

Ecological Desktop Study

The proposed Diamonds Alluvial and Diamonds General Prospecting Right near Barkly West on the Remaining Extent and Portion 6 of the farm Nooitgedacht 66, Registration Division: Kimberley, Norther Cape Province.

Reference No. : NC30/5/1/1/2/11894PR
Prepared by



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Introduction

Milnex 189 CC was contracted by Morgenson Mining CC as the independent environmental consultant to undertake the Ecological Desktop Study for the Environmental Impact Assessment process for a Prospecting Right of Diamonds Alluvial & Diamonds General, located approximately 15.9km South East of Barkly West in the Northern Cape Province, on the Remaining Extent and Portion 6 of the farm Nooitgedacht 66, Registration Division: Kimberley. Milnex 189 CC is a specialist environmental consultancy with extensive experience in the mining industry which provides a holistic environmental management service, including environmental assessment and planning to ensure compliance with relevant environmental legislation. Milnex 189 CC benefits from the pooled resources, diverse skills and experience in the environmental and mining field held by its team that has been actively involved in undertaking environmental studies for a wide variety of mining related projects throughout South Africa. The Milnex 189 CC team has considerable experience in environmental impact assessment and environmental management, especially in the mining industry.

The EAP, Danie Labuschagne, which conducted the desktop study has experience in consulting in the environmental field. His key focuses are on environmental assessment, advice and management and ensuring compliance to legislation and guidelines, GIS and Water Use Licenses. He is currently involved in undertaking EIAs for several projects across the country. He's key qualifications include:

- Masters Degree in Environmental Management and Geography, North West University, SA.
- Honors in Environmental Management (Hons.Env.Man) (Cum Laude), North West University (NWU), SA.
- B. Sc in Geology and Geography, North West University (NWU), SA.
- Implementing Environmental Management Systems (ISO 14001) course from the CEM (Centre for Environmental Management).
- Environmental Law for Environmental Managers course from the CEM (Centre for Environmental Management).
- Environmental Management Systems ISO 14001 Audit: A Lead Auditor Course based on ISO 19011 and ISO 17021(SAATCA Registered) course at the CEM (Centre for Environmental Management).

It should just be noted that Danie Labuschagne ***is not*** a qualified Ecologist.

The Ecological habitat status of the proposed mining right area, was determined by means of a site visit and a desktop study. In this document a brief description of the ecology, as stated by Mucina and Rutherford (2006), will be given. This information will be supported with a map and site specific photographs.

It should be noted that the status of these vegetation may have changed as the data used from Mucina and Rutherford (2006) is 10 years old.

Vegetation Map

The exact coordinates of the proposed mining right area are plotted to determine the vegetation unit(s), in which the proposed mining activities will take place. The data used, is that provided by Mucina and Rutherford (2006). A vegetation unit is defined by Mucina and Rutherford (2006) as a complex of plant communities ecologically and historically occupying habitat complexes at the landscape scale. According to Mucina and Rutherford (2006) their vegetation units are the obvious vegetation complexes that share some general ecological properties such as position on major ecological gradients and nutrient levels, and appear similar in vegetation structure and especially in floristic composition.

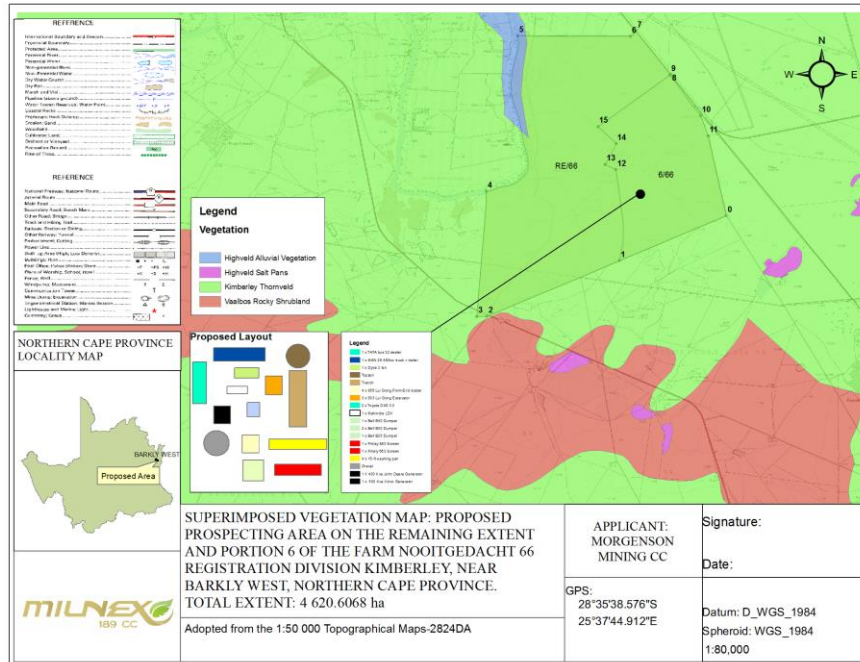


Figure 1: Vegetation Unit Map

The result obtained by plotting the coordinates are as follow:

The proposed area falls within vegetation unit SVk 4 and Aza 5, which is known as the Kimberley Thornveld and Highveld Alluvial Vegetation. The Kimberly Thornveld is part of the Eastern Kalahari Bushveld Bioregion, which is a sub-bioregion for the Savanna Biome. While the Highveld Alluvial Vegetation is part of the Alluvial Vegetation Bioregion which is a sub-bioregion for the Inland Azonal Vegetation.

Kimberley Thornveld

According to Mucina and Rutherford (2006:516), the Kimberley Thornveld vegetation covers the North West, Free State and Northern Cape Provinces: Most of the Kimberley, Hartswater, Bloemhof and Hoopstad Districts as well as substantial parts of the Warrenton, Christiana, Taung, Boshof and to some extent the Barkley West District. This thornveld is situated on an altitude of 1050m – 1400m.

The area often has slightly irregular plains with a well-developed tree layer with *Acacia Erioloba*, *A. tortillis*, *A. karoo* and *Boscia albitrunca* and a well-developed shrub layer with occasional dense stands of *Tarchonanthus camphoratus* and *A. mellifera*. Grass layer open with much uncovered soil.

Some other important Taxa found on in the area:

Tall Tree: *Acacia erioloba* (d).

Small Trees: *Acacia karroo* (d), *A. mellifera* subsp. *detinens* (d), *A. tortilis* subsp. *heteracantha* (d), *Rhus lancea*.

Tall Shrubs: *Tarchonanthus camphoratus* (d), *Diospyros pallens*, *Ehretia rigida* subsp. *rigida*, *Euclea crispa* subsp. *ovata* *Grewia flava*, *Lycium arenicola*, *L. hirsutum*, *Rhus tridactyla*.

Low Shrubs: *Acacia hebeclada*, subsp. *hebeclada* (d), *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum zeyheri*, *Hermannia comosa*, *Lycium pilifolium*, *Melolobium microphyllum*, *Pavonia burchelli*, *Peliostomum leucorrhizum*, *Plinthus sericeus*, *Wahlenbergia nodosa*.

Succulent Shrubs: *Aloe hereroensis* var. *hereroensis*, *Lycium cinereum*

Graminoids: *Eragrotis lehmanniana* (d), *Aristida canescens*, *A. congesta*, *A. mollissima* subsp. *argentea*, *Cymbopogon pospischilli*, *Digitaria argyrograpt*, *D. eriantha* subsp. *eriantha*, *Enneapogon cenchroides*, *E. scoparius*, *Eragrostis rigidior*, *Heteropogon contortus*, *Themeda triandra*.

Herbs: *Barleria macrotegia*, *Dicoma schinzii*, *Harpagophytum procumbens* subsp. *procumbens*, *Helichrysum cerastioides*, *Hermbstaedtia odorata*, *Hibiscus marlothianus*, *Jamesbrittenia aurantiaca*, *Lippia scaberrima*, *Osteospermum muricatum*, *Vahlia capensis* subsp. *vulgaris*.

Succulent Herbs: *Aloe grandidentata*, *Piранthus decipiens*.

Mucina and Rutherford (2006:517) also states that the conservation of this thornveld type, is Least Threatened with a target of 16%. Only 2% of this thornveld is statutorily conserved in Vaalbos National Park and in Sanveld, Bloemhof Dam and S.A. Lombard Nature Reserve. As much as 18% is already transformed, mostly by cultivation. Low erosion is associated with this type of thornveld. The area is mostly used for cattle farming or game ranching. Overgrazing leads to encroachment of *Acacia mellifera* subsp. *detinens*.

Highveld Alluvial Vegetation

According to Mucina and Rutherford (2006:640), the Highveld Alluvial Vegetation covers the Free State, North-West, Mpumalanga and Gauteng Provinces as well as Lesotho and Swaziland: with Alluvial drainage lines and floodplains along rivers embedded within the Grassland Biome and marginal (eastern) units of the Kalahari (Savanna Biome), such as along the upper Riet, Harts, upper Modder, upper Caledon, Vet, Sand, Vals, Wilge, Mooi, middle and upper Vaal Rivers etc. and their numerous tributaries. Altitude ranging from 1 000 – 1 500 m.

The area has a relative flat topography supporting riparian thickets mostly dominated by *Acacia karroo*, accompanied by seasonally flooded grasslands and disturbed herblands often dominated by alien plants.

Some other important Taxa found on in the area:

Riparian thickets

Small trees: *Acacia karroo* (d), *Salix mucronata* subsp. *Mucronata* (d), *S. mucronata* subsp. *woodii* (d, within subescarpment grasslands of Kwazulu Natal) *Ziziphus mucronata* (d), *Celtis Africana*, *Rhus lancea*

Tall shrubs: *Gymnosporia buxifolia* (d), *Rhus pyroides* (d), *Diospyros lycioides*, *Ehretia rigida*, *Grewia flava*

Low shrubs: *Asparagus larycinus* (d), *A suaveolens* (d).

Woody Climber: *Clematis brachiata*.

Succulent Shrub: *Lycium hirsutum* (d)

Graminoids: *Setaria verticillata* (d), *Panicum maximum*

Herb: *Pollichia campestris*

Red beds *Megagraminoids: Phragmites australis* (d)

Flooded grasslands & herblands

Low shrubs: *Gomphocarpus fruticosu* (d), *Felicia muricata*.

Succulent Shrub: *Salsola rabieana*

Graminoids: *Agrostis lachnantha* (d), *Andropogon eucomus* (d), *Chloris virgate* (d), *Cynodon dactylon* (d), *Eragrostis plana* (d), *Hemarthria altissima* (d), *Imperata cylindrica* (d), *Ischaemum fasciculatum* (d), *Micanthus junceus* (d), *Paspalum distichum* (d), *Andropogon appendiculatus*, *Brachiaria marlothii*, *Cyperus denudatus*, *C. longus*, *Echinochloa holubii*, *Eragrostis odtusa*, *E.porosa*, *Firmbristylis ferruginea*, *Panicum coloratum*, *Pycreus mundii*, *Sporobolus africanus*, *S. fimbriatus*, *Themeda trianda*, *Urochloa panicoides*

Herbs: *Parsicaria lapathifolia* (d), *Alternanthera sessilis*, *Baleria macrostegia*, *Corchorus asplenifolius*, *Equisetum ramosissimu*, *Galium capens*, *Hibiscus pusillus*, *Lobelia angolensis*, *Nidorella resedifolia*, *Persicaria amphibian*, *P. hystricula*, *Pseudognaphalium oligandrum*, *Pulicaria scabra*, *Rorippa fluviatilis* var. *fluviatilis*, *Senecio inornatus*, *Stachys hyssopoides*, *Vahlia capensis*

Geophytic Herbs: *Crinum bulbispermum*, *Haplocarpha lyrata*,

Open water Aquatic Herb: *Myriophyllum spicatum*

This has a conservation which is Least threatened with a 31% target. Nearly 10% statutorily conserved in Barberspan, Bloemhof dam, Christiana, Faan Mentjies, Sandveld, Schoonspruit, Soetdoringand Wolwespruit Nature Reserves. More than a quarter has been transformed for cultivation and by building of dams. These areas are prone to invasion by a number of weeds, encouraged by the high nutrient status of soils and ample water supply. The undergrowth of the alluvial riparian thickets and the accompanying grasslands suffer from heavy overgrazing in many places (Mucina and Rutherford, 2006:640).

Protected Areas

According to the data for protected areas, the portion does not fall within a Protected Area, nor Threatened Ecosystems.

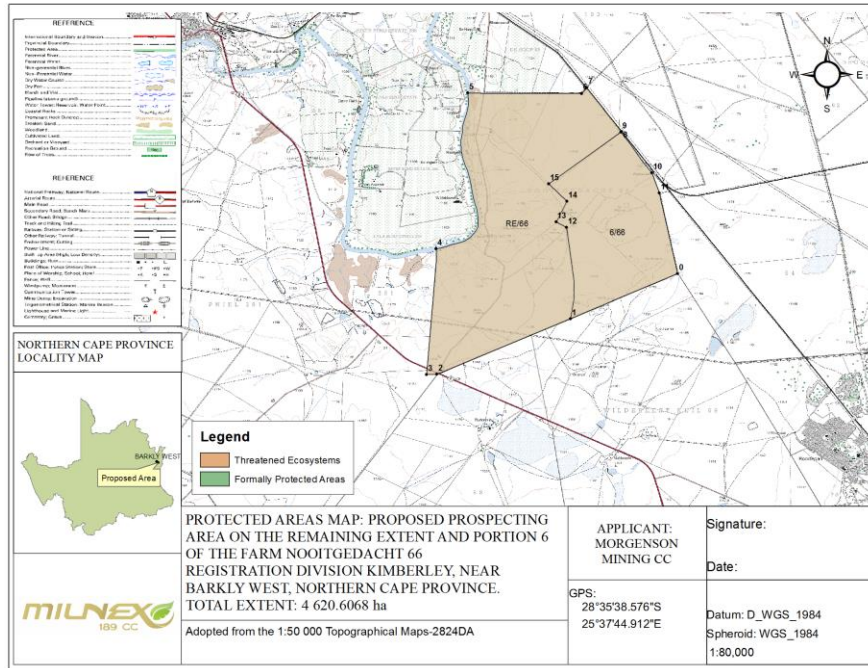






Figure 2: Protected Areas Map

Critical Biodiversity Area

According to B-GIS “Critical biodiversity areas (CBAs) are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services”, therefore the purpose of CBA’s is simply to indicate spatially the location of critical or important areas for biodiversity in the landscape.

According to the figure 3, the Namakwa District is the only district municipalities which have CBA maps in the Northern Cape. Thus, there is no CBD for Frances Baard District Municipality within whose jurisdiction the proposed prospecting right application falls.

Name	Description	Projects	Data Partner	Province
Namakwa District Aquatic CBAs View Spatial Dataset >	Namakwa District critical biodiversity assessment aquatic polygons	<input checked="" type="checkbox"/> Projects(1)	Botanical Society of South Africa 	Northern Cape 
Namakwa District Terrestrial CBAs View Spatial Dataset >	Namakwa District critical biodiversity assessment terrestrial polygons.	<input checked="" type="checkbox"/> Projects(1)	Botanical Society of South Africa 	Northern Cape 

Showing 1 to 2 of 2 entries (filtered from 463 total entries)

Previous **1** Next

Figure 3: Critical Biodiversity Areas Map.

Sensitive area for Mine

Certain areas of the proposed portions fall within Highest biodiversity importance (Class B) which means it is a highest risk area for mining.

Highest biodiversity importance (B)

These areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being.

According to SANBI (data from online SANBI:2012) an environmental impact assessment should include the strategic assessment of optimum, sustainable land use for a particular area will determine the significance of the impact on biodiversity.

Below is figure 4 representing the sensitive area for mining (data from online SANBI)

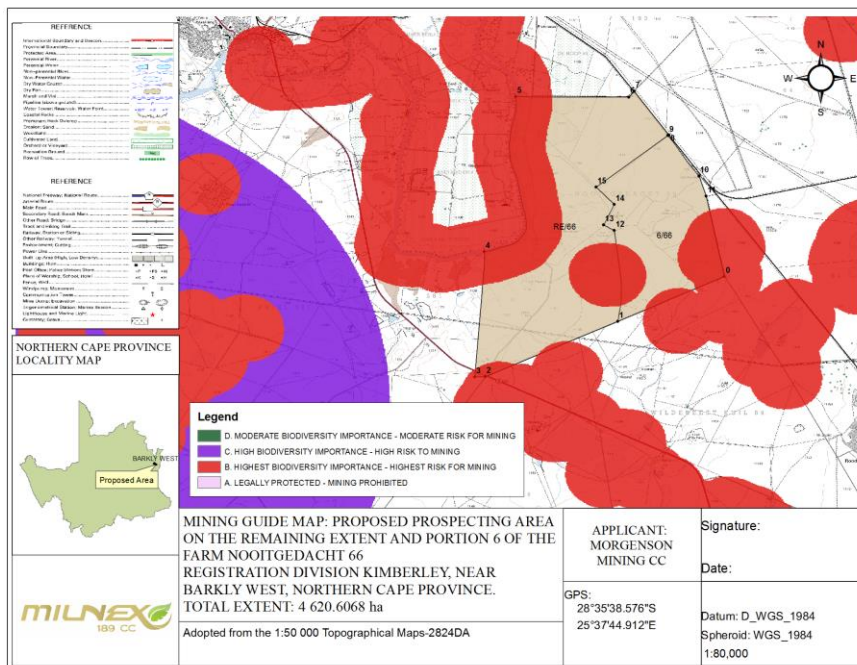


Figure 4: Sensitive area for mine

Wetland Areas

Wetland is defined as land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil (from the South African National Water Act; Act No. 36 of 1998).

Map below depicts all wetland areas on the proposed area. The proposed area consists of a floodplain wetland, Unchannelled valley-bottom wetland, Seep and Depression. The wetland vegetation type falls within the Eastern Kalahari Bushveld Group 3.

According to the 2013 SANBI Biodiversity Series 22 a:

Floodplain wetland is a wetland area on the mostly flat or gently-sloping land adjacent to and formed by an alluvial river channel under its present climate and sediment load, which is subject to periodic inundation by overtopping of the channel bank. They generally occur on a plain and are typically characterised by a suite of geomorphological features associated with river-derived depositional processes, including point bars, scroll bars, oxbow lakes and levees. Floodplain wetlands must be considered as wetland ecosystems that are distinct from but associated with the adjacent river channel itself, which must be classified as a ‘river’.

Unchannelled valley-bottom wetland is a valley-bottom wetland without a river channel running through it. They are characterised by their location on valley floors, an absence of distinct channel banks, and the prevalence of diffuse flows.

Seep is a wetland area located on gently to steeply sloping land and dominated by colluvial (i.e. gravity-driven), unidirectional movement of water and material down-slope. Seeps are often located on the side-slopes of a valley but they do not, typically, extend onto a valley floor. Seeps are characterised by their association with geological formations (lithologies) and topographic positions that either cause groundwater to discharge to the land surface or rain-derived water to ‘seep’ down-slope as subsurface interflow.

Depression is a wetland or aquatic ecosystem with closed (or near-closed) elevation contours, which increases in depth from the perimeter to a central area of greatest depth and within which water typically accumulates. Although they may at times have a river flowing into or out of them, depressions are especially characterised by their closed (or at least near-closed) contour shape, which makes them relatively easy to identify on topographic maps.

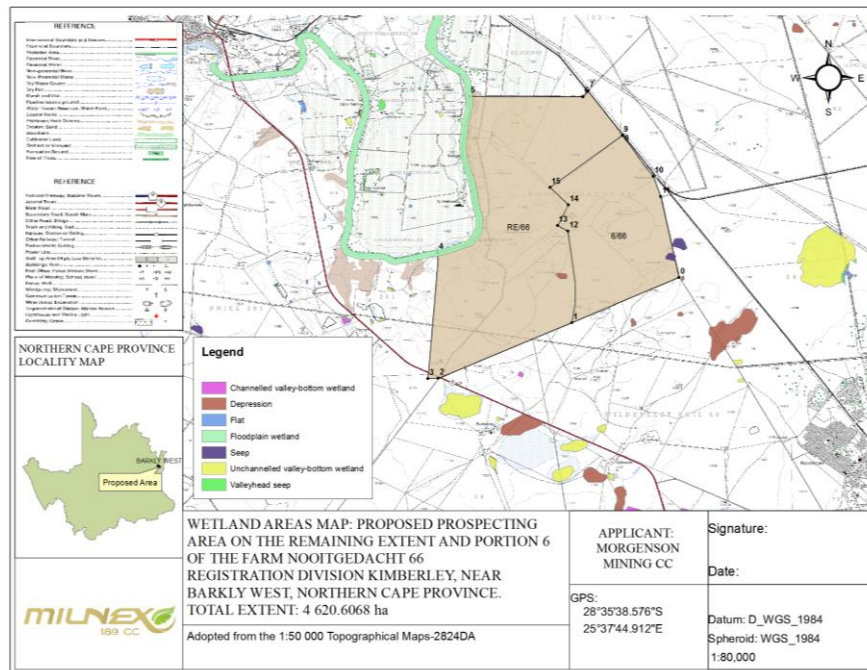


Figure 5: Wetland types present on site

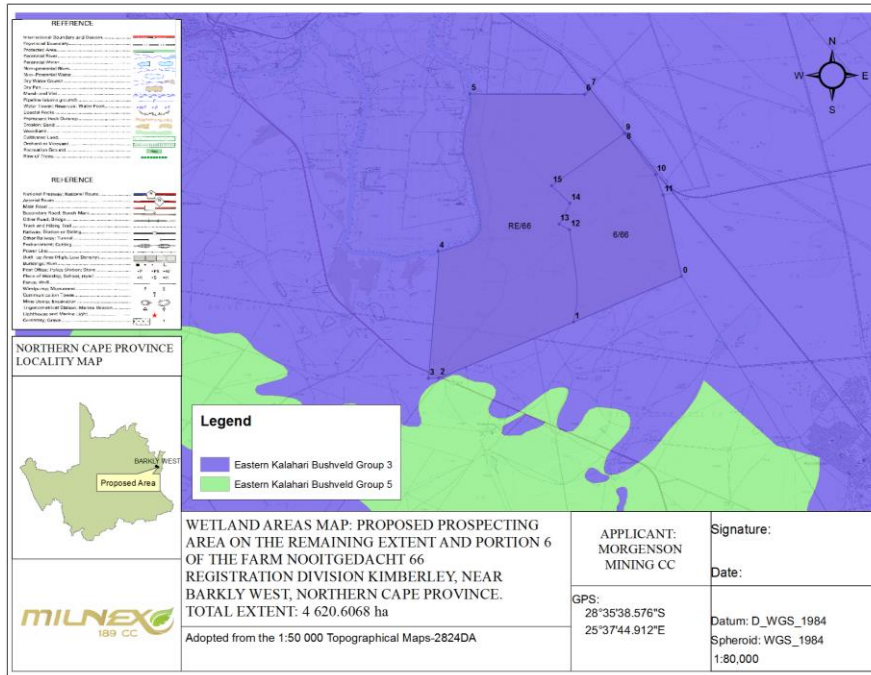


Figure 6: Wetland vegetation types

River Ecosystem Status

The status of the river in question is Largely modified (Class D) in this area. The figure below depicts the river ecosystem status

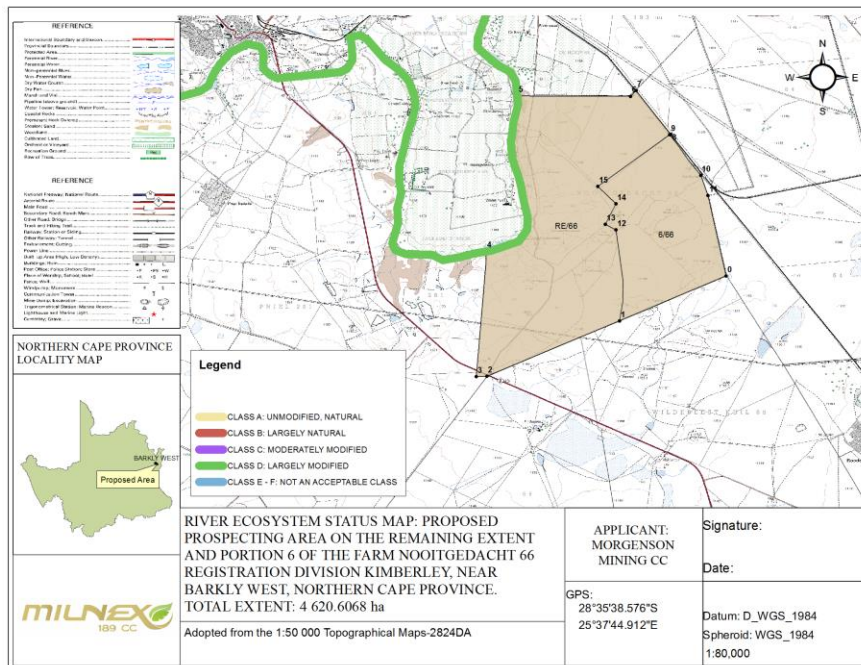


Figure 7: River Ecosystem Status

Recommendations

- Protected trees and plants shall not be removed or damaged without prior approval and permits or licenses from the relevant authority.
- Vegetation clearance, if any, should be kept to the minimum required for the operation.

The EAP herewith confirms the correctness of the information provided in this report.

A handwritten signature in black ink, appearing to read 'Danie Labuschagne', written in a cursive style.

Signature of the EAP: Danie Labuschagne

Date: 28/11/2016