These shrimps were moderately abundant at both sites. The proportion of air-breathing taxa was the same at the two sites (50%). The results show that there was no measurable difference in the composition or abundance of aquatic macroinvertebrates at the two monitoring sites.

Toxicity:

Toxicity tests conducted in December 2015 indicated an increase in overall toxicity throughout the area, with all sites having some degree of toxicity, and seven sites (50%) classified as Highly Toxic. By contrast, the previous survey recorded no toxicity at eight sites, and two sites (14%) were classified as Highly Toxic.

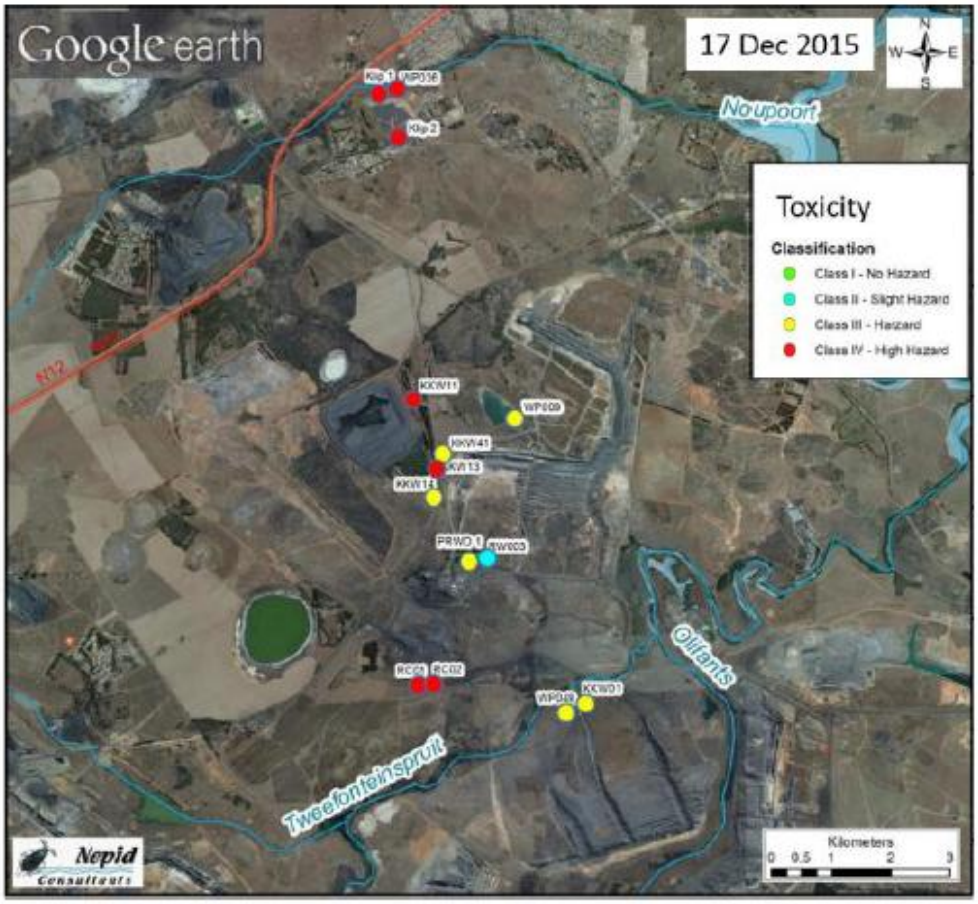

Figure 38: Toxicity results (Source: Nepid Consultants; December 2015)

7.2 Blaauwkrans co-disposal facility and surrounds

Information contained in this section has been sourced from the following:

- The report titled: "*Aquatic Biomonitoring Assessment for Anglo Coal, Landau Colliery, Wet Season Survey (March 2016)*", compiled by Clean Stream Biological Services.

The biomonitoring sites at Khwezela North Colliery are indicated in Figure 39 below.

Figure 39: Google image indicating aquatic sampling sites of the "Schoongezicht Spruit" and "Clewer Spruit" reaches of the Landau Colliery study area. (Source: Clean Stream Biomonitoring; March 2016)

Results

The Schoongezicht Spruit is not suitable for the application of biomonitoring protocols (SASS5) and hence no *in-situ* water quality measurements are therefore recorded for the system during the specified biomonitoring survey. Reference is however made to the water quality results gained during toxicity testing under laboratory conditions to provide some indication of the water quality prevailing in the system. The pH levels measured very acidic in the entire system ranging between 2.6 and 2.7. The target water quality pH r/--anges for fish health of 6.5 - 9.0 (DWAF, 1996) was therefore critically exceeded and it can be estimated that no fish life would exist in this system under current conditions. The salinity levels, as indicated by electrical conductivity (EC) was high at all sites ranging from 309 mS/m to 396 mS/m. Salinity can therefore also be expected to limit the biotic integrity of this ecosystem (Clean Stream, March 2016).

Chapter H: Wetlands

Information on wetlands as contained under this section has been obtained from the following sources:

- The report titled: "*Biodiversity Action Plan for Kleinkopje Colliery*", dated February 2014, compiled by Digby Wells;
- The report titled: "*Wetland delineation and assessment for Kleinkopje Colliery*", dated January 2013 and compiled by Wetland Consulting Services (Pty) Ltd; and
- The report titled: "*Wetland Delineation and Impact Assessment Report for Landau Colliery Life Extension Project*", dated October 2013, and compiled by Wetland Consulting Services.

1 National Freshwater Ecosystem Priority Areas

The published Atlas of Freshwater Ecosystem Priority Areas in South Africa (Nel et al, 2011a) (The Atlas) which represents the culmination of the National Freshwater Ecosystem Priority Areas project (NFEPA), a partnership between SANBI, CSIR, WRC, DEA, DWA, WWF, SAIAB and SANParks, provides a series of maps detailing strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources. Freshwater Ecosystem Priority Areas (FEPA's) were identified through a systematic biodiversity planning approach that incorporated a range of biodiversity aspects such as ecoregion, current condition of habitat, presence of threatened vegetation, fish, frogs and birds, and importance in terms of maintaining downstream habitat. The Atlas incorporates the National Wetland Inventory (NWI) (SANBI, 2011) to provide information on the distribution and extent of wetland areas. An extract of the NFEPA database is illustrated in Figure 32 below.

The NFEPA identified 791 wetland ecosystem types in South Africa based on classification of surrounding vegetation (taken from Mucina and Rutherford, 2006) and hydro-geomorphic (HGM) wetland type; seven HGM wetland types are recognised and 133 wetland vegetation groups.

Figure 40 below provides a representation of the NFEPA wetlands within the project area(s), as well as the wetlands as delineated by Wetland Consulting Services.

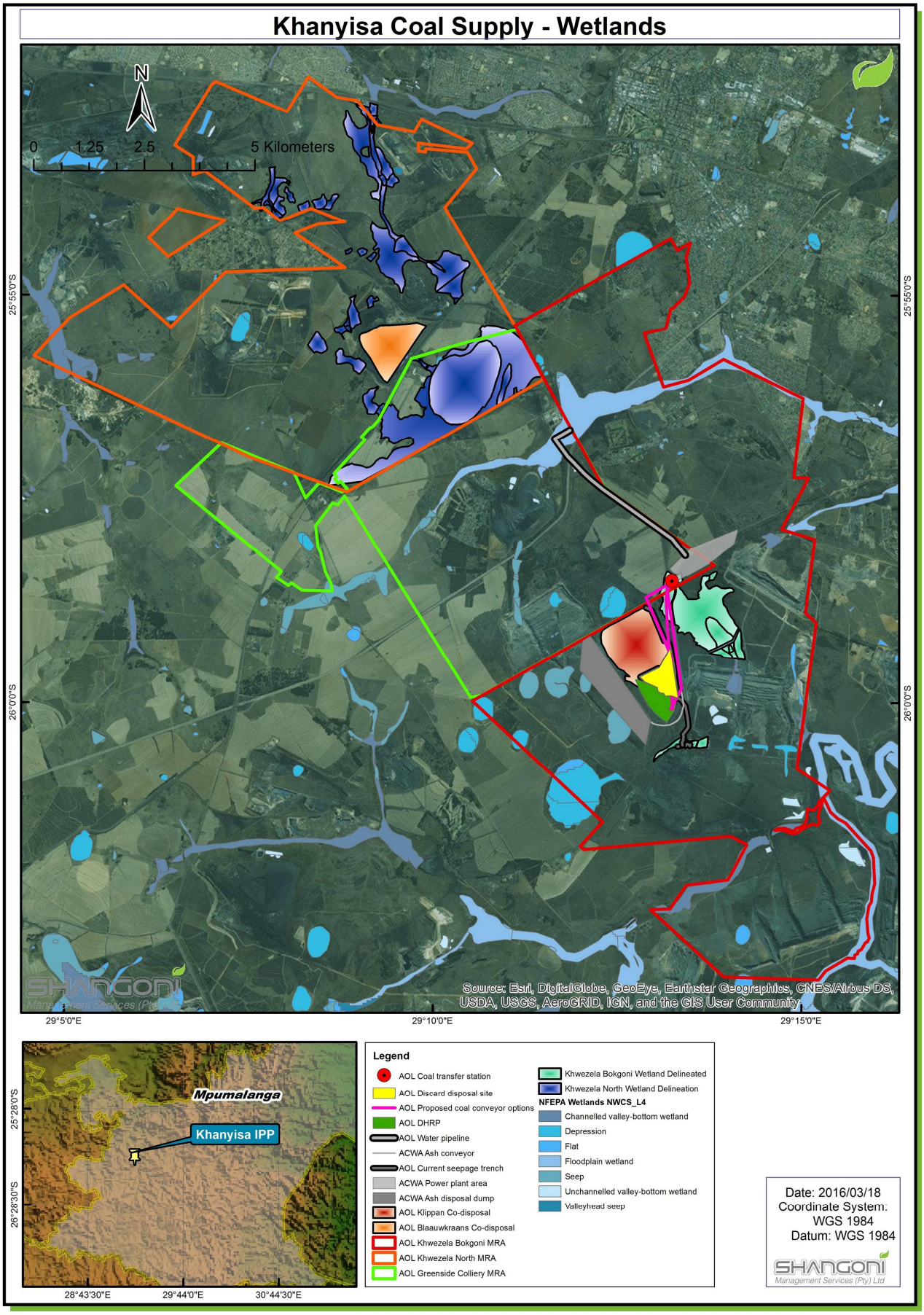

Figure 40: Wetlands map

2 Wetland delineation and classification

2.1 Klippan co-disposal facility and project development area

A total of 1 365.5 hectares of wetlands were delineated within the Khwezela Bokgoni Colliery area, covering approximately 16.1 % of the site. The wetlands consist predominantly of hillslope seepage wetlands (67 %) and pan wetlands (12 %), several dams, most significantly the Vleishaft Dam (2A Dam) and a series of dams in the Tweefonteinspruit, were also delineated, together occupying roughly 8 % of the wetland area. The total wetland coverage of 16.1 % of the study site is relatively low for a site predominantly underlain by sandstones and located on the Mpumalanga Highveld. The low wetland coverage (in terms of area) is considered a consequence of the extensive mining disturbances that have taken place on site, with the 1:50 000 topographical maps and historical imagery of the site indicating that a number of wetland areas used to be located within the mining disturbed areas.

Refer to Figure 40 above and Figure 41 below for the delineated wetlands on the Kkhwezela Bokgoni Colliery mining site (in relation to the location of the proposed Khanyisa IPP Coal Supply infrastructure and activities).

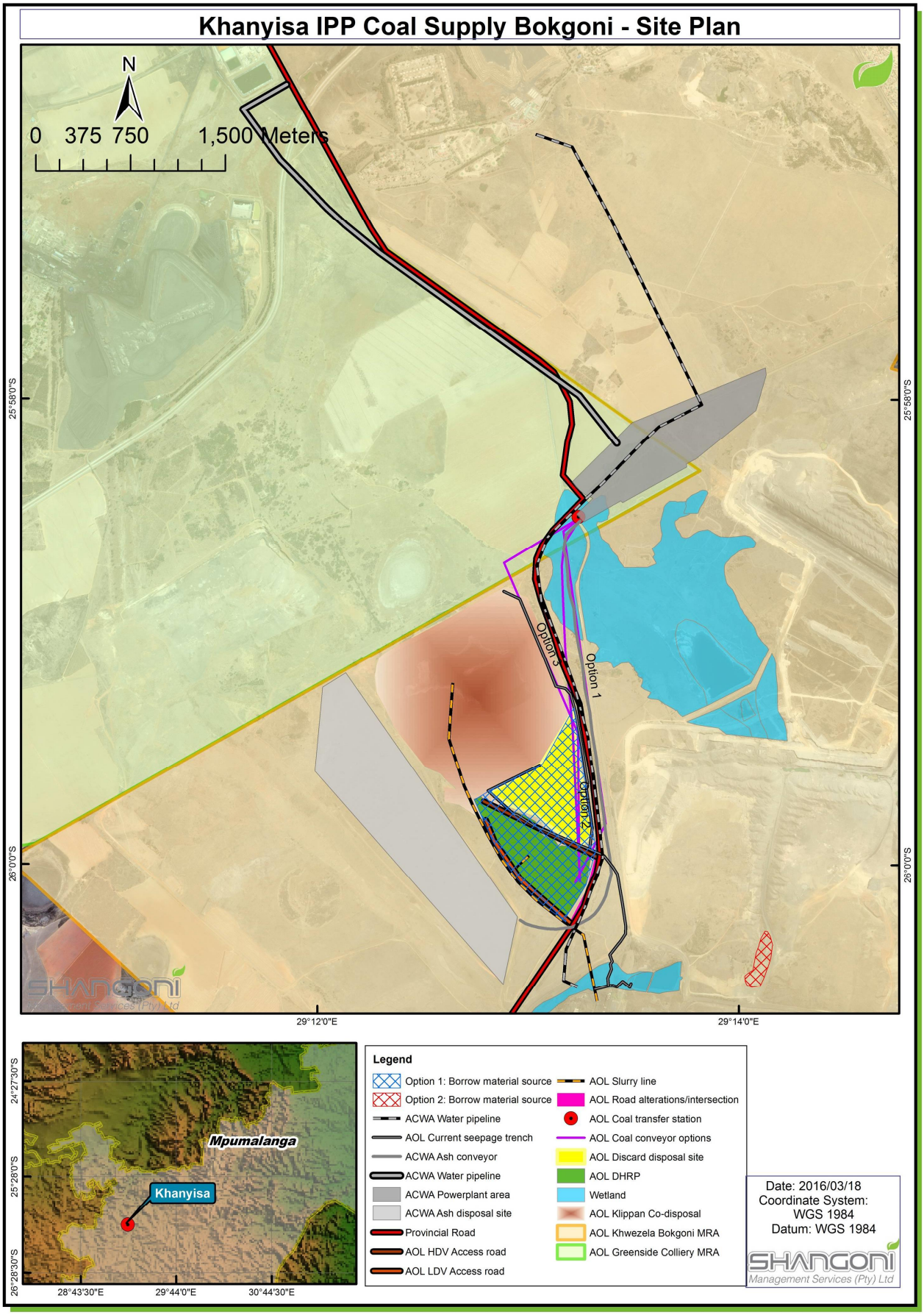

Figure 41: Delineated wetlands within the Khwezela Bokgoni Pit 2A area

The Vleishaft Dam (2A Dam) wetland complex consists of two remnant patches of wetland that have been isolated from downstream water resources. The large 2A Dam, which is operated as a PCD (as per the mine's approved Water Use License), is surrounded by a large hillslope seepage wetland feeding into the dam. The western section of this seepage wetland appears to receive significant seepage inputs from the large discard dump to the west, with discharges from the water treatment plant on the western shores of the dam also entering 2A Dam. Extensive areas of alien trees occur within the eastern section of the hillslope seepage wetland. Downstream of the dam, a short section of valley bottom wetland remains, though the link to the Tweefonteinspruit has been entirely mined through via opencast mining methods and no connection exists. A small section of isolated valley bottom wetland occurs adjacent to the mine offices. This wetland also originally would have drained towards the Tweefonteinspruit, but has been isolated through opencast mining activities across its downstream reaches. The proposed location of the PCD is situated in close proximity to this wetland system.

Present Ecological State (PES) Assessment

The 2A Dam area is located within an active mining area and has been exposed to mining and agricultural impacts for many years. The 2A Dam, the main PCD for Khwezela Bokgoni Mine, is located within the hillslope seepage wetland, and the entire system forms part of an isolated dirty water system with no connectivity to downstream water resources. In addition, a number of further impacts were observed on site:

- Mining activities in the direct catchment of the wetland area, as well as downstream of the wetland area;
- Abandoned agricultural activities, including old cultivated fields, within and surrounding the hillslope seepage wetland;
- Contaminated seepage with elevated salinities from the adjacent discard dump (Klippan Co-disposal Facility) enters the hillslope seepage wetland;
- Overflow and discharge of dirty water from reservoirs and pump stations located adjacent to and within the hillslope seepage wetland;
- Numerous trenches cross the hillslope seepage wetland, diverting and intercepting flows;
- A number of old excavations occur within the hillslope seepage wetland;
- Stands of alien vegetation, including stands of *Populus x canescens* and Eucalyptus trees within the wetland area;
- Numerous roads and tracks cross the wetland areas; and
- Impoundment of flow in dams and upstream of road crossings.

The above impacts have resulted in the present ecological state of the wetlands on site departing significantly from the reference condition or un-impacted state of the wetlands. This is reflected in the results of the PES assessment which classes the hillslope seepage wetlands on site as being largely modified (PES D), and the unchannelled valley bottom as seriously modified (PES E). The results of the assessment are provided in Table 29 below.

Given the water quality concerns within the wetlands (being part of a dirty water system) as well as the isolated nature of the wetland system with no connection to downstream water resources, a motivation could be put forward to further increase the PES scores (i.e. lower the PES categories). However, for the purpose of this report the results have been taken as is.

Table 29: Results of the WET-Health Level 1 assessment for the wetlands within the study area.

HGM Unit	Threat descriptions			PES category	Combined score
	Hydrology	Geomorphology	Vegetation		
Hillslope seepage	4.0	2.4	7.6	D	4.6
Unchannelled valley bottom	10.0	4.0	7.6	E	7.6

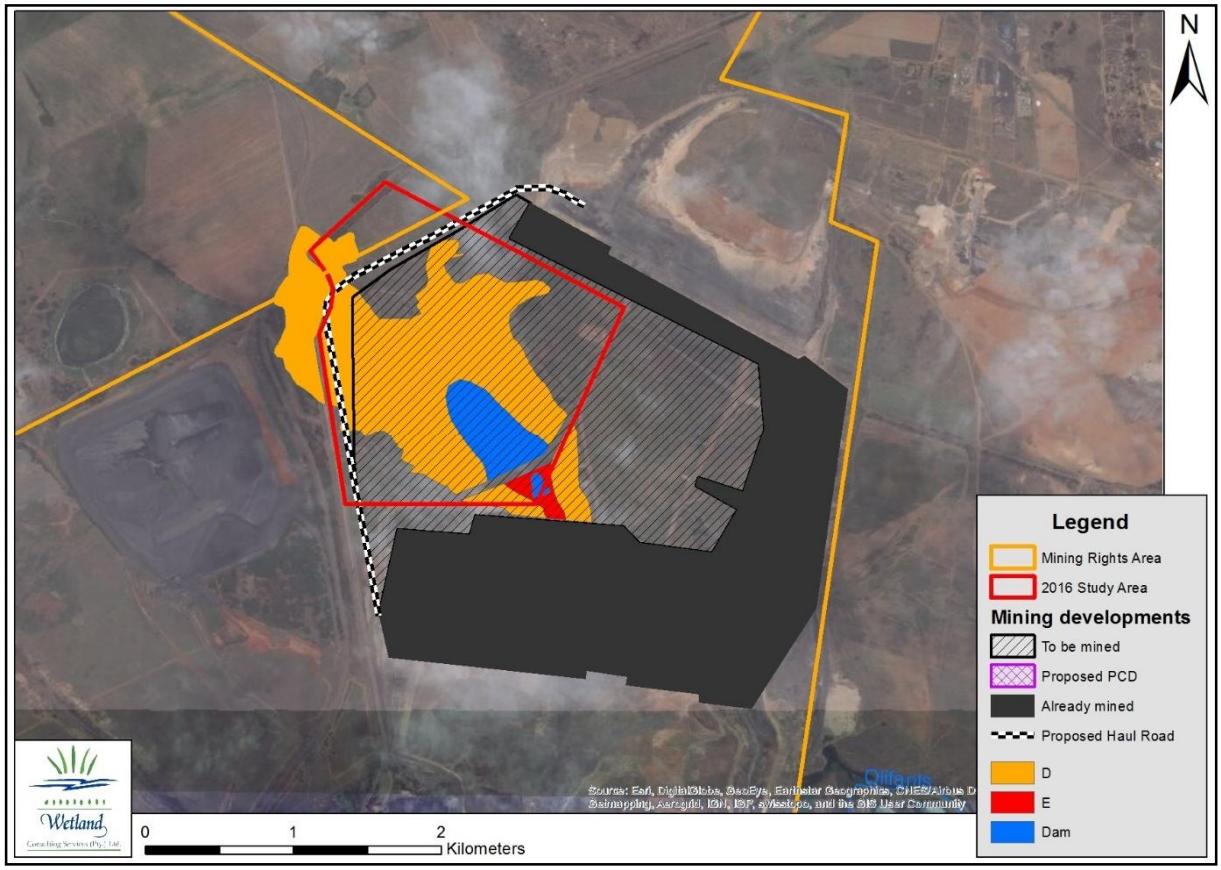

Figure 42: Map showing the results of the PES Assessment – Khwezela Bokgoni Pit 2A area (source: Wetland Consulting Services, 2016)

Ecological Importance and Sensitivity (EIS) Assessment

"Ecological importance" of a water resource is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales. "Ecological sensitivity" refers to the system's ability to resist disturbances and its capability to recover from disturbance once it has occurred. In determining the EIS of a wetland, the following factors are considered:

- Biodiversity – i.e. the presence of rare and endangered species, populations of unique species, species richness, diversity of habitat types, and migration/breeding and feeding sites for wetland species
- Hydrological functionality – i.e. sensitivity to changes in the supporting hydrological regime and/or changes in water quality, Toxins and nitrate assimilation and sediment trapping
- Functionality – i.e. flood storage, energy dissipation and particulate/element removal
- Direct human benefit – i.e. human water use as a harvestable resource, cultivation and cultural heritage

The wetlands within the study area form part of the Olifants River Primary catchment which is a heavily utilised and economically important catchment. Wetlands and rivers within the Olifants River Catchment upstream of Loskop Dam have been greatly impacted upon by various activities, which include mining, power stations, water abstraction, urbanization, agriculture etc. As a result of these impacts serious water quality and quantity concerns have been raised within the sub-catchment. Given this situation, and the fact that wetlands can support functions such as water purification and stream flow regulation, a high importance and conservation value is placed on all wetlands and rivers within the catchment that have as yet not been seriously modified. Within this context an EIS assessment was conducted for every hydro-geomorphic wetland unit identified within the study area. Further considerations that informed the EIS assessment include:

- The location of the study area within a vegetation type (Eastern Highveld Grassland) considered extensively transformed and threatened, having been classed as ***Vulnerable.***
- The wetland vegetation type of the area, Mesic Highveld Grassland Group 6 wetlands, is considered to be ***Endangered***.
- The specific wetland ecosystem type of the hillslope seepage wetland, Mesic Highveld Grassland Group 4, is considered ***Least Threatened*** and the unchannelled valley bottom, also Mesic Highveld Grassland Group 4, is considered as ***Least Threatened.*** Valleyhead seeps in Mesic Highveld Grassland Group 4 are however considered ***Critically Endangered***.
- The level of degradation observed within the wetland systems on site, including the fact that the wetland forms part of a dirty water management system and is isolated from downstream water resources.

It is these considerations that have informed the scoring of the systems in terms of its ecological importance and sensitivity. The results of the assessment and rankings based on our current understanding of the wetlands is summarised in Table 30.

Table 30: Table showing the results of the EIS assessment (all figures are in hectares).

SUMMARY	Hillslope Seepage Wetland	Unchannelled Valley Bottom Wetland
Ecological Importance and Sensitivity	1.0	1.0
Hydro-Functional Importance	1.0	0.9
Direct Human Benefits	0.2	0.0
Overall EIS Score	1.0	1.0
Overall EIS Category	Low/Marginal	Low/Marginal

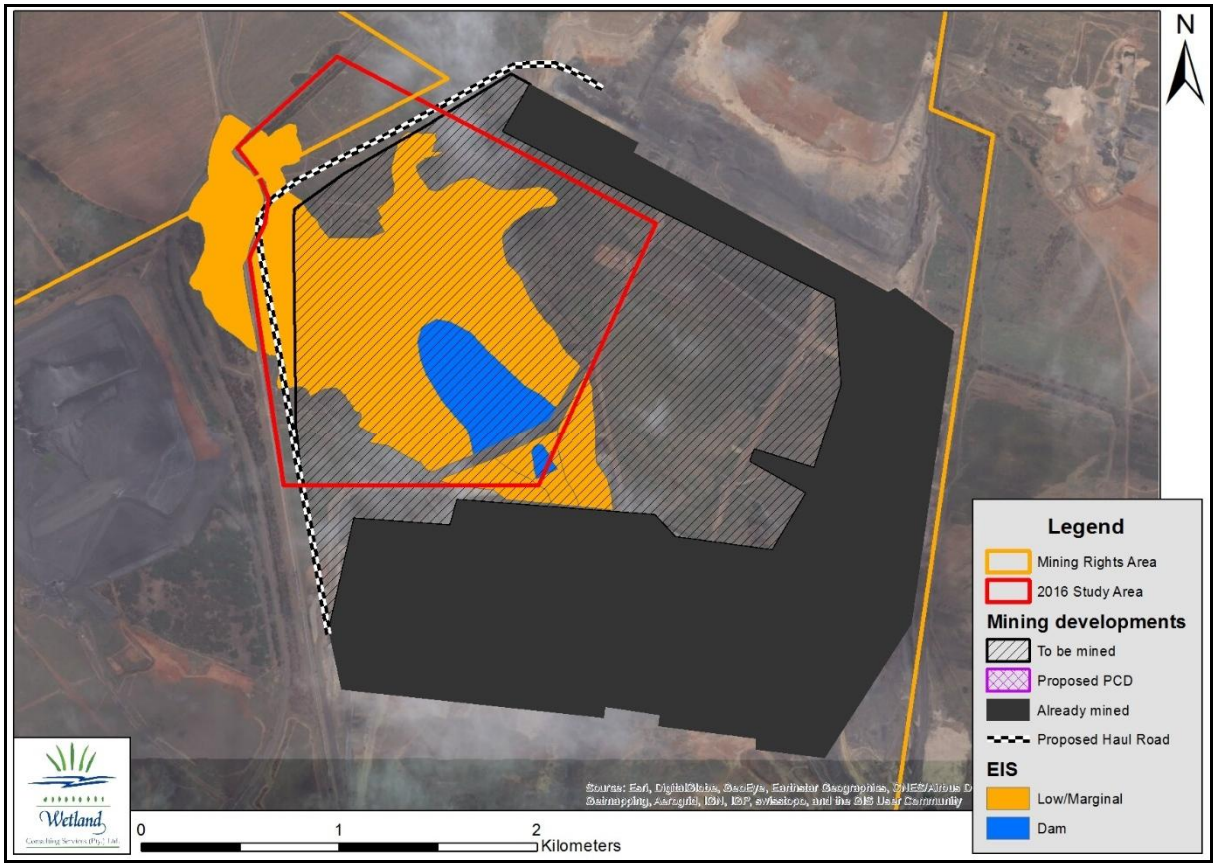

Figure 43: Map showing the results of the EIS assessment Khwezela Bokgoni Pit 2A area (Wetland Consulting Services, 2016)

2.2 Blaauwkrans co-disposal facility and surrounds

As per the report titled: "*Wetland Delineation and Impact Assessment Report for Landau Colliery Life Extension Project*", dated October 2013, and compiled by Wetland Consulting Services, a total of 300.36 hectares of wetlands were delineated within the study area (also associated with the Blaauwkrans Co-disposal Facility), covering approximately 17.15% of the site. The wetlands consist predominantly of hillslope seepage wetlands (81.4 %) and channelled valley bottom wetlands (9 %). Several small farm dams and a number of water-filled quarries were also delineated, with dams occupying roughly 5 % of the wetland area.

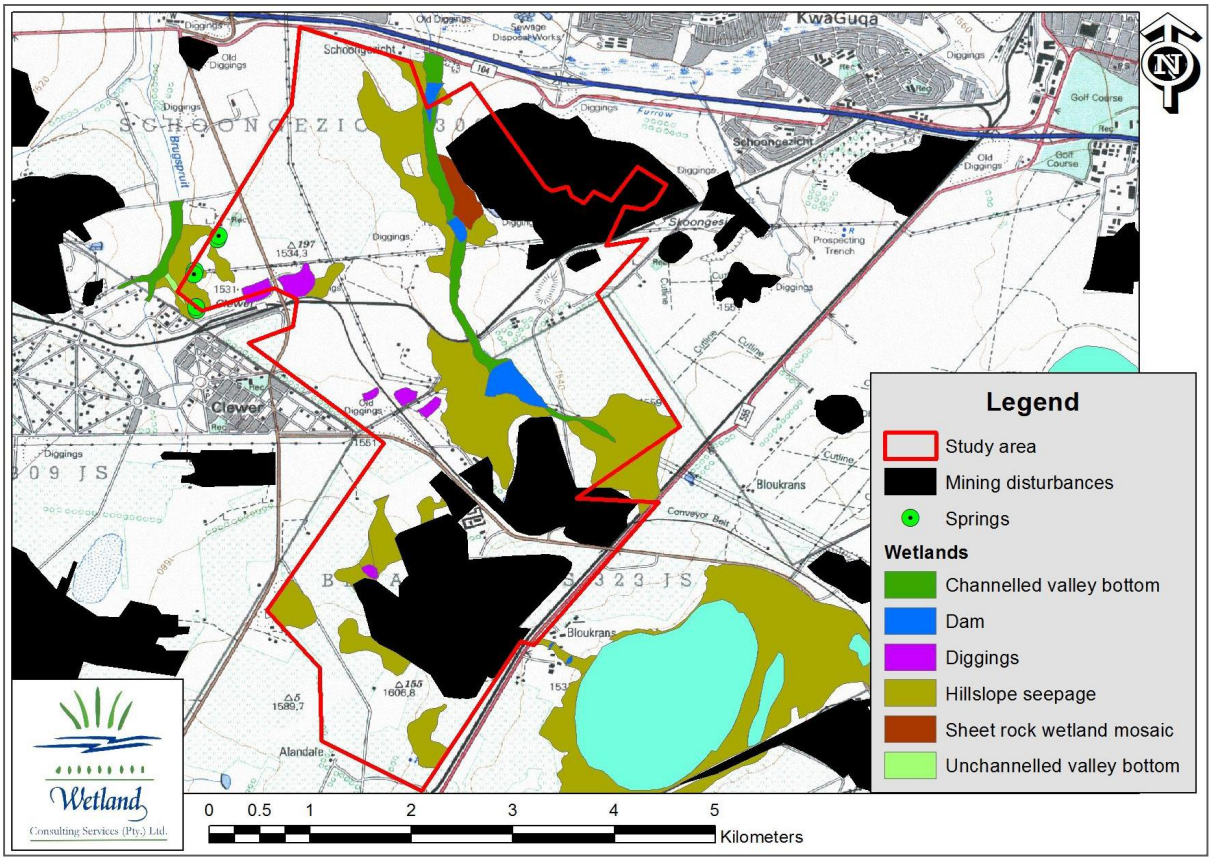

Figure 44: Map showing the delineated and classified wetlands in the vicinity of the Blaauwkrans Co-disposal Facility and surrounds (Wetland Consulting Services, 2013)

Present Ecological State (PES) Assessment

The above impacts have resulted in a change in the supporting hydrology of the wetlands, a deterioration of water quality, and a significant degradation of the wetland vegetation of most of the wetlands on site, though to varying degrees. This is captured in the results of the PES assessment of the wetlands on site which classed all of the wetlands as being moderately to critically modified.

Table 31: Table showing the results of the PES assessment[79] (Wetland Consulting Services, 2013)

Wetland type	C	D	E	F	Total
Channelled valley bottom	---	---	---	27.06	27.06
Hillslope Seepage	64.44	44.73	136.43	---	245.60
Sheet rock wetland mosaic	---	12.21	---	---	12.21
Unchanneled valley bottom	---	0.09	---	---	0.09
Total	64.44	57.03	136.43	27.06	284.96

[79] Results in Hectares

% of wetland areas	22.61%	20.01%	47.88%	9.50%	100.00%

Wetlands associated with the Schooniespruit system have been most impacted. The upper hillslope seepage wetlands are considered to be seriously modified (PES category E) due to a combination of hydrological and water quality impacts from the mining operations at the Navigation Section of Khwezela North Colliery, specifically associated with seepage and runoff from the dump and plant areas. Past cultivation practices have also resulted in these systems being characterised by secondary vegetation.

Most of the remaining wetlands on site are considered moderately to largely modified (PES category C and D), mostly as a result of agricultural impacts, especially cultivation along and within the wetland margins. With the Brugspruit systems, the establishment of alien vegetation and the discharge of urban stormwater have also contributed to wetland degradation.

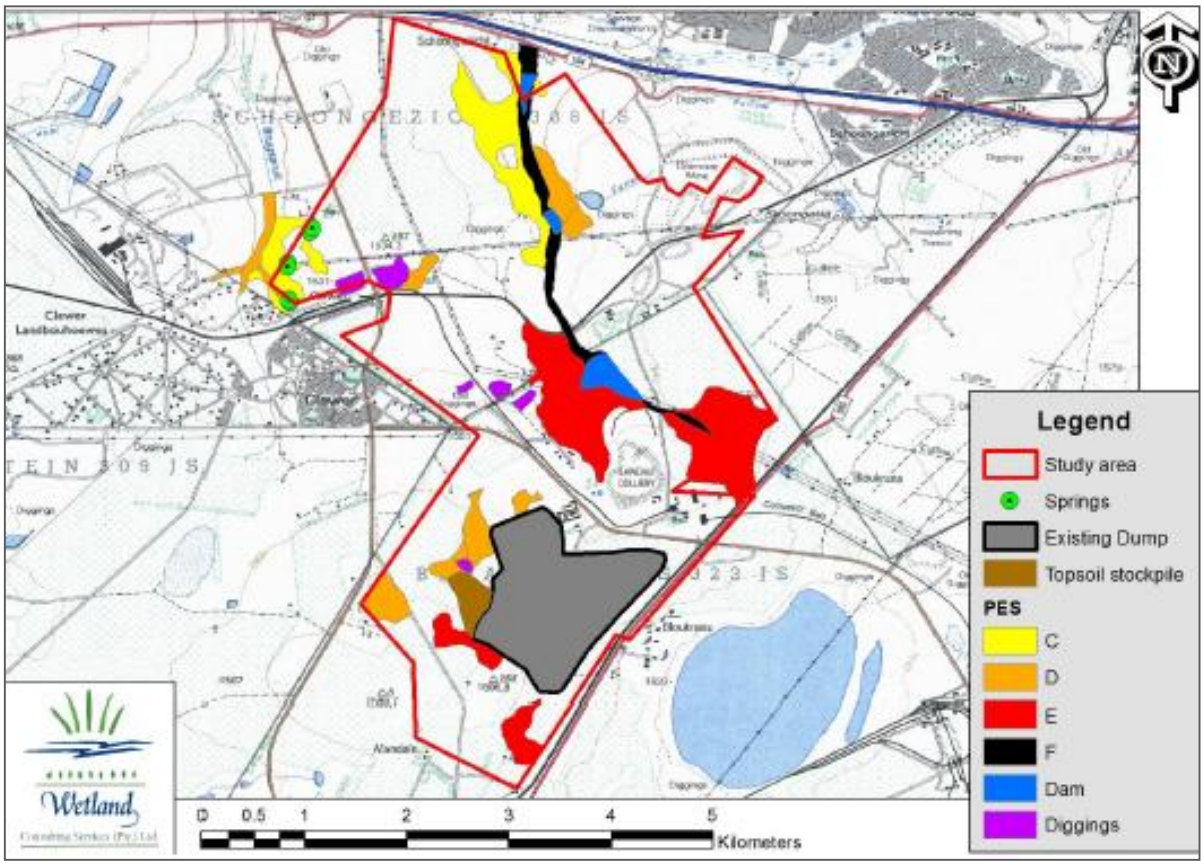

Figure 45: Map showing the results of the PES Assessment for Khwezela North (source: Wetland Consulting Services, 2013)

Ecological Importance and Sensitivity (EIS) Assessment

The majority of the wetlands on site, more than 70% in fact, are considered to be of Low/Marginal ecological importance and sensitivity due to the extensive degradation that these systems have undergone. Two hillslope seepage wetlands, including the sheet rock wetland mosaic, are considered to be of High ecological importance and sensitivity, based mainly on the role these wetlands play in

biodiversity maintenance, as well as the fact that these are the least degraded wetlands on site from a vegetation perspective.

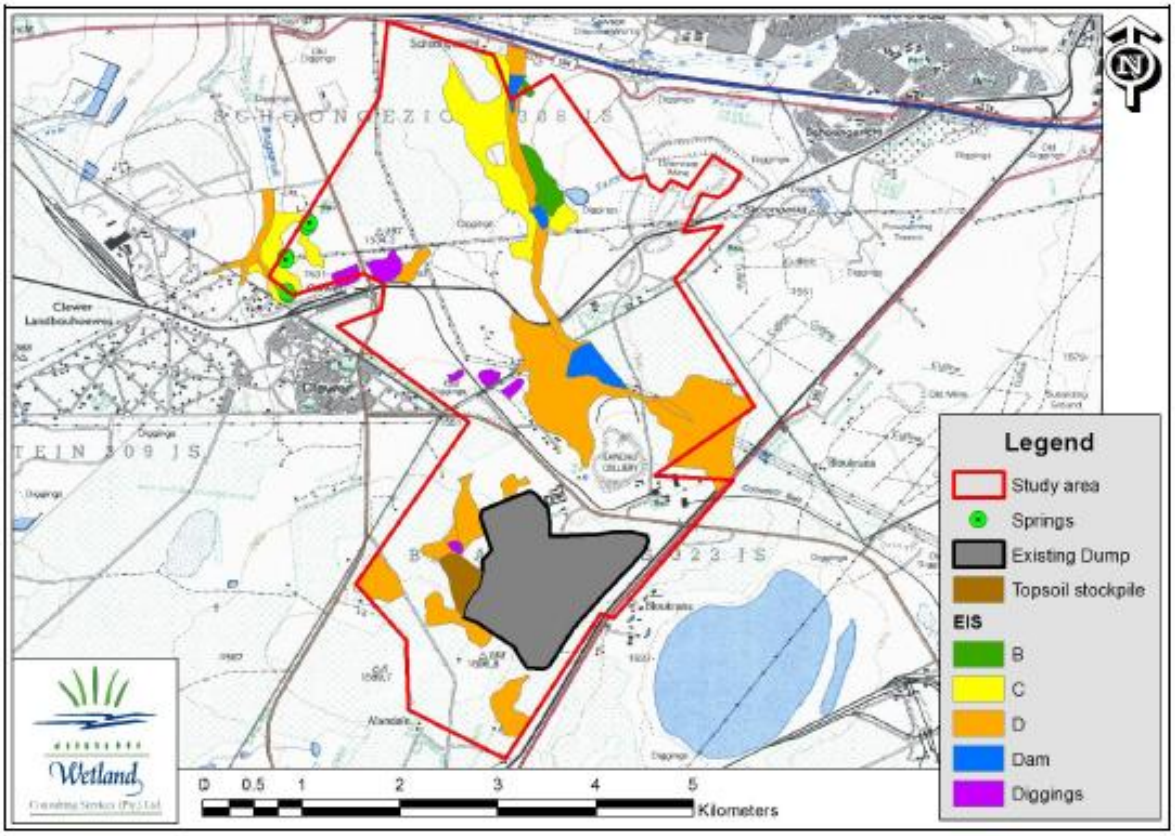

Figure 46: Map showing the results of the EIS assessment - Khwezela North (Wetland Consulting Services, 2013)

Chapter I: Groundwater

Information contained in this section of this report was sourced from the following:

The report titled: "*Anglo American Coal (Pty) Ltd – SACE Complex - Post-closure Groundwater and Geochemical Model"*. Project Number 2014.011-8, dated October 2016 and compiled by Delta-H.

1. Conceptual Model

Based on the conceptual hydrogeological understanding of the site, the following hydro-stratigraphic zones are differentiated within the SACE study area:

- Shallow alluvial and weathered Karoo zone
- Backfilled opencast areas
- Fractured Karoo aquifer & coal seams
- Underground mine voids
- Transvaal Supergroup and BIC
- Dolerite intrusions

1.1 Shallow Primiary Aquifers

1.1.1 Weathered Karoo aquifer

The weathered zone of the Karoo sediments hosts the unconfined or semi-confined shallow weathered Karoo aquifer or hydro-stratigraphic zone. The zone is up to 15m thick and water levels are often shallow (few meters below ground level). Due to direct rainfall recharge and dynamic groundwater flow through the unconfined aquifer in weathered sediments, the water quality is generally good, but also vulnerable to pollution. Localised perched aquifers may occur on clay layers or lenses, but are due to its localised nature of no further interest in the context of the current study. Water intersections in the weathered aquifer are mostly above or at the interface to fresh bedrock, where less permeable layers of weathering products and capillary forces limit the vertical percolation of water and promote lateral water movement. Groundwater daylights as springs (contact springs) where the flow path is obstructed by palaeotopographic highs of the basement rocks or more often in the area of interest where the surface topography cuts into the groundwater level at e.g. drainage lines (free draining springs).

Below is a brief discussion of the 2015 (model calibration year) groundwater levels for the SACE mining areas.

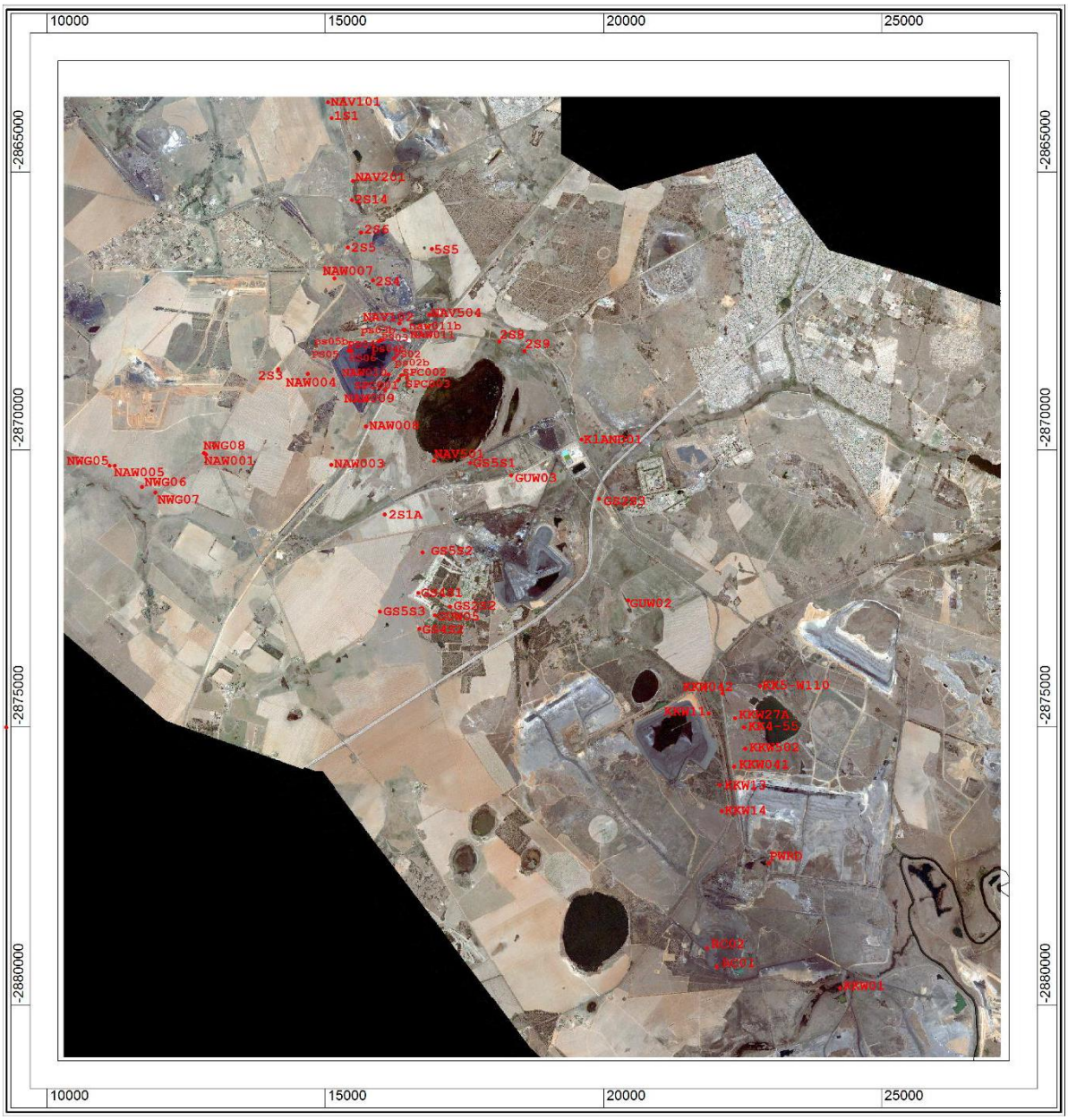

Figure 47: SACE Complex borehole locations (Delta H, 2016)

Khwezela North Navigation Shallow aquifer water levels

Boreholes SPC001, SPC002 and SPC003, are grouped based on its spatial proximity to each other and the Blaauwkrans Co-disposal Facility (Figure 47). All three boreholes have water levels close to surface elevation, ranging from 1554 and 1559 mamsl (2 to 4 mbgl) throughout the 2015 monitoring period with a slightly declining trend. The water levels are generally above the roof elevation of the 5 Seam workings, which sits at approximately 1534 mamsl in the area. Assuming no hydraulic connection to the 5Seam workings below, the boreholes appear to be monitoring the shallow weathered aquifer. Furthermore, its proximity to the Blaauwkrans Co-disposal Facility suggests that seepage from the dump influences its water levels and qualities. This is certainly evident in borehole SPC002, with an average TDS content of around 4600 mg/L, whereas boreholes SPC001 and SPC003 showed only average TDS values of 400 and 1000 mg/L respectively. The boreholes show

no seasonal fluctuations, suggesting that seepage from the Blaauwkrans Co-disposal Facility has a stronger influence on water levels than seasonal rainfall recharge.

Blaauwkrans dump monitoring boreholes

Based on their location on the Blaauwkrans Co-disposal Facility, boreholes PS02, PS03, PS04, PS05, PS06, PS02b, PS03b, PS04b and PS06 were grouped as (pollution) source monitoring boreholes. While boreholes SPC001, SPC002 and SPC003 are also in close proximity to the dump, they do not monitor water levels in the dump itself (but downstream plume migration in the shallow aquifer) and are therefore excluded from this group.

All the Blaauwkrans boreholes show relatively stable water levels, with little or no seasonal fluctuations. The single spike in measured water levels in boreholes PS02, PS03, PS04, PS05 and PS06 for June 2015 appears to be an outlier associated with measurement errors or external influences (e.g. water injection). In comparison, boreholes PS02b, PS03b, PS04b and PS05b show a subdued decline of water levels in June 2015. The differences in absolute water levels (in mamsl) of the Blaauwkrans dump boreholes is due to their topographic setting, with higher water levels for boreholes located on top of the dump (PS02, PS03, PS04, PS05 and PS06). The higher levels measured on top of the dump indicate a free elevated water table within the dump (i.e. not drained conditions) with associated hydraulic gradients accelerating pollutant transport.

Khwezela Bokgoni monitoring boreholes

Boreholes PWRD, KIAND01, KK041, KKW01, KK042, RCO1, RCO2, KKW11, KKW13 and KKW14 are part of the Kleinkopje monitoring network. The drilled borehole depth and measured water levels, as provided by the client in the SACE monthly water level reporting spreadsheet, indicate that these boreholes are monitoring the shallow weathered aquifer at Khwezela Bokgoni. While boreholes PWRD and KIAND01 have deeper water levels (approximately 12 and 21 mbgl) probably influenced by mine inflows, the remainder. In comparison, KK041, KKW01 KK042, RCO1, RCO2, KKW11, KKW13 and KKW14 have significantly shallower water levels (ranging from 3 to 8 mbgl). The proximity of these boreholes to Klippan Co-disposal Facility and the Kleinkopje discard dump (roof coal dump) suggest that the observed water levels could be influenced by seepage from the facilities or monitor water levels within these facilities. All boreholes show relatively stable water levels with no seasonal variation during 2015, suggesting limited influence of rainfall recharge.

1.1.2 Artificial mine aquifer (backfilled spoils)

The shallow strip mining method applied at Khwezela entails the continuous backfilling of mined out areas with compacted discard and spoil material (rehabilitated by dressing with a layer of soil and seeding); creating a highly altered artificial mine aquifer or hydrostratigraphic unit behind the active mining window. The porosity, storativity and hydraulic conductivity of the backfilled material is obviously different from the in-situ Karoo sediments and give rise to a unique artificial hydrostratigraphic unit embedded within the former mine voids and in interaction with the in-situ

weathered aquifer. No hydraulic tests have been performed within the backfilled areas of the SACE complex and their hydraulic properties are therefore unknown. Based on experience from similar sites, highly variable hydraulic properties related to variably sized backfill material and/or different compaction rates are expected. A hydraulic conductivity of 3.5 m/d (4E-05 m/s) and an effective porosity of 12 percent were assigned to the backfill.

2. Water sources and sinks

The main groundwater sources in the wider area of interest are

- Direct rainfall recharge of the shallow primary aquifers with vertical leakage to the fractured Karoo aquifer,
- Potential leakage from surface water courses and unlined dams, and
- Regional groundwater inflow.

The main groundwater sinks in the wider area of interest are

- Groundwater seepage towards surface waters,
- Groundwater inflows into underground and current opencast mine workings and associated abstractions and decant to surface, and
- Regional groundwater outflow.

2.1 Recharge

Schlumberger (2012) estimated recharge for un-rehabilitated spoil/waste material at Khwezela North Colliery as high as 30% of MAP, reducing to 10% once re-habilitated (soil covered and re-vegetated). Hodgson (2014) furthermore estimated the seepage flux from the Blaauwkrans Co-disposal Facility due to past co-disposal activities as high as 1 ML/day (equivalent to a seepage rate of ~ 300 mm/a).

Considering the substantial uncertainty associated with recharge/seepage estimates in general and for mining influenced areas in specific, Delta H moderated the different values and used the estimates as given in Table 32 for the current model application. A 50% reduction in post-closure seepage rates is assumed for the dumps due to cessation of deposition and assumed rehabilitation of the dumps (hence a value equivalent to rehabilitated spoils). Independent estimates of recharge and seepage rates for especially backfill areas and the discard dumps are a major information gap affecting the overall conceptual and numerical model confidence.

Table 32: Estimates of recharge rates for the SACE groundwater model (Delta H, 2016)

Unit	Life of Mine		Post-closure	
	(% of MAP)	(mm/a)	(% of MAP)	(mm/a)
Weathered Karoo and Alluvium	~ 5	38	~ 5	38
Open cuts	~ 20	142	na	na
Rehabilitated spoils	~ 8	57	~ 8	57
Discard Dumps	~ 15	114	~ 8	57
Blaauwkrans Discard Dump	~ 30	220	~ 8	57

2.2 Groundwater abstractions from mine workings

Groundwater discharges into the existing open cast and underground mine workings of the different mines, from where it is abstracted and re-used (e.g. coal washing or treatment at the EWRP).

The approximate figures of recent water abstraction or decant rates based on data provided by Anglo is summarised in Table 33.

Table 33: Groundwater abstractions from the different mine workings. (Delta H, 2016)

Year	Kleinkopje		Greenside	Navigation
(all in Ml/d)	Abstraction from 5West ramps	Abstraction from 2A pit ramps	Borehole abstraction	Decant from mine voids
2011	-	-	6.83	~ 2.5 – 3
2012	0.84	2.69	8.22	
2013	2.19	9.46	9.98	
2014	1.63	8.32	10.42	
2015	2.04	5.23	11.93	
Average	1.68	6.43	9.48	

2.3 Seepage quality estimates

The assessment undertaken by Delta H has provided estimates of sulphate concentration for underground workings, discard facilities, and backfill/overburden spoil.

Underground workings

Based on monitoring results conservative estimates of water quality in the underground workings include:

- 1 Seam and 2 Seam workings at Landau/Navigation: pH 2.3, sulphate 5 635 mg/L
- 1 Seam and 2 Seam workings at Greenside: pH 6.3 sulphate 2 315 mg/L
- 5 Seam workings at Greenside: pH 5.9 sulphate 1 150 mg/L

Discard facility sulphate

The geochemical model simulations for discard indicated the following conclusions:

- Seepage quality during the operating phase is indicated by monitoring results from the Blaauwkrans toe seep (WP078). The mean sulphate concentration is 11 127 mg/L. Standard error of the sample mean suggests that the 95% confidence limits of the population mean are 9 867 mg/L to 12 548 mg/L.
- After closure the modelled sulphate concentration in discard seepage reaches approximately 7 500 mg/L after 85 years while pH declines to less than 2.
- Assuming a 0.3 m soil cover over the discards reduces the modelled sulphate concentration. Sulphate concentration remains at about 2 200 mg/L for the entire 100 years of simulation.

- Modelled interaction of discard seepage with the generalised mineralogy of hydrostratigraphic units underlying SACE yields indicative post-closure sulphate concentration in the range of 2 200 mg/L to 4 300 mg/L

.

Backfill/overburden spoil sulphate

- The following conclusions are indicated for backfill/overburden spoil post-closure seepage:
- Ten years after closure, modelled backfill/overburden spoil sulphate is 1 700 mg/L to 4 400 mg/L. This is similar to the range indicated in literature.
- Approximately 40 years after closure sulphate concentration at 30 m in backfill seepage reaches approximately 7 000 mg/L. The pH remains neutral throughout the 100-year model simulation.
- With a 0.3 m soil cover, sulphate concentration at 30 m in backfill seepage increases from 1 100 mg/L to 2 800 mg/L after about 60 years. The pH remains neutral throughout the model simulation.
- Modelled interaction of backfill/overburden spoil seepage with generalised mineralogy indicates sulphate concentration in the range of 1 100 mg/L to 2 600 mg/L, which compares with the ±1 500 mg/L indicated in literature. However, the model results do not account for dilution and mixing with background groundwater quality.

Refer also to the following reports (available upon request):

- Shangoni AquiScience: Report titled: '*Geohydrological study and risk assessment for Anglo Operations (Pty) Ltd: Kleinkopje Colliery Pit 2A Extension*", dated August 2016;
- Report titled:" *Geohydrological Assessment and Gap Analysis for Kleinkopje Colliery*", dated November 2011; and
- The report titled *"Anglo Coal Landau Colliery – Landau Life Extension Project: Report on Geohydrological Investigation as part of the Environmental Impact Assessment and Management Program Report for the proposed Coal Mining Operation",* dated October 2013.

Chapter J: Air Quality

1. Klippan co-disposal facility and project development area

WSP Environmental (Pty) Ltd has been appointed by Anglo American Coal SA to monitor particulate concentrations and maintain a dust fallout network in and around Khwezela Bokgoni Colliery.

The dust fallout (DFO) monitoring network located in and around the Khwezela Bokgoni Colliery, enables the assessment of the current levels of nuisance dust against the NEM:AQA National Dust Control Regulations, 2013 (published under GN R827 in GG 36974 of 1 November 2013). The ASTM D1739 reference method, as required in the National Dust Control Regulations, makes use of fallout gauges (dust buckets) which are essentially open containers, filled with distilled water and algaecide, and left at designated sites for a stipulated timeframe to collect deposited particles. Important to note

is that compliance with the National Dust Control Regulations is only assessed with fallout levels obtained from single fallout units and not with directional units.

Reporting of dust fallout, PM10 and PM2.5 concentrations is conducted on a monthly basis.

1.1 Dust deposition

Air quality standards and guidelines are specified in the NEM:AQA; the South African National Standards (SANS) Framework for Setting and Implementing National Ambient Air Quality Standards; as well as the SANS 1929:2005 Ambient Air Quality - Limits for Common Pollutants. The priority pollutants as defined by the Act are sulphur dioxide (SO2), nitrogen dioxide (NO2), particulate matter (PM10 and PM2.5), ozone (O3), benzene (C6H6), lead (Pb) and carbon monoxide (CO). On 01 November 2013, the legislated standards for dust fallout were promulgated by the Minister of Water and Environmental Affairs in the form of the NEM:AQA National Dust Control Regulations . These regulations are based on the SANS standards and present acceptable/allowable dust fallout rates for both residential and non-residential areas. These dust fallout rates, as applied in the Khwezela Bokgoni Colliery air quality monitoring reports for compliance assessment purposes, are presented in Table 34.

Table 34: Acceptable Dust Fallout Rates as per the National Dust Control Regulations (GN.R 827, 01 November 2013)

Restriction areas	Dust fallout rate (D) (mg/m^2/day) 30 day average	Permitted frequency of exceeding dust fallout rate	Reference method
Residential area	D < 600	Two within a year; not sequential months	ASTM D1739
Non-residential area	600 < D < 1200	Two within a year; not sequential months	ASTM D1739

1.2 Particulate matter

With regard to the setting of limit values for particulate matter, the following is recognised:

- Different types of particles can have different harmful effects on human health;
- There is evidence that risks to human health associated with exposure to man-made PM_{10} and now $PM_{2.5}$ are higher than risks associated with exposure to naturally occurring particles in ambient air; and
- As far as they relate to PM_{10} and $PM_{2.5}$, action plans and other reduction strategies should aim to reduce concentrations of fine particles as part of the total reduction in concentrations of particulate matter.

Stringent Limit and Target Values for particulate matter (expressed in µg/m³) have been suggested as guidelines in SANS 1929:2005, and revised in 2009 and 2012 as part of the NEM:AQA ambient air

quality standards. These were developed by a panel of experts on the basis of best international practice. The latest regulations pertaining to $PM_{2.5}$, emanating from NEM:AQA (GNR 1210), were promulgated in June 2012 and stipulate a phased approach towards the implementation of national ambient air quality standards. The PM_{10} and $PM_{2.5}$ standards as applicable to this assessment are tabulated below (Table 35 and Table 36).

Table 35: Rollout of National Ambient Air Quality Standards for PM_{10}

Averaging period	Concentration	Permissible exceedances (per calendar year)	Compliance date
24-hour	180 µg/m^3	4	Prior to 1 April 2010
24-hour	120 µg/m^3	4	1 April 2010 – 31 December 2014
24-hour	75 µg/m^3	**4**	**1 January 2015**
Annual	60 µg/m^3	0	Prior to 1 April 2010
Annual	50 µg/m^3	0	1 April 2010 – 31 December 2014
Annual	40 µg/m^3	**0**	**1 January 2015**
Note: Standards indicated in bold are the current standards			

Table 36: Rollout of National Ambient Air Quality Standards for $PM_{2.5}$

Averaging period	Concentration	Permissible exceedances (per calendar year)	Compliance date
24-hour	65 µg/m^3	**4**	**Immediate – 31 December 2015**
24-hour	40 µg/m^3	4	1 January 2016 – 31 December 2029
24-hour	25 µg/m^3	4	1 January 2030
Annual	25 µg/m^3	**0**	**Immediate – 31 December 2015**
Annual	20 µg/m^3	**0**	1 January 2016 – 31 December 2029
Annual	15 µg/m^3	0	1 January 2030
Note: Standards indicated in bold are the standards relevant to the air quality report period (December 2015)			

It must be noted that from a legal standpoint, only standards promulgated under the NEM:AQA are applicable during the relevant timeframes as stipulated above. In addition, the ambient air quality standards are to be used to identify priority areas which require the attention of the regulatory authorities.

1.3 Highveld Priority Area

On 4 May 2007 the Minister of Environmental Affairs and Tourism formally declared the eastern part of Gauteng and western part of Mpumalanga an air pollution hotspot, to be known as the "The Highveld Priority Area", a National air pollution hotspot in terms of Section 18(1) of the NEM:AQA. By declaring a priority area, authorities recognise that air quality within these areas are generally regarded as being poor, and frequently meet or exceed ambient air quality standards.

The Highveld Priority Area extends from the eastern parts of Gauteng, to Middelburg in the north and the edge of the escarpment in the south and east. Major towns occurring within this region include eMalahleni (Witbank), Middelburg, Secunda, Standerton, Edenvale, Boksburg, Benoni and Balfour. The area incorporates portions of the Gauteng and Mpumalanga Provinces. The area is contained within 1 Metropolitan Municipality (Ekurhuleni) and 3 District Municipalities (Sedibeng, Gert Sibande and Nkangala) and more specifically 9 local municipalities: Lesedi Local Municipality (Sedibeng); Govan Mbeki Local Municipality (Gert Sibande); Dipaleseng Local Municipality (Gert Sibande); Lekwa Local Municipality (Gert Sibande); Msukaligwa Local Municipality (Gert Sibande); Dr. Pixley Ka Isaka Seme Local Municipality (Gert Sibande); Victor Khanye Local Municipality (Nkangala); eMalahleni Local Municipality (Nkangala); and Steve Tshwete Local Municipality (Nkangala).

The project site(s) are located in eMalahleni, which forms part of the eMalahleni Local Municipality in the Nkangala District, therefore falls within the boundaries of the Highveld Priority Area. This implies that authorities may impose measures on the the applicant and other mines and industries within this area in order to allow for improvements in the air quality of the region.

1.4 Monitoring network

Dust fallout monitoring at the Khwezela Bokgoni Colliery is conducted at 21 locations, nineteen of which are single units and two are directional units. Figure 48 illustrates all monitoring locations, distinguishing between single buckets and monitoring trailer.

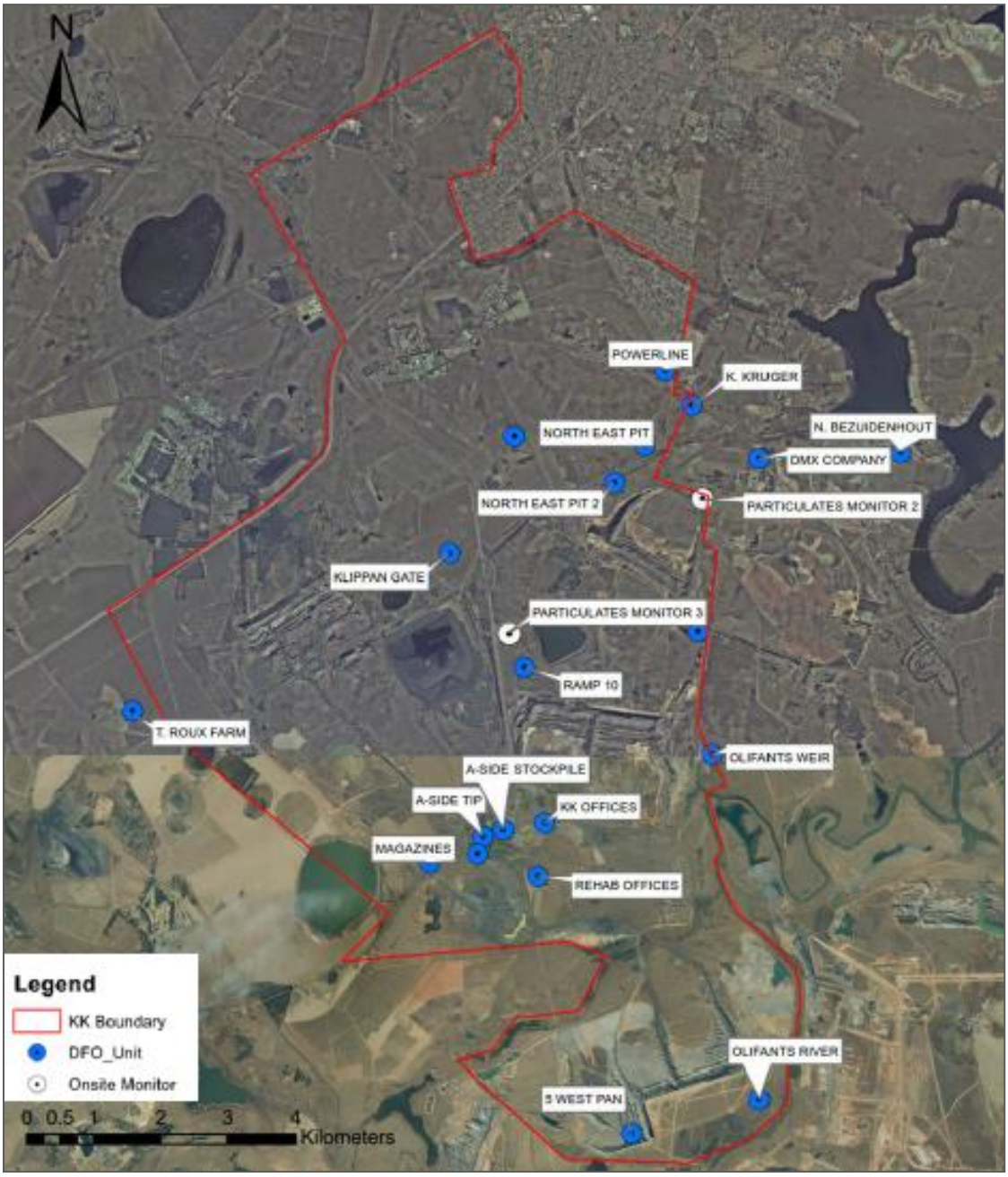

Figure 48: Khwezela Bokgoni Colliery dust fallout monitoring locations (source: WSP Environmental; April 2016)

1.5 Monitoring results for ambient monitoring locations

1.5.1 Dust fallout results

Table 5 of the April 2016 monitoring report presents the dust fallout results for 2016. Refer also to Figure 49.

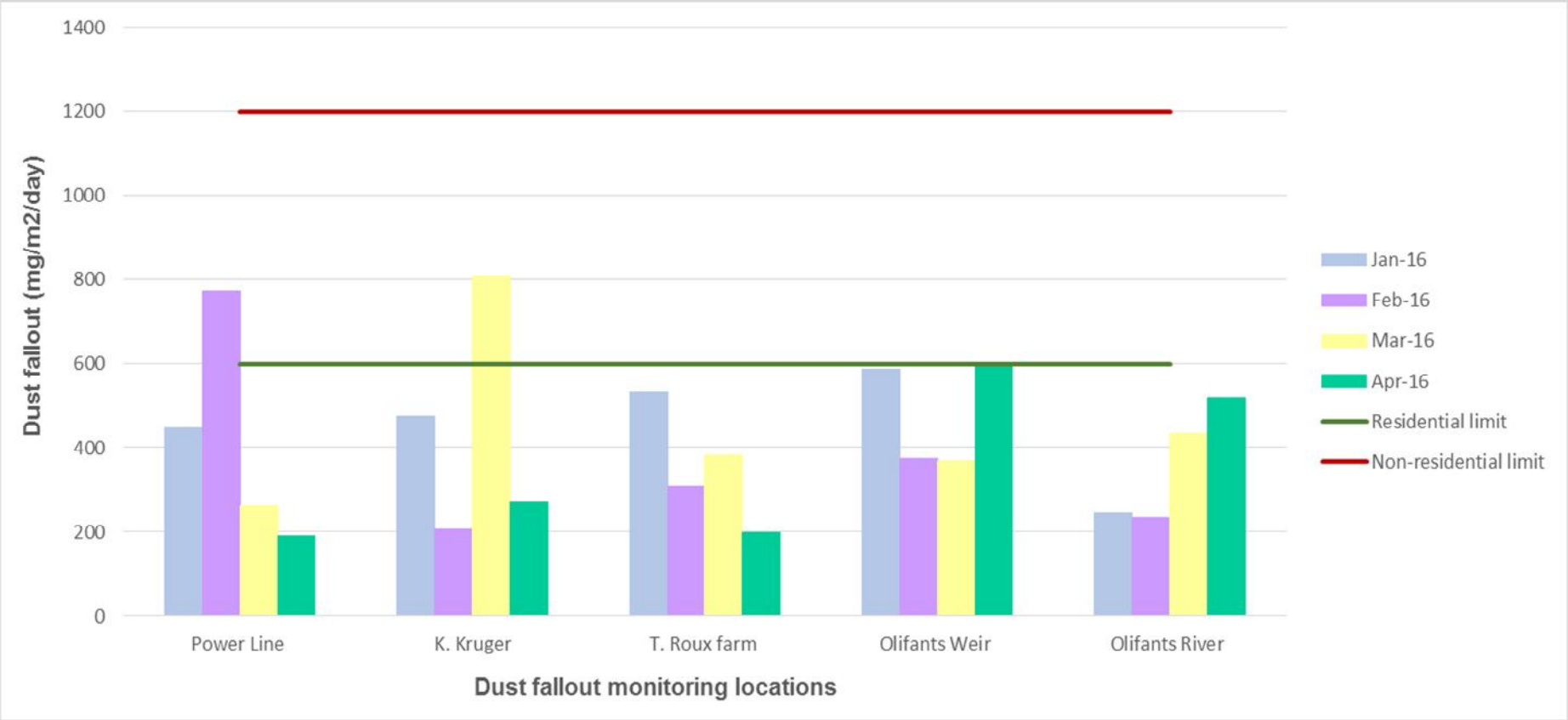

Figure 49: 2016 Dust fallout results for perimeter monitoring locations (adapted from: WSP Environmental; April 2016)

1.5.2 Particulate matter[80]

Du Plessis TOPAS Monitor

- Data recovery from the Du Plessis TOPAS Monitor was 14.31% for the monitoring period, well below the minimum requirement of 90% set by the Department of Environmental Affairs. Such poor recovery is a result of power issues at the unit. Khwezela Bokgoni Colliery is busy investigating these issues;
- Due to the low data recovery, a pollution rose for the monitoring period could not be generated. The monitor's wind sensors are also faulty and were unable to record wind speed and direction data. New wind sensors have been ordered and will be replaced; and
- Due to the low data recovery on the unit, the data presented here should be viewed with caution.

[80] Particulate Matter Concentrations at Block 3A (PM10): The E-BAM has been repaired and has been delivered to Kleinkopje Colliery. A site location has been proposed and is currently being prepared so that the monitor can be permanently installed.

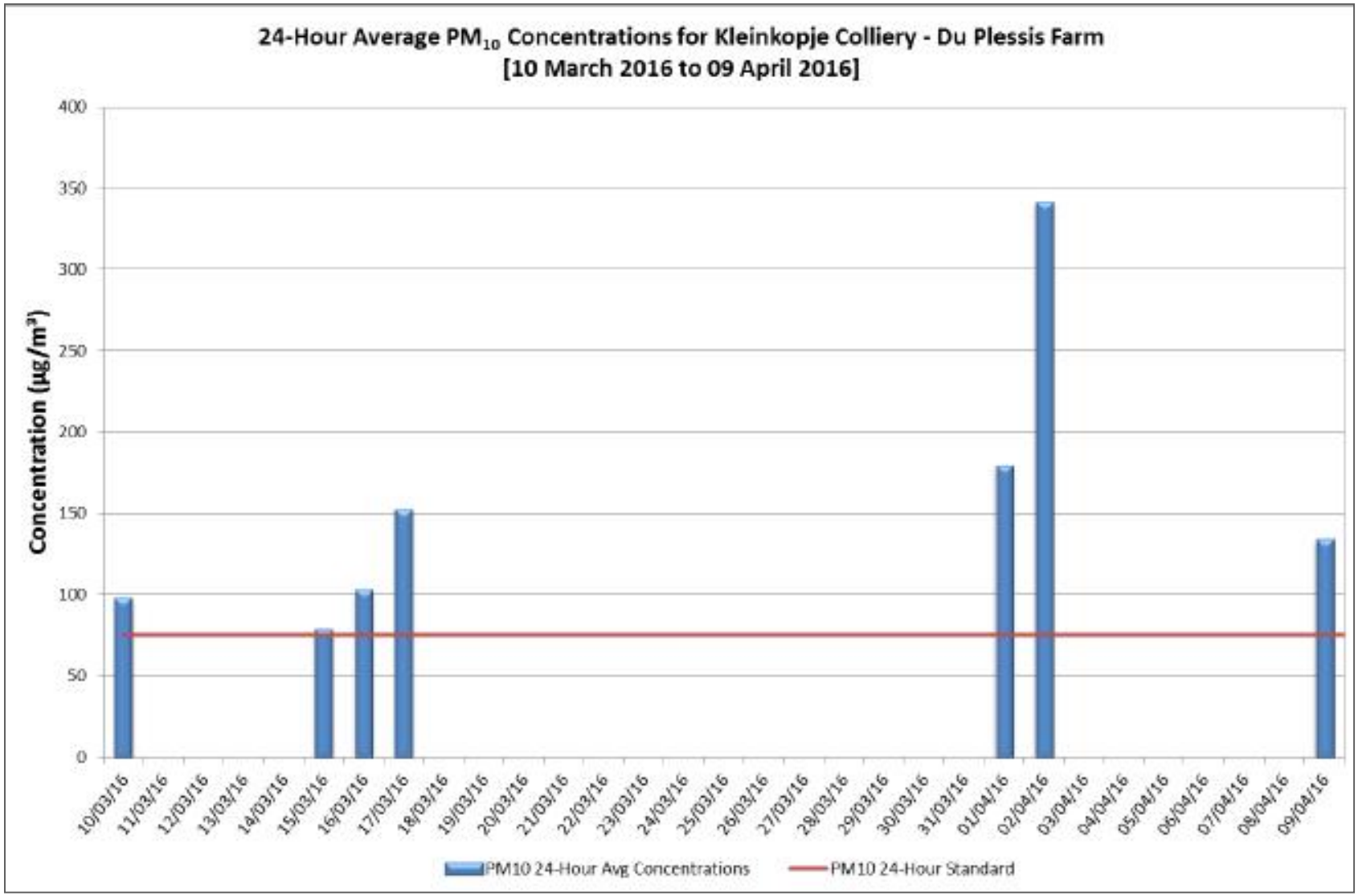

Figure 50: Daily average PM_{10} measured at the Du Plessis Topas Monitor for the monitoring period (source: WSP Environmental; April 2016)

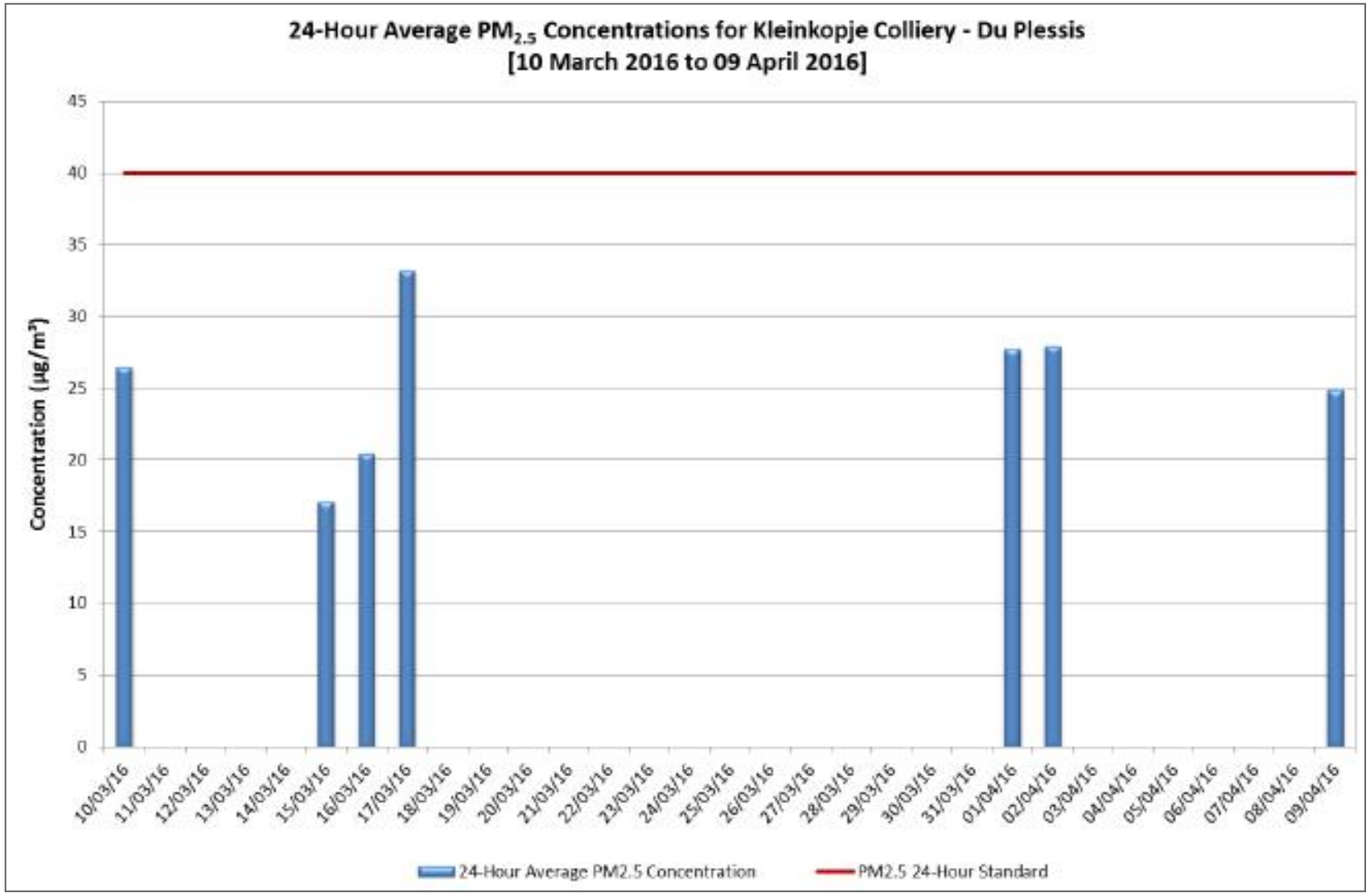

Figure 51: Daily average $PM_{2.5}$ measured at Du Plessis Topas Monitor for the monitoring period (source: WSP Environmental; April 2016)

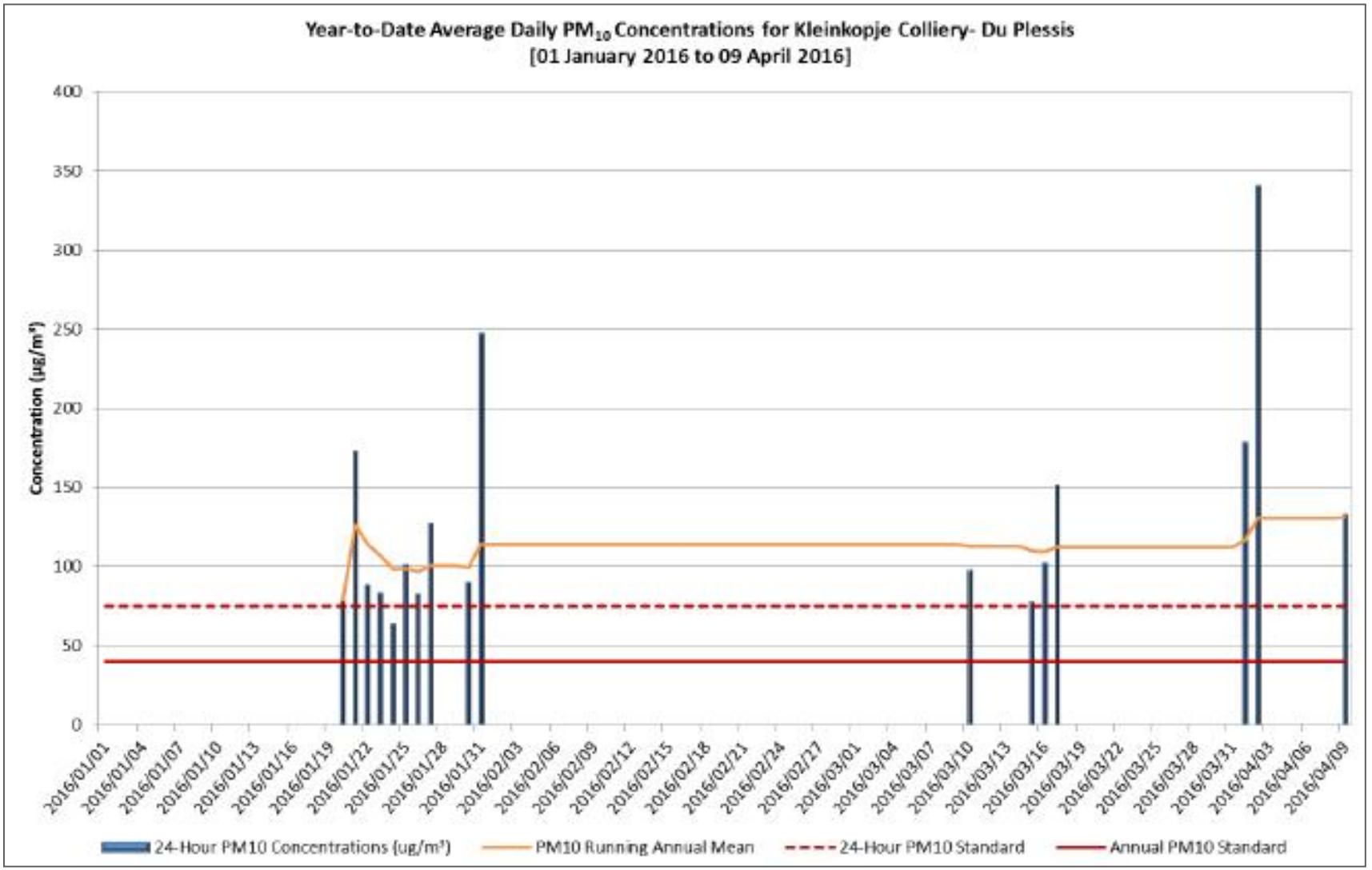

Figure 52: Year-to-date daily average PM_{10} concentrations at the Du Plessis Topas Monitor (source: WSP Environmental; April 2016)

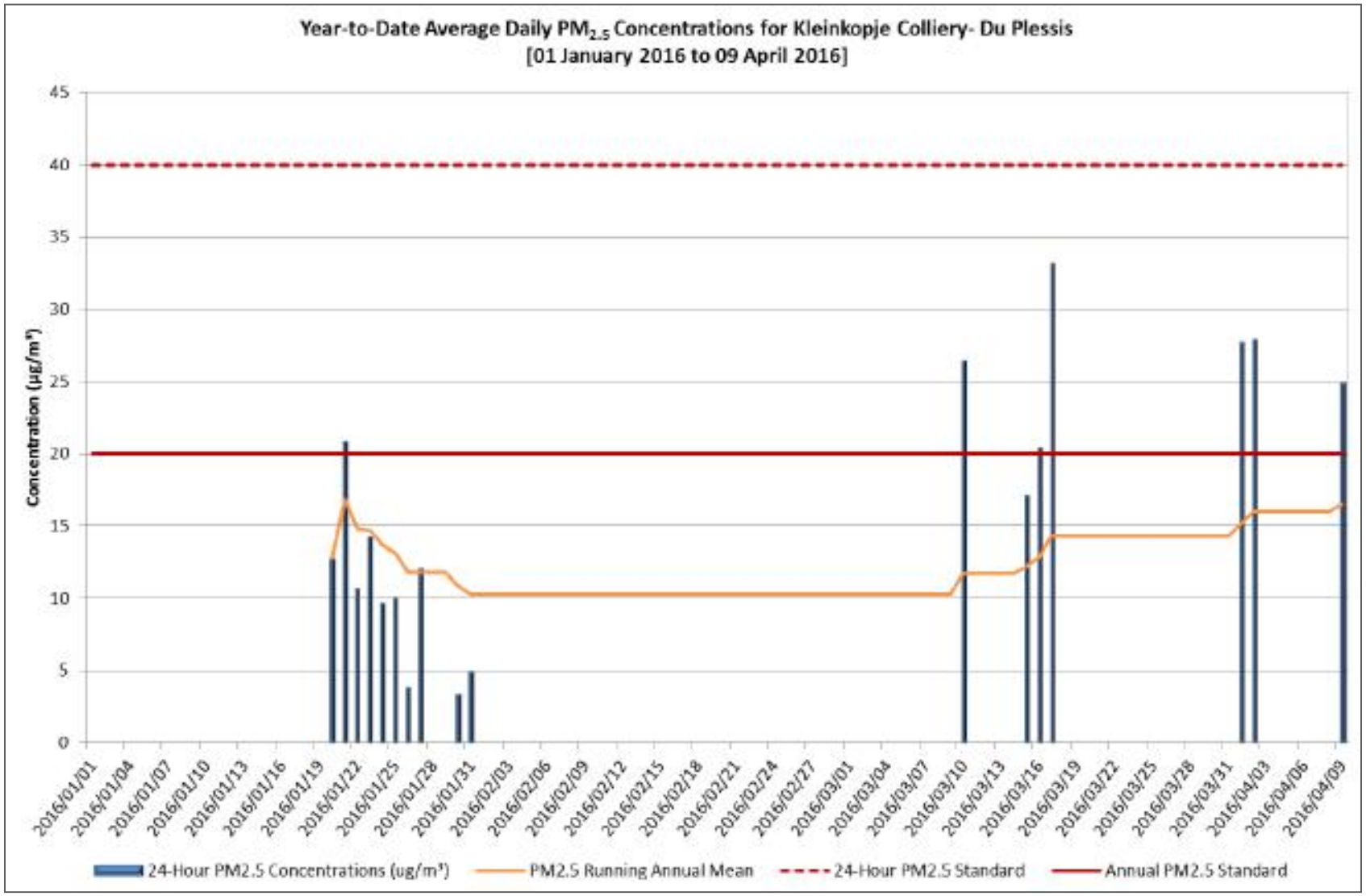

Figure 53: Year-to-date daily average $PM_{2.5}$ concentrations at the Du Plessis Topas Monitor (source: WSP Environmental; April 2016)

1.5.3 Erikson dam TOPAS Monitor

The Erickson Dam TOPAS Monitor is still in for repairs and replacement of its photometer, thus there is no data presented for this location for monitoring period.

Baseline air quality information relevant to the Khanyisa IPP – power plant and ash disposal site:

The baseline study encompassed the analysis of meteorological data, identification of receptors, and description of current ambient air quality in the region. Local meteorological data was obtained from the South African Weather Services (SAWS) weather station in Emalahleni for the period November 2011 to October 2014; receptors were identified from Google Earth imagery; and ambient air quality was described with reference to findings from the Highveld Priority Area Baseline Assessment and measured ambient concentrations at the Emalahleni monitoring station of the DEA (Airshed, 2015).

The main findings from the baseline assessment were as follows (Airshed, 2015):

- Existing sources of air emission were identified material handling operations associated with mining activities in the area, industrial emissions, opencast mining activities, household fuel burning, biomass burning, vehicle exhaust emissions, and fugitive dust emissions as a result of vehicle entrained dust from local roads and agricultural activities.
- The proposed development falls with the Highveld Priority Area which was declared priority area due to the concern of elevated pollutant concentrations within the area, specifically PM10.
- Measured background ambient air concentrations obtained from the eMalahleni monitoring station nearest to the project site for the period 2010 to 2014 indicated exceedances of the hourly average NAAQS[81] limit values for NO2, SO2 and for the daily average NAAQS limit values for PM10.
- It is anticipated that the air concentrations at the proposed site will be in the same order as the residential areas in the greater airshed. However local activities such as nearby industries such as nearby industries and agricultural operations could potentially add to the general background levels.
- The closest sensitive areas to the project site include a primary school (~2 km northeast), residential areas situated between 2.5 and 6.5 km northeast (Duvha Park, Tasbeth Park, Dixon Agricultural Holdings, Highveld Single Quarters and Reyno Ridge), a farmstead located ~4 km to the east and Clewer residential area (7.5 km northwest).

The resultant report titled: "*Air quality impact assessment of the proposed Khanyisa Power Station, Mpumalanga*, dated September 2011, compiled by Air Shed Planning Professionals is available upon request.

[81] National Ambient Air Quality Standards

2. Blaauwkrans co-disposal facility and surrounds

WSP Environmental (Pty) Ltd has been appointed by Anglo American Coal SA to monitor particulate concentrations and maintain a dust fallout network in and around Khwezela North Colliery.

2.1 Monitoring network

Dust fallout monitoring at the Khwezela North Colliery is conducted at twenty monitoring locations, consisting of two directional buckets and eighteen single buckets. Figure 48 illustrates all monitoring locations.

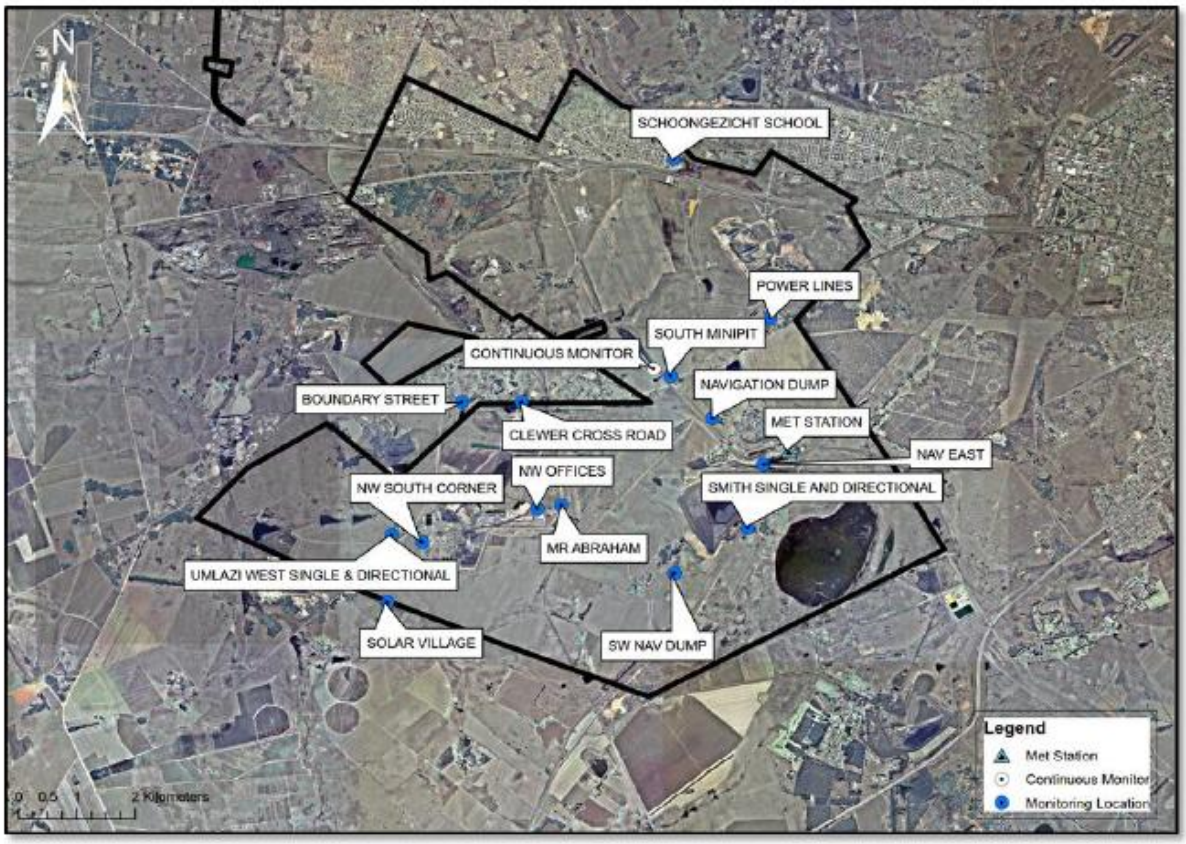

Figure 54: Khwezela North – Navigation Section dust fallout monitoring locations (source: WSP Environmental; May 2016)

2.2 *Monitoring results for ambient monitoring locations*

2.2.1 *Dust fallout results*

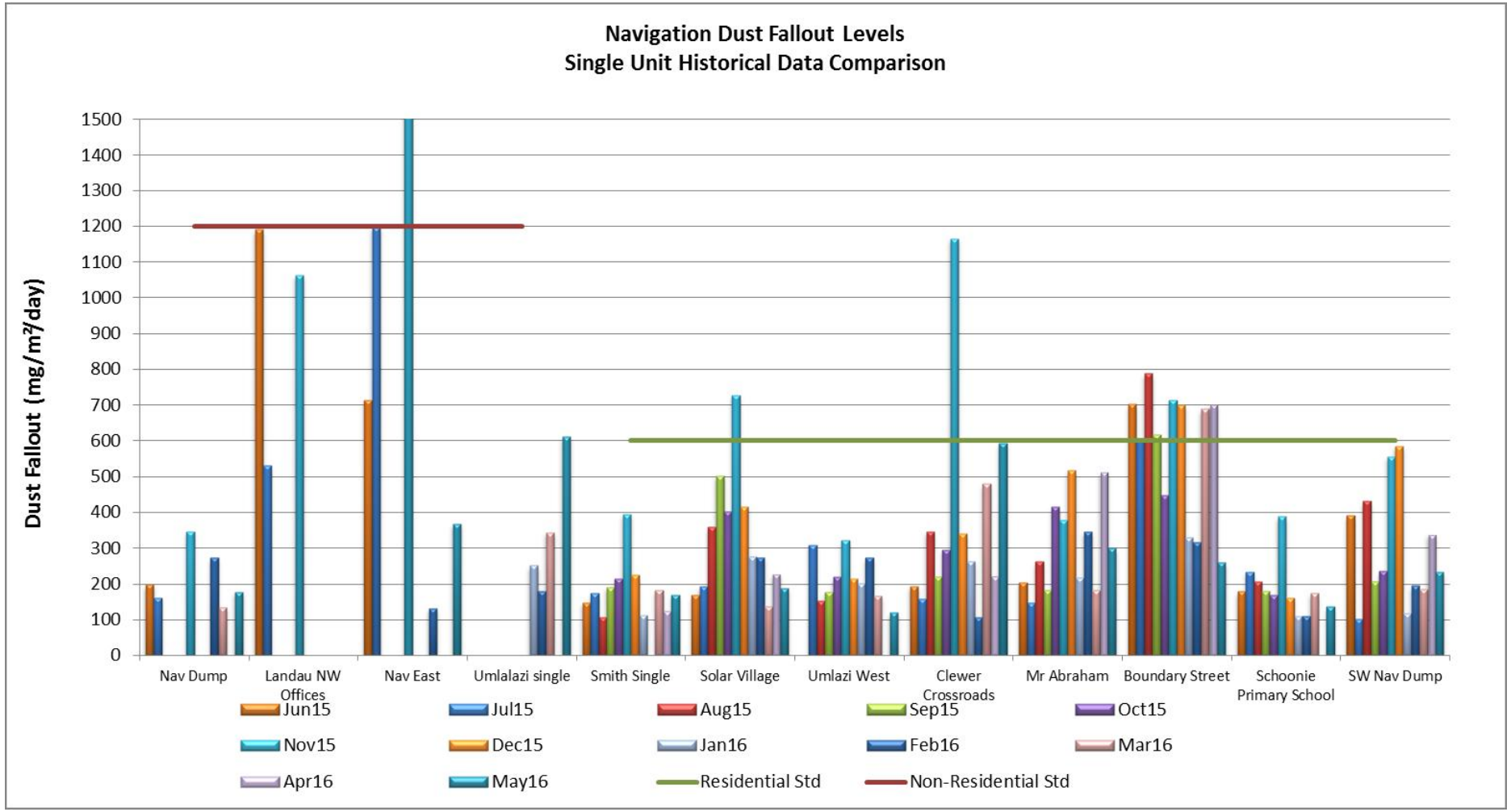

Figure 55: Historical dust fallout results at Khwezela North Navigation June 2015 to May 2016 (WSP Environmental; May 2016)

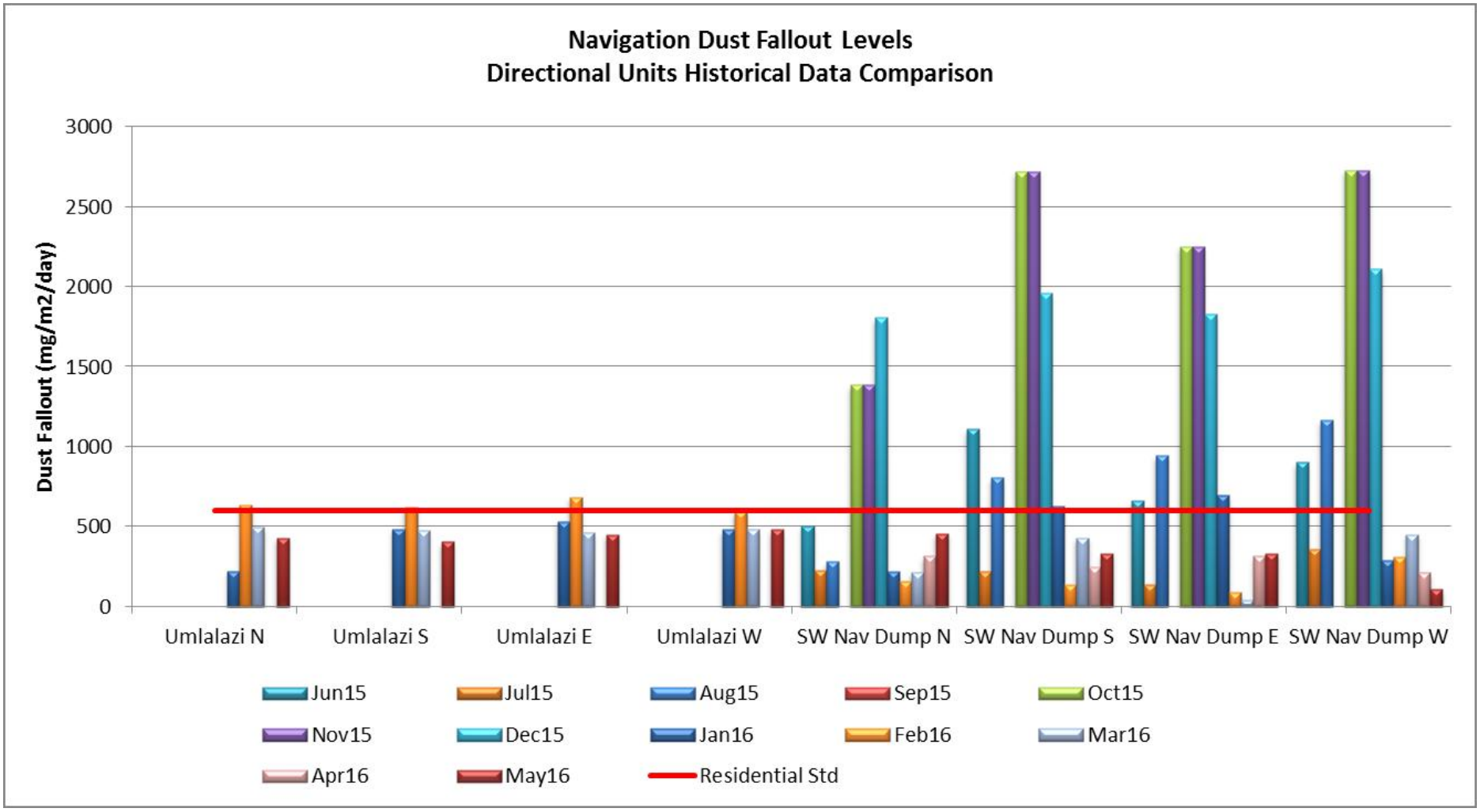

Figure 56: Historical directional dust fallout results at Khwezela North Navigation June 2015 – May 2016 (WSP Environmental; May 2016)

2.2.2 *Particulate matter*

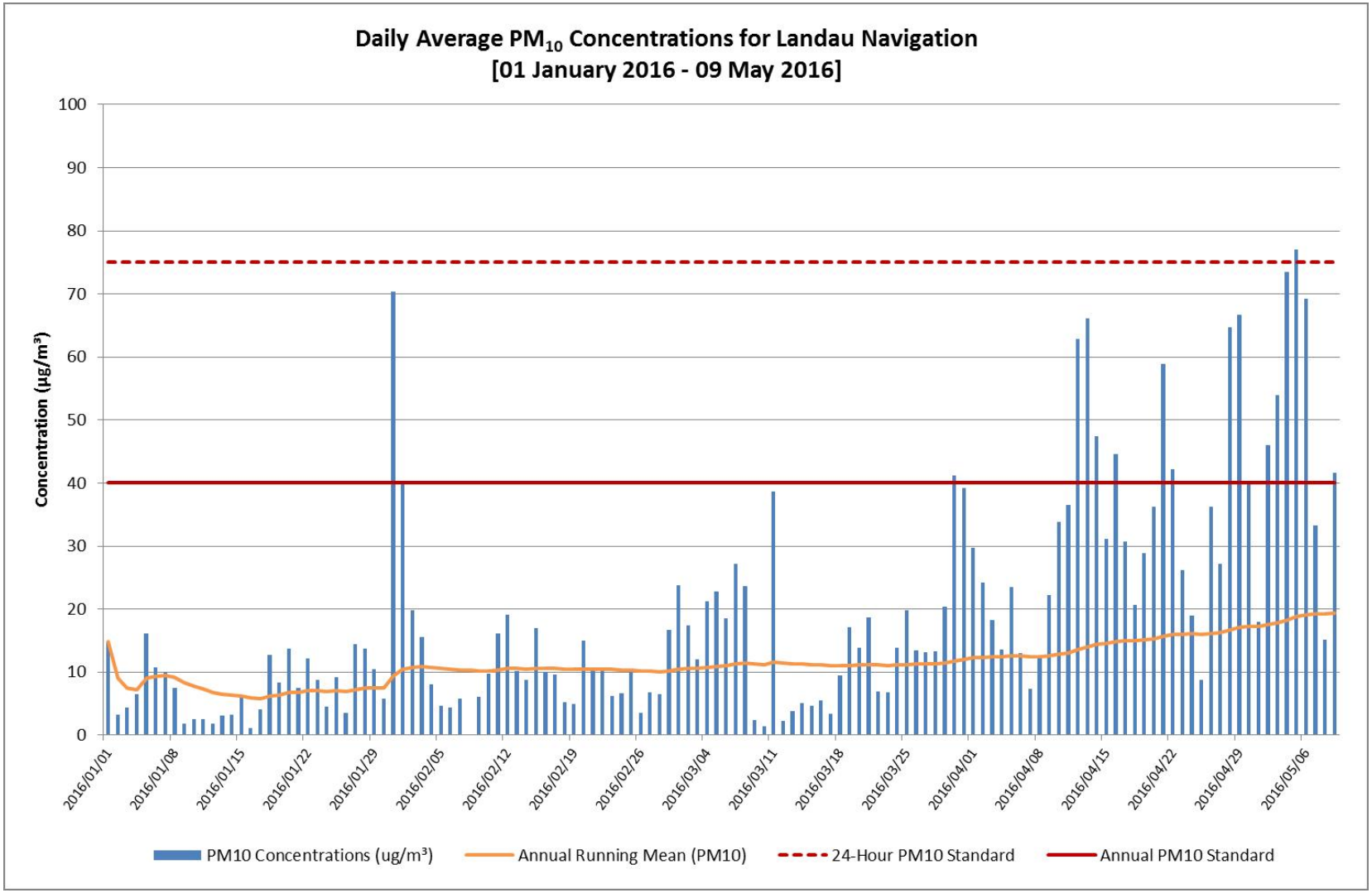

Figure 57: Year-to-date daily average PM_{10} concentrations at Khwezela North Navigation (WSP Environmental; May 2016)

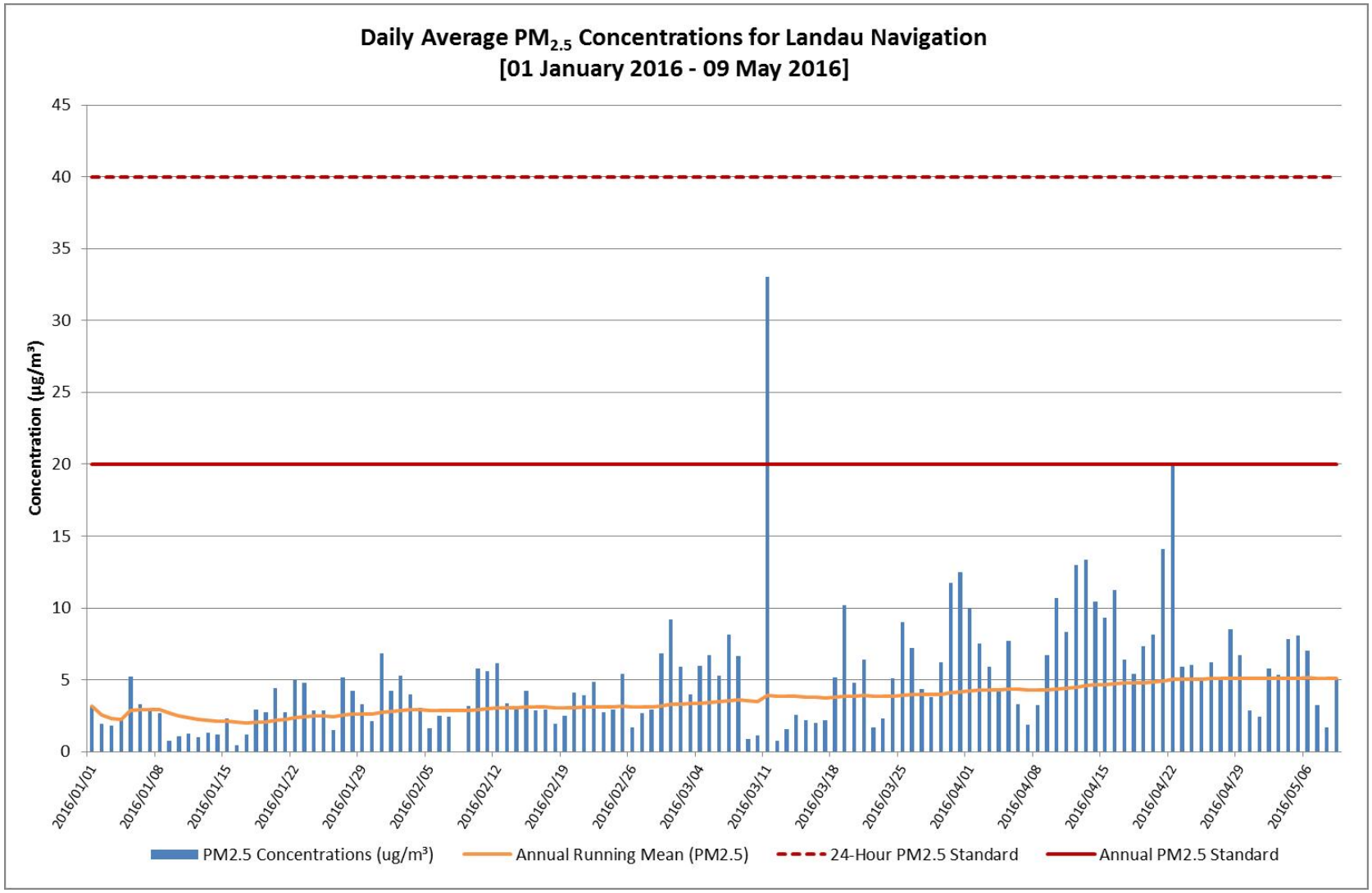

Figure 58: Year-to-date daily average $PM_{2.5}$ concentrations at Khwezela North Navigation (WSP Environmental; May 2016)

Chapter K: Noise

Routine monitoring of blast noise and vibrations emanating from opencast blasts is conducted at strategic points along mine boundaries and at selected residences of neighbouring farms. Further, a number of environmental noise studies have previously been conducted in the area(s) associated with the project site(s).

Information contained in this section of this report was sourced from the following documents:

- The report titled: "*Kleinkopje Colliery revised and consolidated EIA and EMP, report prepared for Anglo American Operations Limited – Thermal Coal*", with report No 414908, compiled by SRK Consulting and dated April 2012 (here after referred to as the revised EMPr, dated April 2012);
- The report titled: "*Kleinkopje Colliery 2A Pollution Control Dam Relocation Project: Draft Environmental Impact Assessment and Environmental Programme Report*"; dated May 2012 and compiled by WSP Environmental;
- The report titled: "*Noise Impact Assessment of the planned Khanyisa Power Station (Final Report)",* dated October 2011 and compiled by Jongens Keet Associates; and
- The report titled "*Noise Impact Study for Environmental Impact Assessment: Proposed establishment of the Landau Colliery Life Extension Project on various farm portions near eMalahleni, Mpumalanga, Rev. 4*", by Enviro Acoustic Research (Pty) Ltd; and dated January 2014.

High ambient noise levels exist in the area due to several major noise emitters including:

- Major coal mining activities;
- The N12 highway;
- The provincial roads in the area; and;
- Residential areas with villages associated with the mines.

1. Klippan co-disposal facility and project development area

The existing ambient noise climate was assessed as part of the Khanyisa IPP (power plant) Project and potential sources of noise in the area we found to be the following (Jongens Keet Associates, 2015):

- Several mines/collieries;
- Rail traffic through the area (main lines and industrial spur lines);
- General farming activities (not major source of noise); and
- Traffic on the farm (gravel) roads. This is an intermittent source of noise.

Residences (inclusive of farm houses and farm worker dwellings), hospitals and schools may be defined as noise-sensitive land uses that may be affected by the elements of the project (Jongens Keet Associates, 2015). Figure 59 below shows the sensitive receptors.

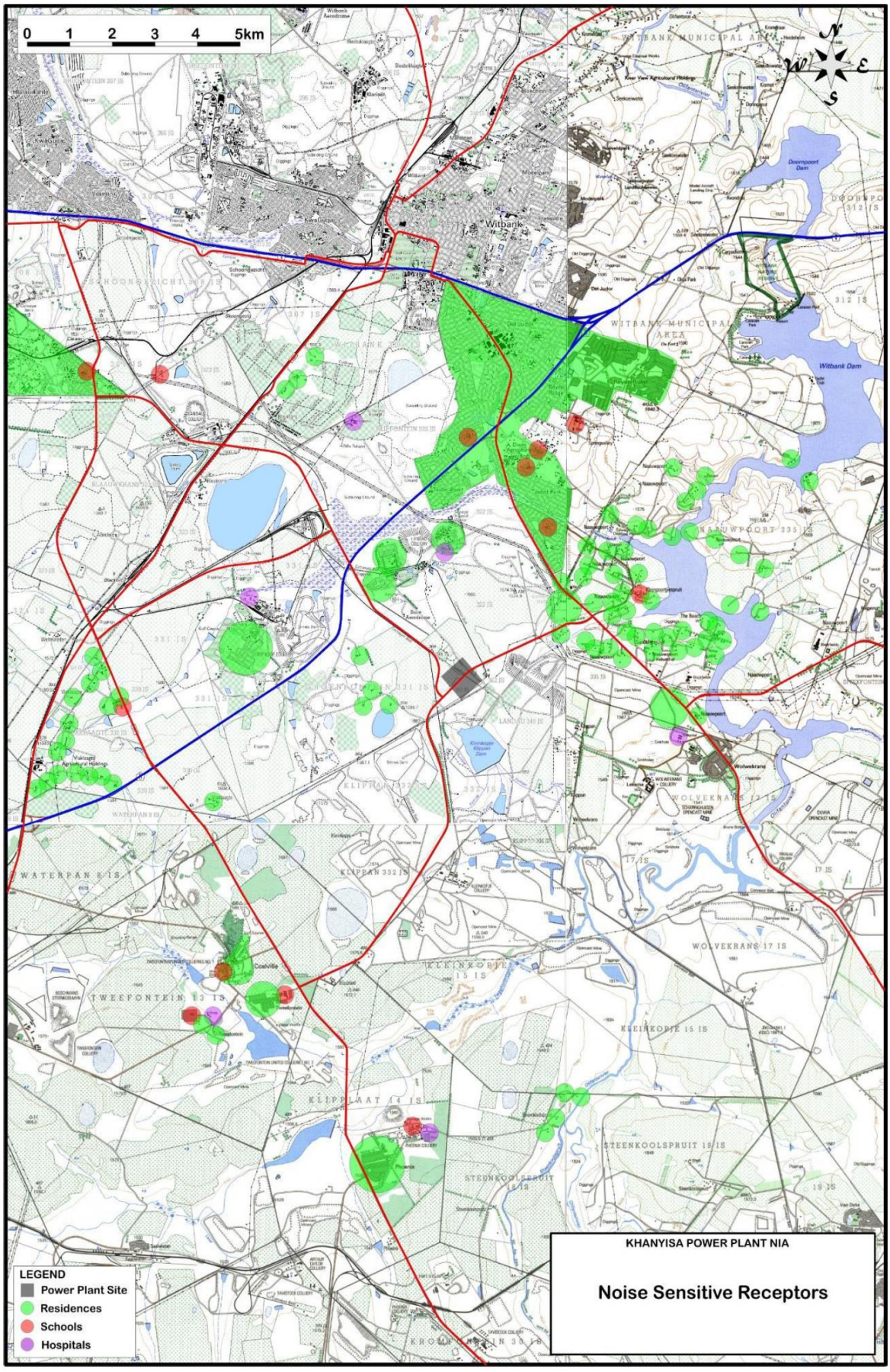

Figure 59: Noise sensitive receptors (Jongens Keet Associates, 2015)

2. Blaauwkrans co-disposal facility and surrounds

The main existing noise sources within the vicinity of the Khwezela north area (and the Blaauwkrans Co-disposal Facility) can be attributed to vehicles on the N4, the R555 and R547 Provincial roads. Residential noise (voices, animals, equipment, etc.) are noise sources in the urban areas. Noise is also generated from the surrounding mining activities and agricultural activities. A railroad line and sidings lies adjacent to the communities of KwaMthunzi Vilakazi (formerly Clewer) and Schoongezicht and are also noise sources.

Chapter L: Visual

1. Klippan co-disposal facility and project development area

As per the report titled: "*Final Visual Impact Assessment, Proposed Khanyisa Coal Fired Power Plant, Emalahleni / Witbank, Mpumalanga*", dated July 2011 and compiled by VRM Africa; the following landscape character findings have been made for the area associated with the Klippan Co-disposal Facility and Khanyisa Coal Supply development area:

- Emalahleni has been identified as an economic growth node and the electricity sector dominates the local economy; the mining activities also contribute significantly.
- The Emalahleni Local Municipality has four power stations situated within its area of jurisdiction and two (Kendal and Duhva) Coal Fired Power Stations located within the greater visual context of the eMalahleni town. The structures are very large and would dominate the attention of the casual observer, but for the air pollution which tends to grey out the mass of the structures reducing the visual intrusion. Within the foreground / mid ground areas, the structure would be clearly visible and dominate the attention of the casual observer.
- There are more than 22 collieries in the municipal radius with half of them being within the visual context of the proposed site which is recognised in the Emalahleni Final Integrated Development Plan Report 2009-2010 as having caused a significant impact on the natural environment, which is also impacting on the built and human environment.
- The mining activities and associated infrastructure have resulted in a significantly fragmented landscape. The only relatively natural landscapes in the area are the water areas, of which the dam to the west is the most significant, with smaller vlei areas scattered to the north and south.
- The landscape character of the power station and ash dump site is degraded with the attention of the casual observer being dominated by the frequent, very large landscape modifications associated with the coal mining industry surrounding the property.
- The existing three 400kV power lines as well as the many other power lines in the immediate vicinity of the power station site already impact and define the sense of place.

The landscape character of the area is moderate to low due to the existing electrical power lines, mine dumps and run down industrial and alien infested type landscapes that characterize the location. The proposed power station is located within a highly modified coal mining landscape with the Duvha Power Station located approximately 10 km from the site and 15 km from eMalahleni. The landscape

is characterised by high levels of contrast and reflects a Class IV type landscape which is suitable for large / high contrast generating landscape modifications.

2. Blaauwkrans co-disposal facility and surrounds

Information pertaining to the Visual Aspects of the proposed project in terms of the Blaauwkrans Co-disposal Facility and surrounds, was abstracted from the Visual Impact Assessment report titled *"Landau Life Extension Project – Visual Impact Assessment"*, October 2013.

The Khwezela North Colliery lies within an area where the landscape has been transformed over the years from a historical farming orientated landscape to one dominated by extensive mining operations, industries and residential activities. Possible sensitive visual receptors include travellers on the N4 highway and residents of KwaGuqa to the north and Clewer to the west.

Chapter M: Protected areas and conservation planning

Information on protected areas and conservation planning as contained under this section has been obtained from the following sources:

- The report titled: "*Biodiversity Action Plan for Kleinkopje Colliery*", dated February 2014, compiled by Digby Wells;
- The report titled: "*Wetland delineation and assessment for Kleinkopje Colliery*", dated January 2013 and compiled by Wetland Consulting Services (Pty) Ltd.;
- The report titled: "*Wetland Delineation and Impact Assessment Report for Landau Colliery Life Extension Project*", dated October 2013, and compiled by Wetland Consulting Services;
- The report titled, *"Flora and Fauna Baseline Survey for the Landau Colliery Life Extension Project Study Area (Clewer, Mpumalanga)",* dated April 2013, compiled by De Castro & Brits c.c; and
- The report titled: "*Terrestrial Ecology Assessment of the proposed Khanyisa Power Plant and Ash pit, Witbank, Mpumalanga*", dated November 2010, and compiled by Ecorex Consulting Ecologists cc

1 Mpumalanga Biodiversity Sector Plan

The Mpumalanga Biodiversity Sector Plan (MBSP) is a high-resolution, up-to-date biodiversity plan that identifies a network of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) that:

- Achieve national and provincial biodiversity targets on the least amount of land possible;
- Minimise conflict between conservation and other forms of land use;
- Favour areas that are important for water security;
- Promotes connectivity and adaptation to climate change across the landscape; and
- Can be used at a scale suitable for local and district-level planning.

The purpose of the biodiversity sector plan is to ensure that spatial biodiversity priorities are effectively incorporated into land use and development planning, environmental assessments and authorisations, and natural resource management within provincial and local levels of government.

CBA are those terrestrial and aquatic areas whose safeguarding is critically required in order to meet biodiversity pattern and process thresholds. They are identified through a systematic biodiversity planning process and represent the most efficient (least land-hungry) option to meeting thresholds.

Systematic Biodiversity Planning aims to meet predefined biodiversity thresholds for both pattern and processes and by doing so in the most efficient network possibly, it implies that the loss of a CBA implies either that the thresholds can never be met or that a more land hungry network will be now be needed to meet the same threshold.

The categories on the CBA Maps are:
Protected Areas: formally declared except for mountain catchment areas due to their lack of promulgated regulations and resultant low level of protection afforded
CBAs: As described above, they include terrestrial and aquatic areas as well as the riparian buffers around aquatic CBAs
Ecological Support Areas: aquatic features directly and indirectly impacting on aquatic CBAs.
Other natural areas: If we are able to secure all of our CBAs, then we can afford to lose these areas. In other words, these are the preferred areas for sustainable development and according to data which was known at the time of the analysis, are not important from a biodiversity perspective.
No natural and Urban: No biodiversity value remains.

1. Klippan co-disposal facility and project development area

The Khwezela mining areas have been heavily impacted by existing mining activities on site, extensive agricultural activities (especially the cultivation of maize) as well as impacts associated with infrastructure (e.g. roads and railways) and urbanisation.

Approximately 3 752 ha of the Khwezela Bokgoni study area have been directly disturbed by surface mining activities, totalling over 44 % of the site. All of these activities have resulted in the extensive transformation of the natural habitats within the study area, as portrayed in the Mpumalanga Biodiversity Conservation Plan's terrestrial biodiversity assessment (Ferrar *et al*. 2007) which classifies most of the area as having no natural habitat remaining / heavily modified (Figure 60 below). A total area of 1223.47 ha of the Khwezela Bokgoni and in Pit 2A specifically, a total area of 237.17 ha has been rehabilitated.

The only Khanyisa IPP Coal Supply infrastructure that will be located within a CBA Optimal area will be the overhead powerline that will run between the Eskom Khwezela Bokgoni substation and proposed DHRP site. The project activities will be undertaken in close proximity to the John Cairns

Nature Reserve (within 5km). However, no record exists of this area having been promulgated as a Protected Area in terms of the National Environmental Management Protected Areas Act, 2003 (Act 57 of 2003)

All other areas associated with the proposed project location (specific to Khwezela Bokgoni and Greenside Colliery) are characterised as modified or other natural areas. Refer however to the discussion regarding the wetlands delineated within the area (Chapter H above).

2. Blaauwkrans co-disposal facility and surrounds

The Khwezela North area has been heavily impacted by existing mining activities on site, extensive agricultural activities (especially the cultivation of maize) as well as impacts associated with infrastructure (e.g. roads and railways) and urbanisation (e.g. Clewer). All of these activities have resulted in the extensive transformation of the natural habitats within the study area, as portrayed in the MBSP terrestrial biodiversity assessment which classifies large parts of the study area as having no natural habitat remaining (Wetland Consulting Services, 2013).

The most extensive areas of natural grassland on site, classified as being a Critical Biodiversity Area (MBSP), is associated with the Schoongezichtspruit (also referred to as the Schooniespruit), a tributary of the Brugspruit, and is located downstream of the existing surface infrastructure at the Navigation Section of Khwezela North Colliery.

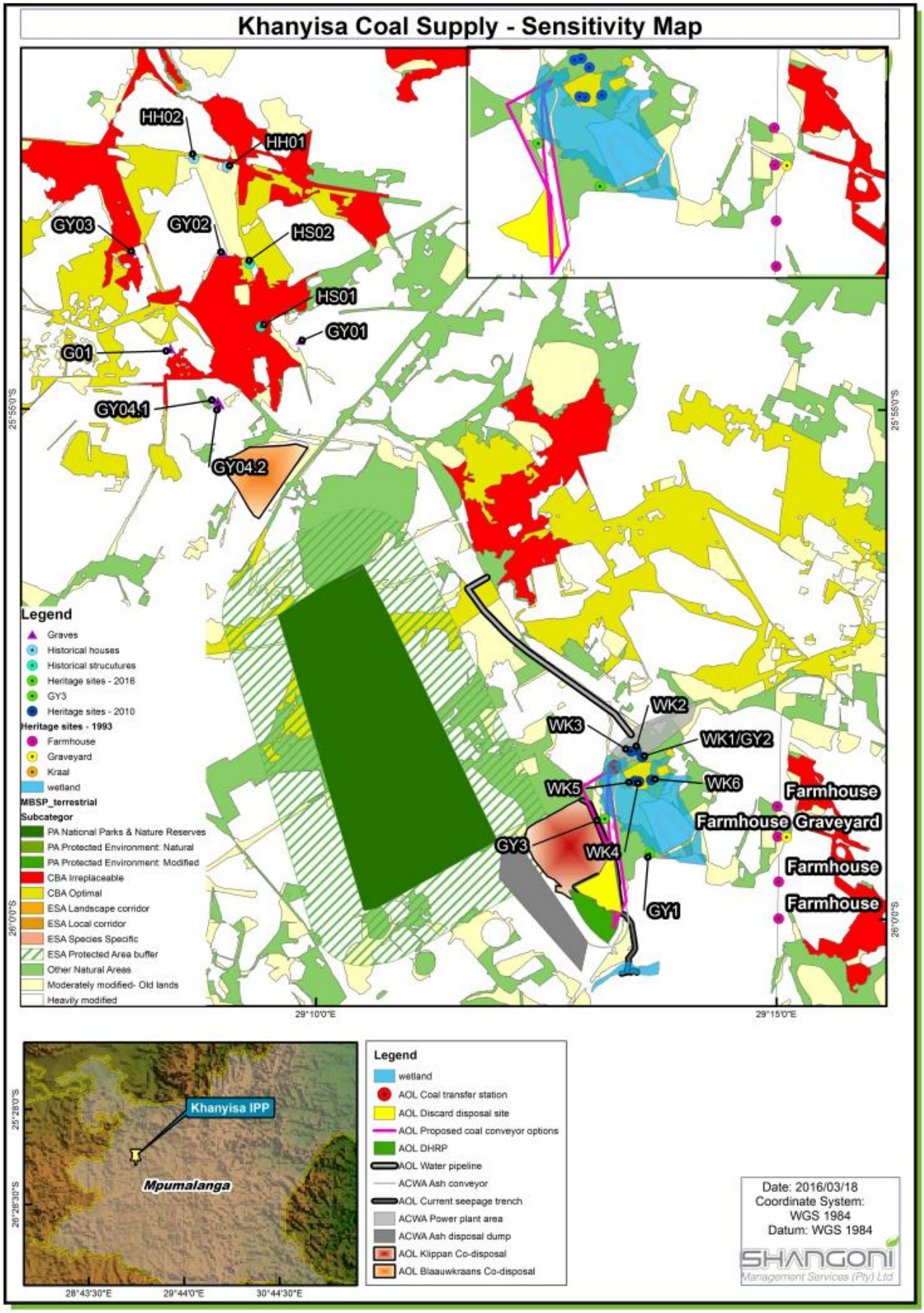

Figure 60: Sensitivity Map (including the Mpumalanga Biodiversity Sector Plan)

Chapter N: Sites of archaeological and cultural importance[82]

Information contained in this section of this Scoping Report was sourced from the following documents:

- The report titled: "*Kleinkopje Colliery: Phase 1 Identification survey of historical sites*", dated July 1993 and compiled by A.C. van Vollenhoven;
- The report titled: "*Phase 1 Archaeological Impact Assessment of the farms Klippan 332 JS, Groenfontein 331 JS, and Klipfontein 322 JS near Witbank, Mpumalanga Province*", dated September 2010 and compiled by Khudzala Antiquity (J.P. Celliers);
- The report titled: "*A report on a Phase 1 Heritage Impact Assessment (HIA) for a proposed pipeline and two dams to be constructed at Kleinkopje Colliery close to Emalahleni*", dated January 2012, compiled by A.C. van Vollenhoven;
- The report titled: "*A Phase 1 Heritage Impact Assessment (HIA) Study for Anglo Operations (Pty) Ltd (Kleinkopje Colliery) proposed Pit 2A Extension Project near Emalahleni in the Mpumalanga Province*", dated August 2016 and compiled by Dr Julius Pistorius;
- The report titled "*A Phase 1 Heritage Impact Assessment (HIA) Study for the proposed Landau Colliery Life Extension Project near eMalahleni (Witbank) on the Eastern Highveld in the Mpumalanga Province"*, dated September 2013 and compiled by Dr Julius Pistorius; and
- The report titled: "*Phase 1 Palaeontological heritage impact assessment report on the site of the construction of a proposed haul road, proposed extension of mining activities beneath 2A Pollution Control Dam and the site of the new Pollution Control Dam on Kleinkopje Colliery*", dated September 2016, compiled by Professor Barry Millsteed.

Klippan co-disposal facility and project development area

1. Archaeology

1.1 Sites of archaeological importance identified during previous studies conducted within and around Khwezela Bokgoni Colliery

1.1.1 Sites of archaeological importance identified as part of a Heritage Survey, dated 1993

The following sites were identified within the Kleinkopje Colliery mine boundary area (specifically within the vicinity of the Block (Pit) 2A mining area) during the survey conducted by A.C. van Vollenhoven in 1993:

- **Farm houses:**

A number of farm houses were identified situated on the eastern side of Block (Pit) 2A. The farm houses were (at that time) used as residences. Although older than 50 years (at that time), none of the houses were architectural features of particular importance.

[82] Figure 60 above provides the locations of all sites of archaeological importance identified during all studies done within and around the project site(s)

- **Graves:**

A neat graveyard was found just east of the farm houses. All the graves were (at the time of the survey) marked and most of them were older than 50 years.

The remainder of the heritage sites were identified in the 5 West Block (refer to Figure 60) and include graves and a kraal.

1.1.2 Sites of archaeological importance identified as part of the Phase 1 Archaeological Impact Assessment of the farms Klippan 332 JS, Groenfontein 331 JS, and Klipfontein 322 JS, dated 2010

Six sites were documented which has characteristics of previous human settlement or activity. None of these are however considered to be of archaeological value. All the documented sites are located on small portions of the farms Klippan 332 JS and Groenfontein 331 JS. Site WK 1 is a formal graveyard with approximately 147 marked and unmarked graves. This site is considered to be of high significance. Sites WK 2 – WK 6 are regarded as being of low significance primarily because they are not regarded as being of archaeological or historic significance, they were observed however, and assessed.

Site WK 1

This is the location of a formal graveyard which contains approximately 147 graves. Most of the graves are marked (have tombstones with inscriptions) but there are also unmarked graves present.

The oldest marked grave is that of a 14 year old “Msiza’ who was buried here in 1948. Most of the graves are of people who were buried here in the 1960’s. The most represented families in the graveyard include amongst others Tsoba, Shoba and Mahlangu.

Figure 61: Site WK1 (source: Khudzala Antiquity, 2010)

Site WK 2

This is a site where scattered remains and the foundation remains on the soil surface indicate the probable presence of a dwelling. It is located some 300 metres south of the graveyard (Site WK 1) and is possibly linked to the graveyard. The dwelling is estimated to have occupied an area of approximately 10x15m. Objects found on the surface include the remains of an old iron folding chair, shoes and other iron objects such as tins, drums etc.

Figure 62: Site WK2 (source: Khudzala Antiquity, 2010)

Site WK 3

The location of another ruined dwelling. Very small surface scatter of iron material.

Figure 63: Site WK3 (source: Khudzala Antiquity, 2010)

Site WK 4

This is the location of a number of old concrete structures. Many of which may have served as floors of previous buildings. There are also stretches of tarmac road and other remains which suggest that this used to serve as a recreational area.

Figure 64: Site WK4 (source: Khudzala Antiquity, 2010)

Site WK 5

Small retaining wall, associated with Site WK 4.

Figure 65: Site WK5 (source: Khudzala Antiquity, 2010)

Site WK 6

This is the location of a building. Probably erected in the late 20th century.

Figure 66: Site WK6 (source: Khudzala Antiquity, 2010)

Table 37: General significance of located sites (source: Khudzala Antiquity, 2010)

Site No.	Description	Type of significance	Degree of significance	Sphere of significance
WK1	Formal graveyard	High, Social	High, Local community	Local, Witbank
WK2	Demolished dwelling	None	Not significant, Local community	Local
WK3	Traces of previous settlement	None	Not significant, Local community	Local
WK4	Ruins	None	None	Late 20th Century Local
WK5	Ruins	Historic	Archaeological: Low potential Historic: Low	Late 20th Century Local
WK6	Building	Historic	Archaeological: Low potential Historic: Medium	Late 20th Century Local

Table 38: Significance allocation of located sites (source: Khudzala Antiquity, 2010)[83]

Site No.	Unique nature	Integrity of archaeological deposit	Wider context	Relative location	Depth of deposit	Quality of archaeological / historic material	Quantity of site features	Preservation condition of site
WK1	Unique graveyard	N/A		Witbank; Klippan 332 JS	N/A	Archaeologically: Not known. Historically: Good	147	Fair

[83] All sites located outside the Kleinkopje Pit 2A Extension application areas

Site No.	Unique nature	Integrity of archaeological deposit	Wider context	Relative location	Depth of deposit	Quality of archaeological / historic material	Quantity of site features	Preservation condition of site
WK2	None	Poor, much disturbed, scattered iron remains, difficult to define	None	Witbank; Klippan 332 JS	Not known, possibly only surface material	Archaeologically: Poor Historically: Poor	1	
WK3	None	Poor, much disturbed, scattered iron remains, difficult to define	None	Witbank; Klippan 332 JS	Not known, possibly only surface material	Archaeologically: Poor Historically: Poor	1	Poor
WK4	None	N/A	None	Witbank; Klippan 332 JS	N/A	Archaeologically: None Historically: Poor	Scattered clunks of concrete and road	Poor
WK5	Ruined brick structure	Not known, probably poor	Not known	Witbank; Klippan 332 JS	Not known	Archaeologically: Low Historically: Low	Small brick built structure, part of remaining wall	Poor
WK6	Brick building	N/A	Not known	Witbank; Klippan 332 JS	N/A	Archaeologically: Low Historically: Low	Single building	Good

1.1.3 *Sites of archaeological importance identified as part of the Phase 1 Heritage Impact Assessment for the proposed pipeline and two dams project, dated 2012*

During the above-mentioned survey, no sites of cultural heritage significance was located in the area(s) associated with the proposed pipeline and dams.

1.1.4 Sites of archaeological importance identified as part of the Phase 1 Archaeological Impact Assessment for the proposed Pit 2A Extension Project, dated August 2016

The Phase I Heritage Impact Assessment (HIA) (Pistorius, 2016) for the proposed Pit 2A Extension Project revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in and near the Project Area, namely:

- One graveyard located within the project area (GY01).
- Two graveyards located directly outside the project area (GY02, GY03).

Graveyard 01 (GY01)

This graveyard (GY01) is located in open veld in the project (application) area. It is demarcated with a fence which has collapsed. GY01 holds five visible graves which are all covered with bricks and ferricrete stone. Four are fitted with sandstone headstones with no decipherable inscriptions. Some of

the graves are edged with cement strips. It is highly likely that all the graves are older than sixty years.

Figure 67: Photograph showing GY01

Graveyard 02 (GY02)

Graveyard 02 (GY02) is located under Eskom's existing power lines outside the project area. It is a large graveyard which holds as many as 150 individual graves. Many of the graves are decorated with cement, sandstone or granite headstones and other trimmings.

It is most likely that most of the graves in GY02 are older than sixty years. The graveyard may have been associated with a small village which has now disappeared as it was abandoned long ago and its remains have disintegrated. It is also possible that the remains have deliberately been demolished for security purposes.

Figure 68*: Photograph showing GY02*

Inscriptions on some of the headstones read as follow:

- *'In loving memory of Vusi 15-03-1979, 08-07-1979 lala ngoxolo'*
- *'Jan Mkwisi Died 26-10-69 Rip Mahlangu'*
- *'Lala ngoxolo baba Lucas M Shoba 1869-1974'*
- *'M SS Mlokika Paulina Mahlangu 22-11-1911'*

Graveyard 03 (GY03)

Graveyard 03 (GY03) is located outside the project area and next to a national road. GY03 holds approximately ten graves (one of which is a double grave). The majority of the graves are decorated and fitted with granite headstones and trimmings. The double grave is fitted with a marble headstone and marble strips. The graveyard is fenced in and fitted with an access gate but is in a neglected state. Most of the graves in GY03 are older than sixty years.

Inscriptions on some of the headstones read as follow:

- *'Ter nagedagtenis aan PDG Coetzer Geb 3-02-1870 Oorl 16-09-1942 Rus in vrede'*
- *'Hier rus vader Johannes Janubus du Toit Geb 3 Okt 1872 Oorl 14 Okt 1926 Hier rus moeder Maria Cornelia du Toit Weduwee van Wyk Geb Jacobs Geb 23 Jun 1874 Oorl 22 Maart 1933'*
- *'Rus sag Dionisius Tot Jesus ons kom haal Du Toit familie 1 Des 1950'*

Figure 69: Photograph showing GY03

Coordinates and level of significance

The coordinates and levels of significance for the graveyards which were recorded in and outside the project area are as per Table 39 below.

Table 39: Coordinates and significance rating for graveyards in and outside the Project Area (above) as per the 2016 Archaeological Assessment (Pistorius, 2016)

Graveyards	Coordinates	Significance
Inside the project area		
GY01. Small graveyard with five graves in open veld.	25º 59.358'S 29º 13.615'E	**HIGH**
GY02. Large graveyard with approximately 150 graves under Eskom's existing power lines. Associated with demolished remains of a former village.	25º 58.427'S 29º 13.542'E	**HIGH**
Outside the Project Area		
GY03. Located next to national road. Approximately 10 graves	25º 59.013'S 29º 13.131'E	**HIGH**

2. Palaeontology

The most conspicuous and common components of the palaeontological record of the Ecca Group in general are the plant macrofossils of the *Glossopteris* flora. Two large and conspicuous leaf form taxa dominate the *Glossopteris* flora; these being *Glossopteris* and *Gangamopteris*. Within the upper Ecca (containing the Vryheid Formation) *Gangamopteris* has ceased to occur with only *Glossopteris* present (Anderson and McLauchlan, 1976). The palaeobotanical record of the Ecca Group is diverse and the literature describing it is voluminous (numerous papers having been published by E. Plumstead, H. Anderson, J. Anderson, E. Kovaks-Endrıdy and M. Bamford amongst others). A comprehensive review of the flora in the Karoo Basin literature is, accordingly, beyond the scope of this study, but a thorough review of the palaeobotanical content of the Ecca Group in general and the Vryheid Formation in particular is presented in Bamford (2004). In that summary it is indicated that the Vryheid Formation can be expected to contain the plant macrofossils *Buthelezia*, *Sphenophyllum*, *Rangia*, *Phyllotheca*, *Schizoneura*, *Sphenopteris*, *Noeggerathiopsis*, *Taeniopteris*, *Pagiophyllum* and *Benlightfootia* and the wood taxa *Australoxylon* and *Prototaxoxylon*. In addition to the above records can be added the observations of Tavener-Smith *et al*., (1988) where it was noted that both *Glossopteris* and *Vertebraria* occur within the palaeontological record of the formation.

In portions of the formation that are typified by low thermal alteration abundant assemblages of palynomorph plant microfossils (including acritarchs) can be expected (Anderson, 1977).

Jubb and Gardiner (1975) report the presence of fragmentary fish fossils within the Ecca sequence of southern Africa; these being *Coelacanthus dendrites* from the Somkele coalfield of northern Natal and *Namaicthys digitata* from correlative strata in the Senge Coalfieldsof Zimbabwe. While fish faunas are obviously rare and none have been reported from the Vryheid Formation the possibility remains that they may be present.

Animal body fossils are rare within the Ecca Group in general (excepting the time equivalent faunas of the Whitehill Formation). However, no reptile fossils have been identified within the Vryheid Formation.

Hobday and Tavener-Smith (1975) reviewed trace fossil assemblages identified within the Vryheid Formation. Within that fossil assemblage they identified two forms (*Helminthiopsis* and *Taphrelminthopsis*) within horizontally laminated siltstones and mudstones that represent part of the deep water *Nerites* community.

No in situ fossil materials were located during the conduct of the survey. However, at Waypoints KK3 and KK4 (see Figures 70 and 71) scattered carbonaceous stem compressions and fragmentary *Glossopteris* leaves were identified in loose blocks of rock that were not *in situ.* The material is highly fragmentary, unidentifiable to species level and is not *in situ*, thus, has little scientific significance. However, Mr Ncima (of Kleinkopje Colliery) informed Prof Millsteed that the site underlying the proposed PCD had previously been Ramp 1 of the initial colliery pit void and had been subsequently rehabilitated. The rock material that had been used for the infilling of the void had been sourced from later excavations of the mine pit void. Thus, while the fossil materials are not *in situ* they indicate that the Vryheid Formations rocks that are being mined in the colliery are indeed fossiliferous.

Figure 70: Photograph of pale, micaceous sandstone bearing carbonaceous compressions of plant stem segments (Waypoint KK3). The stem segments are up to 10 cm in length.

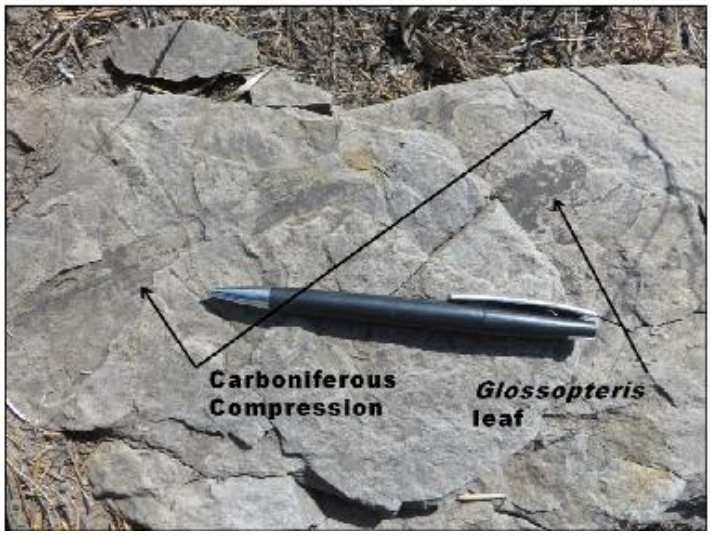

Figure 71: Photograph of pale, micaceous sandstone bearing carbonaceous compressions of plant stem segments (Waypoint KK4) are up to 15 cm in length and 2cm

Blaauwkrans co-disposal facility and surrounds

A Phase 1 Heritage Impact Assessment (HIA) was done for the proposed Khwezela North (Landau) Colliery Life Extension Project (which includes the expansion of the Blaauwkrans Co-disposal Facility). The aim of the HIA was to establish whether or not any of the types and ranges of heritage resources (as outlined in Section 3 of the National Heritage Resources Act, 1999 (Act 25 of 1999) occur within the proposed Life Extension Project study area, and if so, to determine the significance of these heritage resources and whether these resources will be affected by the proposed mining and related activities associated with the mentioned project.

The Phase 1 HIA study for the proposed Project Area revealed the following types and ranges of heritage resources within the study area as outlined in Section 3 of the National Heritage Resources Act, 1999 (Act 25 of 1999):

- Historical houses and structures dating from the twentieth century.
- Graveyards.

The locations of the above-named heritage resources are also shown in Figure 60 above.

It should be noted that since the section of the Blaauwkrans Co-disposal Facility to be reclaimed is an existing facility, no heritage sites will be directly affected as a result of the reclamation activities.

Chapter O: Regional socio-economic structures

The information provided under this section has been sourced from the Social and Labour Plan (SLP) Annual Progress Report for Khwezela Bokgoni Colliery, dated 2015, as well as the Emalahleni Local Municipality Integrated Development Plan (IDP) 2016/17 (IDP, 2016/17).

1 Demographic profile

1.1 Population size

According to Stats SA (2011 Census) 395 466 people were recorded in 2011 which is 30.2% of Nkangala's population and 9.8% of Mpumalanga Province. Emalahleni is ranked number 3 in the whole province in terms of population, which grew by 43.1% between 2001 & 2011 while annualised population growth rate was measured at 3.6%.

Table 40: Population size (source: IDP, 2016/17)

Demographic indicators	Stats SA Census 1996	Stats SA Census 2001	Stats SA Census 2011	Share of Nkangala's figure	Share of Mpumalanga's figure	Ranking highest (1) – lowest (18)
Population number	236 040	276 413	395 466	30.2%	9.8%	3
Annual growth rate		1.58	3.58			
Area size (km2)			2 677.67	16.0%	3.5%	13
Population per km2			**148**			

2 Composition

2.1 Gender distribution

Table 41: Gender distribution (source: IDP, 2016/17)

Gender	1996	2001	2011
Males	51.73%	50.91%	52.79%
Females	48.27%	49.09%	47.21%

The above table indicates an increase of males and decrease of females between 2001 and 2011. This is largely due to the nature of industries around the municipal area which tend to be more male oriented.

2.2 Population groups

Table 42: Population age groups (source: IDP, 2016/17)

Population group	1996	2001	2011
% Population (0 – 14 years)	29	28	25
% Population (15 - 64 years)	67	69	71
% Population (65+ years)	4	3	4
% Population (14 - 35 years)	43	42	43
% Persons with disability	5		5

The above table reveal the economical active populations (15-64 years) as represent the highest percentage of 71%.

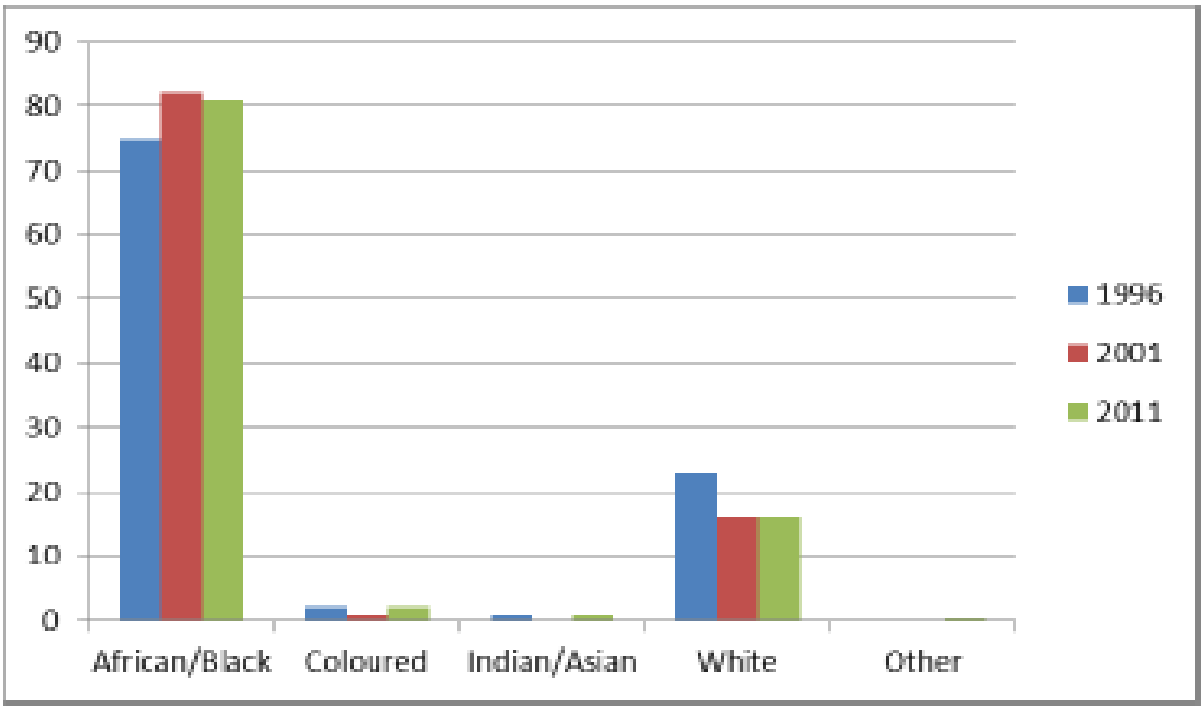

Figure 72: Racial groups (IDP, 2016/17)

Emalahleni is composed of all racial groups with 321,668 Black African, Coloured 6 717, Indian or Asian 3562, White and Other 1, 626. The table above shows that in 2001 and 2011 there was slight decrease of Africans and a slight increase of Coloureds, with the white population group remaining the same. African/Blacks are 81, 3%, 0, 9% Asians, 1, 7% Coloured, 15, 7% Whites and 0, 4% Others.

3 Economic indicators

The Emalahleni Local Municipality is expected to record a GDP growth of 3.3% per annum over the period 2011-2016. The historic growth rate is 2.8% per annum for the period 1996-2011. Emalahleni contributed 17.9% to the provincial economy in 2011. GVA in 2011 was R40.5 billion at current prices and R19.9 billion at constant 2005 prices, which is third largest economy in the province.

4 Labour indicators

Unemployment rate in Emalahleni decreased since 2001. The below table show the unemployment rate of 27.3% (strict definition) in 2011 – 52 114 unemployed as a percentage of the economically active population of 190 662 – decreasing trend.

Table 43: Labour indicators (source: IDP, 2016/17)

Labour indicators	Census 2001	Census 2011	Share of Nkangala's figure	Ranking: Best (1) – worst (18)
Working group	190 882	238 768		
Economically active population / labour force	124 371	190 662		
Number of employed	76 668	138 548	39.0%	
Number of unemployed	47 703	52 114	34.2%	
Unemployment rate (%)	38.4%	27.3%		8

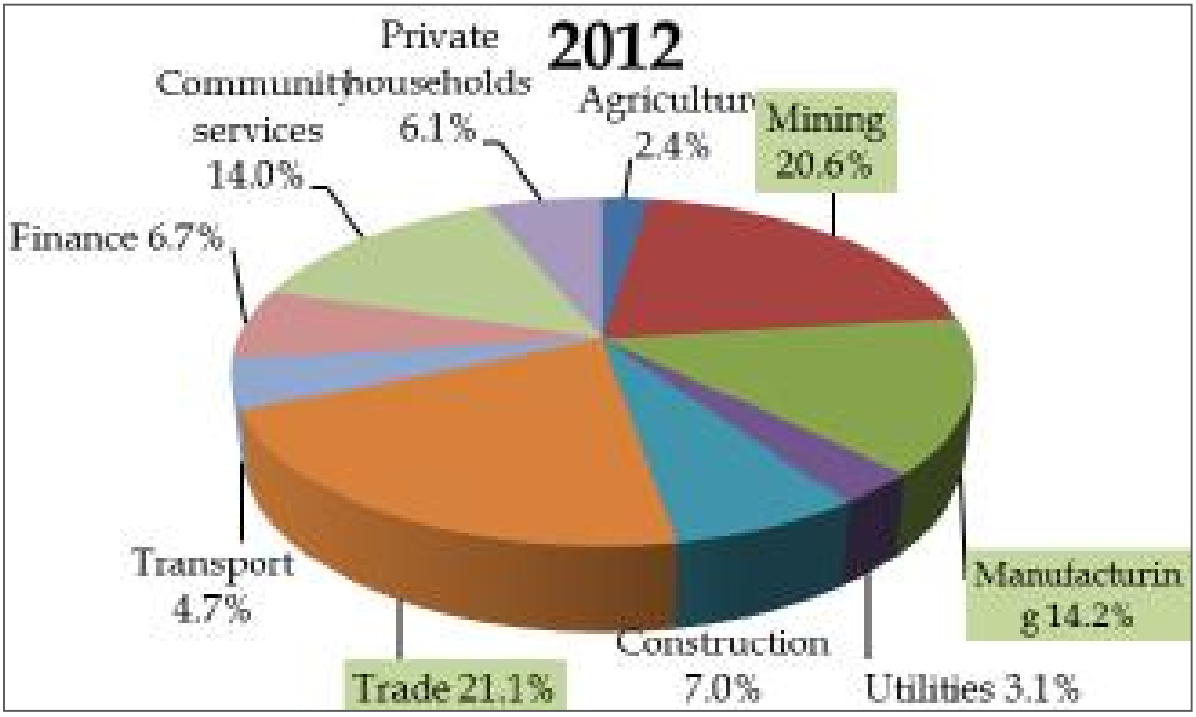

Figure 73: Industries (IDP, 2016/17)

The leading industry in terms of employment is trade with 21.1%, followed by mining 20.6% and manufacturing 14.2%. Since 2001 there has been an increasing role/share of mining, construction, community services and finance as employer and a decrease in the role/share of trade, manufacturing, transport, agriculture, private households and utility.

5 Education indicators

Table 44: Education indicators (source: IDP, 2016/17)

Labour indicators	Census 2001	Census 2011	Better (+) or worse (-) than Nkangala	Better (+) or worse (-) than Province	Ranking: Best (1) – worst (18)
Number of people 20+ with no schooling	24 908	14 993			11

Labour indicators	Census 2001	Census 2011	Better (+) or worse (-) than Nkangala	Better (+) or worse (-) than Province	Ranking: Best (1) – worst (18)
Population 20+ with no schooling (%)	14.5%	5.8%	(+)(11.5%)	(+)(14.1%)	1
Population 20+ with matric and higher (%)	31.9%	45.3%	(+)(39.7%)	(+)(38.7%)	3
Functional literacy rate (%)	73.9%	86.0%	(+)(79.0%)	(+)(76.9%)	1

6 Household profile and services

Table 45 below indicates an increase in the number of households in Emalahleni since 1996 and 2011. The ownership on houses is decreasing since 1996. The decrease in percentage of ownership implies that the Emalahleni people prefer buying houses in other areas. In terms of 2011 statistics there are 38 519 owned and fully paid houses, 15 798 owned but not yet paid off, 22 874 occupied rent-free and rented is 39 463.

Table 45: Household trends (source: IDP, 2016/17)

	1996	2001	2011
Number of households	56 349	82 298	119 874
Annual growth rate of households (%)		3.79	3.76
Average household size	4.01	3.22	3.25
% Ownership (houses)	75	55	45

Table 46: Basic Service Infrastructure Indicators (source: IDP, 2016/17)

Basic Service Infrastructure indicators	Census 2001	Census 2011	Better (+) or worse (-) than Nkangala	Better (+) or worse (-) than Province	Ranking: Best (1) – worst (18)
% of households in informal dwellings	26.0%	19.3%	(-) (13.8%)	(-) (10.9%)	14
% households with no toilets	8.0%	3.1%	(+) (3.8%)	(+) (7.2%)	3
% households with connection to piped (tap) water: on site and off site	93.8%	94.8%	(+) (92.7%)	(+) (87.4%)	8
% households with electricity for lighting	70.3%	73.4%	(-) (85.7%)	(-) (86.4%)	17
% households with weekly municipal refuse removal	64.2%	67.2%	(+) (48.3%)	(+) (42.4%)	7

8.4.2 Description of the current land uses

8.4.2.1 Klippan co-disposal facility and project development area

Early topo-cadastral maps indicate that the pre-mining (1960s) land use was agricultural. There is evidence of previous grazing on a number of blocks, as shown by the presence of *Stoebe vulgaris*, which is an indicator of excessive grazing pressure. Invasive wattle and eucalyptus trees were present in the area, and large stands of wattle have been removed as part of the colliery land management strategy.

The Khwezela Bokgoni processing plant and associated infrastructure was commissioned in 1979, and consists of a tip, stockpiles, processing plant and overland conveyors. Mining infrastructure consists of open pits, offices, a sewage plant, workshops, water reticulation pipelines, overhead powerlines and service roads. Refer to the site plan (Figure 3) for a visual representation of the mining infrastructure on-site as well as the proposed (authorised ACWA Power – Khanyisa power plant project) infrastructure, in relation to the proposed Khanyisa IPP Coal Supply infrastructure.

A section of the land associated with the proposed routes for the coal conveyor and associated road and substation is occupied by a wetland system (refer to Chapter H) a portion of cultivated land (located within the Greenside Colliery Mining Rights Area). The section associated with the proposed location of the discard disposal area is considered disturbed land ('alien invasive vegetation' as per Figure 28, and forms part of the authorised footprint area of the Klippan Co-disposal Facility – earmarked for discard disposal. The DHRP site location is also characterised as 'disturbed land'. Further to the south-western corner of the Khwezela Bokgoni Mining Rights Area, there is an area forming part of an Optimal Critical Biodiversity Area (see Figure 60).

Four different land capability classes are used by the coal mining industry in South Africa, namely Arable Land, Grazing Land, Wetland and Wilderness. The pre-mining and post-mining land capabilities for Khwezela Bokgoni Colliery are shown in Figures 74 and 75 below.

The land capability map as sourced from the report titled: "*Khanyisa Power Station and Power Line Routing, Environmental Assessment Programme – Specialist Soils and Land Capability Studies*", dated September 2011 and compiled by Earth Science Solutions, is provided in Figure 76 below.

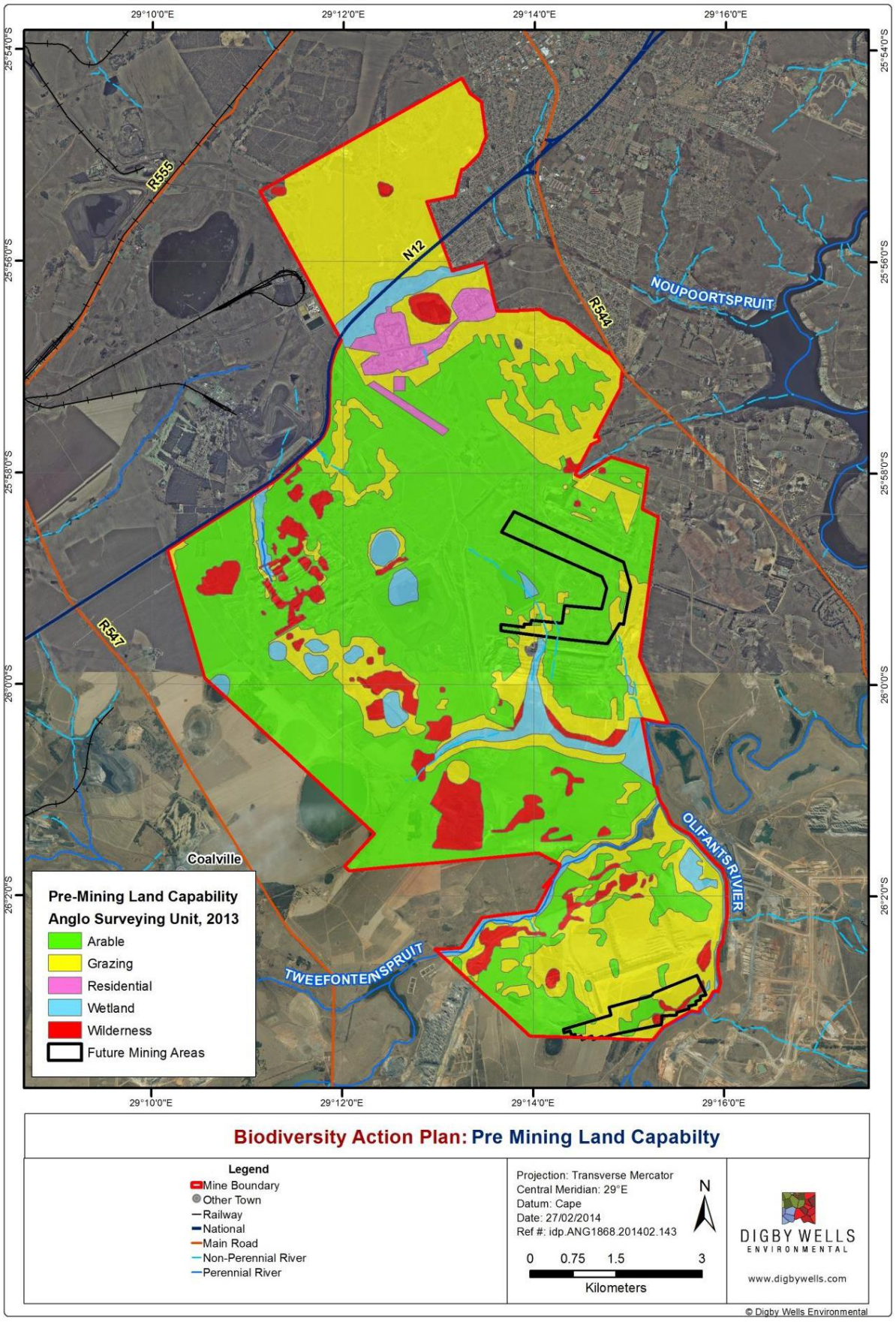

Figure 74: Khwezela Bokgoni Pre-mining land capability (Digby Wells, 2014)

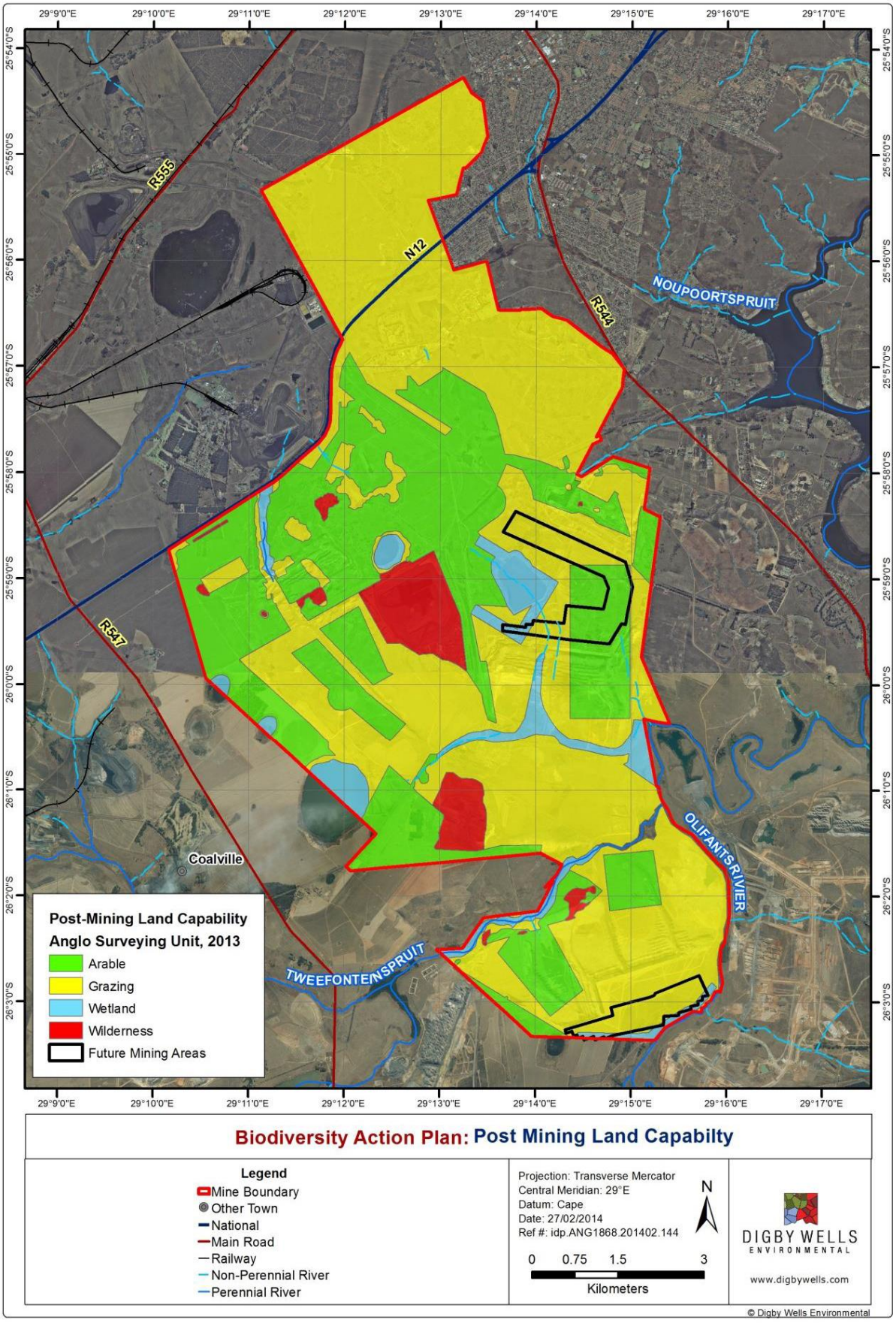

Figure 75: Khwezela Bokgoni Post-mining land capability (Digby Wells, 2014)

Figure 76: Land Capability Plan – Khanyisa IPP Power Station Site and Ash Dump (Earth Science Solutions, 2011)

8.4.2.2 Blaauwkrans co-disposal facility and surrounds

The pre-mining land uses were identified and described in the report titled, "S*oil, land capability and land use assessment of proposed opencast mining areas as well the footprints of various proposed mining infrastructure related to the Landau Colliery Life Extension Project*," by Rehab Green, dated February 2014.

Land within the Khwezela North area (specifically the proposed Life Expansion areas) is mainly used for grazing (79.8%), with only 9.26% of the area currently being cultivated with maize. The Blaauwkrans Co-disposal facility, and some existing excavated areas and dams form a small percentage of the current land use within the project area. Refer to Figure 77 below.

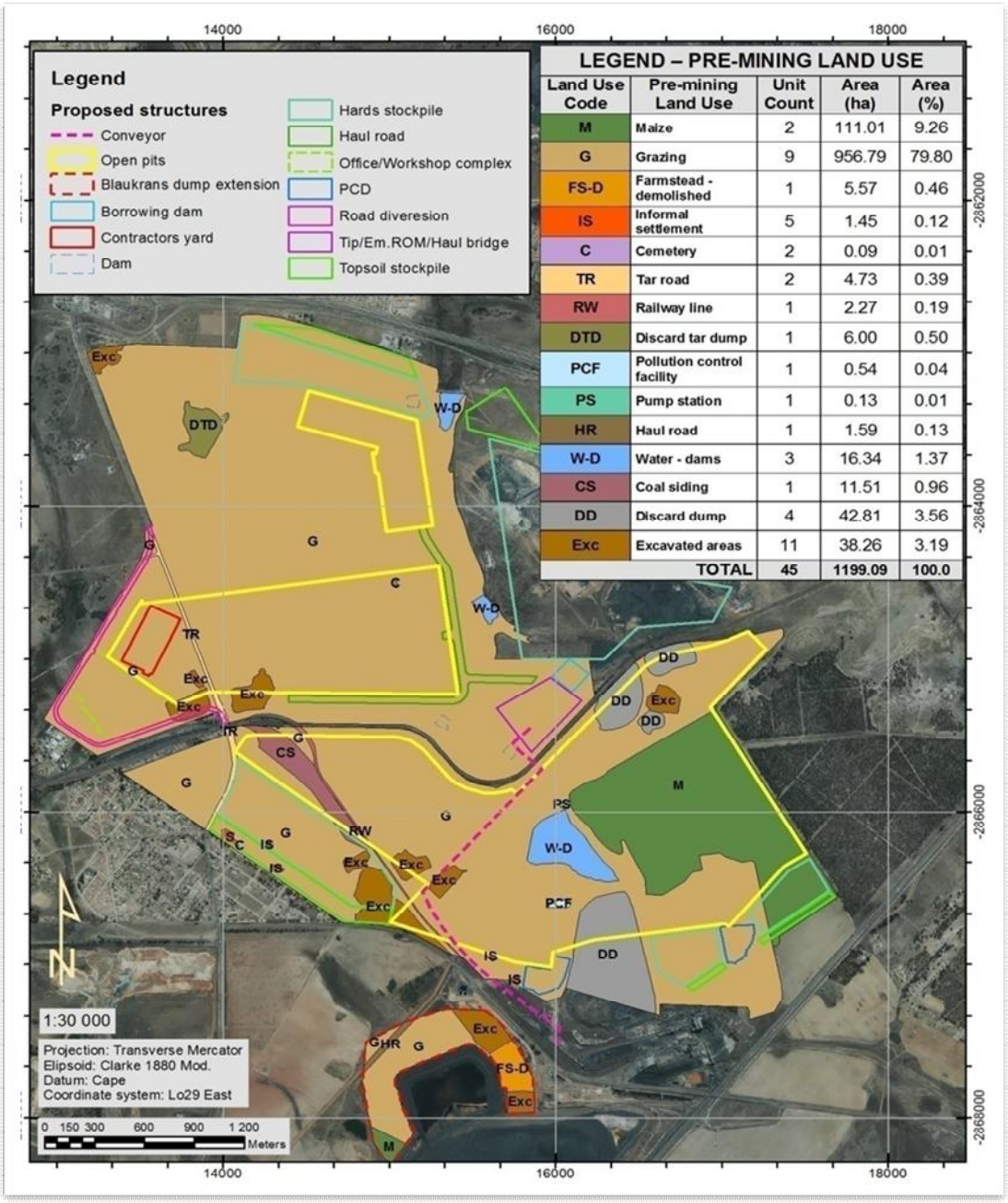

Figure 77: Land Use map - Khwezela North Life Expansion Project Area – Including the existing Blaauwkrans Co-disposal Facility (Rehab Green, 2014)

The agricultural land use was ± 70 ha cultivated land, before commencement of the construction of the Blaauwkrans Co-disposal facility (Clean Stream Environmental Consultants, 2010). Table 47 below indicates the pre-mining land capability for the area associated with the Navigation Beneficiation Plant and Blaauwkrans Co-disposal facility.

Table 47: Pre-mining land capability for the area associated with the Navigation Beneficiation Plant and Blaauwkrans Co-disposal facility

Land Capability	Area	
	Hectares	% of Total
Cultivated land (maize)	70	66
Pasture / unused land / playing field	25	22
Labourer's dwellings	15	12
Roads, etc.	4	0
Total	**114**	**100**

The high potential soils (including the residential area) occupied ± 75 % of the area, the remaining area being suitable for pasture.

8.4.3 Description of specific environmental features and infrastructure on the site

Refer to Sections 8.4.1 and 8.4.2 above.

8.4.4 Environmental and current land use map

Figure 60 above presents the specific environmental features in relation to the Coal Supply Project Area. Refer also to Sections 8.4.1 and 8.4.2 above.

8.5 Impacts identified

Table 48 below contains preliminary potential impacts that have been identified for the activities described in the final site layout plan. A detailed risk assessment will be undertaken as part of the EIA and EMP Phase, in which the duration, probability, magnitude and reversibility of the impacts will be determined and the significance of the impact calculated. Potential cumulative impacts have also been determined and are presented in Table 49 below.

Table 48: Preliminary determination of potential impacts

Environmental component (Aspects affected)	Activity	Potential Impact description[84]
Geology	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility	No additional impact will occur on geology as a result of the reclamation of the co-disposal facilities.
Topography	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Site clearance activities • DHRP • Coal product stockpiling • PCD • Water management measures • Coal conveyor • Roads • Discard disposal site • Borrow pit(s) • Removal of infrastructure and rehabilitation	The establishment of infrastructure may influence the topography.
		The reclamation of Klippan Co-disposal Facility will result in a positive impact in terms of topography (sense of place and visual aspects)
		The continuation of disposal of residue within the existing footprint of the Klippan Co-Disposal Facility will continue to influence the nature of the topography that is typical of the surrounding area.
		As part of rehabilitation the area will be top-soiled, the area re-vegetated and shaped to be free draining. Reclamation of the co-disposal facilities will assist with the improvement of the topography.

[84] Impacts will be split (in the EIAR / EMPr detailed Risk Assessment) between the various Mining Rights Areas wherein activities will take place

Environmental component (Aspects affected)	Activity	Potential Impact description[84]
Soil, land use and land capability	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Transportation of discard coal from Blaauwkrans Co-disposal Facility • Site clearance activities • DHRP • Coal product stockpiling • PCD • Water management measures • Dust suppression • Coal Transfer Station • Coal conveyor • Roads • Powerlines and associated infrastructure • Discard disposal site • Borrow pit(s) • Removal of infrastructure and rehabilitation	The removal of topsoil may result in the mixing of the horizons of the soil which will have an impact on the fertility and production potential of the soil.
		The temporary stockpiling of topsoil may result in a decrease in the fertility of the soil and the leaching of minerals due to exposure of the soil to elements.
		A loss of microbes and viable seed may occur as a result of the temporary stockpiling of topsoil.
		Soil compaction and topsoil loss through erosion may occur as a result of the mining and mining related activities (including the temporary stockpiling). This will further lead to a loss of soil fertility.
		The construction of the PCD may impact on soil in terms of compaction and possible spillages from machinery, as well as possible overflows.
		The ineffective control and management of sewage and water management measures may have an impact on soil, if incorrectly handled.
		The ineffective handling of hydrocarbon spillages may lead to the contamination of soil, surface water and groundwater resources.
		Ineffective erosion control along roads may lead to siltation of downstream water resources and scouring of soil.
		Leakage of hydrocarbons from trucks may lead to soil contamination
		Inadequate waste management may lead to soil contamination.
		Spillages from the coal conveyor may lead to soil contamination.
		The construction activities will leave the area exposed (cleared of vegetation), which may lead to erosion.
		The project areas will continue to be used as part of “mining and related activities” for the life of the project, where after only the land use and land capability can be returned / changed to the agreed end land use.
Surface water	• Reclamation of Klippan Co-disposal Facility • Reclamation of	Due to the proximity of the proposed project area(s) to the identified wetland systems, surface water quality of such resources may be impacted upon.

Environmental component (Aspects affected)	Activity	Potential Impact description[84]
	Blaauwkrans Co-disposal Facility • Site clearance activities • DHRP • Coal product stockpiling • PCD • Water management measures • Dust suppression • Coal Transfer Station • Coal conveyor • Roads • Powerlines and associated infrastructure • Discard disposal site • Borrow pit(s) • Removal of infrastructure and rehabilitation	In the event of chemical or hydrocarbon spillages on soil, surface water runoff which comes into contact with the soil may become contaminated and enter the receiving environment and / or water resources. This will have an impact on, not only the surface water quality, but the aquatic vegetation, animal life and any other downstream water users.
		Surface water contamination may occur should the separation of clean- and dirty water management areas not be effectively implemented.
		The construction activities will leave the area exposed (cleared of vegetation), which may lead to compaction and a change in surface water flow patterns.
		Potential overflows from the PCD / water or sewage reticulation system may result in surface water impacts.
Groundwater	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • DHRP • Coal product stockpiling • PCD • Water management measures • Dust suppression • Coal Transfer Station • Coal conveyor • Roads • Discard disposal site • Removal of infrastructure and rehabilitation	The reclamation of the co-disposal facilities may result in a positive impact in terms of the groundwater regime and the current impacts on groundwater in the area.
		Potential seepage of water to the groundwater regime as a result of coal stockpiling, discard disposal and the use of the PCD may contaminate groundwater resources.
		Groundwater quality may be impacted in the event of a spillage of chemicals or hydrocarbon materials (e.g. oil spill from vehicles and machinery).

Environmental component (Aspects affected)	Activity	Potential Impact description[84]
Vegetation	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor • Roads • Powerline • Discard disposal site • Removal of infrastructure and rehabilitation	The vegetation on the areas associated with development of infrastructure will be impacted on by the stripping and clearing of vegetation. However, the largest part of the project areas is considered disturbed area, with large stands of alien invasive vegetation.
		Dust generation may have an indirect impact on vegetation.
		Declared alien and invasive plant species may establish in disturbed areas, if not controlled properly.
Fauna	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Transportation of discard coal from Blaauwkrans Co-disposal Facility • Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Roads • Powerlines • Discard disposal site • Removal of infrastructure and rehabilitation	Noise generated by the proposed activities may frighten animals which may lead to injuries, deaths as well as the animals migrating away from the site.
		The animal life in the area has already been impacted upon by mining activities; however, the removal of vegetation may decrease the size of the habitat available for animal life in certain portions of the properties.
		Any poaching, killing or snaring of animals will have a negative impact on animal life. It will result in migration of these species but the lack of suitable habitat in the surrounding areas may further contribute to loss of animal life.
		Veld fires can be a risk to fauna and flora as well as the community (including adjacent landowners and employees).
		Animal deaths may occur should they be struck by haul vehicles, due to the hauling activities.
		Habitat fragmentation may occur as a result of linear infrastructure (conveyor, roads etc.), if not managed appropriately.

Environmental component (Aspects affected)	Activity	Potential Impact description[84]
Wetlands	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Pipelines and water management measures • Roads • Powerlines • Discard disposal site • Removal of infrastructure and rehabilitation	The project site will be undertaken within the area that falls within wetland systems or within their buffer areas. The wetlands may therefore be impacted upon. Potential impacts to be taken into account include: • Loss and disturbance of wetland habitat (including possible diatom and invertebrate communities) and fringe vegetation. • Introduction and spread of alien invasive vegetation. • Changes in the amount of sediment entering the system. • Changes in water quality due to toxic contaminants and increased nutrient levels entering the system. • Changes in water flow regime due to the alteration of surface characteristics.
Sites of archaeological and cultural importance	• Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Pipelines and water management measures • Roads • Powerlines • Discard disposal site • Removal of infrastructure and rehabilitation	Some activities undertaken in close proximity to identified heritage sites may have some impact on such sites, if not appropriately managed.

Environmental component (Aspects affected)	Activity	Potential Impact description[84]
Air quality	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Pipelines and water management measures • Roads • Dust suppression • Powerlines • Discard disposal site • Removal of infrastructure and rehabilitation	During the reclamation activities, tipping activities, crushing, stockpiling, discard disposal, site clearance activities, and transport of the material as well as rehabilitation activities, dust (particulate matter, PM10 and PM2.5) may be generated which may have an impact on the ambient air quality of the area.
		All vehicles and mining machinery may have an impact on the air quality of the surrounding area as a result of the emissions released by the vehicles and machinery.
		The climate change impact potential will be investigated further during the EIA Phase.
Noise	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Roads • Discard disposal site • Removal of infrastructure and rehabilitation	The reclamation activities, tipping activities, crushing, site clearance activities, and transport of the material as well as rehabilitation activities, will produce noise which may impact on the surrounding landowners / communities.

Environmental component (Aspects affected)	Activity	Potential Impact description[84]
Visual	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Roads • Discard disposal site • Removal of infrastructure and rehabilitation	The proposed activities may be intrusive, in terms of visual aspects, which may result in a change of sense of place to the local community and tourist passing through the area. It is however important to note that mining activities are currently taking place at Khwezela- and Greenside Collieries. Therefore, it is likely that regular passers-by and the local residents are desensitised to the mining activities.
Socio-economic	• Coal Supply Project	The proposed project will create job security, along with the implementation of other socio-economic responsibilities.
		The project will hinder the opportunity to utilise the proposed sites for other land use activities for the duration of the operational phase, until such a time as the land has been rehabilitated.
		Some indirect impacts on surrounding communities / landowners may occur as a result of dust generation, noise, visual aspects etc.
	• Closure	During closure, a loss of jobs will occur which may not only impact on the employees but on the socio-economic status of the local community and economy.

Table 49: Preliminary identification of potential cumulative impacts

Environmental component (Aspects affected)	Activity	Potential Impact description
Topography, Land use and visual aspects	• Khanyisa IPP, Coal Supply and all mining activities conducted in a	The project site(s) are located in a region where opencast coal mining and electricity generation infrastructure is common place. The large number of opencast coal mines

Environmental component (Aspects affected)	Activity	Potential Impact description
	regional context.	and power stations in the region, together with the historical nature of the mining in the Emalahleni region (over 100 years of mining history) will most likely have desensitised local residents and frequent travellers through the area.
Soil, land capability, Socio-economic conditions	• Khanyisa IPP, Coal Supply and all mining activities conducted in a regional context.	Agriculture is one of the largest economic sectors in Mpumalanga. The number of opencast mines in Mpumalanga, particularly large operations, has led to a significant loss of high agricultural potential soils that would otherwise continue to be capable of supporting crop cultivation. Loss of high potential agricultural land due to opencast mining activities in the area will reduce the food production capability of the region. In addition, large areas of the surface have been affected by agriculture and opencast mining, which has led to loss of soil structure and function, and ultimately to loss of biodiversity due to the transformation and fragmentation of natural habitats and ecosystems.
Surface and groundwater	• Khanyisa IPP, Coal Supply and all mining activities conducted in a regional context.	The bulk (65%) of water resources available in Mpumalanga comes from surface water resources, water transfers into the province provide 19% of total water availability, groundwater contributes 6% of available water and return flows from mining, industrial, irrigation and urban sectors contribute 10%. Water quality indicators have shown a general decrease in water quality over time. Median levels of surface water nutrients have increased and indicate a potential for enrichment. The consequences of these elevated levels are: A greater potential for algal blooms; an impact on riverine ecosystems; and impairment of human health. High (and increasing) TDS levels in the Olifants Water Management Area (WMA) have the potential for decreasing the aesthetic value of the water. Exceedance of the guideline levels for certain metals in the Olifants WMA may be attributed to the numerous industrial and

Environmental component (Aspects affected)	Activity	Potential Impact description
		mining activities taking place in that area. At the WMA scale, high exceedance above water quality guideline levels exist for pH levels in the province. Groundwater is used for irrigation and domestic consumption in the surrounding agricultural region. Groundwater levels are drawn down at all operational mines in the region, leading to an overall impact on groundwater levels but have also lead to a complicated flow of groundwater between mines. The IPP and Coal Supply Projects may contribute to a cumulative impact in terms of water quality and quantity in the region. In terms of separation of clean and dirty water, a cumulative aspect (if not mitigated and managed appropriately) will be the storm water management related to the Khanyisa IPP Coal Supply Project along with the other mining and related activities surrounding the project area.
Biodiversity and Sensitive landscapes	• Khanyisa IPP, Coal Supply and all mining activities conducted in a regional context.	The establishment and spreading of alien invasive plant species could impact cumulatively in terms of the loss of natural vegetation in the area. From a sensitive landscape perspective, a cumulative impact may occur with regards to the identified wetland area located in close proximity to the project area (when taking the Khwezela Bokgoni activities at Pit 2A into account as well).
Air quality	• Khanyisa IPP, Coal Supply and all mining activities conducted in a regional context.	Air quality is an issue of concern in Mpumalanga, as it is in many other parts of South Africa. A wide variety of air pollution exist in Mpumalanga, ranging from veld fires to industrial processes, agriculture, mining activities, power generation, paper and pulp processing, vehicle use and domestic use of fossil fuels. The project site also falls within a priority area.
Noise	• Khanyisa IPP, Coal Supply and all mining	Noise generated by mining activities is related to blasting and use of equipment and vehicles. However, noise is

Environmental component (Aspects affected)	Activity	Potential Impact description
	activities conducted in a regional context.	directional, and dissipates with distance. The spatial distribution of mines and related operations in the region reduces noise impacts inherently. However, when the noise is generated near residential areas, the location of the I&APs within the noise transmission paths together with the actual generation of noise cumulatively increases the significance of the impact.
Traffic	• Khanyisa IPP, Coal Supply and all mining activities conducted in a regional context	Possible cumulative impacts may arise from the proposed Khanyisa IPP Coal Supply Project along with current traffic related impacts within the region.
Socio-economic	• Khanyisa IPP, Coal Supply and all mining activities conducted in a regional context	Job security along with other socio-economic benefits will contribute cumulatively towards the well-being of the local municipality's residents and communities.
		Cessation of the project along with the Closure of the mines within the area, may result in a significant negative socio-economic impact on the region's communities.

8.6 Methodology used in determining the significance of environmental impacts

8.6.1 Methodology to be applied during the EIA and EMP phase

The environmental risk of any aspect is determined by a combination of parameters associated with the impact. Each parameter connects the physical characteristics of an impact to a quantifiable value to rate the environmental risk.

Impact assessments should be conducted based on a methodology that includes the following:

- Clear processes for impact identification, predication and evaluation;
- Specification of the impact identification techniques;
- Criteria to evaluate the significance of impacts;
- Design of mitigation measures to lessen impacts;
- Definition of the different types of impacts (indirect, direct or cumulative); and
- Specification of uncertainties.

After all impacts have been identified, the nature and scale of each impact can be predicted. The impact prediction will take into account physical, biological, socio-economic and cultural information and will then estimate the likely parameters and characteristics of the impacts. The impact prediction

will aim to provide a basis from which the significance of each impact can be determined and appropriate mitigation measures can be developed.

The risk assessment methodology is based on defining and understanding the three basic components of the risk, i.e. the source of the risk, the pathway and the target that experiences the risk (receptor). Refer to Figure 78 below for a model representing the above principle (as contained in the DWA's Best Practice Guideline: G4 – Impact Prediction.

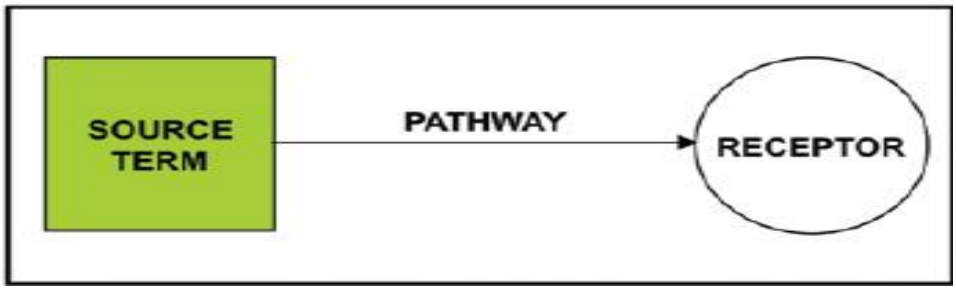

Figure 78: Impact prediction model

Table 50 and Table 51 below indicate the methodology to be used in order to assess the Probability and Magnitude of the impact, respectively, and Table 52 provides the Risk Matrix that will be used to plot the Probability against the Magnitude in order to determine the Severity of the impact.

Table 50: Determination of Probability of impact

SCORE	FREQUENCY OF ASPECT / UNWANTED EVENT	AVAILABILITY OF PATHWAY FROM THE SOURCE TO THE RECEPTOR	AVAILABILITY OF RECEPTOR
1	Never known to have happened, but may happen	A pathway to allow for the impact to occur is never available	The receptor is never available
2	Known to happen in industry	A pathway to allow for the impact to occur is almost never available	The receptor is almost never available
3	< once a year	A pathway to allow for the impact to occur is sometimes available	The receptor is sometimes available
4	Once per year to up to once per month	A pathway to allow for the impact to occur is almost always available	The receptor is almost always available
5	Once a month - Continuous	A pathway to allow for the impact to occur is always available	The receptor is always available

***Step 1**: Determine the **PROBABILITY** of the impact by calculating the average between the Frequency of the Aspect, the Availability of a pathway to the receptor and the availability of the receptor.*

Table 51: Determination of Magnitude of impact

Score	SOURCE				RECEPTOR	
	Duration of impact	**Extent**	**Volume / Quantity / Intensity**	**Toxicity / Destruction Effect**	**Reversibility**	**Sensitivity of environmental component**
1	Lasting days to a month	Effect limited to the site. (metres);	Very small quantities / volumes / intensity (e.g. < 50L or < 1Ha)	Non-toxic (e.g. water) / Very low potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes will remain unaltered.	Current environmental component(s) are largely disturbed from the natural state. Receptor of low significance / sensitivity
2	Lasting 1 month to 1 year	Effect limited to the activity and its immediate surroundings. (tens of metres)	Small quantities / volumes / intensity (e.g. 50L to 210L or 1Ha to 5Ha)	Slightly toxic / Harmful (e.g. diluted brine) / Low potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes might be negligibly altered or enhanced / Still reversible	Current environmental component(s) are moderately disturbed from the natural state. No environmentally sensitive components.
3	Lasting 1 – 5 years	Impacts on extended area beyond site boundary (hundreds of metres)	Moderate quantities / volumes / intensity (e.g. > 210 L < 5000L or 5 – 8Ha)	Moderately toxic (e.g. slimes) Potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes might be notably altered or enhanced / Partially reversible	Current environmental component(s) are a mix of disturbed and undisturbed areas. Area with some environmental sensitivity (scarce / valuable environment etc.).
4	Lasting 5 years to Life of Organisation	Impact on local scale / adjacent sites (km's)	Very large quantities / volumes / intensity (e.g. 5000 L – 10 000L or 8Ha– 12Ha)	Toxic (e.g. diesel & Sodium Hydroxide)	Bio-physical and/or social functions and/or processes might be considerably altered or enhanced / potentially irreversible	Current environmental component(s) are in a natural state. Environmentally sensitive environment / receptor (endangered species / habitats etc.).
5	Beyond life of Organisation / Permanent impacts	Extends widely (nationally or globally)	Very large quantities / volumes / intensity (e.g. > 10 000 L or > 12Ha)	Highly toxic (e.g. arsenic or TCE)	Bio-physical and/or social functions and/or processes might be severely/substantially altered or enhanced / Irreversible	Current environmental component(s) are in a pristine natural state. Highly Sensitive area (endangered species, protected habitats etc.)

***Step 2**: Determine the **MAGNITUDE** of the impact by calculating the average of the factors above.*

Table 52: Determination of Severity of impact

ENVIRONMENTAL IMPACT RATING / PRIORITY					
	MAGNITUDE				
PROBABILITY	**1 Minor**	**2 Low**	**3 Medium**	**4 High**	**5 Major**
5 Almost Certain	Low	Medium	High	High	High
4 Likely	Low	Medium	High	High	High
3 Possible	Low	Medium	Medium	High	High
2 Unlikely	Low	Low	Medium	Medium	High
1 Rare	Low	Low	Low	Medium	Medium

***Step 3**: Determine the **SEVERITY** of the impact by plotting the averages that were obtained above for Probability and Magnitude.*

8.6.2 Methodology to be applied by the specialists

The methodology that will be applied in determining the significance of the impacts is described in Tables 50 to 52 (i.e. the same methodology as applied by the EAP will be applied by the specialists, as far as possible). The wetland risk assessment will be done in accordance with the methodologies set out in GN R509.

8.6.3 Knowledge gaps, assumptions and limitations

The knowledge gaps, assumptions and limitation that were identified are described below:

- Specialist studies that have been identified and will be conducted during the EIA phase, include:
  - A wetland risk assessment in terms of GN R509;
  - A geohydrological risk assessment and geochemical / waste characterisation;
  - Hydrological assessment (storm water management plan);
  - Air quality impact assessment;
  - Climate change impact assessment; and
  - Traffic impact assessment.
- Detailed designs and layout plans for infrastructure associated with the project will be included in the EIAR / EMPr.
- Geotechnical Investigations will be undertaken by the applicant during the EIA Phase.
- A Closure Plan, Rehabilitation Plan and Closure cost calculations for the project specific infrastructure and activities will be compiled in terms of GN R1147.

Possibility for a change in the initial site layout

As mentioned above, a number of further specialist studies are to conducted for the proposed project during the EIA phase. Furthermore, although various alternatives have been identified during the scoping process, project alternatives will be further assessed during the EIA process, and such alternatives will also be investigated by the EAP and relevant specialists from an environmental perspective.

Therefore, there is a possibility that the initial site layout (as included in Figure 3 in this Scoping Report) may change, based on information obtained through the conducting of specialist studies as well as the alternatives assessment process. The final site layout plan will be included in the EIAR / EMPr.

8.7 Positive and negatives that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and community affected.

A full description on the positive and negative implications of both the proposed activities and the alternatives has been provided as part of the Alternative Assessment Report attached hereto as Annexure D. The positive and negative implication of the proposed activity and the alternatives identified have however also been provided below. Refer also to Part 8.1 of this Scoping Report.

Table 53: Advantage and disadvantages of the proposed activities and alternatives

Alternative		Advantages	Disadvantages
Activity alternatives (re-mining method alternatives)	**Alternative MM1:** Mechanical Load & Haul with mobile equipment	• Initial CAPEX required for Alternative 1 is more favourable	• Some challenges if co-disposal facility is not dry enough. However, mitigation possible. It is anticipated that the slurry section would have dried out after completion of the first phase of the mine plan. • Lesser safety advantages than Alternative 3. Appropriate mitigation required. • OPEX for Alternative 1 for the life of the project - less favourable
	Alternative MM2: A combination of mechanical Load & Haul and hydraulic re-mining	• Combination of initial CAPEX and OPEX over the life of the project	• Lesser safety advantages than Alternative 3. Appropriate mitigation required.
	Alternative MM3: Truckless re-mining and transport method	• Reduced carbon footprint • Safety advantages • OPEX for Alternative 3 for the life of the project - more favourable	• Lower reliability and mechanical availability due to all parts of the system working in series • Will also be problematic to re-mine the fines in the slurry pond from approximately month 73 onwards (after most of the coarse discard has been mined) unless the fines have dried out completely. • Initial CAPEX required for Alternative 3 is higher
Scheduling alternatives: Klippan Co-disposal Facility Mine plan	**Alternative SC_KP_1:** Mining the entire dump in 2 Phases.	• Practical in execution • Pond section can dry up sufficiently before Phase 2 commences • Considering that fines will be reclaimed at an average rate of 150 000 tpa or in layers of approx. 0.25 – 0.4 m deep over the entire area of the pond, the	• During Phase 2, the feed requirements of the DHRP (Coarse versus Fines ROM material), could mean that the walls of the slurry pond will be mined faster than the slurry pond level, which in turn could lead to a safety risk.

Alternative		Advantages	Disadvantages
		wetness and stability of the slurry pond, should therefore not be a problem for reclamation purposes.	
	Alternative SC_KP_2: Re-claiming the entire dump right from the start in layers of 3m (or less) at a time, including fines and coarse material as the dump is mined away	• Practical in execution • Produce re-claimed fines from the slurry pond in fairly large tonnage quantities within a few months of the operation starting up	• The reclamation around the slurry pond to be the same as for Alternative 1 above – in terms of dealing with excessive rainfall and safety aspects. • It would be impossible to reclaim the fines material immediately over the entire surface area of the slurry pond via a Load & Haul operation involving mobile equipment (excavators and trucks) as the centre of the pond will be very wet
Scheduling alternatives: Blaauwkrans Co-disposal Facility Mine plan	**Alternative SC_BK_1:** Re-claiming the entire dump right from the start in layers of 3m (or less) at a time, including fines and coarse material as the dump is mined away	• Practical in execution • Produce re-claimed fines from the slurry pond in fairly large tonnage quantities within a few months of the operation starting up	• Safety aspects and excessive rainfall to be considered when reclaiming around the slurry pond
	Alternative SC_BK_1: Re-claiming the dump in layers of 3m (or less) at a time, including fines and coarse material as the dump is mined away but leaving the yellow boy area in tact	• Yellow boy area to be utilise for stockpiling oversize material	• The entire dump will not be reclaimed
Design / layout alternatives: (Tip Points)	**Alternative DL1:** Design the DHRP with a single tip point	• Initial CAPEX required for Alternative 1 is more favourable	• Blaauwkrans feed material cannot be washed due to the acidic nature of the material. A single tip would result in the DHRP being run as a batch operation.
	Alternative DL2: Design the DHRP with 2 tip points, (back tip for KK coarse & KP coarse and side tip for BK coarse & fines and KP fines)	• DHRP can operate on continuous basis	• More CAPEX intensive than Alternative 1

Alternative		Advantages	Disadvantages
Borrow Pit Material sourcing alternatives	**Alternative MS1:** Sourcing from DHRP and discard disposal site	• No to very little indigenous vegetation remaining • Large footprint area earmarked for placement of Khanyisa Coal Supply's DHRP and discard handling facility • Thus, also no trucking distance (lesser cost) • Discard disposal facility site forms part of approved Klippan Co-disposal Facility's authorised footprint area • Initial CAPEX required for Alternative 1 & 2 is more favourable	• Contaminating potential of material to be determined.
	Alternative MS2: Sourcing from area to the east of the Return Water Dams	• Stockpiled road building material earmarked for use by Khwezela Bokgoni. Possibility for this material to be used for Khanyisa Coal Supply construction purpose as well. • Initial CAPEX required for Alternative 1 & 2 is more favourable	• Contaminating potential of material unknown. Needs to be determined through characterisation.
	Alternative MS3: Sourcing from combination of S1 and S2 aboove	• Refer to advantages above	• Refer to disadvantages above
	Alternative MS4: Sourcing from external site(s)	• Commercially sourced material has better quality control and characterisation	• Higher CAPEX implications than Alternative 1, 2 & 3 • Distances to be travelled with associated risks
Routing alternatives: Coal conveyor and associated road	**Alternative CR1 (Option 1):** Conveyor crosses provincial road in the direction of the Khwezela Bokgoni product conveyor. The conveyor then runs along the product conveyor (same route as the ACWA ash conveyor). At the top it crosses the Khwezela Bokgoni product conveyor and ties into ACWA transfer station.	• In same footprint area as ACWA ash conveyor and Khwezela Bokgoni product conveyor. • Only one crossing over / under re-aligned road (ACWA authorised activity)	• Route runs through wetland area • Intermediate transfer points on conveyor.

Alternative		Advantages	Disadvantages
	Alternative CR2 (Option 2): The conveyor follows a more direct (straight-line route to the transfer station). The conveyor is curved and does not have any intermediate transfer points.	• Only one crossing over / under re-aligned road (ACWA authorised activity). • No intermediete transfer points	• This option has the longest culvert as it crosses the road at an angle. • Route runs through wetland area • Crosses the proposed discard disposal area, which may impact on discard disposal methods and layout / design for the mentioned area.
	Alternative CR3 (Option 3): Conveyor runs on the western side of the provincial road to the north of Klippan Co-disposal Facility. It then crosses over/under the provincial road to tie-in to the ACWA transfer station.	• Shortest footprint area running through the wetland.	• Two crossings over/ under re-aligned road (ACWA authorised activity). • Crosses the proposed discard disposal area, which may impact on discard disposal methods and layout / design for the mentioned area. • Route runs through a section of the wetland area. • Intermediate transfer points on conveyor.
No-go versus development	**Alternative NGD1:** Development and reclamation	• The reclamation of the co-disposal facilities will result in the facilities being removed from the surface (Klippan in its entirety and a portion of Blaauwkrans Co-disposal Facility). This will also result in associated environmental impacts being reduced and / or eliminated. • Supply of coal discard (fuel) to the authorised Khanyisa IPP. • The development alternative will result in job creation and sustaining livelihoods. Therefore, a positive socio-economic impact.	• A number of environmental impacts may arise as a result of the construction and operational phase activities associated with the project, which would require management and mitigation.
	Alternative NGD2: No-go option	• No additional environmental impacts that may arise as a result of the construction and operational phase	• No job creation and sustaining of livelihoods. • No supply of coal discard (fuel) from the

Alternative		Advantages	Disadvantages
		activities.	coal supply project to the authorised Khanyisa IPP, with potential indirect impacts in terms of electricity supply. • The co-disposal facilities will remain as is, with associated current impacts, and with rehabilitation of the facilities to be done *in situ*.

8.8 Possible mitigation measures that could be applied and the level of risk

Table 54 below provides a summary of the issues and concerns as raised by affected parties and an assessment of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered.

Table 54: Summary of issues and concerns raised by I&APs

This table will be completed once the public review period has ended

Concerns as raised by DWS	Mitigation measures or site alternative

8.9 The outcome of the site selection Matrix. Final Site Layout Plan

As described in Part 8.10 below, no site alternatives for the reclamation activities were considered for the proposed project.

8.10 Motivation where no alternative sites were considered

Khwezela Colliery: Bokgoni and North Sections are existing mining operations. The existing co-disposal facilities from the two mentioned sections will be reclaimed, and thus no location alternatives for the reclamation activities could be considered, due to the locality of the existing facilities. Associated infrastructure, such as the DHRP and proposed discard disposal facility, have been placed in locations within a short distance from the Khanyisa IPP site and Klippan Co-disposal Facility, as possible, also taking into account aspects such as previously disturbed areas, geotechnical aspects, and authorised footprint areas.

8.11 Statement motivating the preferred site

Refer to Part 8.10 above.

9. Plan of study for the Environmental Impact Assessment process.

9.1 Description of alternatives to be considered including the option of not going ahead with the activity

Refer to Sections 8.1 and 8.7 above for a description of the alternatives that have been identified and will be further assessed during the EIA phase.

9.2 Description of the aspects to be assessed as part of the environmental impact assessment process

As Part of the EIA and EMP phase of the project all aspects of the bio-physical, socio-economic and cultural environment will be assessed and include (but is not limited to) the following:

- Geology.
- Topography.
- Soil.
- Land use and land capability.
- Vegetation.
- Fauna.
- Surface water.
- Groundwater.
- Sensitive landscapes (wetlands).
- Visual aspects.
- Noise.
- Air quality and climate change.
- Traffic.
- Sites of cultural and archaeological importance.
- Socio-economic aspects.

9.3 Description of aspects to be assessed by specialists

Specialist studies that have been identified and will be conducted during the EIA phase, include:

- A wetland risk assessment in terms of GN R509;
- A geohydrological assessment and waste characterisation;
- Hydrological assessment (storm water management plan);
- Air quality impact assessment;
- Climate change impact assessment; and
- Traffic impact assessment.

These specialist studies, and their respective reports will be included and discussed in the EIAR / EMPR.

9.4 Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

9.4.1 Proposed method of assessing environmental aspects

As mentioned, a Wetland Risk Assessment, Hydrological Assessment (Storm Water Management Plan), Geohydrological Risk Assessment, Air Quality Impact Assessment, Climate Change Impact Assessment and Traffic Impact Assessment, have been identified during the Scoping Phase (Plan of Study for EIA) and will be conducted for the proposed project during the EIA phase. The methodology that will be applied in determining the significance of the impacts is described in Tables 50 to 52 (i.e. the same methodlogy as applied by the EAP will be applied by the specialists, as far as possible). The Wetland Risk Assessment will be done in accordance with the methodologies set out in GN R509.

Furthermore, existing information in the form of baseline studies and monitoring conducted previously (and on an on-going basis as part of the mine's environmental management systems) as well as studies conducted for the Khanyisa IPP, are available. Relevant information from these sources have been incorporated into Section 8.4.1 of this Scoping Report (as baseline information) and will also be used (in conjunction with the proposed specialist studies) for incorporation into the EIAR.

9.4.2 Proposed method of assessing alternatives

As described previously, no alternative site locations could be considered for the reclamation activities due to the locality of the existing facilities. However, alternatives in terms of mining method, layout and design, scheduling, material sourcing, routing, and the "no-go" options are considered. The proposed method of assessing the alternatives during the EIA Phase has been described in detail in the Alternative Assessment Report attached hereto as Annexure D.

9.5 The proposed method of assessing duration significance

The method used in determining the significance of the duration of the impact is described below in Table 55. Duration is divided into five (5) periods as seen in Table 55. A score of between 1 and 5 is assigned to the impact based on the characteristics of the impact and the period for which the impact will occur and have an impact on the socio-economic, cultural and biphysical environment. The score assigned to the specific impact for duration is then used in dtermining the magnitude of the impact.

Table 55: determination of the duration of an impact

Duration of impact	Score
Lasting days to a month	1
Lasting 1 month to 1 year	2
Lasting 1 – 5 years	3
Lasting 5 years to Life of Organisation	4
Beyond life of Organisation / Permanent impacts	5

9.6 The stages at which the competent authority will be consulted

The competent authority, in this case the Mpumalanga: DMR will be consulted throughout the application process. Prior to the submission of the application form, the DMR was consulted (during a meeting held on 24 February 2017, regarding the proposed activities. The application form was also submitted on 12 April 2017 (refer to Annexure C).

This Scoping Report was compiled and is made available for public and stakeholder review for a period of thirty (30) days. Upon completion of the review period and finalisation of the Scoping Report, this Scoping Report will be submitted to the DMR, whereafter the DMR will have 43 days to refuse environmental authorisation or accept the Scoping Report and inform the aplicant to proceed with the tasks contemplated in the plan of study for the Environmental Impact Assessment (EIA).

The competent authority (the DMR) will further be involved during the EIA phase of the project. The EIAR and EMPr will be made available for a public and stakeholder review period of thirty (30) days. Upon completion of the review period, the EIAR and EMPr will be finalised and submitted to the DMR, whereafter the DMR will have a period of 107 days to consider the application and, in writing, notify the applicant of the decision to grant or refuse environmental authorisation.

9.7 Particulars of the public participation process with regard to the Impact Assessment process that will be conducted

9.7.1 Steps to be taken to notify interested and affected parties.

Steps have already been taken to notify the public of the proposed project during the Scoping Phase. These steps have been described in detaill in the public participation report, attached hereto as Annexure E. The public was notified through the following means:

- Advertisements placed.
- Notification letters and Background Information Documents (BIDs) sent to already registered I&APs and stakeholders.
- Site notices placed at the proposed activity site as well as at other places conspicuous to the public.

- This Scoping Report is made available for public review from 26 April 2017 to 28 May 2017.

9.7.2 Details of the engagement process to be followed.

The notification letters, BID and the newspaper advertisement (mentioned above) present a background to the proposed listed activities, present the location of where this Scoping Report is available for review as well as indicates that all I&APs and stakeholders are invited to peruse the Scoping Report and provide comment within the period provided. Details of where comments should be directed was also provided. This Scoping Report is also made available for public review on the Shangoni Management Services website (www.shangoni.co.za).

I&APs and stakeholders will further be notified during the process of the availability of the EIAR and EMPr for public and stakeholder review by means of notifications (via e-mail and post). The documents will be made available for public review on the Shangoni Management Services website (www.shangoni.co.za). All comments received on the EIAR and EMPr will be incorporated and responded to in the final EIAR and EMPr to be submitted to the DMR.

A public meeting will also be held during the process to provide background of the proposed project and to afford I&APs the opportunity to submit comments and questions. Details with regards to the public meeting will be communicated to I&APs.

9.7.3 Description of the information to be provided to Interested and Affected Parties.

Notification letters, including a BID have been provided to I&APs and stakeholders during the Scoping Phase. As mentioned above, I&APs and stakeholders will further be notified during the process of the availability of the EIAR and EMPr for public and stakeholder review by means of notifications (via e-mail and post). The documents will be made available for public and stakeholder review on the Shangoni Management Services website (www.shangoni.co.za). All comments received on the EIAR and EMPr will be incorporated and responded to in the final EIAR and EMPr to be submitted to the DMR.

9.8 Description of the tasks that will be undertaken during the environmental impact assessment process

The Environmental Impact Assessment Phase will be undertaken subsequently to the Scoping Phase as stipulated in Regulation 23 of the Environmental Impact Assessment Regulations, 2014 (as amended), under the NEMA. The EIR and EMPr for the proposed project will include detailed information relating to the potential or anticipated impacts that may arise as a result of the proposed activity.

The EIAR and EMPr will be compiled in accordance with the EIA Regulations R.982 of Decmeber 2014 as amended in April 2017 (Appendices 3 and 4 to the mentioned Regulations).

9.8.1 Compilation of a integrated EIAR and EMPR for the proposed project

A pre-application Authorities meeting was held on 24 February 2017 between representatives of the Department of Mineral Resources (DMR) the applicant and Shangoni Management Services (the EAP). Minutes of the mentioned meeting are attached in Annexure C. During the mentioned meeting the submission of a single integrated application for the project was discussed (since the project acivities fall on more than one AOL mining rights area. It was indicated during the meeting that Regulation 11(4) of the EIA Regulations, dated April 2017 (then dated December 2014) makes provision for single / integrated applications. Subsequently, a letter was submitted to the DMR requesting that a single application be considered and approved by the DMR. No response has yet been received. Refer to Annexure C for the correspondence in this regard. An single integrated application was submitted based on the provision made in Regulation 11(4). It is thus also proposed that the EIAR / EMPr be an integrated report based on a consolidated assessment process, containing all activities associated with the proposed project, but the potential environmental impacts of each activity, including its cumulative impacts, considered in terms of the location where the activity is to be undertaken.

9.9 Measures to avoid, reverse, mitigate, or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Table 56 below is the Risk assessment table in which preliminarily identified impacts have been identified. Mitigations measures (to avoid , reverse, mitigate, or manage identified impacts) as well as the extent to which these impacts are anticipated to result in residual risks are also provided in Table 56 below.

Table 56: Risk assessment table

Environmental component (Aspects affected)	Activity	Potential Impact description[85]	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
Geology	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility	No additional impact will occur on geology as a result of the reclamation of the co-disposal facilities.	N/A	N/A
Topography	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Site clearance activities • DHRP • Coal product stockpiling • PCD • Water management measures • Coal conveyor • Roads • Discard disposal site • Borrow pit(s) • Removal of infrastructure and rehabilitation	The establishment of infrastructure may influence the topography.	Control	Medium. If rehabilitation is not implemented adequately, a residual impact on topography may occur.
		The continuation of disposal of residue within the existing footprint of the Klippan Co-Disposal Facility will continue to influence the nature of the topography that is typical of the surrounding area.	Control, Remedy	
		As part of rehabilitation the area will be top-	Remedy	

[85] Impacts will be split (in the EIAR / EMPr detailed Risk Assessment) between the various Mining Rights Areas wherein activities will take place

Environmental component (Aspects affected)	Activity	Potential Impact description[85]	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
		soiled, the area re-vegetated and shaped to be free draining. Reclamation of the co-disposal facilities will assist with the improvement of the topography.		
Soil, land use and land capability	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Transportation of discard coal from Blaauwkrans Co-disposal Facility • Site clearance activities • DHRP • Coal product stockpiling • PCD • Water management measures • Dust suppression • Coal Transfer Station • Coal conveyor • Roads • Powerlines and associated infrastructure • Discard disposal site • Borrow pit(s)	The removal of topsoil may result in the mixing of the horizons of the soil which will have an impact on the fertility and production potential of the soil.	Stop, Control and Remedy	Low If water management measures and rehabilitation is not implemented adequately, a residual impact on soil, land use and land capability may occur.
		The temporary stockpiling of topsoil may result in a decrease in the fertility of the soil and the leaching of minerals due to exposure of the soil to elements.		
		A loss of microbes and viable seed may occur as a result of the temporary stockpiling of topsoil.		
		Soil compaction and topsoil loss through erosion may occur as a result of the mining and mining related activities (including the temporary stockpiling). This will further lead to a loss of soil fertility.		
		The construction of the PCD may impact on soil in terms of compaction and possible spillages from machinery, as well as possible overflows.		

Environmental component (Aspects affected)	Activity	Potential Impact description[85]	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
	• Removal of infrastructure and rehabilitation	The ineffective control and management of sewage and water management measures may have an impact on soil, if incorrectly handled.	Stop, Control and Remedy	Low If water management measures and rehabilitation is not implemented adequately, a residual impact on soil, land use and land capability may occur.
		The ineffective handling of hydrocarbon spillages may lead to the contamination of soil, surface water and groundwater resources.		
		Ineffective erosion control along roads may lead to siltation of downstream water resources and scouring of soil.		
		Leakage of hydrocarbons from trucks may lead to soil contamination		
		Inadequate waste management may lead to soil contamination.		
		Spillages from the coal conveyor may lead to soil contamination.		
		The construction activities will leave the area exposed (cleared of vegetation), which may lead to erosion.		
		The project areas will continue to be used as part of “mining and related activities” for the life of the project, where after only the land use and land capability can be returned / changed to the agreed end land use.		

Environmental component (Aspects affected)	Activity	Potential Impact description[85]	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
Surface water	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Site clearance activities • DHRP • Coal product stockpiling • PCD • Water management measures • Dust suppression • Coal Transfer Station • Coal conveyor • Roads • Powerlines and associated infrastructure • Discard disposal site • Borrow pit(s) • Removal of infrastructure and rehabilitation	Due to the proximity of the proposed project area(s) to the identified wetland systems, surface water quality of such resources may be impacted upon.		
		In the event of chemical or hydrocarbon spillages on soil, surface water runoff which comes into contact with the soil may become contaminated and enter the receiving environment and / or water resources. This will have an impact on, not only the surface water quality, but the aquatic vegetation, animal life and any other downstream water users.	Stop and Remedy	Medium. If water management measures and rehabilitation is not implemented adequately, a residual impact on surface water may occur.
		Surface water contamination may occur should the separation of clean- and dirty water management areas not be effectively implemented.	Stop and Control	
		The construction activities will leave the area exposed (cleared of vegetation), which may lead to compaction and a change in surface water flow patterns.	Control	
		Potential overflows from the PCD / water or sewage reticulation system may result in surface water impacts.	Stop and Remedy	

Environmental component (Aspects affected)	Activity	Potential Impact description[85]	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
Groundwater	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • DHRP • Coal product stockpiling • PCD • Water management measures • Dust suppression • Coal Transfer Station • Coal conveyor • Roads • Discard disposal site • Removal of infrastructure and rehabilitation	The reclamation of the co-disposal facilities may result in a positive impact in terms of the groundwater regime and the current impacts on groundwater in the area.	N/A	Medium (positive)
		Potential seepage of water to the groundwater regime as a result of coal stockpiling, discard disposal and the use of the PCD may contaminate groundwater resources.	Stop and Remedy	Medium. If water management measures, operation of facilities and rehabilitation is not implemented adequately, a residual impact on groundwater may occur.
		Groundwater quality may be impacted in the event of a spillage of chemicals or hydrocarbon materials (e.g. oil spill from vehicles and machinery).	Stop and Remedy	

Environmental component (Aspects affected)	Activity	Potential Impact description[85]	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
Flora	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor • Roads • Powerline • Discard disposal site • Removal of infrastructure and rehabilitation	The vegetation on the areas associated with development of infrastructure will be impacted on by the stripping and clearing of vegetation. However, the largest part of the project areas is considered disturbed area, with large stands of alien invasive vegetation.	Control	Low. If site clearance, noise generating activities and rehabilitation is not undertaken / managed adequately, a residual impact on flora and fauna may occur.
		Dust generation may have an indirect impact on vegetation.	Control	
		Declared alien and invasive plant species may establish in disturbed areas, if not controlled properly.	Control and Remedy	
Fauna	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Transportation of discard coal from Blaauwkrans Co-disposal Facility • Clearance activities • DHRP	Noise generated by the proposed activities may frighten animals which may lead to injuries, deaths as well as the animals migrating away from the site.	Control	
		The animal life in the area has already been impacted upon by mining activities; however, the removal of vegetation may decrease the size of the habitat available for animal life in certain portions of the properties.	Control and Stop	

Environmental component (Aspects affected)	Activity	Potential Impact description[85]	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
	• Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Roads • Powerlines • Discard disposal site • Removal of infrastructure and rehabilitation	Any poaching, killing or snaring of animals will have a negative impact on animal life. It will result in migration of these species but the lack of suitable habitat in the surrounding areas may further contribute to loss of animal life.	Stop	Low. If site clearance, noise generating activities and rehabilitation is not undertaken / managed adequately, a residual impact on flora and fauna may occur.
		Veld fires can be a risk to fauna and flora as well as the community (including adjacent landowners and employees).	Stop and Remedy	
		Animal deaths may occur should they be struck by haul vehicles, due to the hauling activities.	Stop and Control	
		Habitat fragmentation may occur as a result of linear infrastructure (conveyor, roads etc.), if not managed appropriately.	Stop	
Wetlands	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Pipelines and water management measures	The project site will be undertaken within the area that falls within wetland systems or within their buffer areas. The wetlands may therefore be impacted upon. Potential impacts to be taken into account include: • Loss and disturbance of wetland habitat (including possible diatom and invertebrate communities) and fringe vegetation. • Introduction and spread of alien invasive	Control and Remedy	Medium If site clearance, mitigation measures and rehabilitation measures are not undertaken adequately, a residual impact on wetlands will occur.

Environmental component (Aspects affected)	Activity	Potential Impact description[85]	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
	• Roads • Powerlines • Discard disposal site • Removal of infrastructure and rehabilitation	vegetation. • Changes in the amount of sediment entering the system. • Changes in water quality due to toxic contaminants and increased nutrient levels entering the system. • Changes in water flow regime due to the alteration of surface characteristics.		
Sites of archaeological and cultural importance	• Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Pipelines and water management measures • Roads • Powerlines • Discard disposal site • Removal of infrastructure and rehabilitation	Some activities undertaken in close proximity to identified heritage sites may have some impact on such sites, if not appropriately managed.	Stop and Control	Low

Environmental component (Aspects affected)	Activity	Potential Impact description[85]	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
Air quality	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Pipelines and water management measures • Roads • Dust suppression • Powerlines • Discard disposal site • Removal of infrastructure and rehabilitation	During the reclamation activities, tipping activities, crushing, stockpiling, discard disposal, site clearance activities, and transport of the material as well as rehabilitation activities, dust (particulate matter, PM10 and PM2.5) may be generated which may have an impact on the ambient air quality of the area.	Control	Medium If site clearance, mitigation measures and rehabilitation measures are not undertaken adequately, a residual impact on air quality may occur
		All vehicles and mining machinery may have an impact on the air quality of the surrounding area as a result of the emissions released by the vehicles and machinery.	Control	
		The climate change impact potential will be investigated further during the EIA Phase.	Control	

Environmental component (Aspects affected)	Activity	Potential Impact description[85]	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
Noise	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Roads • Discard disposal site • Removal of infrastructure and rehabilitation	The reclamation activities, tipping activities, crushing, site clearance activities, and transport of the material as well as rehabilitation activities, will produce noise which may impact on the surrounding landowners / communities.	Stop and Control	Low
Visual	• Reclamation of Klippan Co-disposal Facility • Reclamation of Blaauwkrans Co-disposal Facility • Clearance activities • DHRP • Coal product stockpiling • Coal Transfer Station • Coal conveyor and substation • Roads	The proposed activities may be intrusive, in terms of visual aspects, which may result in a change of sense of place to the local community and tourist passing through the area. It is however important to note that mining activities are currently taking place at Khwezela- and Greenside Collieries. Therefore, it is likely that regular passers-by and the local residents are desensitised to the mining activities.	Control and Remedy	Medium If rehabilitation measures are not undertaken adequately, a residual impact on visual aspects may occur

Environmental component (Aspects affected)	Activity	Potential Impact description[85]	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
	• Discard disposal site • Removal of infrastructure and rehabilitation			
Socio-economic	• Coal Supply Project	The proposed project will create job security, along with the implementation of other socio-economic responsibilities.	Control	Medium
		The project will hinder the opportunity to utilise the proposed sites for other land use activities for the duration of the operational phase, until such a time as the land has been rehabilitated.		Medium If rehabilitation measures are not undertaken adequately, a residual impact on land use may occur
		Some indirect impacts on surrounding communities / landowners may occur as a result of dust generation, noise, visual aspects etc.		
	• Closure	During closure, a loss of jobs will occur which may not only impact on the employees but on the socio-economic status of the local community and economy.	Stop and Control	Medium

10 Other information required by the competent Authority

10.1 Compliance with the provisions of section 24(4)(a) and (b) read with section 24(3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the:-

10.1.1 Impact on the socio-economic conditions of any directly affected person.

Results of investigation, assessment and evaluation of impact on any directly affected person	Reference to where mitigation is reflected
Social – A number of social impacts have been provisionally identified and include impacts on: sense of place. Furthermore, a number of social related impacts have been identified as part of the Social Impact Assessment conducted for the Khanyisa IPP (power plant) Project. Since the Khanyisa IPP Coal Supply Project is a supplementary project to the Khanyisa IPP (power plant) Project, cumulative and / or indirect impacts may occur as a result of the overall Project (taking all project scopes into account). Refer to Table 56 for the provisionally identified impacts. It is however also important to note that the co-disposal facilities and Khwezela Colliery Sections that are associated with the Coal Supply project, are existing mining and related operations. Therefore, the significance of negative social impacts that have been identified could be described as being low in this regard, as regular visitors to the area and the local community are likely to be desensitised to the mining operations. Economic – Should the Environmental Authorisation not be granted, job security and the sustaining of livelihoods in the area may be lost. Skills development may cease and the co-disposal facilities will remain *in situ*. Further to this, the purpose of the project is for coal to be supplied to the Khanyisa IPP. This will not realise should the authorisation not be granted. This impact will be further discussed in detail, assessed and the significance determined during the EIA and EMP Phase of the project.	Refer to Part 9.9 above.

10.1.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.

Results of investigation, assessment and evaluation of impact on any national estate	Reference to where mitigation is reflected
Refer to Chapter N of Section 8.4.1. Refer also to Figure 60.	Refer to Chapter N of Section 8.4.1

11. Other matters required in terms of section 24(4)(a) and (b) of the Act.

Section 24(4)(b) of the NEMA (1998) states that the following:

"24(4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment -

(b) must include, with respect to every application for an environmental authorisation and where applicable-

(i) investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity;"

An Alternative Assessment Report has been compiled and is attached hereto as Annexure D. The Alternative Assessment Report has been compiled to include the following:

- Brief description of the proposed project.
- A description of the proposed alternatives.
- An assessment of the positive and negative implications of each of the alternatives.
- A description of the method to be followed during the EIA and EMPr Phase, in terms of quantitavely assessing the alternatives.

12. Undertaking regarding correctness of information

I WILDA ELIZABETH MEYER herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report.

_____

Signature of EAP

Date: 26 April 2017

13 Undertaking regarding level of agreement

I WILDA ELIZABETH MEYER herewith undertake that the information provided in the foregoing report is correct, and the level of agreement with Interested and Affected parties and stakeholders has been correctly recorded and reported herein.

_____

Signature of EAP

Date: 26 April 2017

I CERTIFY that the Deponent acknowledged that she knows and understands the contents of this affidavit which was signed and sworn to before me at PRETORIA on this the ___ day of _____-_____ 2017, by the Deponent who admitted and declared that she understands the content of this declaration, the content thereof is true and correct, that she has no objection to taking the oath and that she considers the oath binding on her conscience, the Regulations contained in Government Notice No R1258 dated 21 July 1972, as amended, having been complied with.

Refer to Hard copy

_____

Commissioner of Oaths

-END-