Northern Section</u> No intersection of Eskom farm and dwellings, runs along the servitude between Eskom and privately owned land. Least general encroachment upon Eskom or private property.		<u>Northern Section</u> Intersection of Eskom farm and dwellings and ~ 80% lies on land owned by Eskom.
Total footprint area of impact.	No notable difference between the total footprint area along the different route options.		
Impact on dams, wetlands and streams. (see Figure 5-5 and Figure 3-1)	No notable difference between the impacts on HGM-4 to HGM-6 and HGM-8 to HGM-13, as all three routes run through these wetlands and intersects dams.		
Ecological sensitivity.	No notable difference between the impacts along the different route options.		
Impact on cultural and heritage resources.	No notable difference between the impacts on known heritage sites or graves.		
Alignments along existing linear infrastructure and disturbed areas.	No notable difference between the occurrences of infrastructure crossings along the different route options.		
Cost of construction.	High cost.		Lowest cost.
Economic impact on affected properties.	No notable difference between the impacts along the different route options.		
Visual impacts.	No notable difference between the impacts along the different route options.		
Sterilisation of coal reserves and avoid future opencast mining areas.	No notable difference in coal sterilisation by the different route options.		
RANKING AND ENVIRONMENTALLY PREFERRED ROUTE OPTION	From an environmental point of view, Route Option 1 is preferred due to the following: • No intersection of Eskom farm and dwellings, runs along the servitude between Eskom and privately owned land. Least general encroachment upon Eskom or private property.		
		2	3
AAIC PROPOSED OPTION	AAIC Proposed Route		

4.4 Alternative Water Supply Options

The following water supply options to supply the Phola-Kusile Coal Conveyor were investigated:

Option 1: Water supplied by Eskom's Kusile Power Station.

Option 2: Water supplied by the Phola Coal Washing Plant.

Option 3: Water supply from municipality.

Option 4: Water abstracted from existing farm dams, springs and boreholes in the area.

Option 5: Treatment of excess water from flooded old underground mine workings that currently decants to surface or is pumped to a nearby pan on farm Klipfontein 566 JR.

AAIC's proposed option, which is also the environmentally preferred option, is Option 5 – to treat excess water from flooded old underground mine workings found in the area. This excess mine water currently decants to the surface and/or is pumped into the nearby pan.

Based on groundwater monitoring conducted between 2006 and 2011, it is estimated that ~1.5 Mℓ/day of water is generated in the old underground workings (pers. Comm. Jaco van den Berg, JMA groundwater specialist responsible for the ground water monitoring programme for AAIC). Limiting the abstraction and treatment to 1.5 Mℓ/day will avoid aggravating the risk of spontaneous combustion in the mine workings due to the lowering of the water table.

At the water focus meeting and the authorities meeting that were held as part of the New Largo Colliery EIA process, there was general support for the installation of a mobile water treatment plant to treat water from the old underground mine workings. As part of the proposed New Largo Colliery project, a further water treatment plant is being planned to eventually treat the remainder of the underground mine water and water generated at the proposed new mine.

The impacts of the mobile plant and associated wastes were assessed in this EIA for the Phola-Kusile Coal Conveyor and discussed in the scoping assessment for the New Largo Colliery. It was found that the mobile water treatment plant will have positive impacts on the quality of the excess water from the old underground mine workings that currently decants or is pumped to a nearby pan, and that it would have minimal impact on other environmental components due to its small footprint and strict engineering design controls for management of wastes associated with the treatment plant.

[illegible]	**Option 5**	**Treatment of excess contaminated water from flooded old underground mine workings that currently decants to surface or is pumped to a nearby pan on farm Klipfontein 566 JR.**
AAIC Proposed Route	**Option 5**	**Treatment of excess contaminated water from flooded old underground mine workings that currently decants to surface or is pumped to a nearby pan on farm Klipfontein 566 JR.**

4.5 Route Alternatives Suggested by Specialists

4.5.1 Economic Specialist Study Route Realignment Suggestion

The economic specialist report suggested an alignment, as presented in Appendix O, to minimise fragmentation of properties. This route follows property boundaries but would result in numerous additional transfer stations. There will be significant additional costs involved, the construction period would be much longer and all the impacts associated with a transfer station would be repeated at each new transfer station, including dust, noise, risk coal spills and thus the need for pollution control structures and evaporation dams, which it itself increases the footprint of impacts. The Environmental Assessment Practitioner is thus of he opinion that, although this suggested conveyor alignment would avoid fragmentation of farm portions, form an integrated environmental approach, this route suggestion is not desirable.

4.5.2 Wetland Specialist Study Route Realignment Suggestion

4.5.2.1 First Section of Flight 4 Moved Northwards

The wetland specialist (Appendix E) suggested that the first section of flight 4 be moved northwards out of the streambeds along the N12, where the conveyor effectively follows the streambed for more than a kilometre. The engineering design in this area involved to long environmental gantries to span across the streambeds. Moving the conveyor northwards would sterilise coal with the New Largo mining right area. AAIC maintains that this move if thus not feasible.

4.5.2.2 Re-Alignment of the Service Road at two Wetland Areas

The wetland specialist found that the biggest impact on wetlands is in fact due to the service road. If the service round can be moved northwards, the majority of the direct impacts on the streambeds and wetlands can be avoided. In preliminary discussions between the engineering team, the wetland specialist and the Environmental Assessment Practitioner, the re-alignment of the service along the start of flight 4 (near wetland HGM-5 as depicted on Figure 1-3, Figure 5-5 and Figure 3-6) as well as well as long the last section of flight 2 (near wetland HGM-3 as depicted on Figure 1-3, Figure 5-5 and Figure 3-4) seemed to be feasible to minimise the impact on these two wetland areas.

The final details will be determined during follow-up discussions and the outcome of these discussions will be reported on in the final EIA. The commitments to involve the wetland specialist in the designs of stream and wetland crossings have been incorporated into the EMP Section on Wetlands and Watercourses.

4.5.3 Ecological Specialist Study Route Realignment Suggestions

Two suggestions were made two suggestions for conveyor route alignments.

4.5.3.1 First Section of Flight 4 Moved Northwards

The ecological team (see Appendix D) also suggested that the first section of flight 4 be moved northwards out of the streambeds along the N12 – this is similar to the suggested re-alignment made by the wetland specialist (as above for details).

4.5.3.2 *Re-Alignment of Flight 5*

The ecological team (see Appendix D) also suggested that flight 5 be diverted around the east of wetlands HGM-10 and HGM-11 as depicted on Figure 1-3, , Figure 5-5 and Figure 3-4. This diversion will require an additional transfer station and AAIC therefore maintains that this option is not feasible.

5. Description of the Affected Environment

5.1 Physical Environment

5.1.1 Climate

5.1.1.1 *Temperatures*

The location of the Eskom monitoring station (Kendal 2) is shown in Figure 5-1. Annual average maximum, minimum and mean temperatures for Kendal 2 are given as 26°C, 10°C and 16°C, respectively, based on the 2005-2009 records. Average daily maximum temperatures range from 30°C in December, January and February to 20°C in June, with daily minima ranging from 15°C in January and December to 3°C in July.

Table 5-1: Annual Temperatures in Degrees Celsius (Kendal weather station, 2005-2009)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Minimum	15	14	12	9	6	4	3	6	10	13	14	15
Mean	21	20	18	15	12	10	10	13	18	19	20	21
Maximum	30	30	27	25	22	20	21	24	29	29	28	30

5.1.1.2 *Precipitation*

Long-term monthly average rainfall figures for various stations within the Witbank region are given in Table 5-2. Long-term average total annual rainfall is in the range of 730 mm to 750 mm. Rain falls mainly in summer from October to April, with the peak being in January for the region.

Table 5-2: Long-term monthly rainfall figures (mm) for various stations within the Witbank region

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Middelburg (1904-1950)	132	103	88	42	19	7	9	8	22	63	124	118	735
Bethal (1904-1984)	134	94	78	46	19	7	8	10	25	78	128	120	747

5.1.1.3 *Wind Patterns*

As depicted on the wind roses below, the predominant wind direction within the New Largo region is from the west-northwest (Kendal 2). Less frequent winds are from the southern sector. During daytime there is an increase in winds from the west-northwest (Kendal 2) while at night-time the frequency of winds increase from the east-southeast. Night-time conditions also reflect a decrease in wind speeds and an increase in calm conditions.

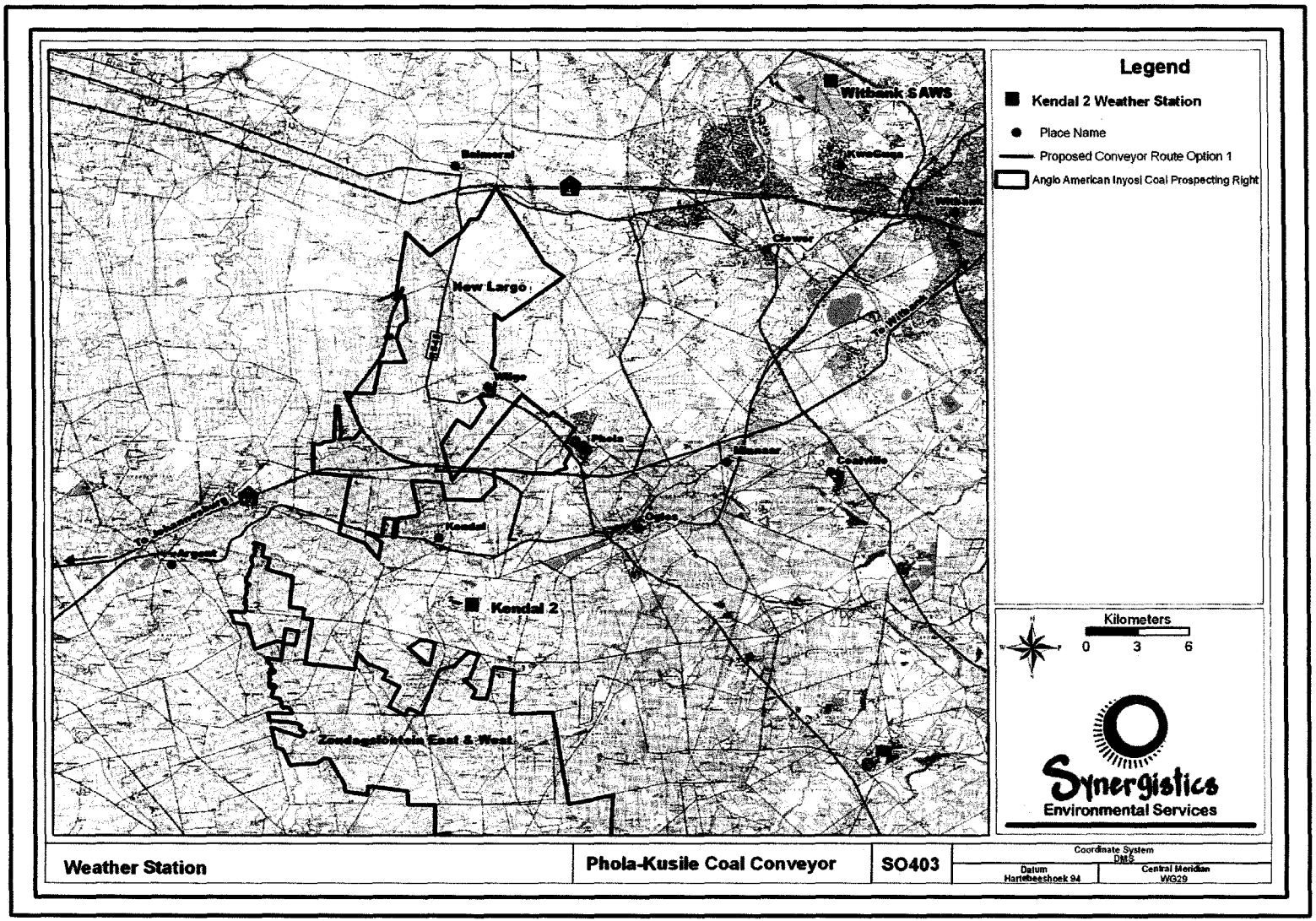


Figure 5-1: Location of the Kendal 2 meteorological data set in relation to the proposed conveyor development.

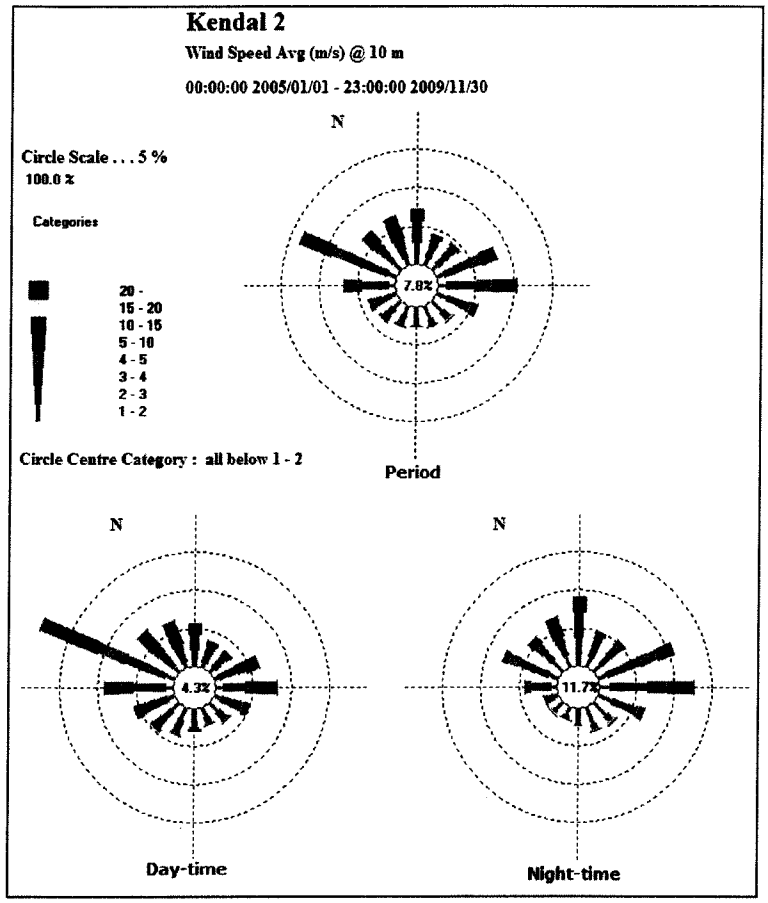


Figure 5-2: Annual average and day/night time wind roses (Kendal 2 weather station)

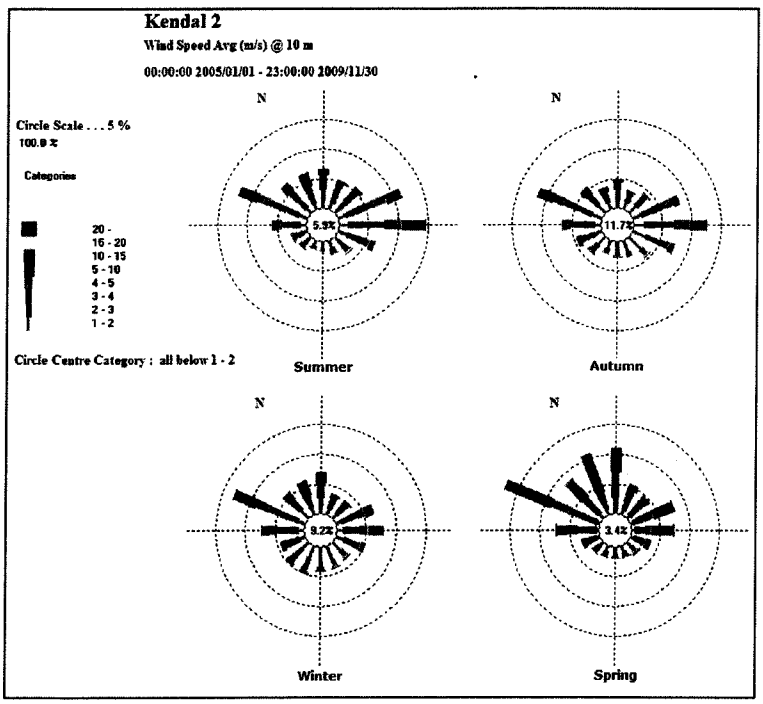


Figure 5-3: Seasonal average wind roses (Kendal 2 weather station)

5.1.2 Topography

The study area comprises of moderately flat to undulating plains with pans. The area is bisected by moderately wide to wide open drainage ways and non perennial streams.

5.1.3 Soils

A number of different soil forms are known to occur across the study area and along the alternative conveyor routes. The materials vary in both physical and chemical composition, based predominantly on the parent materials from which the soils have formed, with additional inputs and complications imprinted by the geomorphology of the area, varying ground roughness, slope and attitude of topography, with the climatic signature of the variable and seasonal changes. It is the complexity of the geomorphological systems that have resulted in a variety of soil forms and families found in the area. The sensitive nature of some of these soils will need to be considered if they are to be disturbed or impacted by the proposed conveyor system.

The variations in soil form are characterized by differences in the texture (grain size), colour, soil structure to some degree, and the effective rooting depths that result from the depth to bedrock and or inhibiting layers that occur. The soils range from deep sandy loams and silt loams with little to no structure, to fine and possibly medium grained sandy clay loams and more structured soils that are associated with the more basic lithologies. Based on available desktop data, coarse textured soils are expected to dominate over the plains and fine textured soils expected to be dominant in the low-lying areas.

The study area has been impacted to some extent by the commercial farming that has been practiced for a number of generations on significantly large sections of the conveyor route alternatives. These impacts will have had some effect on the soil chemistry and to a limited extent on the land forms that have developed.

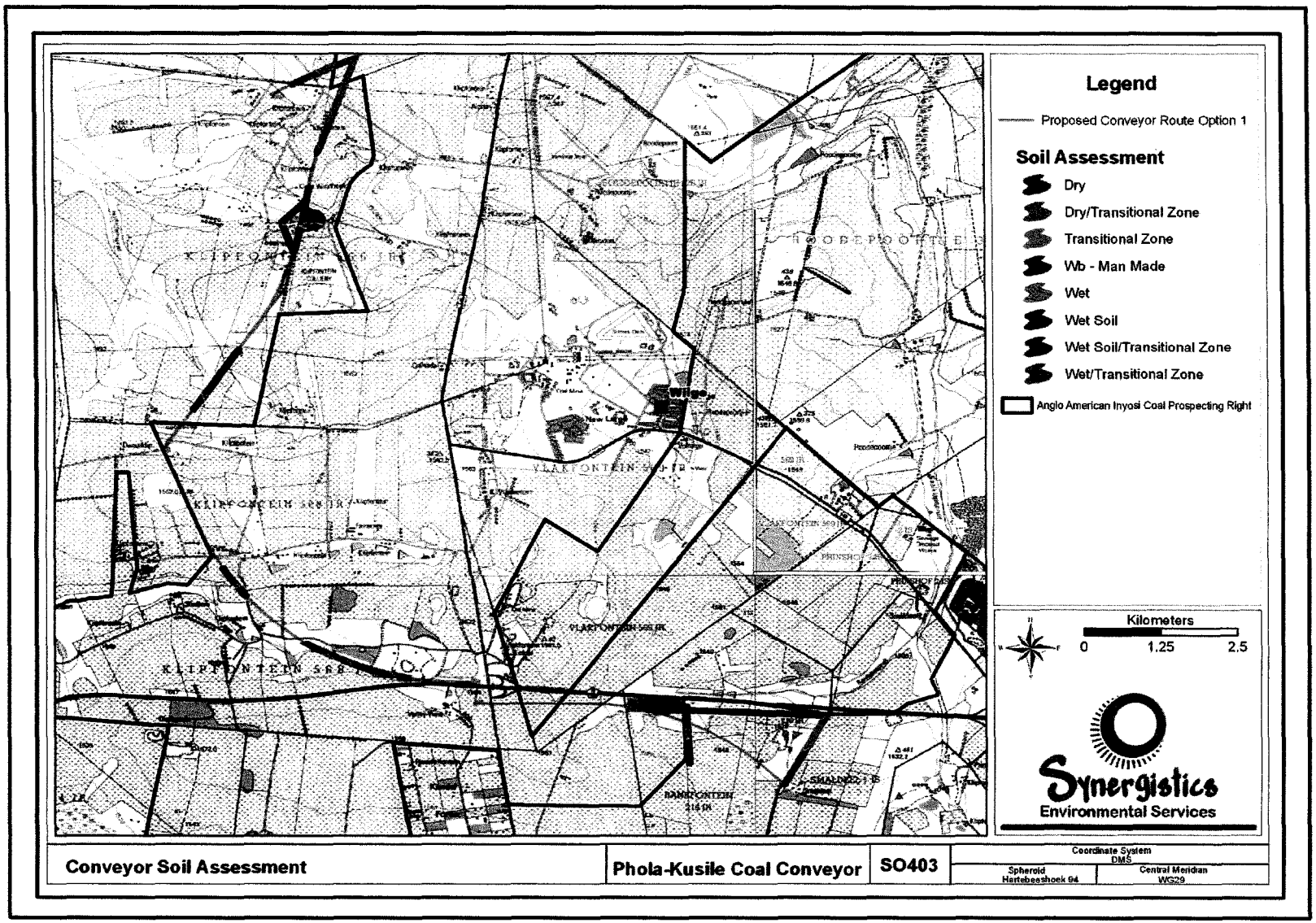


Figure 5-4: Soil Sensitivity Map along AAIC proposed conveyor route

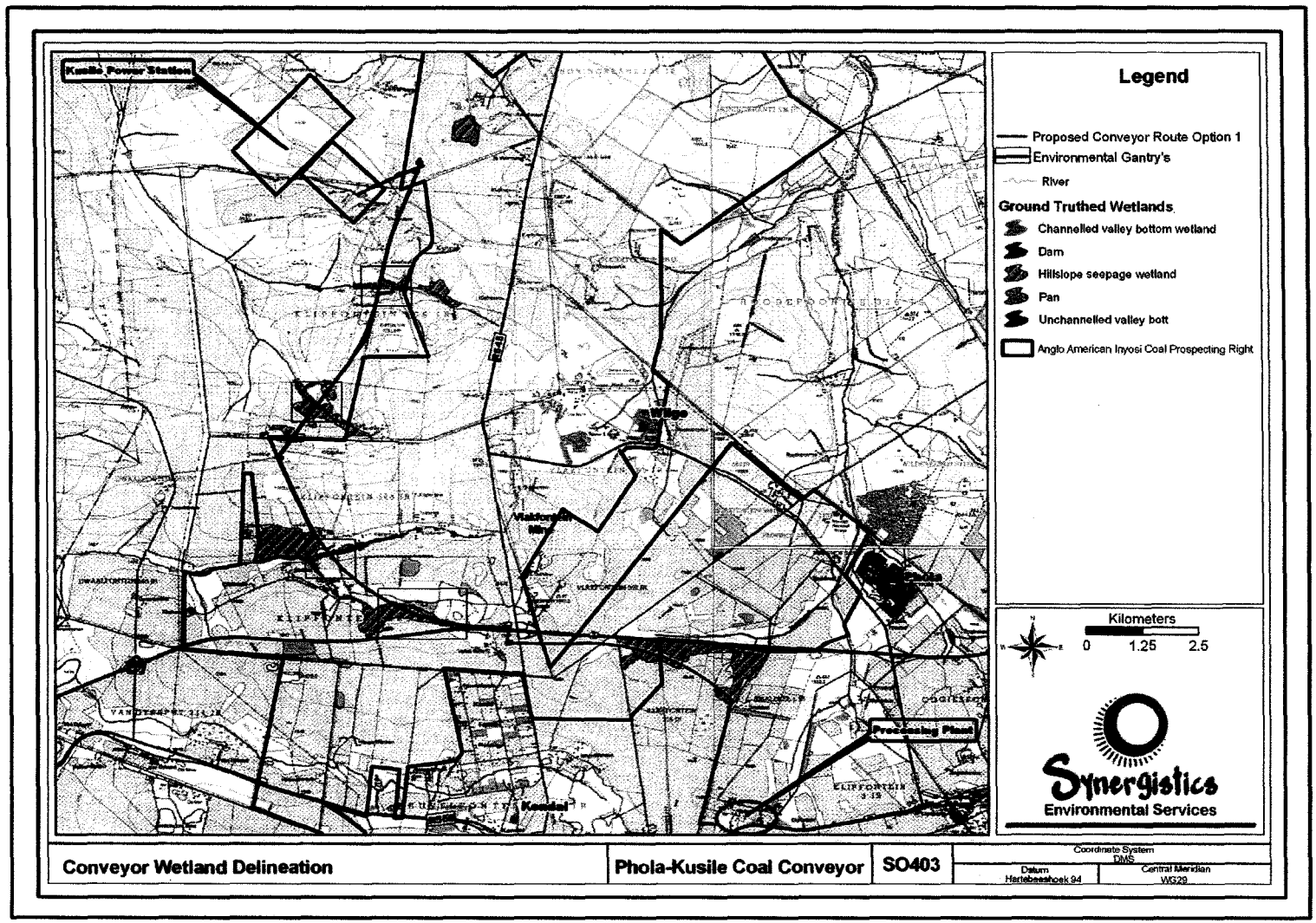


Figure 5-5: Wetland delineation along AAIC proposed conveyor route, showing floodlines and proposed positions of environmental gantries to cross stream channels

5.1.4 Geology

The study area falls within the north-eastern part of the Witbank Coalfield and all the conveyor routes intersect coal resources along certain sections of the routes.

The Witbank Coalfield is underlain by pre-Karoo rocks, mainly Bushveld Complex and Pretoria Group volcanics. Glaciation events resulted in the deposition of tillite (Dwyka Formation) on the basement rocks over most of the area. Within the Karoo Sedimentary Sequence, the Ecca Group rest on top of the Dwyka Formation. In the Witbank coalfield the coal-bearing Vryheid Formation occurs at the bottom of the Ecca Group conformably to the underlying Dwyka Formation.

The Dwyka Formation consists of tillite, siltstone and sometimes a thin shale development. The Ecca Group consists predominantly of sandstone, siltstone, shale and coal. The Vryheid Formation in the Ecca Group contains five bituminous coal seams, numbered as No. 1 to No. 5 from bottom to top. The No. 2, No. 4 and No. 5 seams are the most economical coal seams in the Witbank Coalfield.

During the EIA phase, all prospecting and mining right areas will be mapped for consideration during route corridor selection and final route alignment.

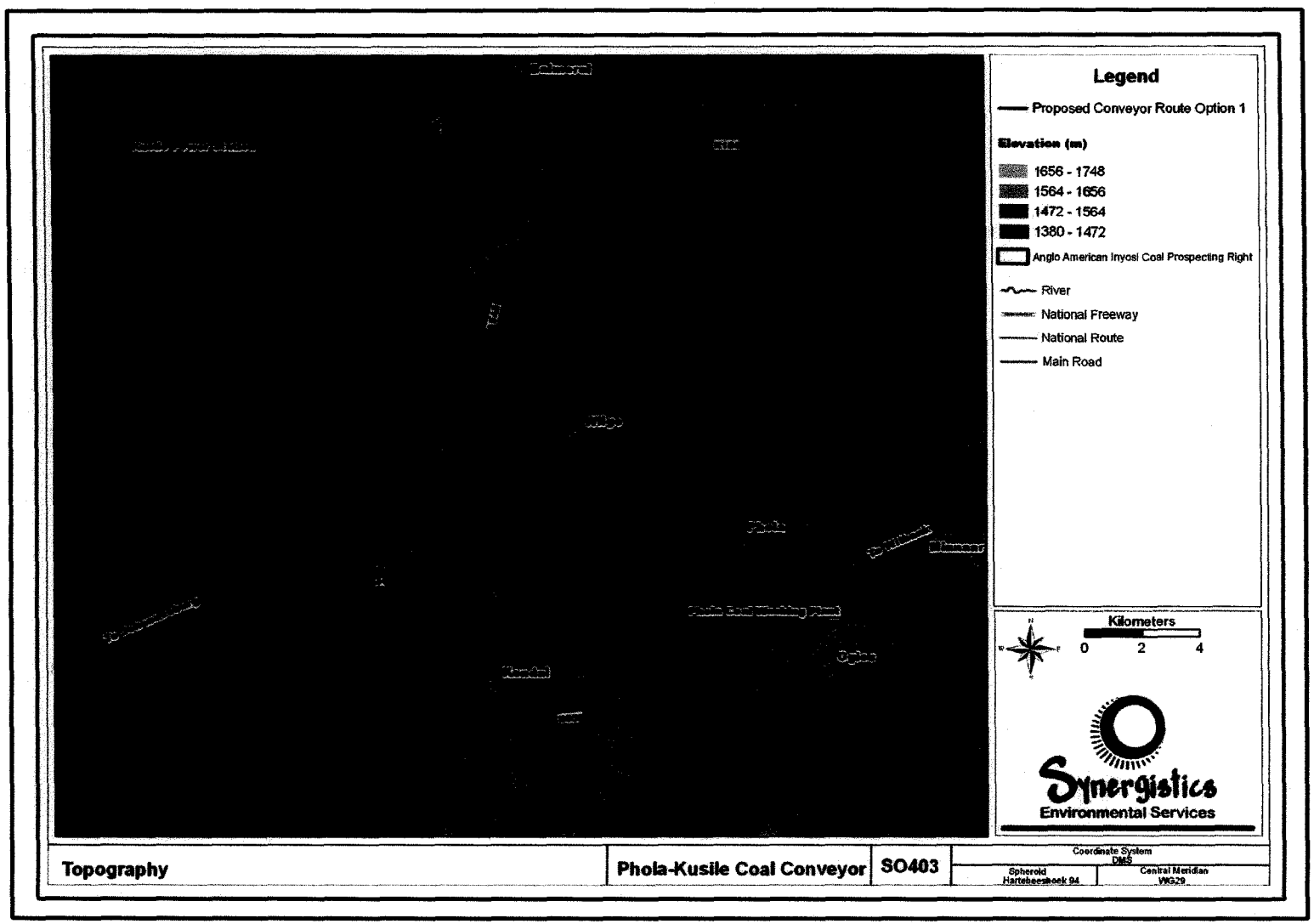


Figure 5-6: Topography

5.1.5 Air Quality

Existing sources of air emissions include the nearby Eskom coal-fired power stations and associated ash disposal facilities, construction activities at Kusile Power Station, industrial developments, blasting and materials transport and handling operations at nearby mines, transportation of coal products, spontaneous combustion associated with old underground coal mining areas and discard (mining waste) disposal facilities, veld fires, vehicle exhaust emissions, household fuel burning and farming (i.e. ploughing) activities.

5.1.6 Surface Water

5.1.6.1 Description of Baseline / Existing Impacts

The Phola-Kusile Coal Conveyor system is situated in the Wilge River catchment area within quaternary catchments B20F of the Limpopo-Olifants primary drainage region. This catchment makes up part of the Loskop Dam catchment.

The Wilge River drains into the Olifants River, which flows to Loskop dam and then through the central part of the Kruger National Park and into Mozambique. It eventually joins the Limpopo River and discharges to the Indian Ocean on the east African coastline.

Surface water downstream of the Phola-Kusile Coal Conveyor System is used primarily for agricultural and livestock watering purposes. There is also a commercial chicken farm (Kendal Poultry), a brick making plant and several other mines around the site using surface water. Other users include mining, the aquatic ecosystem; and informal users of the river (e.g. for washing or drinking purposes). Detailed information on water uses per property is presented in Appendix F.

The receiving water body for the assessment of potential surface water quality impacts of the conveyor system is taken as the Loskop Dam. The use of this dam is motivated on the basis that:

- The proposed conveyor system lies mainly in the Wilge River catchment and the Loskop Dam is downstream of the Wilge River catchment area;
- By implication, the potential impacts on the Loskop Dam will also be included in the impact assessment;
- Beyond the Loskop Dam, the potential impact of the conveyor system becomes extremely small due to the water volumes in the catchment and dilution effects.
- Furthermore, by the time the water reaches Loskop Dam, it is required to be suitable for use for all of the expected uses (drinking water, agricultural, industrial and aquatic ecosystems). Thus, by achieving compliance in terms of these uses, no additional impacts are expected downstream of Loskop Dam. The receiving water body is relevant only in so far as it defines the aerial extent of the catchment to be considered in the impact assessment, and described in the baseline study.
- In terms of impact assessment, the total area affected by the proposed conveyor system is small compared to the Loskop Dam catchment. The proposed conveyor footprint is some 17 km^2, compared to a catchment of 12 285 km^2 for Loskop Dam (or some 0.14% of the area).

- The MAR for Loskop Dam is some 384 x 10^6 m³ (31 mm), while the MAR for the project area is estimated at 0.543 x 10^6 m³ (32 mm).

Mean annual runoff per sub-catchment is tabled below.

Table 5-3: Mean Annual Runoff (MAR) for the Phola-Kusile Coal Conveyor

Node	Catchment Area (km^2)	MAR ($x10^6m^3$)	% of MAR at Loskop Dam
NL20	27.9	1.00	0.26
NL21	12.8	0.46	0.12
NL22	9.1	0.33	0.09
NL32	5.4	0.19	0.05
NL33	15.3	0.55	0.14

Note: The MAR for Loskop Dam is estimated at 384 x 10^6 m³.

Dry weather flows (DWF) for sub-catchments are shown below.

Table 5-4: Dry weather flows of the affected rivers at the Phola-Kusile Coal Conveyor

Node	Catchment Area (km^2)	Computed DWF ($x10^6m^3$ per month average)	Computed DWF (l/s per month average)
NL20	27.9	0.02	7.10
NL21	12.8	0.01	3.26
NL22	9.1	0.01	2.32
NL32	5.4	0.00	1.38
NL33	15.3	0.01	3.90

Note: A flow of less than 0,01 x 10^6 m^3 per month probably implies that the river in question dries out completely during the winter months. This correlates to a flow of less than 10l/s

The peak flows calculated using each method were evaluated for each node and a representative value adopted. The 1:20, 1:50, 1:100, 1:250 and Regional Maximum Flood (RMF) for each node, together with catchment areas, are presented in Table 5-5 below.

Table 5-5: Flood peaks and flood volumes for the Phola-Kusile Coal Conveyor System

Node	Recurrence Interval	Flood Peak (m³/s)	Flood Volume (m^3x10^6)
Node	**Recurrence Interval**	**Flood Peak (m³/s)**	**Flood Volume (m^3x10^6)**
NL20	1:20 year	101	1.46
	1:50 year	150	2.16
	1:100 year	189	2.73
	1:250 year	232	3.35
	RMF	354	5.11
NL21	1:20 year	61	0.54
	1:50 year	95	0.85
	1:100 year	120	1.07
	1:250 year	144	1.28
	RMF	263	2.34
NL22	1:20 year	54	0.39
	1:50 year	81	0.58

Node	Recurrence Interval	Flood Peak (m^3/s)	Flood Volume (m^3x10^6)
	1:100 year	101	0.73
	1:250 year	123	0.89
	RMF	231	1.67
NL32	1:20 year	87	0.86
	1:50 year	126	1.25
	1:100 year	158	1.57
	1:250 year	188	1.87
	RMF	282	2.80
NL33	1:20 year	87	0.86
	1:50 year	126	1.25
	1:100 year	158	1.57
	1:250 year	188	1.87
	RMF	282	2.80

- **Floodlines**

Floodlines were determined based on the calculated flood peaks at each node. A steady flow, backwater analysis was performed for each stream using the HEC-RAS river modelling system. HEC-RAS was developed by the United States Army Corps of Engineers, and is considered industry standard software for floodline determination in many countries, including the United States, the United Kingdom, Europe, Australia and South Africa.

When determining floodlines, each stream is defined by inputting a number of cross sections along the length of the stream. The mapping data used consisted of 1 metre contour interval digital terrain model (dtm) received from the client in 2007.

It should be noted that the accuracy of the floodlines produced in this study is commensurate with the accuracy of the dtm data provided. With a contour interval of 1 m, the accuracy of the floodlines can be considered to be within 1 m vertically. The floodlines given here are considered suitable for planning purposes only. Where infrastructure is to be located adjacent to streams, the floodlines should be determined more accurately using a digital terrain model (DTM) developed from a field survey at the area of concern.

Floodlines are indicated in Appendix F (Drawing no. C184-00-001).

- **Water Quality**

The Directorate National Water Resource Planning (DNWRP) of the (then) Department of Water Affairs and Forestry (DWAF) developed a water quality management strategy for the Upper and Middle Olifants River catchment, which was published in 2009 (DNWRP, 2009). One of the key elements of this strategy was the development of Receiving Water Quality Objectives (RWQO). Interim RWQO were determined based on the current set of objectives in the Witbank, Klipspruit and Middelburg Dam catchments, which was modified to account for the water quality component of the Ecological Reserve. Where previous objectives were not available, the South African Water Quality Guidelines together with the present water quality status were used to determine RWQO. The set of RWQO determined were interim objectives that will be reviewed once the water quality component of the Ecological Reserve has been updated (in five years' time) (DNWRP, 2009).

The interim RWQO for MU 22 are given in Table 5-6 below. These objectives were used to assess the water quality data collected at the sampling points given in Table 5-7. The locations of the sampling points are indicated in Appendix F. Although a small part of the conveyor system also falls within MU20, it is not considered to be a significant portion and therefore only MU22 guidelines are used. For the detailed surface water quality data, please refer to Appendix F.

Table 5-6: Catchment objectives for surface water quality based on the interim RWQO for the Olifants River catchment

Water Quality Variable	Units	MU22 RWQO
Physical		
Conductivity	mS/m	40
Dissolved Oxygen	% Sat	70
pH	-	6.5-8.4
Suspended solids	mg/ℓ	-
Turbidity	NTU	-
Chemical, Inorganic		
Alkalinity	mg $CaCO_3$/l	120
Boron	mg/ℓ	0.5
Calcium	mg/ℓ	25
Chloride	mg/ℓ	20
Fluoride	mg/ℓ	0.5
Magnesium	mg/ℓ	20
Potassium	mg/ℓ	10
Sodium	mg/ℓ	20
SAR	$meql^{0.5}$	1.0
Sulphate	mg/ℓ	60
Total Dissolved Solids	mg/ℓ	280
Chemical, Organic		
Dissolved Organic Carbon	mg/ℓ	10
Metals, Dissolved		
Iron	mg/ℓ	1.0
Manganese	mg/ℓ	0.18
Aluminium	mg/ℓ	0.02

Water Quality Variable	Units	MU22 RWQO
Chromium VI	mg/ℓ	0.05
Plant Nutrients		
Ammonia*	mg/ℓ as N	0.007
Nitrate	mg/ℓ as N	6

Table 5-7: Surface Water Monitoring points relevant to the Phola-Kusile Coal Conveyor System

Monitoring point	Description
NL1	On the Wilge River at a bridge crossing on the R555. This represents the upstream monitoring point for this sub-catchment, as it will not be impacted by the proposed conveyor system.
NL2	On a tributary of the Wilge River.
NL3	On a tributary of the Wilge River.
NL4	On the Klipfonteinspruit (a tributary of the Wilge River).
NL5	On the Klipfonteinspruit (a tributary of the Wilge River), downstream of NL4.
NL6	On the Klipfonteinspruit (a tributary of the Wilge River), downstream of NL5 and upstream of the confluence of the Klipfonteinspruit with the Wilge River.
NL7	On a tributary of the Wilge River
NL8	On tributary of the Wilge River, downstream of NL7 and upstream of its confluence with the Wilge River.
NL9	On the Wilge River. This represents the downstream monitoring point for this sub-catchment, reflecting the cumulative impact of the proposed Phola- Kusile conveyor system, the proposed New Largo Colliery, the Kusile Power Station and other activities further upstream on the Wilge River.
NL21	Monitors surface water discharge into the Holfonteinspruit, a tributary of the Klipfonteinspruit.
NL22	On a tributary of the Wilge River, upstream of NL7.

The location of these points are indicated on Figure 5-8.

Sampling of these points was done monthly from October 2010 to February 2011, and every second month thereafter (hereafter referred to as "the monitoring period"). Monthly sampling will again be undertaken from October 2011 onwards on the same basis.

In addition, water quality data was also obtained for DWA gauge B2H014 that is located on the Wilge River, downstream of monitoring point NL9 but upstream of the confluence of the Wilge and the Bronkhorstspruit Rivers. Data for the period January 1991 to February 2011 was obtained from the Department's website.

For maps and graphics depicting water quality data in more detail, refer to Appendix F.

Electrical conductivity (EC)

Electrical conductivity (EC) is a measure of the ability of water to conduct an electrical current, which is as a result of the presence of charged ions such as carbonate, bicarbonate, chloride, sulphate, nitrate, sodium, potassium, calcium and magnesium (Appendix F)). It is therefore an indicator of the salinity, or total salt content, of water. Accumulation of salts can influence the potential to use the water downstream by water users such as irrigation for agriculture.

EC levels at the monitoring points on the Wilge River are generally below the interim RWQO for MU22 of 40 mS/m and the target water quality limit (70 mS/m) for domestic use in the SA Water Quality Guidelines. NL1 and NL2 show concentrations above the interim RWQO, but below 70 mS/m. The exception is NL4, which is located on the Klipfonteinspruit, which had elevated concentrations (maximum of 116.7 mS/m and an average of 78.9 mS/m), exceeding the interim RWQO from October 2010 to February 2011. Concentrations have, however, decreased over time but could be seasonal. Mine water from the underground workings of the discontinued New Largo Colliery is pumped to a large pan to the south-east of NL4. The high levels of EC measured at NL4 are attributed to this aspect.

In the Wilge River sub-catchment, NL9 is the most downstream point of the sampling programme, which is downstream of the proposed conveyor system and New Largo Mine, as well as the Kusile Power Station. The EC values at NL9 are low, with an average of 35.4 mS/m, thus meeting the interim RWQO. The poor quality water in the Klipfonteinspruit (as measured at NL4) is therefore diluted with good quality water from upstream. At the DWA monitoring point B2H14 (downstream of NL9), an average EC level of 23.3 mS/m was measured for the period January 1991 to February 2011. The minimum for the period was 10.31 mS/m and the maximum 63.9 mS/m. As indicated by the trend line, the water quality has shown a steady deterioration over time.

The general good water quality of the Wilge River sub-catchment indicates that the impact in the sub-catchment has been limited to date, but that additional salt increases cannot be afforded.

pH

The pH of natural water is a measurement of the acidity/alkalinity and is the result of complex acid-base equilibriums of various dissolved compounds. The pH of most raw water sources is within the range of 6.5 - 8.5 (DWAF, 1996).

pH levels in the Wilge River sub-catchments is largely within the interim RWQO objective for MU22 of 6.5 - 8.4, with the exception of NL21 as can be seen from Figure 5.2.4 (c). Levels between 5.7 and 6.3 have been measured at NL21 on the Holfonteinspruit and there seems to be a decreasing trend. This could be attributed to the decant of mine water on the farm Klipfontein 566 JR, that could occur as a result of previous underground mining activities.

The pH levels at DWA station B2H14 for the monitoring period is within the interim RWQO (the February 2011 pH level was 8.43). An average pH level of 8.0 was measured for the period January 1991 to February 2011. The minimum for the period was 6.43 and the maximum 9.23.

Chloride

Chloride (Cl) is a common constituent in water, is highly soluble, and is typically found in concentrations from a few to several hundred mg/ℓ in fresh water (DWAF, 1996).
Chloride levels in the Wilge River sub-catchments are generally below the interim RWQO of 20 mg/ℓ. At the DWA monitoring point B2H14, an average Cl concentration of 8.49 mg/ℓ was measured for the period January 1991 to February 2011. The minimum for the period was 3.2 mg/ℓ and the maximum 48.97 mg/ℓ. The Cl concentration has shown a steady increase since 1991 as indicated in the time-series graph for gauge B2H014.\

Sulphate (SO_4)

The concentration of sulphates in surface water is typically low (~5 mg/ℓ), although concentrations of several hundred mg/ℓ may occur where dissolution of sulphate minerals or discharge of sulphate-rich effluents takes place (DWAF, 1996). Chemical fallout during rain events in areas where coal burning takes place can result in an increase in the sulphate content of surface water bodies.

The sulphate levels at some of the monitoring points in the Wilge River sub-catchment are slightly elevated above the interim RWQO of 60 mg/ℓ for the MU. Levels at NL4 were significantly elevated between October 2010 and February 2011, with concentrations ranging between 423 and 555 mg/ℓ. Concentrations show a decreasing trend over time, with concentrations of 167.4 mg/ℓ and 16.7 mg/ℓ measured in April 2011 and June 2011 respectively. Mine water from the underground workings of the old discontinued New Largo Colliery is pumped to a large pan to the south-east of NL4. A sample of this pan was taken by J&W during May 2007 and a sulphate concentration of 3139 mg/ℓ was measured. During the wetland assessment undertaken by Wetland Consulting Services (WCS) in 2007, a sulphate concentration of 2941 mg/ℓ was measured in the pan. Furthermore, the sulphate concentration at a sampling point on a seepage wetland draining into the Wilge River was high (874 mg/ℓ) (this sampling point of WCS and NL4 are located in the same vicinity and are close to the pan). Since the composition of the water samples taken at the two points was similar, WCS suggested that the water at the sampling point in the seepage wetland represents decant from the underground workings at the old colliery, which has been diluted and buffered to some extent by interflow (WCS, 2007).

At the downstream point, NL9, which is representative of the cumulative impact up to that point in the sub-catchment, the sulphate level is slightly elevated above the interim RWQO (minimum of 37.9 mg/ℓ, maximum of 74.0 mg/ℓ and mean of 60.5 mg/ℓ). The high levels of sulphate measured on the Klipfonteinspruit at NL4 are therefore diluted by the good quality water from the upper reaches of the Wilge River.

At the DWA monitoring point B2H14, downstream of NL9, an average sulphate concentration of 22.45 mg/ℓ was measured for the period January 1991 to February 2011. The minimum for the period was 4.4 mg/ℓ and the maximum 195 mg/ℓ. As can be seen from the trend line, the sulphate levels has shown a steady increase since monitoring commenced in 1991.

Ammonium (NH_4)

High levels of ammonium indicate pollution with organic waste such as untreated or partially treated sewage, or run-off from agricultural areas due to excessive fertiliser use.

An interim RWQO has not been set for ammonium (NH_4), but an objective of 0.007 mg/ℓ has been set for ammonia (NH_3) for MU22. Ammonia occurs in equilibrium with the ammonium ion in solution and the position of equilibrium is determined by pH and temperature and to a lesser extent by the total dissolved salts. Ammonia (NH_3) is highly toxic to the aquatic environment, especially fish.

Ammonium levels in the Wilge River and its tributaries are generally low, with occasional increased levels up to as high as 1.0 mg/ℓ and 5.4 mg/ℓ.

At the DWA monitoring point B2H14, an average ammonium concentration of 0.02 mg/ℓ was measured for the period January 1991 to February 2011. The minimum for the period was 0.015 mg/ℓ and the maximum 0.59 mg/ℓ. No specific trend has been observed over time.

Nitrate

Typical concentrations of nitrate in un-polluted fresh water are below 5 mg/ℓ. Sources of nitrogen in surface water include the oxidation of plant and animal debris, discharges from sewage treatment works, effluents from food-related industries, as well as runoff from agricultural activities (DWAF, 1996).

The nitrate levels in the Wilge River sub-catchment is generally well below the interim RWQO of 6 mg/ℓ. The exception is the February 2011 sampling results for monitoring points NL1 to NL4 and NL8. No apparent reason for the sporadic increase at these points could be found and it is expected that it is as a result of an analytical error.

At the DWA monitoring point B2H14, an average nitrate concentration of 0.11 mg/ℓ was measured for the period January 1991 to February 2011. The minimum for the period was 0.02 mg/ℓ and the maximum 0.99 mg/ℓ. A slight increase in the nitrate concentration has been observed over time.

Calcium

Calcium occurs naturally in varying concentrations and the concentration in fresh water bodies is typically 15 mg/ℓ (DWAF, 1996).

The measured calcium concentration in the Wilge River and its tributaries are generally either slightly elevated above the interim RWQO of 25 mg/ℓ, or below this level. The only exception is NL4, which showed concentrations between 136.4 mg/ℓ and 204.9 mg/ℓ for the period October 2010 to February 2011, although at a decreasing trend over time. The concentration decreased further to 37.2 mg/ℓ during April 2011 and to 3.2 mg/ℓ during June 2011. The potential impact at NL4 was discussed above.

At the DWA monitoring point B2H14, an average Ca concentration of 16.1 mg/ℓ was measured for the period January 1991 to February 2011. The minimum for the period was 6.145 mg/ℓ and the maximum 48.59 mg/ℓ. As with the other constituents, the water quality has deteriorated over time with respect to calcium concentration.

Aluminium

Aluminium occurs in water either as suspended aluminium minerals or as dissolved aluminium species. The concentration of dissolved aluminium in unpolluted water at neutral pH is 0.005 mg/ℓ or less. In water with a low pH, or where soluble aluminium complexes are present, the dissolved aluminium concentration can rise to high values (DWAF, 1996).

The aluminium concentration in the Wilge River exceeded the interim RWQO of 0.02 mg/ℓ at all the monitoring sites for most of the monitoring period. In particular, NL4 of the Klipfonteinspruit (a tributary of the Wilge River) showed an average concentration of 0.79 mg/ℓ during the 2010/11 sampling period and a maximum concentration of 1.39 mg/ℓ measured during February 2011. The impact at NL4 causing the poor water quality has been discussed previously.
It should be noted that the interim RWQO for aluminium is based on the Aquatic Ecological Reserve determined in 2001 (DNWRP, 2009). When the levels are compared to the SA Water Quality Guidelines for irrigation and stock watering, the measured quality is below the target guideline of 5 mg/ℓ. The levels at most of the monitoring points are above the ideal domestic guideline of 0.15 mg/ℓ, but below the acceptable guideline for domestic use of 0.5 mg/ℓ (except NL4).

Iron

Iron (Fe) is the fourth most abundant element, constitutes 5% of the earth's crust and is found in many minerals. Iron can be present in water as dissolved ferric iron (Fe III), as ferrous iron (Fe II) or as suspended iron hydroxides. The concentration of dissolved iron in unpolluted surface water is in the range of 0.001 - 0.5 mg/ℓ (DWAF, 1996).

The interim RWQO for iron was set as 1 mg/ℓ by the DNWRP for MU22. In general, the iron concentration in the Wilge River sub-catchment is below or at this level, or slightly elevated (but below 2 mg/ℓ). NL7 and NL8 had elevated concentrations on several occasions. As with the other constituents, NL4 showed significantly elevated levels (12.15 mg/ℓ and 14.96 mg/ℓ during the February and April 2011 sampling events respectively) and a mean concentration of 4.55 mg/ℓ during the 2010/11 sampling period. The impact at NL4 has been discussed previously.

Magnesium

Typically, the concentration of magnesium (Mg) in fresh water is between 4 - 10 mg/ℓ (DWAF, 1996).

In general, the magnesium concentration in the Wilge River sub-catchment was below the interim RWQO of 20 mg/ℓ, with the exception of NL4 which showed elevated levels from October 2010 to February 2011, with a mean concentration of 22.3 mg/ℓ during the 2010/11 sampling period and with a decreasing trend over time. Elevated levels were also measured at NL1 (57.7 mg/ℓ) during the November 2010 sampling event.

At the DWA monitoring point B2H14, an average Mg concentration of 10.9 mg/ℓ was measured for the period January 1991 to February 2011. The minimum for the period was 3.531 mg/ℓ and the maximum 32.77 mg/ℓ. The Mg levels at this point have also shown a steady increase since monitoring commenced in 1991.

Potassium

Potassium is ubiquitous in the environment and always occurs in water in association with anions such as chloride or sulphate. Typical concentration in fresh water is 2 - 5 mg/ℓ (DWAF, 1996).
An interim RWQO of 10 mg/ℓ has been set for MU22. Levels of potassium in the Wilge River and its tributaries are below the objective.

At the DWA monitoring point B2H14, an average K concentration of 2.84 mg/ℓ was measured for the period January 1991 to February 2011. The minimum for the period was 1.17 mg/ℓ and the maximum 9.15 mg/ℓ. The levels of potassium have remained fairly constant over time and no specific trend is observed.

5.1.6.2 Synthesis of Baseline / Existing Impacts

The Phola-Kusile Coal Conveyor system is situated in the Wilge River catchment area within quaternary catchments B20F of the Limpopo-Olifants primary drainage region. This catchment makes up part of the Loskop Dam catchment.

The Wilge River drains into the Olifants River, which flows to Loskop dam and then through the central part of the Kruger National Park and into Mozambique. It eventually joins the Limpopo River and discharges to the Indian Ocean on the east African coastline.

Surface water downstream of the Phola-Kusile Coal Conveyor System is used primarily for agricultural and livestock watering purposes. There is also a commercial chicken farm (Kendal Poultry), a brick making plant and several other mines around the site using surface water. Other users include mining, the aquatic ecosystem; and Informal users of the river (e.g. for washing or drinking purposes). Detailed information on water uses per property is presented in Appendix F.

The current water quality in the Wilge River sub-catchment has not been impacted to a large extent and generally is within the interim RWQO's for MU22 as developed by the DNWRP. The only exception is the Klipfonteinspruit (at monitoring point NL4), where an impact associated with the decant of mine water from underground workings has been observed. The impact is noticeable in the macro and micro constituents of the water in the Klipfonteinspruit. The high dissolved aluminium values observed at this point is of particular concern. The poor quality water in the Klipfonteinspruit is however diluted with good quality water from reaches further upstream, resulting in water quality at the furthest downstream monitoring point (NL9) which generally is in the order of the interim RWQO for MU22, with the exception of Al which was exceeded on most occasions.

Historical data for DWA gauge B2H014 show a steady deterioration in the water quality in the Wilge River downstream of the proposed conveyor system, the proposed New Largo Mine and the Kusile Power Station. The levels of sulphate, chloride, calcium and magnesium are approaching the interim RWQO set for the management unit. Any further contribution of salt load into the system can therefore not be tolerated.

5.1.7 Groundwater

An assessment of background groundwater quality was conducted in 2006 and was repeated in 2010 and 2011. Typical groundwater qualities are presented below.

Table 5-8: Typical background groundwater quality in the shallow weathered aquifer (2006)

VARIABLE	AVERAGE
pH	6.79
EC (*mS/m*)	14.55
TDS (*mg/l*)	89.97
Ca (*mg/l*)	12.38
Mg (*mg/l*)	5.80
Na (*mg/l*)	9.63
K (*mg/l*)	2.47
Si (*mg/l*)	7.61
T-Alk (*mg/l*)	62.47
Cl (*mg/l*)	4.91
SO_4 (*mg/l*)	5.64
NO_3 (*mg/l*)	0.95
F (*mg/l*)	0.42
Al (*mg/l*)*	0.186

Fe *(mg/l)**	2.934
Mn *(mg/l)**	0.074

*Samples acidified before filtration.

There are old underground mine workings to the east of the proposed conveyor route, within the centre of the proposed New Largo Colliery mining area. The workings are flooded and excess mine water currently decants to the surface and/or is pumped into the nearby pan on Portion 1 of the Farm Klipfontein 566 JR.

Based on groundwater monitoring conducted between 2006 and 2011, it is estimated that ~1.5 Mℓ/day of water is generated in the old underground workings (pers. Comm. Jaco van den Berg, JMA groundwater specialist responsible for the ground water monitoring programme for AAIC, see Appendix G).

Surface water monitoring results clearly indicated that the water quality of the pan and downstream areas are negatively affected (Section 5.1.6.1).

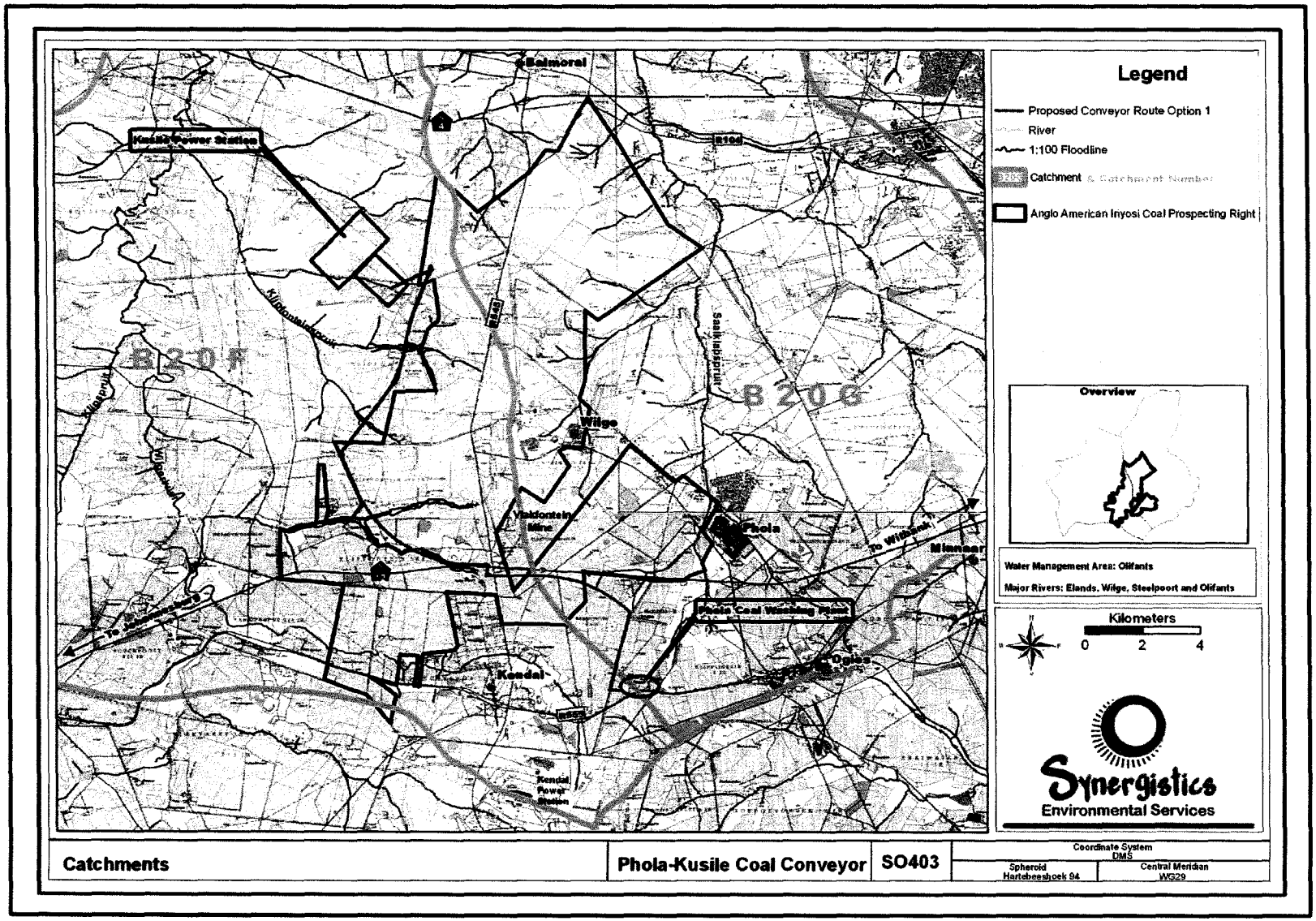
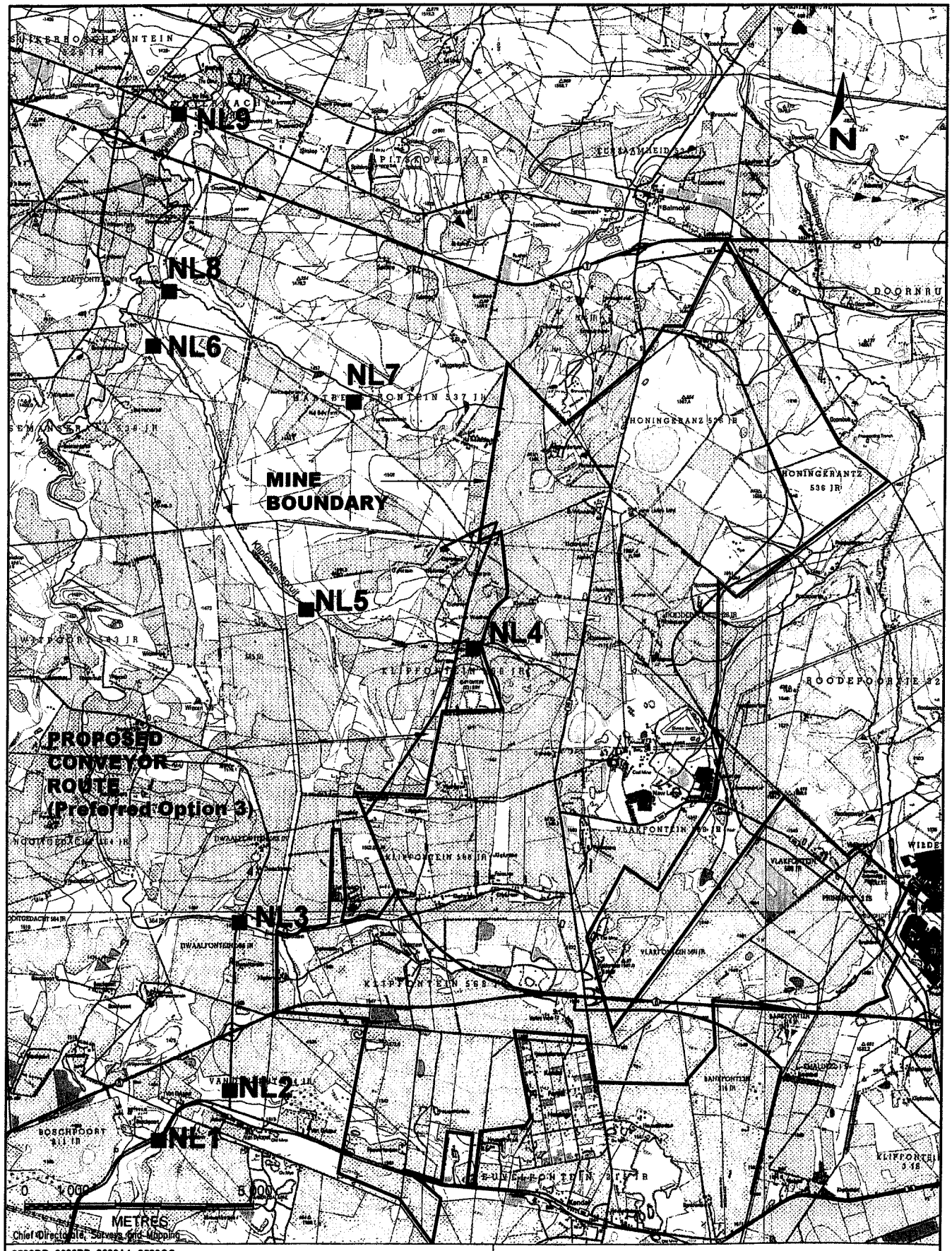


Figure 5-7: Catchments and Rivers



2528DD, 2628BB, 2629AA, 2529CC

Co-ordinate System: WGS84 Projection: WG 29

ANGLO AMERICAN INYOSI COAL
PHOLA - KUSILE CONVEYOR SYSTEM
Surface water monitoring points

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FIGURE 5.2.4(a)

5.1.8 Noise

5.1.8.1 Description of Baseline / Existing Impacts

The proposed Phola-Kusile Overland Coal Conveyor project will be located in an area where the character of ambient noise is to some extent determined by industrialisation and economic activity which over time has resulted in an increase in road traffic noise and noise generated by mining and agricultural activities. Road traffic noise emanates from the N4 and N12 highways, the R545 provincial road, as well as from other secondary roads.

Baseline noise measurements were conducted at seven areas along the proposed Phola-Kusile Coal Conveyor and the broader study area around the proposed New Largo Colliery to determine the conditions before the development of both the Phola-Kusile Coal Conveyor and the New Largo Colliery.

Table 5-9: Noise Baseline Monitoring Points

Monitoring location	Coordinate	Monitoring location	Coordinate
M1 Premises Rockblend	S25 54 18.4 E28 58 27.2	M4 Residence Cloete	S25 57 44.3 E29 01 24.7
M2 Residence Mac Donald	S25 57 09.9 E28 55 57.0	M5 Residence Truter	S25 59 23.7 E29 00 43.6
M3 Residence Engelbrecht	S25 59 51.0 E28 55 47.9	M6 Residence V d Heever	S25 54 00.0 E29 04 04.8
M7 Area south of the N12			

Table 5-10 summarises SANS 10103 criteria for acceptable ambient levels in various districts. Note that ratings increase in steps of 5 dB from one to the next higher category and that, in general, regardless of the type of district, ambient noise levels tend to decline by typically 10 dB from daytime to night-time. It follows that, for the same level of intrusive noise, the noise impact would typically increase by 10 dB from daytime to night-time.

Table 5-10: Typical outdoor ambient noise levels in various districts (SANS 10103)

Type of district	Noise level Equivalent continuous level L_{Aeq} (dBA)		
	Day-Night L_{dn}	**Day-time** L_d	**Night-time** L_n
(a) Rural	45	45	35
(b) Suburban – With little road traffic	50	50	40
(c) Urban	55	55	45
(d) Urban - With some workshops, business premises & main roads	60	60	50
(e) Central business districts	65	65	55
(f) Industrial districts	70	70	60

The periods in Table 2.3 into which a 24 hour cycle is divided, are defined as follows:

- Day-time (06:00 – 22:00)
- Night-time (22:00 – 06:00)

- Day-Night (24-hour day-night period)

The day-night level L_{dn} represents a 24-hour average of the ambient noise level, with a weighting of +10 dB applied to night-time levels, yielding numerically equal values for daytime and day-night levels. SANS 10103 also gives guidelines in relation to expected community response to different levels of noise impact (increase in noise level), as summarized in Table 5-11.

Table 5-11: Expected community response to an increase in ambient noise level (SANS 10103)

Increase in ambient level [dB]	Expected community reaction
0 – 10	Sporadic complaints
5 – 15	Widespread complaints
10 – 20	Threats of community action
More than 15	Vigorous community action

In terms of SANS 10103 guidelines (Table 5-10), the area falls in the category between Rural and Urban, described as "Suburban – With little road traffic". As such, one would expect typical ambient levels in the area to be in the order of 50 dBA (daytime) and 40 dBA (night-time), respectively. The results of the baseline survey should serve to verify the current status and to establish the extent to which ambient levels are currently affected by abovementioned activities.

Ambient levels at M1 (Premises at Rockblend – Nelson family)

Average daytime and night-time ambient levels recorded at this location during the course of this investigation, were 55 dBA (daytime) and 37 dBA (night-time), respectively. The daytime ambient level was determined by:

- Noise from the R545 main road;
- Noise from work activities on this property;
- Trucks and other vehicles arriving at and leaving from the premises.
- Audible sources of noise at night were road traffic from local roads, as well as insect and bird calls.

Ambient levels at M2 (Residence Mac Donald)

Average daytime and night-time ambient levels recorded at this location were 52 dBA (daytime) and 40 dBA (night-time). Audible sources of noise during daytime were found to be heavy mining vehicle traffic on the local unpaved road approximately 500 m from the residence, farming activities, livestock noise and distant traffic noise on the R545 main road. At night it was mainly road traffic in the distance, livestock noise, as well as insect and bird calls which contributed to audible noise. Obvious, noise levels measured at this point included existing distant mining activities.

Ambient levels at M3 (Residence Engelbrecht)

Average daytime and night-time ambient levels recorded at this location were 50 dBA (daytime) and 37 dBA (night-time). Audible sources of noise during daytime were found to be farming activity, livestock and barely audible levels of road traffic noise in the distance. At night it was mainly livestock, bird and insect calls, and at a much lower level, noise from traffic on distant roads.

Ambient levels at M4 (Residence Cloete)
Average daytime and night-time ambient levels recorded at this location were 52 dBA (daytime) and 43 dBA (night-time). The level of activity and the ambient levels are higher but the types of noise sources contributing to audible ambient noise were found to be the same as those recorded at M3.

Ambient levels at M5 (Residence Truter)
Average daytime and night-time ambient levels recorded at this location were 54 dBA (daytime) and 48 dBA (night-time). Daytime levels were determined by traffic on the R545 passing at a distance of approximately 250 m and by work activities and vehicle movement on the premises. Night-time levels are determined predominantly by traffic on the R545.

Ambient levels at M6 (Residence Van den Heever)
Average daytime and night-time ambient levels recorded at this location were 49 dBA (daytime) and 45 dBA (night-time). The types of noise sources contributing to audible ambient noise are similar to those recorded at M3. Night-time levels were elevated by dogs barking. In the absence of barking, the level dropped to 41 dBA.

Ambient levels at M7 (Area south of N12 highway)
Based on probing and short duration averaging, typical daytime and night-time ambient levels in this area are 54 dBA (daytime) and 46 dBA (night-time), respectively. Levels are elevated by traffic noise on the N12 and by mining noise in the area.

The results of the survey are summarised on the map in Figure 3.1. Daytime and night-time periods are as defined in SANS 10103.

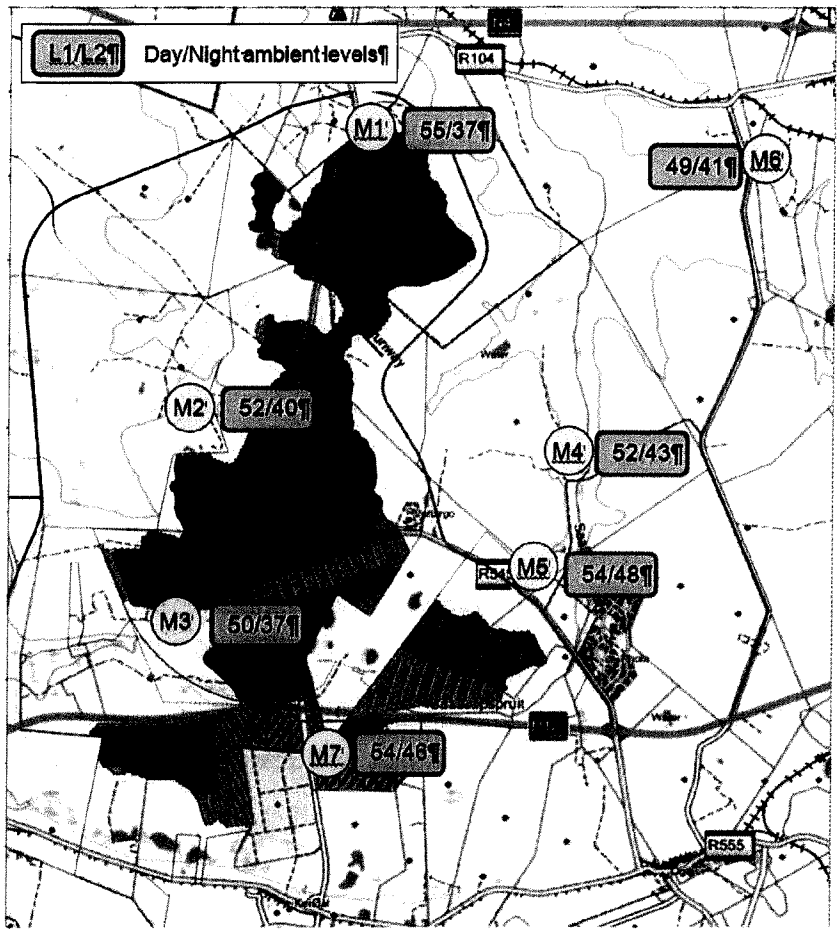

Figure 5-9: Baseline: Average daytime (06:00 to 22:00) and night-time (22:00 to 06:00) Ambient Levels

In terms of SANS 10103 guidelines, the area falls in the category between Rural and Urban (Suburban – with little road traffic). As such, one would expect typical ambient levels in the area to be in the order of 50 dBA (daytime) and 40 dBA (night-time), respectively.

5.1.8.2 Synthesis of Baseline / Existing Impacts

The results of the baseline monitoring survey showed that ambient noise climate is homogeneous over the largest part of the project area. Night-time levels vary between 37 and 43 dBA, which is in good agreement with the typical level (40 dBA) expected in accordance with SANS 10103 guidelines for the area. The exception is to this is areas found within 500 m from the R545 and N12, which are affected by traffic. Monitoring affected by these two roads showed night-time levels of between 46 and 48 dBA.

Averages baseline noise levels for the study area is tabled below:

Table 5-12: Baseline outdoor ambient noise levels derived from field surveys Rounded to the nearest nominal rating in 5 dB steps in accordance with SANS 10103 system

Area	Baseline ambient noise level L_{Aeq} (dBA)	
	Day-time L_d	**Night-time** L_n
All areas excluding areas near the N12 and R545	50	40
Locations within 500 m from the N12	55	45
Locations within 100 m from the R545 main road	55	45

5.2 Biological Environment

5.2.1 Flora

The study area is located within the grassland biome of South Africa. The grassland biome is one of the most threatened biomes in South Africa, due to agricultural and mining activities. Approximately 60 to 80% of the grassland biome has been irreversibly transformed, while only 2% is formally conserved. In terms of the latest regional vegetation classification, three regional vegetation units occur in the area: Eastern Highveld Grassland, Eastern Temperate Freshwater Wetlands and Rand Highveld Grassland (Mucina & Rutherford 2006) (

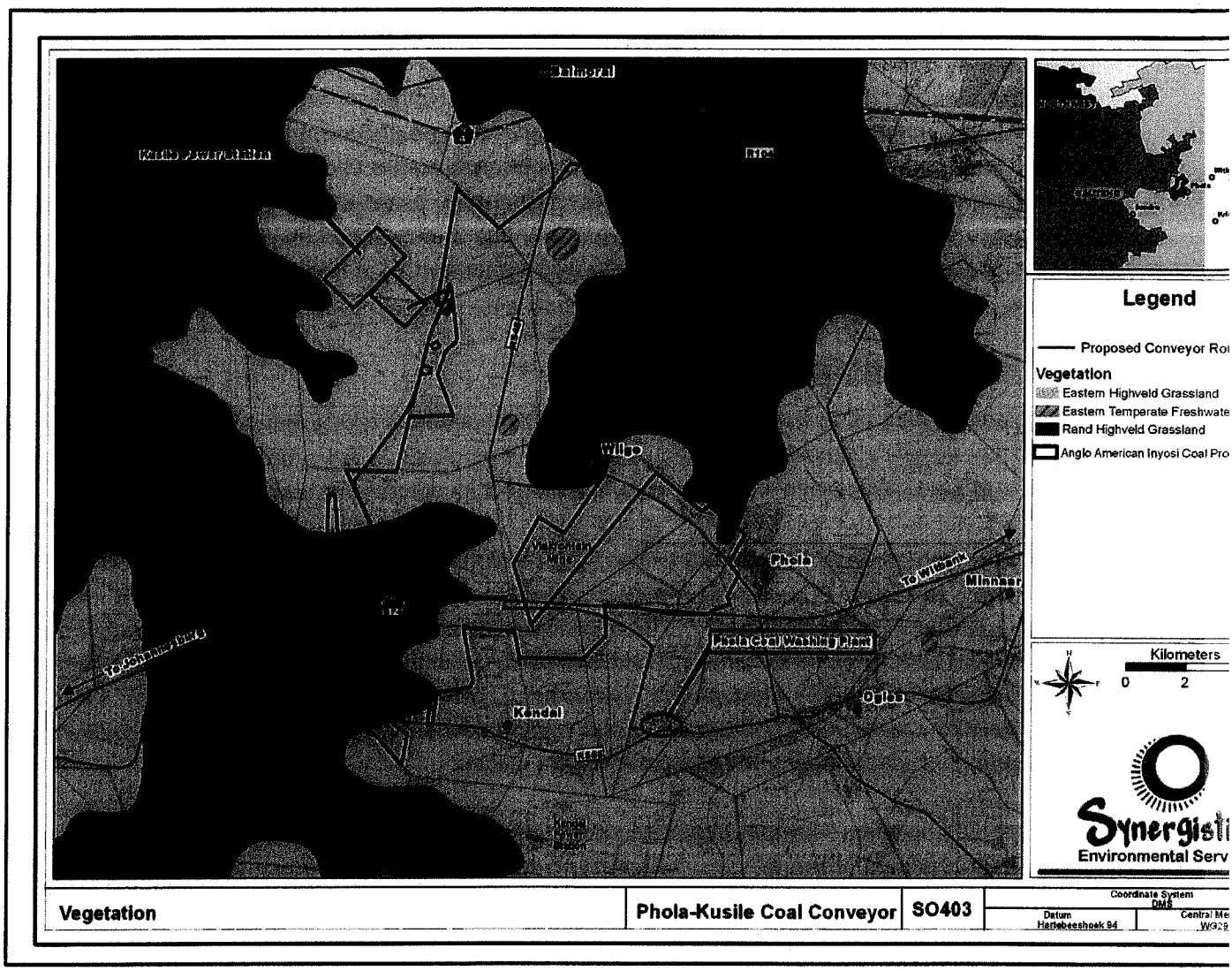

Figure 5-11).

5.2.1.1 *Eastern Highveld Grassland*

This vegetation unit is described as occurring on slightly to moderately undulating plains, including some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual Highveld grass composition (Aristida, Digitaria, Eragrostis, Themeda, Tristachya etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Acacia caffra, Celtis africana, Diospyroslyciodes subsp lycioides, Parinari capensis, Protea caffra, P. welwitschii* and *Rhus magalismontanum*). Abiotic attributes associated with this vegetation unit are red to yellow sandy soils of the Ba (30%) and Bb (65%) land types found on shale and sandstones on the Madzaringwe Formation (Karoo Supergroup). Land types associated with the Ba and Bb soil patterns are associated with landscapes in which a plinthic catena forms part of the landscape. In these landscapes, soft plinthic soils associated with fluctuating water tables within 1.5 m of the surface of the earth are common.

This vegetation unit is considered to be endangered, its conservation target is 24%. Some 44% is transformed mainly by cultivation, plantations, mines and urbanization and by building of dams. Cultivation may have had a more extensive impact, indicated by land-cover data. No serious alien invasions are reported, but *Acacia mearnsii* can become dominant in disturbed sites. Erosion is very low.

5.2.1.2 Eastern Temperate Freshwater Wetlands

This vegetation is described as occurring on flat landscape or shallow depressions filled with (temporary) water bodies, supporting zoned systems of aquatic and hygrophilous vegetation of temporarily flooded grasslands and ephemeral herblands. Soils are peaty (Champagne form) to vertic (Rensburg form). Wetlands form where flow of water is impeded by impermeable soils and/or by erosion resistant features, such as dolerite intrusions. Surface water inundating may be present at any point while the wetland is saturated and some plant species will be present only under inundated conditions or under permanently saturated conditions. The presence of standing water should not be taken as a sign of permanent wet conditions.

5.2.1.3 Rand Highveld Grassland

This unit is described as forming part of a highly variable landscape with extensive sloping plains and a series of ridges slightly elevated over undulating surrounding plains. The vegetation is species-rich, wiry, sour grassland alternating with low, sour shrub-land on rocky outcrops and steeper slopes.

Biogeographically important taxa occurring in the regional vegetation are *Agapanthus inapertus P.Beauv. ssp. pendulus (L.Bolus) Leight., Eucomis vandermerwei I.Verd., Huernia insigniflora C.A.Maass and Melhania randii Baker f.* The following species are endemic to the regional vegetation unit: *Anacampseros subnuda Poelln. ssp. lubbersii (Bleck) Gerbaulet, Crassula arborescens (Mill.) Willd. ssp. undulatifolia Toelken, Delosperma purpureum, Encephalartos eugene-maraisii I.Verd. ssp. middelburgensis Lavranos & D.L.Goode, Encephalartos lanatus Stapf & Burtt Davy, Frithia humilis, Melanospermum rudolfii Hilliard and Polygala spicata Chodat.*

This unit is also considered endangered; its conservation target is 24%. It is poorly conserved. Almost half has been transformed mostly by cultivation, plantations, urbanization or dam-building. Cultivation may also have had an impact on an additional portion of the surface area of the unit where old lands are currently classified as grasslands in the land-cover classifications. Scattered aliens (most prominently *Acacia mearnsii*) occur in about 7% of this unit. Only about 7% has been subjected to moderate to high erosion levels.

5.2.2 Fauna

The animals observed during previous field assessments are typical of the region in which the study area is located – a combination of ecological characteristics associated with wetlands, grasslands, crop fields and outcrops found in the study area. No Red Data or sensitive animal species were found or any indication of such species observed.

The red data species that are known from the regional databases are considered to have a low or moderate likelihood of occurrence in the study area, lacking some of their habitat requirements within the study area. These include characteristics such as woodland-associated conditions, caves or subterranean habitats. As a result, a large portion of the red data species contingent for the study area is not considered likely inhabitants (49% of species). However, the presence of wetlands and untransformed grasslands has led to the estimations of high (11% of species) and moderate (40% of species) probability of occurrences of red data species within the study area's boundaries.

5.2.3 Ecological Sensitivity

Habitat classifications as defined in the Mpumalanga Conservation Plan (C Plan) are presented in Figure 5-14. Ecological sensitivity, based on the results of ecological surveys conducted in 2006 and 2010 is presented in Figure 5-12. Where required, the ecological specialist will expand the data for any route alternatives located outside the areas previously surveyed.

Important habitats include wetlands and wetland-related habitats (high faunal sensitivity) and untransformed grasslands (moderate sensitivity). These areas are also considered to be important for the conservation of biodiversity in the study area. These areas include ecological conditions that are varied, unique and likely host to restricted (geographically) animal assemblages and communities. The high-lying rocky shrub-land is one ecological system that deserves higher status than based on red data habitat alone. The presence of a much localized plant species, *Frithia humilis*, is an indication of the biological importance of the habitat type in the study area and region. It is likely that the high lying rocky shrub-land will also be host to unique animal assemblages, especially where invertebrates are concerned (one might be a pollinator of *F. humilis*.).

5.2.4 Wetlands

The presence of wetlands in the study area is linked to both perched groundwater and surface water. Three types of natural wetland systems occur within and around the study area:

- Valley bottom wetlands with and without channels;
- Hillslope seepage wetlands; and
- Pans.

Wetlands found in the study area are depicted in Figure 3-1. A schematic diagram of how these systems are positioned in the landscape and the general topography of the study sites is given in Figure 5-10 with the generalised hydrological and other characteristics of the wetlands tabulated in Table 5-13.

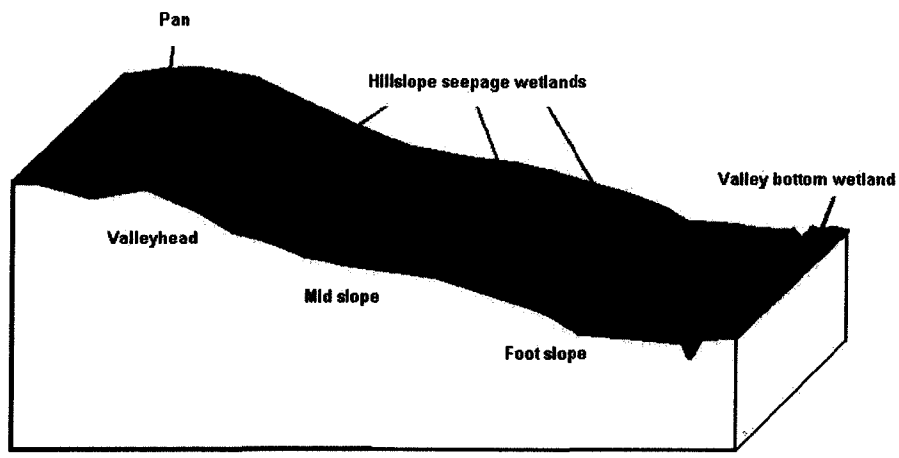

Figure 5-10: Schematic illustration of the types of wetlands and the topographical settings of typical wetlands found in and around the study area

Both seepage and some sections of valley bottom wetlands have been modified to form impoundments to provide access to and to extend the period of availability of water that is moving through the landscape.

The study area straddles a catchment divide form where water flows off to emerge as seepage wetlands where the aquiclude (impermeable area) intercepts the side slopes and where flows concentrate in the valley bottoms. The valley bottom wetlands on the tributaries of the Saalklapspruit are largely channelled implying that the energy associated with the flows is high enough to cause sediment transport. The large *Phragmites* stands in the Saalklapspruit are undoubtedly a reflection of the deposition of sediments emerging from the upstream catchment. In contrast to this the valley bottom wetlands associated with west draining tributaries of the Wilge River are, within the study site, largely naturally unchannelled. There is some evidence of channel development in the systems on the farm Klipfontein where channelling has developed in one of the reaches. The absence of any extensive reed beds in the Wilge River would suggest that the energy associated with flows out of this section of the catchment are high thus transporting sediments to beyond the study area.

The relatively large surface area representing seeps suggests that a considerable portion of the rainfall falling in this area enters the valley bottom systems as diffuse flow, over an extended period of time.

Table 5-13: General characteristics of the wetlands recorded in the study area

WETLAND TYPE		TOPOGRAPHIC SETTING	DESCRIPTION	HYDROLOGIC COMPONENTS		
				Inputs	Throughputs	Outputs
RIPARIAN	Valley bottom wetlands	Generally in the steeper headward parts of the streams and in the shallow valleys that drain the slopes.	Relatively narrow grassland areas (generally < 60m wide) with or without a channel that drain the steeper upper catchment slopes in the study area.	Receive water from overland flow including runoff from the adjacent slopes and from overtopping of the channel banks during high rainfall events.	Surface flow supported in some cases by interflow.	Variable but predominantly overland, stream flow and evapo-transpiration.
NON-RIPARIAN	Hillslope seepage	Hillslopes	Occur on concave or convex slopes which are characterized by the colluvial (transported by gravity) movement of materials. Generally always associated with deep sands.	Predominantly interflow associated with perched aquifers but may include groundwater.	Interflow and diffuse surface flow.	May be seasonal to permanent, surface flow or interflow and evapo-transpiration.
	Pans	In depressions and basins	A basin shaped area with a closed elevation contour that allows for the non-permanent (seasonal or temporary) accumulation of surface water. An outlet is usually absent.	Runoff from the surrounding catchment area.	In some cases, possibly seepage	Evapo-transpiration and in some instances suspected leakage

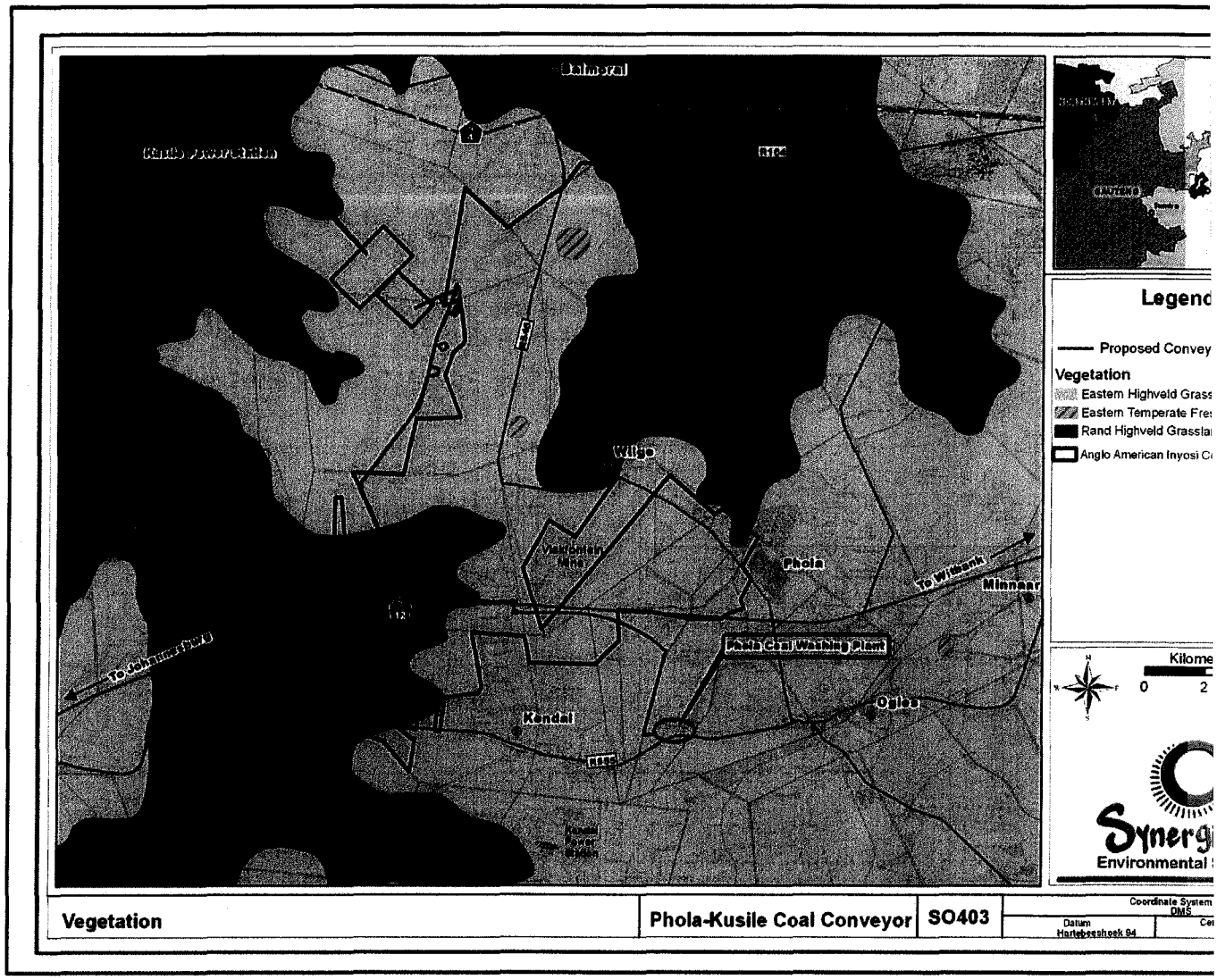

Figure 5-11: Regional Vegetation

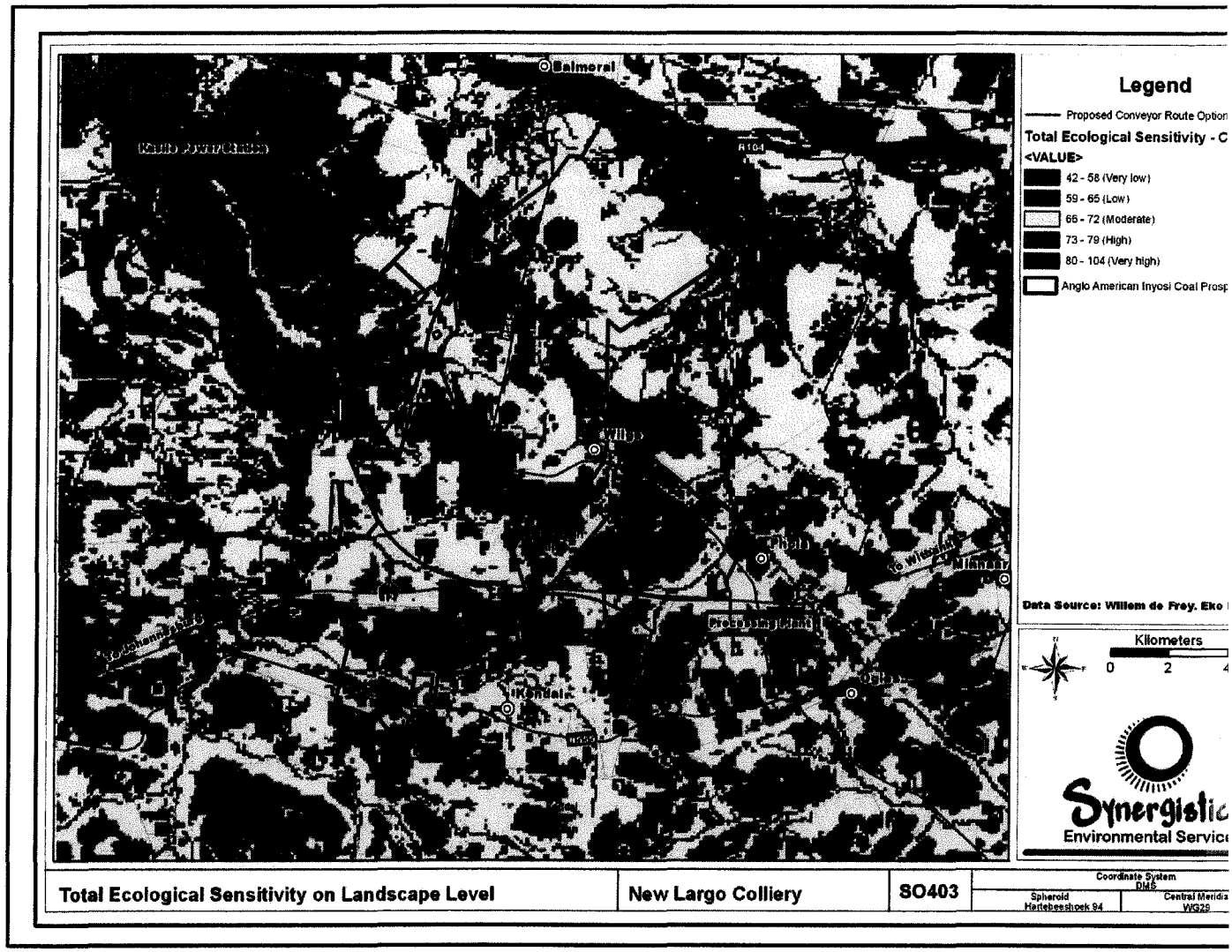

Figure 5-12: Ecological Sensitivity

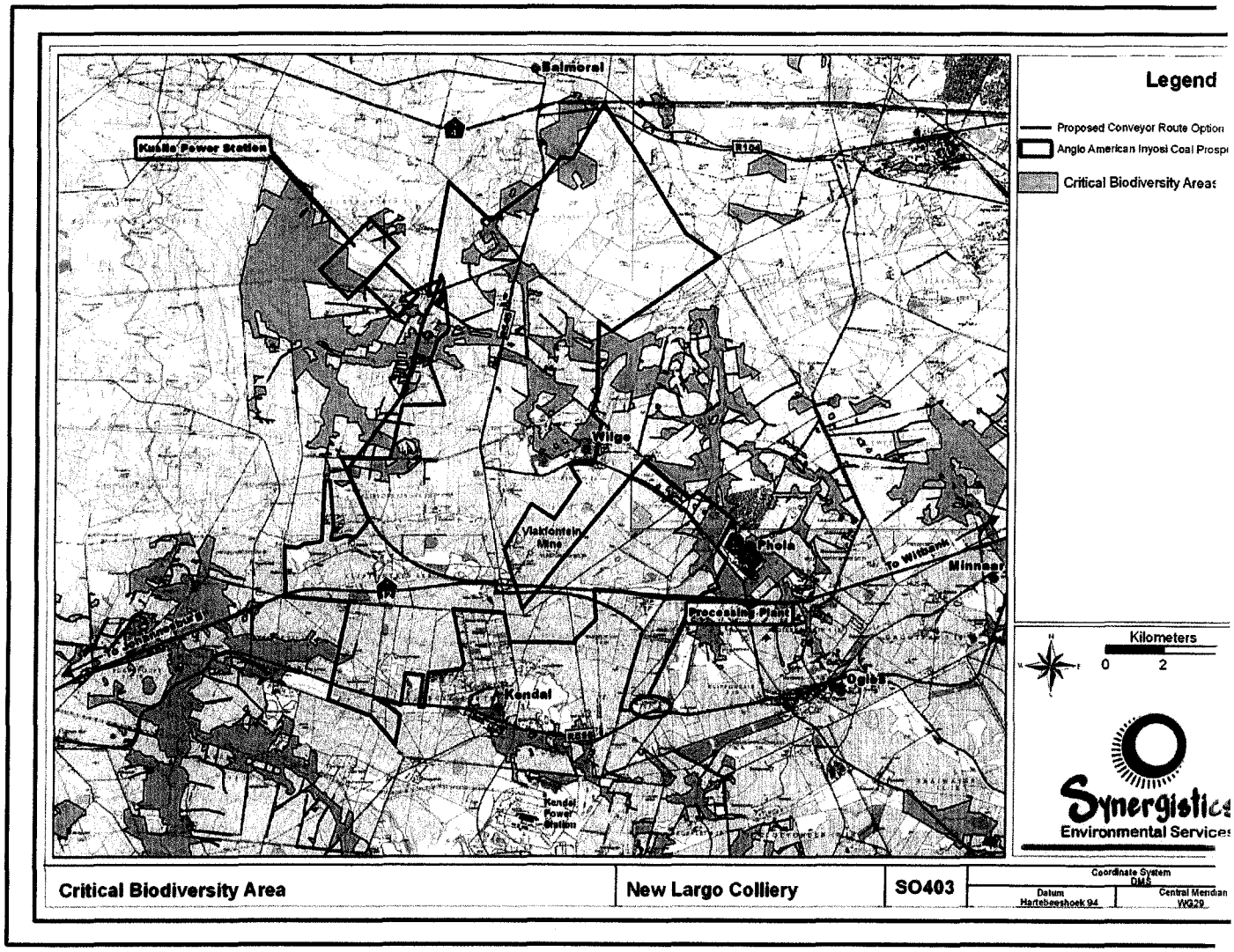

Figure 5-13: Critical Biodiversity Areas

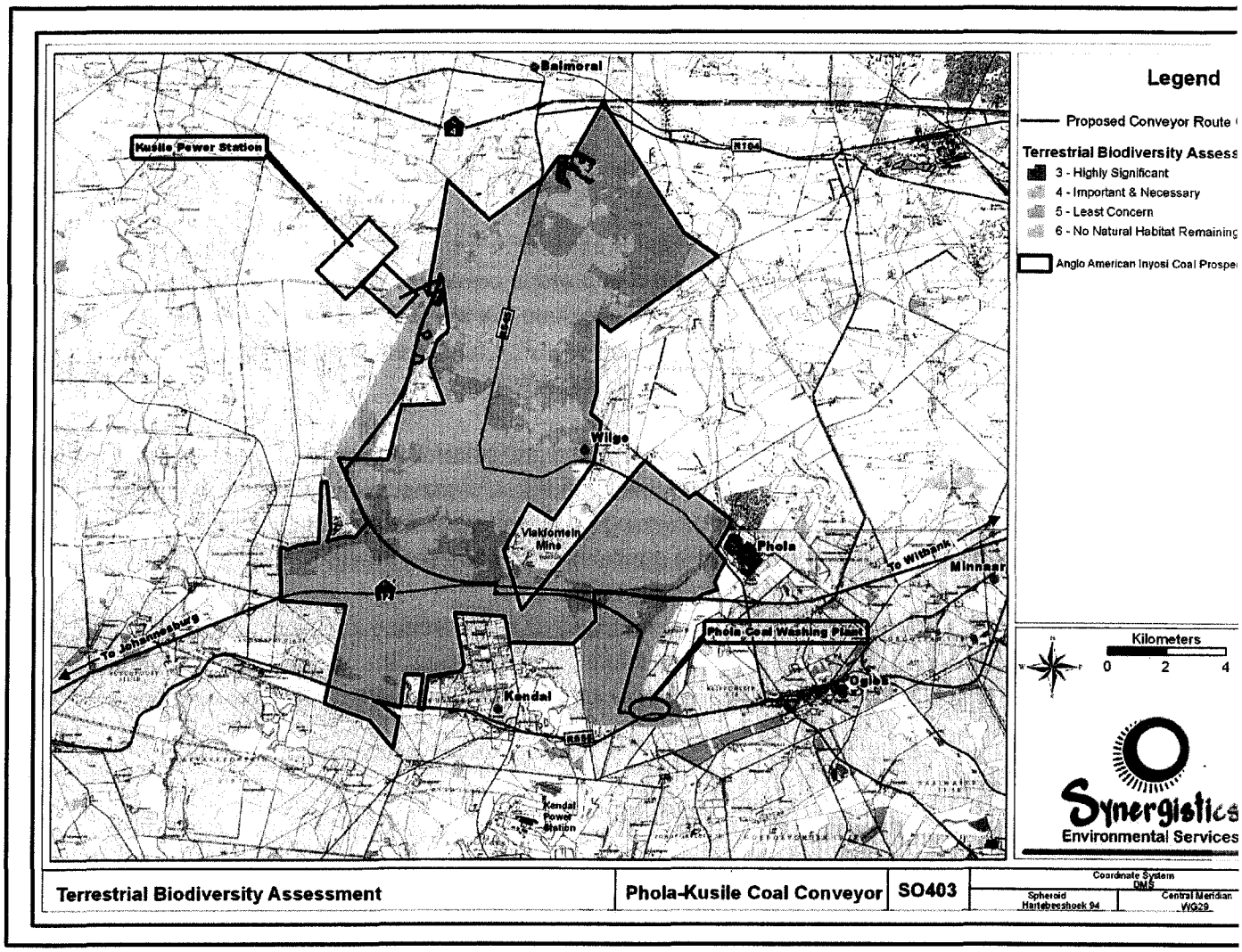

Figure 5-14: Terrestrial Biodiversity Assessment (Mpumalanga Conservation Plan)

5.3 Socio-Economic Environment

5.3.1 Economic Features

The historical drivers of the local economy are that of mining, agriculture and electricity generation.

Mining occurs throughout the broader study area, with large sections of the area affected by under undermined areas, rehabilitated mining land and areas covered by mining and/or mineral rights. Due to the rich coal reserves in local area, Eskom developed the Kendal, Kriel, Matla, Wilge and Duvha power stations during the 1970's and 1980's to provide for future electricity needs. This has led to the establishment of towns such as Kriel, Thubelihle and Wilge.

The non-urban areas consist mainly of farms and agricultural holdings. The agricultural holdings are found on the periphery of the urban settlements. In terms of agriculture, stock farming (sheep and cattle) and maize farming with some irrigated farming occur throughout the area and especially along the river drainage basins. Intensive and extensive agriculture activities are present.

The economic profile of the study area indicates the importance of mining as a driver in the local economy. This is supported by manufacturing activities in the local economy. Additionally the employment figures indicate that the majority of people either work in the trade sector or the mining sector.

5.3.2 Population Structure

5.3.2.1 Population

According to the Community Survey 2007, the population of South Africa is approximately 48.5 million and has shown an increase of about 8.2% since 2001. The household density for the country is estimated at approximately 3.87 people per household. This indicates an average household size of 3-4 people (leaning towards 4) for most households, which is slightly down from the 2001 average household size of 4 people per household.

The growth rate in Mpumalanga was very similar to the national average, but Nkangala District and Emalahleni Local Municipalities experienced growth rates well above the national average with the population within the Emalahleni Local Municipality more than doubling since 2001, as tabled below.

Table 5-14: Population Growth from 2001

Area	Approximate population size	Estimated growth since 2001	Average household size
Mpumalanga	3,643,435	8.25%	3.87
Nkangala District Municipality	1,226,500	20.38%	4.01
Emalahleni Local Municipality	435,217	57.45%	4.12

5.3.2.2 Age

Emalahleni Local Municipality has the highest average population age (27.68 years) of the areas investigated. This can possibly be ascribed to the more urban nature of the Emalahleni Local Municipality and the extent of industrial activities in the area compared to the district. Although there are larger urban areas in the Mpumalanga province than Emalahleni, there are also a number of tribal areas in the province which tend to have large proportions of young people that lowers the average age of the population in the province.

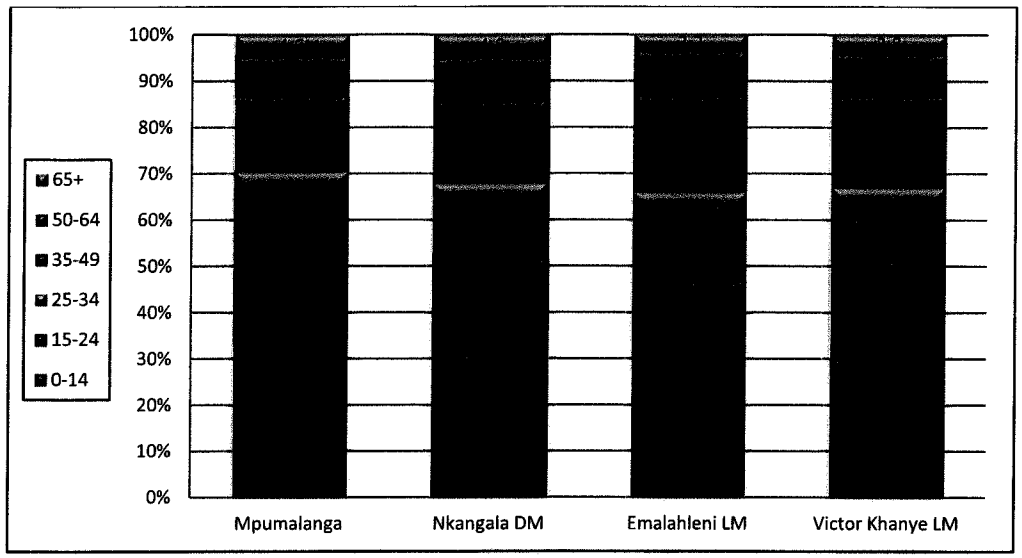

Figure 5-15: Age distribution (shown as percentage, source: Ptersa, 2011)

5.3.2.3 Gender

The gender distribution is fairly equal, with a slightly higher percentage of males in the Emalahleni Local Municipality area as well as in the Victor Khanye local municipality area, which can be ascribed to the industrial nature of these areas.

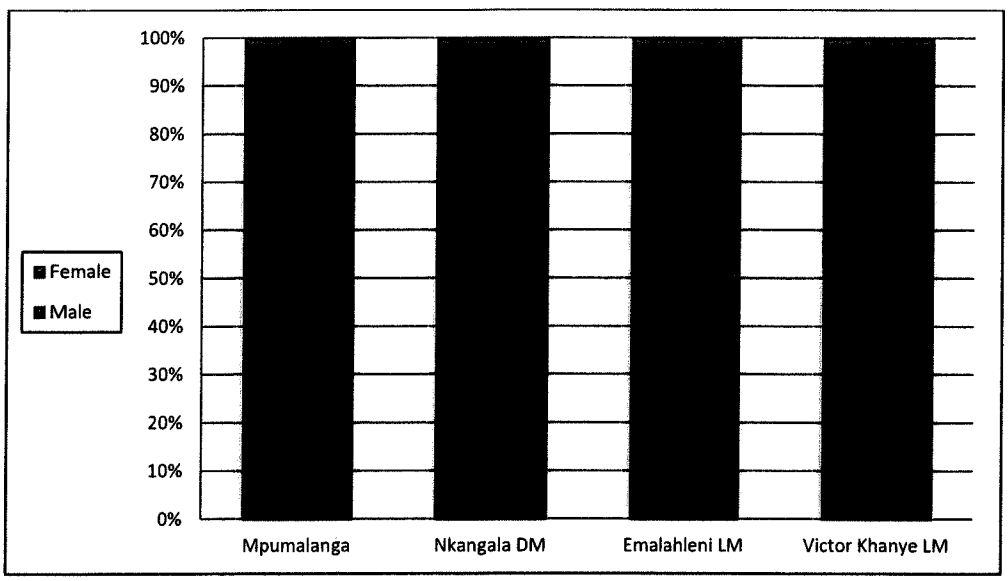

Figure 5-16: Gender distribution (shown as percentage, source: Ptersa, 2011).

5.3.2.4 Education

Education deprivation is one of the domains of Multiple Deprivation that was used to calculate the Provincial Indices of Multiple Deprivation. There is a close link between educational attainment, the type of work an individual is engaged in and the associated earnings potential. The level of education achieved by an individual, determines current income and savings potential, as well as future opportunities for individuals and their dependants.

The Emalahleni Local Municipality has a higher proportion of people (23.7%) indicating that they have obtained Grade 12 or a higher qualification than on district or provincial level (**Figure 4.4.2(c)**). Even so, this proportion is still relatively low and this is limiting the employment potential of the population of the area. The Victor Khanye municipality has the lowest proportion of people (11.7%) indicating that they have obtained Grade 12 or a higher qualification. The high proportion of people who did not attend an educational institution has led to a generation of illiterate young people with a future of unemployment. This also poses a huge problem within communities as dependency as well as criminal activities increase.

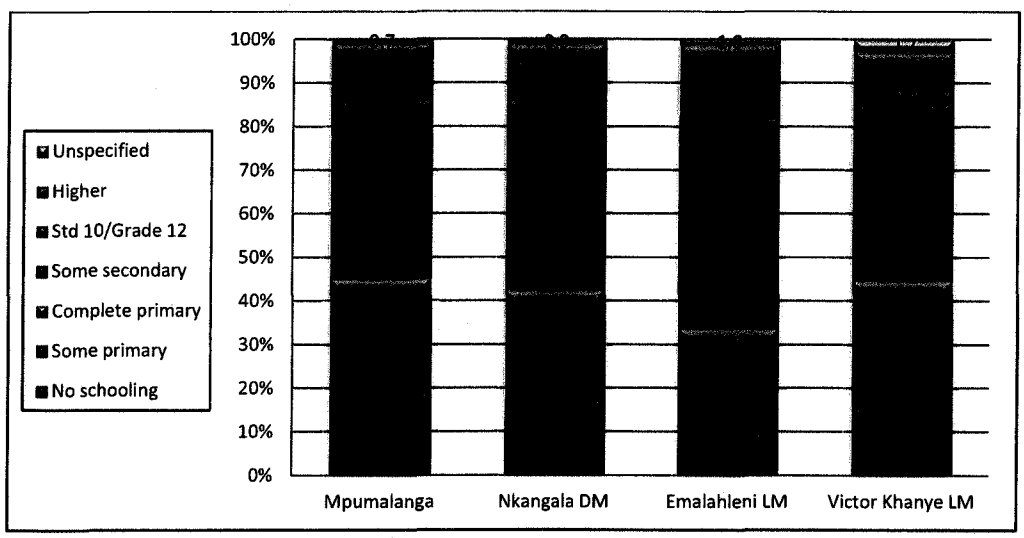

Figure 5-17: Highest education level – people 20 years or older (shown as percentage)

The Nkangala District Municipality identified some challenges with regard to education in the district as decaying schools, lack of learner transport and lack of facilities, e.g. libraries, sport facilities and basic necessities such as ablution facilities. Other important social issues affecting the school attendance rate include drug abuse, teenage pregnancy and violence at schools (Nkangala IDP 2008/2009).

5.3.3 Employment

The majority of the market population (57.5%) is economically active while conversely 42.5% are not economically active. Of the 57.5% of the population that are economically active 74.9% are employed while 25.1% of the economically active population is unemployed. A large number of people which are not economically active, coupled with high rates of unemployment, have created scenarios where the dependency ratio is high. This means that people that are employed have to sustain friends and family

members that cannot find work. This reduces the disposable income and in most cases people can only buy the most basic of products such as food. Very little savings and additional money are available for consumption.

5.3.4 Land Capability and Land Use

The majority of the land between the Phola Coal Processing Plant and the Kusile Power Station, over which a route for the overland conveyor has to be found, can be considered to be arable land or grazing land. Only small areas can be classified as wilderness land and as wetlands, as illustrated in Figure 5-18. The regional land cover is depicted in

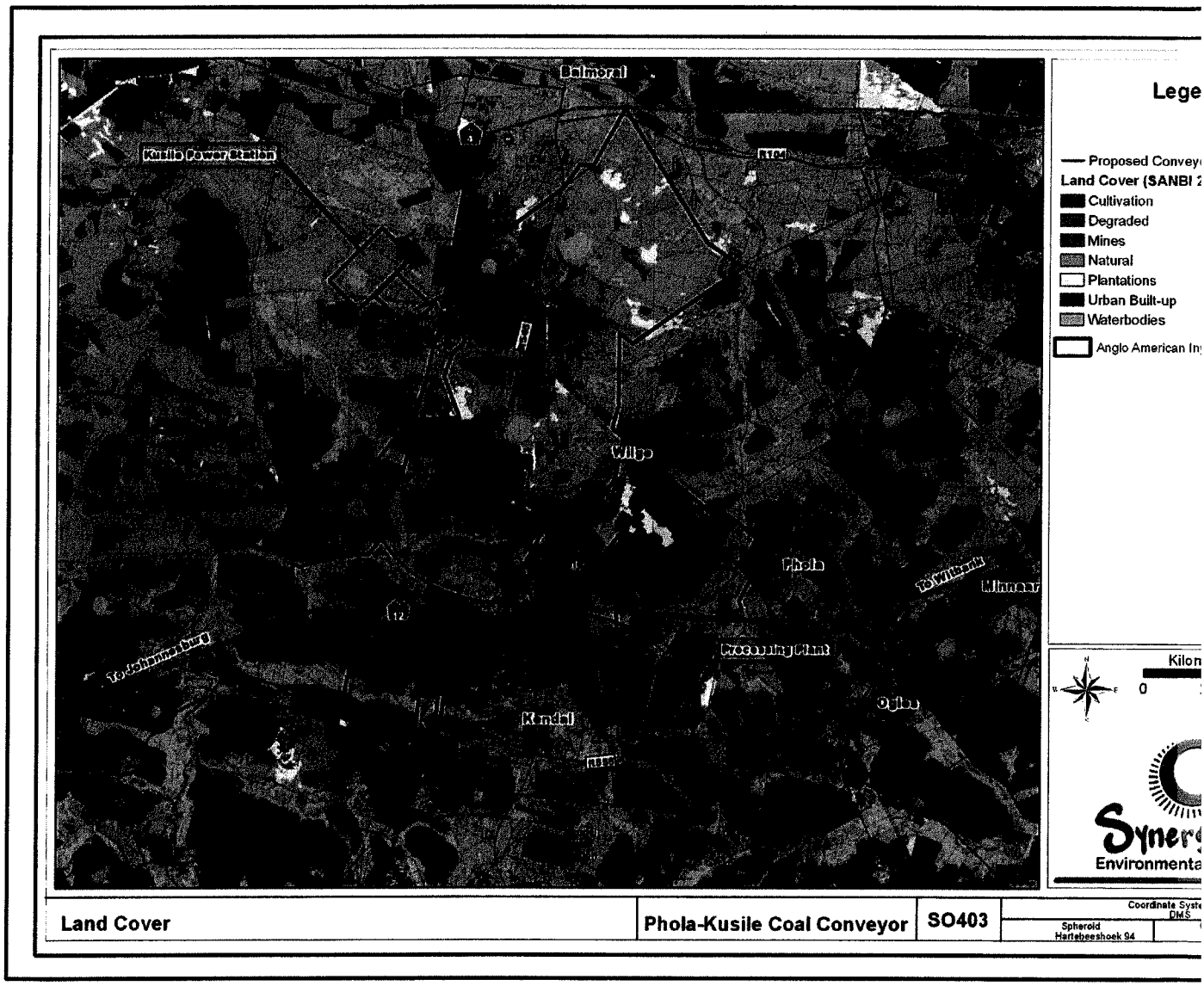

Figure 5-19.

5.3.4.1 Arable Land

Land capable of sustaining arable crop production is generally found on deeper (> 750 mm) well drained, red (Hutton) and yellow-brown (Clovelly and Griffin) soils on the midslope and upper midslope positions in the landscape. Areas where deeper hydromorphic soil forms (soil that developed in the presence of excess water) are found are also capable of sustaining agricultural crop production (Glencoe, Katspruit, Kroonstad, Rensburg, Westleigh, Pinedene and Avalon), if good management practices are employed. The more structured and shallow hydromorphic soils are not considered to be arable soils.

5.3.4.2 Grazing Land

Grazing land is generally confined to areas with shallower soils. These soils are generally darker in colour and are hydromorphic. They can be moderately to well drained but are not always free draining to a depth of 750 mm. These soils are capable of sustaining palatable plant species on a sustainable basis, especially since only the subsoils (at a depth of 500 mm) are periodically saturated. To be classified as grazing land, there should be no rocks or pedocrete fragments (a type of infertile and compacted soil formed by the concentration of minerals due to terrestrial weathering in the upper soil layers). If present, these would limit the land capability to wilderness land.

5.3.4.3 Wilderness Land

The areas that classify as wilderness land are found associated with the shallower and rockier soils and are not suitable for agriculture or grazing.

5.3.4.4 Wetlands

Wetlands are generally delineated based on a combination of soil types and the presence of hydromorphic vegetation. Wetland soils are defined using hydromorphic soil criteria. The soils are generally dark grey to black in the topsoil horizons with a high transported clay component and show pronounced mottling in the subsoils layers. A general wetland map of the area is provided as Figure 3-1, while the detailed wetland delineation along the AAIC proposed conveyor route is depicted on Figure 5-5.