Reptiles

Four reptiles and nine frog species were confirmed to occur within the study area during fieldwork. The Southern African Python, has a national Red Data status of Vulnerable, and was confirmed to be resident at one of the farm dams close to where the proposed offices will be sited (Mr A. Nel, pers.comm.). Much suitable habitat exists within the study area. Another species which has a provincial Red Data status of Near Threatened was confirmed, namely Sekhukhune Flat Lizard. This species was seen sunning itself on large boulders at several sites. A species that has a provincial status of Near Threatened, Montane Dwarf Burrowing Skink, was confirmed to occur on an adjacent property (Boycott, 2002) and has a high likelihood of occurring in the study area.

Scorpions

Twelve species of scorpion are predicted as potentially occurring at the Hoogland site (Leeming 2003, Prendini 2006, Ian Engenbrecht, pers. comm.). Four of these species [i.e. Flat Rock Scorpion (*Hadogenes bicolour*), Flat Rock Scorpion (*H. Polytrichobothrius*), Burrowing Scorpion (*Opistophthalmus glabrifrons*) and Creeping scorpion (*Opistacanthus validus*)] are of conservation concern and are included on the published list of threatened and protected species (National Environmental Management: Biodiversity Act) due to potential threats from the pet trade.

Ants

Five undescribed ant species were confirmed from the samples collected. In total 85 species of ground-dwelling ants were collected. Fifty-nine species were found at the proposed north pit site and 58 at the south pit site; 34 species were common to both sites. Estimated total diversity for each site was approximately 80 species, and for both sites combined about 112 species, which is indicative of a very diverse and undisturbed bushveld ant community.

2.6.7 TERRESTRIAL FLORA (NATURAL PLANT LIFE)

Seven vegetation communities were identified within the study area (Figure 2-3). The proportion of the study area that each vegetation type covers is as follows:

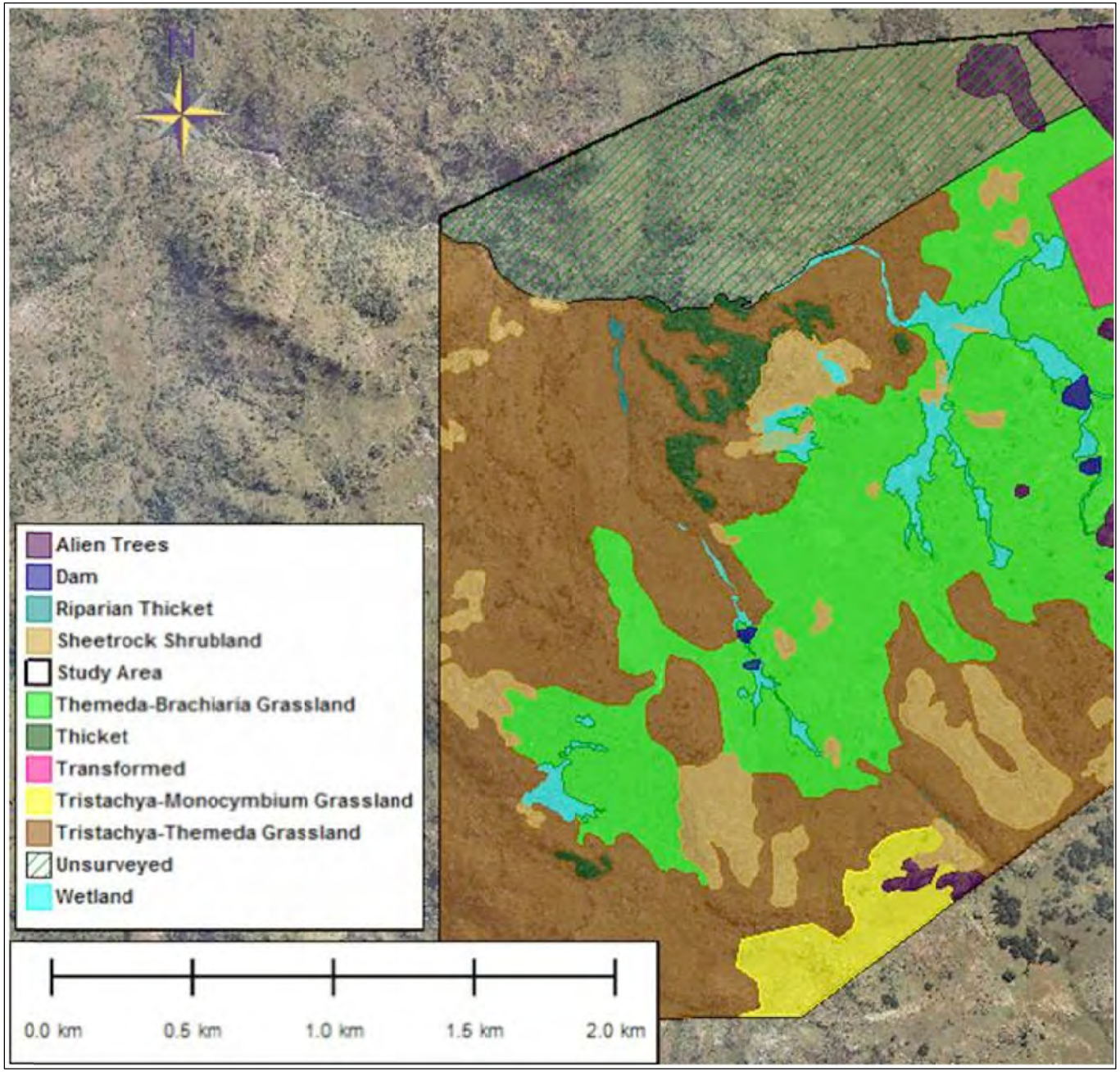
- Tristachya-Themeda grassland (47% coverage);
- Themeda-Bracharia grassland (31.6% coverage);
- Tristachya-monocymbium grassland (3% coverage);
- Aloe-Myrothamnus shrubland (7.4% coverage);
- Wetlands (8.2% coverage);
- Pterocelastrus-olea thicket on rocky outcrops (2.6% coverage); and
- Pittosporum-Ilex riparian thicket (0.2% coverage);

Within these seven communities, a total of 449 plant species was recorded within the study area during the baseline fieldwork. This data is significant when compared with the results (i.e. only 400 species) from a much larger area further north within the Dwars River valley. Of the 449 species, 67 (15%) are

considered species of conservation concern, are endemic to centres of plant endemism, and / or are protected by legislation. Fourteen species are listed in the latest Red List publication as having conservation concern2. Five of these are considered threatened3. A full list of species will be included in the EIA/EMP amendment report.

[2] Ecorex follows the terminology of Raimondo *et al*. (2009); species of conservation concern are those that are important for South Africa's conservation decision-making processes and comprise all threatened species, as well as those with a status of Data Deficient, Near Threatened, Critically Rare, Rare and Declining.

[3] Ecorex follows the terminology of Raimondo *et al*. (2009); threatened species are those facing a high risk of extinction and are placed in the categories Critically Endangered, Endangered or Vulnerable.



VEGETATION TYPES WITHIN THE HOOGLAND STUDY AREA

01/2011

E017-06

FIGURE 2.3

2.6.8 AQUATIC BIODIVERSITY (NATURAL VEGETATION AND ANIMAL LIFE)

2.6.8.1 Aquatic habitats

In addition to the terrestrial habitats there are a number of unmarked dams and water courses within the Hoogland project area as indicated in Figure 4-1. In stream Habitat Integrity around the Hoogland project area were classified as Natural (Category A). The Riparian Habitat Integrity was rated as Natural (Category A).

The Department of Water Affairs and Forestry's Desktop Ecological Classification considers quaternary catchment B41G to be of High Ecological Importance and Sensitivity (Class B: Small risk allowed). The high status is attributed to the presence of rare and endangered aquatic species, high diversity of aquatic habitats, and its importance as a refuge area, migration corridor and conservation area.

2.6.8.2 Aquatic flora

These aquatic environments provide habitats for aquatic vegetation and Ecorex was commissioned to establish the baseline conditions of these communities. Within the study area wetlands occur in two landscape settings as described by Kotze et al. (1994):

- Midslopes – these are wetlands that are fed by groundwater, are situated higher up in the catchment and do not have stream channels within or entering them and are referred to as Midslope wetlands, these are seasonal wetlands and are located in the proposed north pit area
- Valley bottoms and channels – these are riparian wetlands that usually have steep gradients, and are usually narrow and often discontinuous.

2.6.8.3 Aquatic fauna

The availability of pristine aquatic floral habitats provides niches for aquatic fauna to establish. Ecorex were able to establish from their baseline data collection that the Hoogland site contains aquatic ecosystems that potentially support a rare aquatic species. The database does not name the rare and endangered aquatic species, but it probably refers to the southern barred minnow, *Opsaridium peringueyi.* The assessment was based on conditions at the lower border of the quaternary, where this species may be expected. All aquatic ecosystems within the Hoogland Mine concession area are ecologically highly sensitive.

At this early stage, it is identified that the natural and relatively untransformed vegetation and animal communities within the Hoogland study area have a high conservation importance rating.

2.6.9 HYDROLOGY (SURFACE WATER)

2.6.9.1 Drainage and Water Resources

In terms of surface drainage at (or near to) the proposed Figure 2-2 gives a good indication of the nature of the river systems. According to the 1:50,000 topographical map, there are no perennial streams in the project area.

The site lies within the headwaters of quaternary catchment B41G and this contains a number of watercourses (Figure 2-2). These flow in a westerly direction to their confluence with the Groot Dwars River (Figure 2-2).

2.6.9.2 Surface water quality

Surface water samples were taken in order to obtain a baseline of the surface water quality at the proposed site prior to mining operations. Results which have been compared to the SANS domestic use standards.

TABLE 2-2 BASELINE WATER QUALITY RESULTS

	SANS drinking water standard Class 1	Class 2	H1	H2	H3	H4
pH	5.0 – 9.0	4.0 – 10.0	8.3	7.9	7.5	7.0
CONDUCTIVITY in mS/m	<150	150–370 (7 yrs)	16.5	7.6	3.5	9.5
TOTAL DISSOLVED SOLIDS	<1000	1000–2400 (7 yrs)	114	54	34	84
ALKALINITY as $CaCO_3$	N/A	N/A	76	32	12	40
NITRATE as N	<10	10 – 20 (7 yrs)	0.3	0.3	0.4	0.3
CHLORIDE as Cl	<200	200–600 (7 yrs)	6	<5	<5	<5
SULPHATE as SO_4	<400	400–600 (7 yrs)	<5	<5	<5	<5
FLUORIDE as F	<1.0	1 – 1.5 (1 yr)	<0.2	<0.2	<0.2	<0.2
SODIUM as Na	<200	200-400 (7 yrs)	4	2	<2	3
POTASSIUM as K	<50	50-100 (7 yrs)	<1.0	<1.0	<1.0	<1.0
CALCIUM as Ca	<150	150-300 (7 yrs)	17	7	3	9
MAGNESIUM as Mg	<70	70-100 (7 yrs)	11	5	2	6
ICP scan results						
Aluminium as Al	<0.3	0.3 – 0.5 (1 yr)	<0.100	<0.100	<0.100	<0.100
Vanadium as V	N/A	N/A	<0.025	<0.025	<0.025	<0.025
Chromium as Cr	<0.1	0.1– 0.5 (3 mnths)	<0.025	<0.025	<0.025	<0.025
Manganese as Mn	<0.1	0.1 – 1.0 (1 yr)	<0.025	<0.025	0.064	<0.025
Iron as Fe	<0.2	0.2–2.0 (7 yrs)	0.078	0.210	0.235	<0.025
Copper as Cu	<1.0	1 – 2 (1 yr)	<0.025	<0.025	<0.025	<0.025
Zinc as Zn	<5.0	5 – 10 (1 yr)	<0.025	<0.025	<0.025	<0.025
Arsenic as As	<0.01	0.01– 0.05 (1 yr)	0.015	<0.010	<0.010	0.012
Selenium as Se	<0.02	0.02– 0.05 (1 yr)	<0.020	<0.020	<0.020	<0.020
Cadmium as Cd	<0.005	0.005–0.01 (6 mnths)	<0.005	<0.005	<0.005	<0.005
Lead as Pb	<0.02	0.02–0.05 (3 mnths)	<0.020	<0.020	<0.020	<0.020
Class of water (parameter in brackets are those responsible for the class of the water)			2 (As)	2 (Fe)	2 (Fe)	2 (As)

The surface water quality results compared to the SANS standards indicate that arsenic and iron are the only parameters that are marginally elevated. These two parameters exceed the Class 1 standard but not Class 2.

When compared to the DWA classification system, all four samples have been classified as class 1 which indicates good water quality which is suitable for human consumption. The arsenic and the iron in some of the samples prevent this water from being classified as class 0 according to the DWA system.

The elevated iron and arsenic levels are assumed to be a function of the underlying geology and not any anthropogenic activities.

2.6.9.3 Surface water users

The water captured in dams and irrigation furrows by the landowners is used for irrigation and livestock watering purposes.

2.6.10 GROUNDWATER

2.6.10.1 Presence of Groundwater

In general, the groundwater regime comprises shallow weathered aquifers underlain by deeper fractured aquifers. The deeper fractured aquifers might show different characteristics due to potential preferred pathways along dykes and geological contacts. Various dykes or contact features potentially exist within the project area and a site specific baseline study will have to be conducted in order to confirm the underlying geology and groundwater regime. Water levels vary from 0.5 m to 20 m below ground level (mbgl).

2.6.10.2 Depth of water table

The depth to ground water varies across the site and the results determined by Ground Water Consulting Services (GCS) in 2010 determined that the water levels occur between 4-45.5meters below ground level.

2.6.10.3 Groundwater quality

A number of water samples were collected during the GCS hydrocensus of boreholes carried out in 2010. Two exploration boreholes, including the water sample for the supply source of Mr. Nel on Portion 1 of Farm 53 JT indicated elevated iron concentrations, which are considered a function of the geology. The monitoring boreholes also indicated some elevated metal concentrations (aluminium, iron and lead), which is also considered a function of the geology.

2.6.10.4 Groundwater use

<u>Boreholes</u>

GCS carried out a hydro census of the area to determine the existence and the use of boreholes within the study area:

The Bakoni Ba-Phetla Community relies largely on groundwater for potable use from two existing production boreholes. The existing mine currently has four production boreholes that get pumped for the provision of potable water use, and for water use within the change house.

<u>Seeps and springs</u>

A number of the local residents/ landowners make use of springs and collective seepage points that get diverted into earth dams for potable and domestic water use. Since the water samples that were obtained

for analysis in some instances represent cumulative seepage from wide surface areas it is difficult to provide coordinates for the origin of the water. At least six spring water users have been identified upslope of the proposed mine site.

2.6.10.5 Aquifer classification

Based on available information two main aquifers occur in the study area. These two aquifers are associated with the following two units:

- The weathered material which is significant to the occurrence of springs; and
- The underlying fractured rock aquifer.

The aquifers are expected to be of local importance to farmers in the area.

2.6.10.6 Groundwater flow

Groundwater migrates down gradient to lower lying areas, either to appear as fountains along the steep slopes of the mountainous study area, or recharge the lower lying streams and rivers as base flow.

2.6.11 AIR QUALITY

2.6.11.1 Background air quality

Particulate matter (dust) less than ten microns in size PM10

Varying PM10 concentrations occur in the region as a result of dust from the unsurfaced roads and from the Everest Mine's tailings dam.

OTHER EMISSIONS IN THE REGION

The sources of SO_2 and NOx that occur in the region include industrial emissions, blasting operations at mines, veld burning, vehicle exhaust emissions and household fuel burning.

Whereas vehicle tailpipe emissions vary, most industrial releases remain relatively constant throughout the year. Domestic coal burning, biomass burning and wind erosion emissions are characterised by significant temporal variations. Biomass burning is a seasonal source with its highest intensity between June and October. Household coal burning emissions increase distinctly during winter months due to the need for space heating. Windblown dust is noted to be greatest during spring months (August to October) due to the increase in wind speeds, and hence dust generation potentials, characteristic of this period.

The existing sources of air pollution within the region include:

- industrial operations such as coal fired power stations, ferro-chrome smelter operations;
- quarrying and mining operations;

- Everest tailings dam;
- vehicle tailpipe emissions;
- household fuel combustion;
- biomass burning;
- various miscellaneous fugitive dust sources including agricultural activities, wind erosion of open areas, vehicle entrainment of dust along unsurfaced roads.

2.6.12 RECEPTOR SITES WITHIN A 5KM RADIUS OF THE HOOGLAND SITE

The sensitive receptors close to the proposed development site include the landowners, the people utilizing the site (i.e. for grazing) and people living along the unpaved track. Further afield there is the Kiwi Primary School and the Everest Early Childhood Development Centre (~2km east of the existing Everest Mine) and various scattered farmsteads. The other sensitive receptors will be those mentioned in Section 4.12.

2.6.13 NOISE

The existing residual noise climate throughout the study area is representative of a rural and agricultural type environment. The current noise climate is not regarded as pristine due to the noise influence of the Everest Platinum Mine. The other existing noise sources are expected to include natural sounds from wind, animals and birds; agricultural/farming activities; homesteads; and localised vehicle movement on the road network.

The existing noise sensitive receptors in an approximate 5km radius of the proposed Hoogland project area include farm houses, farm labourer dwellings, owners at the head of the valley, the Groot Dwars River valley natural environment, Kiwi Community, educational facilities and the Davel Private Nature reserve.

2.6.14 VISUAL ASPECTS

The study area is rural in nature. The Hoogland area is representative of a grazing area with mountains in the east and south and a deeply incised valley to the west. There are minimal dwellings in the immediate vicinity of the site.

The sensitive visual receptors will be the same as the noise and air receptors. The project area is not visible from public tourist routes as it is located some 2-3 km away from these routes and the adjacent hills obstruct the view. The residents on the farms to the northeast, east and southwest of the proposed site have raised concerns that the proposed Hoogland project will have a direct impact on the character of the environment and will add to the already negative visual effect created by the Everest Platinum Mine.

The most sensitive public views are expected to be from viewer locations that are located at highpoints to the southwest of the proposed project site. These highpoints have panoramic vistas of the valley below. Some of these farms cater for ecotourism and activities such as fly-fishing, hiking and 4 X 4 trails that could come into view of the proposed Hoogland project.

3 SCOPING STUDY: APPROACH AND METHODOLOGY

This section presents the approach and methodology used to identify potential environmental and social impacts and project alternatives associated with the project.

3.1 INFORMATION COLLECTION

The main sources of information for the preparation of the scoping report include:

- documentation prepared by AQPSA technical project team;
- consultation with the technical project team;
- key legislative and regulatory requirements outlined in Section I;
- site visits that were used to familiarise the Metago environmental team with the proposed project site, to identify potential environmental issues and to identify site specific stakeholders;
- consultation with interested and/or affected parties (IAPs) and regulatory authorities and
- desktop baseline reports and/or literature reviews completed by environmental specialists (see list in Section 7.7.2.

3.1.1 AVAILABLE AQPSA REPORTS

The mining right application (AQPSA's application for the conversion of Old Order Mining Rights to New Order Rights at Everest Platinum Mine) submitted to the DMR in 2007 and the supporting social and labour plan compiled by AQPSA (September 2006) were used to compile sections of the scoping report.

3.2 STAKEHOLDER ENGAGEMENT

3.2.1 IDENTIFIED INTERESTED AND AFFECTED PARTIES

Metago has made use of the mine's interested and affected party (IAP) database. This database was updated through a deeds search of the properties on and adjacent to the project site, social scans including site visits in the surrounding area, networking and direct consultation with IAPs. The database is updated on an ongoing basis throughout the environmental process. The following groups of interested and affected parties (IAPs) have been identified:

Regulatory authorities:

- Department of Mineral Resources (DMR);
- Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET);
- Department of Agriculture, Forestry and Fisheries (DAFF);
- Department of Water Affairs (DWA);
- Department of Rural Development and Land Reform (DRDLR);
- Mpumalanga Tourism and Parks Agency (MTPA)