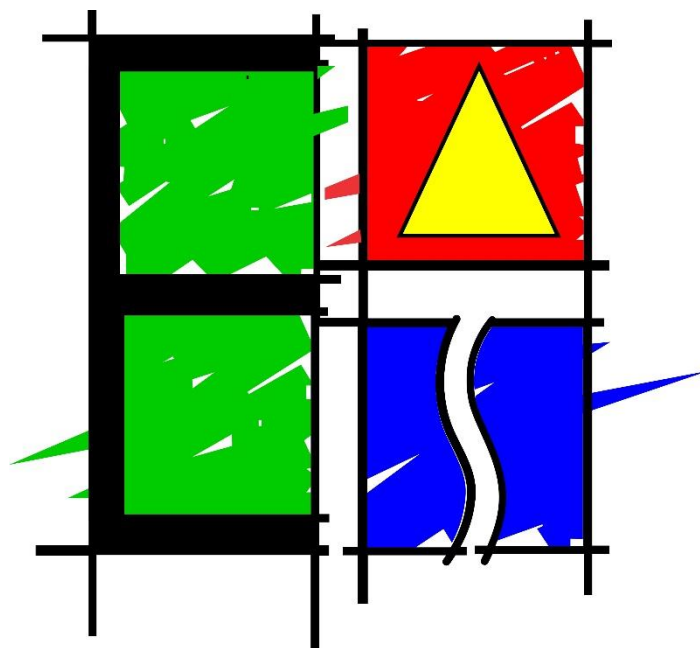


Quantum Foods Egglund: Ecological Assessment Report (Section 24G)



Report Prepared by:
Engineering Advice & Services (Pty) Ltd

EAS Project Number: 1752

28 January 2020

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Table of Contents

1	INTRODUCTION & BACKGROUND	6
1.1	Background.....	6
1.1.1	Section 24G – Background on the existing facility: Thornhill Egglund & Packhouse.....	6
1.2	Methodology and Approach	7
1.3	Legislation Framework.....	7
1.4	Systematic Planning Frameworks and Biodiversity Features	8
1.4.1	Vegetation of Southern Africa (VEGMAP)	8
1.4.2	National Biodiversity Assessment (NBA).....	10
1.4.3	Eastern Cape Biodiversity Conservation Plan (ECBCP).....	10
1.4.4	Sub-Tropical Ecosystem Planning (STEP).....	10
1.4.5	Garden Route Biodiversity Sector Plan (GRBSP).....	10
1.4.6	National Rivers and Wetlands.....	10
1.5	Implications of Systematic Planning frameworks	11
1.6	Systematic Planning Maps.....	11
2	DESCRIPTION OF THE TERRESTRIAL ENVIRONMENT.....	16
2.1	Site Locality.....	16
2.2	Summary of Terrestrial Environment.....	16
2.3	Ecological Processes.....	16
2.4	On-site Vegetation, Flora and Mapped Sensitivity	17
2.4.1	Pre-existing development.....	17
2.4.2	Species of Special Concern	18
2.4.3	Alien Invasive species.....	19
2.5	Fauna.....	20
2.5.1	Permit Requirements.....	20
3	IMPACT ASSESSMENT	21
3.1	Assessment of the significance of the potential impacts	21
3.1.1	Criteria of assigning significance to potential impacts.....	21
3.1.2	Significance Rating.....	21
3.2	Identification of impacts that may have occurred	22
3.2.1	Possible impacts on biodiversity during construction and operations.....	22
3.2.2	Summary of actions, activities, or processes that have sufficiently significant impacts to require mitigation 22	
3.2.3	Potential cumulative impacts.....	22
4	CONCLUSIONS	24
5	REFERENCES	25
6	APPENDIX A: SITE PHOTOGRAPHIC RECORD.....	27
	APPENDIX C: FLORA AND FAUNA SPECIES	31
7	APPENDIX D: SPECIALIST CV, SACNASP REGISTRATION AND DECLARATION	35

List of Figures

Figure 1: Layout of existing and proposed facility.	6
Figure 2: Map indicating locality of the site	11
Figure 3: National Vegetation Type and Conservation Status (2006).....	11
Figure 4: Rivers and Wetlands	11
Figure 5: Aerial Map	11
Figure 6: Mapped Vegetation and Sensitivity.....	17

List of Tables

Table 1: Flora Species of Special Concern known to occur in the vicinity of the site.....	18
Table 2: Summary indicating significance of potential impacts (SB = Significance BEFORE Mitigation; SA = Significance AFTER Mitigation)	23

Abbreviations

CARA	Conservation of Agricultural Resources Act 43 of 1983
CBA	Critical Biodiversity Area
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DEMC	Desired Ecological Management Class
DWS	Department of Water Affairs and Sanitation
DWAF	Department of Water Affairs and Forestry (former department name)
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMC	Ecological Management Class
EMP	Environmental Management Plan
EMPr	Environmental Management Programme report
ER	Environmental Representative
ESS	Ecosystem Services
IAP's	Interested and Affected Parties
IEM	Integrated Environmental Management
LM	Local Municipality
masl	meters above sea level
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act 107 of 1998
NFA	National Forests Act
NEMBA	National Environmental Management: Biodiversity Act 10 of 2004
NFA	National Forest Act 84 of 1998
PEMC	Present Ecological Management Class
PES	Present Ecological State
PNCO	Provincial Nature and Environment Conservation Ordinance (No. 19 of 1974).
RDL	Red Data List
RHS	Right Hand Side
RoD	Record of Decision
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SoER	State of the Environment Report
SSC	Species of Special Concern
TOPS	Threatened of Protected Species
ToR	Terms of Reference
+ve	Positive
-ve	Negative

Glossary

Corridors:	Have important functions as strips of a particular type of landscape differing from adjacent land on both sides. Habitat, ecosystems or undeveloped areas that physically connect habitat patches. Smaller, intervening patches of surviving habitat can also serve as "stepping stones" that link fragmented ecosystems by ensuring that certain ecological processes are maintained within and between groups of habitat fragments.
Degraded habitat/land:	Land that has been impacted upon by human activities (including introduction of invasive alien plants, light to moderate overgrazing, accelerated soil erosion, dumping of waste), but still retains a degree of its original structure and species composition (although some species loss would have occurred) and where ecological processes still occur (albeit in an altered way). Degraded land is capable of being restored to a near-natural state with appropriate ecological management.
Ecological Processes:	Ecological processes typically only function well where natural vegetation remains, and in particular where the remaining vegetation is well-connected with other nearby patches of natural vegetation. Loss and fragmentation of natural habitat severely threatens the integrity of ecological processes. Where basic processes are intact, ecosystems are likely to recover more easily from disturbances or inappropriate actions if the actions themselves are not permanent. Conversely, the more interference there has been with basic processes, the greater the severity (and longevity) of effects. Natural processes are complex and interdependent, and it is not possible to predict all the consequences of loss of biodiversity or ecosystem integrity. When a region's natural or historic level of diversity and integrity is maintained, higher levels of system productivity are supported in the long run and the overall effects of disturbances may be dampened.
Ecosystem status:	Ecosystem status of terrestrial ecosystems is based on the degree of habitat loss that has occurred in each ecosystem, relative to two thresholds: one for maintaining healthy ecosystem functioning, and one for conserving the majority of species associated with the ecosystem. As natural habitat is lost in an ecosystem, its functioning is increasingly compromised, leading eventually to the collapse of the ecosystem and to loss of species associated with that ecosystem.
Ecosystem:	All the organisms of a particular habitat, such as a lake or forest, together with the physical environment in which they live.
Endangered:	Endangered terrestrial ecosystems have lost significant amounts (more than 60 % lost) of their original natural habitat, so their functioning is compromised.
Endemic:	A plant or animal species, or a vegetation type, which is naturally restricted to a particular defined region. It is often confused with indigenous, which means 'native, occurring naturally in a defined area'.
Environment:	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Exotic:	Non-indigenous; introduced from elsewhere, may also be a <i>weed</i> or alien <i>invasive</i> species. Exotic species may be invasive or non-invasive.
Fragmentation (habitat):	Causes land transformation, an important current process in landscapes as more and more development occurs.
Habitat:	The home of a plant or animal species. Generally, those features of an area inhabited by animal or plant which are essential to its survival.
Indigenous:	Native; occurring naturally in a defined area.

Indigenous vegetation	Refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Least threatened terrestrial ecosystems:	These ecosystems have lost only a small proportion (more than 80 % remains) of their original natural habitat, and are largely intact (although they may be degraded to varying degrees, for example by invasive alien species, overgrazing, or overharvesting from the wild).
Riparian:	Pertaining to, situated on or associated with a river bank.
River corridors:	River corridors perform several ecological functions such as modulating stream flow, storing water, removing harmful materials from water, and providing habitat for aquatic and terrestrial plants and animals. These corridors also have vegetation and soil characteristics distinctly different from surrounding uplands and support higher levels of species diversity, species densities, and rates of biological productivity than most other landscape elements. Rivers provide for migration and exchange between inland and coastal biotas.
Transformation:	In ecology, transformation refers to adverse changes to biodiversity, typically habitats or ecosystems, through processes such as cultivation, forestry, drainage of wetlands, urban development or invasion by alien plants or animals. Transformation results in habitat fragmentation – the breaking up of a continuous habitat, ecosystem, or landuse type into smaller fragments.
Transformed Habitat/Land:	Land that has been significantly impacted upon as a result of human interferences/disturbances (such as cultivation, urban development, mining, landscaping, severe overgrazing), and where the original structure, species composition and functioning of ecological processes have been irreversibly altered. Transformed habitats are not capable of being restored to their original states.
Tributary/ Drainage line:	A small stream or river flowing into a larger one.
Untransformed habitat/land:	Land that has not been significantly impacted upon by man's activities. These are ecosystems that are in a near-pristine condition in terms of structure, species composition and functioning of ecological processes.
Vulnerable:	Vulnerable terrestrial ecosystems have lost some (more than 60 % remains) of their original natural habitat and their functioning will be compromised if they continue to lose natural habitat.
Weed:	An indigenous or non-indigenous plant that grows and reproduces aggressively, usually a ruderal pioneer of disturbed areas. Weeds may be unwanted because they are unsightly, or they limit the growth of other plants by blocking light or using up nutrients from the soil. They can also harbour and spread plant pathogens.
Wetlands:	A collective term used to describe lands that are sometimes or always covered by shallow water or have saturated soils, and where plants adapted for life in wet conditions usually grow.

1 Introduction & Background

Engineering Advice and Services were commissioned by Quantum Foods (Pty) Ltd to undertake an Ecological Assessment for Egglard Farm egg laying facilities on Bergsig North Farm (Portion 4 of 431) and Diepkloof Farm (Portion 1 of 429). The purpose of this report is to assess the ecological impact, as well the requirements in terms of the relevant Environmental Legislation of ongoing historical expansion of the lay houses and pack house facility without respective Environmental Authorisations being in place. The farm is situated along the R331 between Thornhill and Loerie (Figure 2).

1.1 Background

1.1.1 Section 24G – Background on the existing facility: Thornhill Egglard & Packhouse

The Thornhill Egglard facility currently consists of eight (8) lay houses. The first four (4) houses were commissioned in 1994/1995 (30 000 hens per house). Two (2) more houses were commissioned in 1996 (40 000 hens each) and the remaining two (2) houses were finished in 2005 (40 000 hens each). The facility was further expanded in 1997/1998 when the Pack House was constructed as part of the integrated operation. Quantum Foods (Pty) Ltd took over the Thornhill Egglard (egg laying & packing) facility from Pioneer Foods (Pty) Ltd in 2014 when Pioneer Foods (Pty) Ltd was unbundled. The ongoing expansion of the facility is deemed irregular and prior Environmental Authorisation was required for expansion of the lay houses as well as the pack facility.

Quantum Foods (Pty) Ltd is undertaking a voluntary Section 24G rectification application process to investigate/assess the activities associated with the development, expansion and operation of the lay houses/packing facility.

The above egg laying and pack house facility is indicated in Figure 1 below.



Figure 1: Layout of existing and proposed facility.

The farm has historically been developed as follows:

1. Development of four chicken houses in Phase 1 (Green Block) occurred in 1994/1995 before any regulations required the activity to obtain environmental authorisation (~1.75 Ha).
2. Development of two more chicken houses (~1 Ha) was then constructed in 1996 and a pack house (~1 Ha) in 1997/1998 as Phase 2 (Turquoise Block). This was undertaken before regulations required the activity to obtain environmental authorisation.
3. Development of two more chicken houses in Phase 3 (Pink Block) was completed in 2005 (~1.1 Ha). No environmental authorisation was undertaken before construction of this phase and hence the activity is deemed to be an illegal activity. This phase of development requires a Section 24G application, for which this Ecological Assessment Report has been compiled.
4. Phase 4 (Red Block) which entails the proposed construction of two additional chicken houses to be developed (~0.84 Ha). The listed triggers are mentioned above in Section 1.3 and a separate Basic Assessment Ecological Assessment report will address the proposed phase 4.

1.2 Methodology and Approach

The proposed methodology and approach are outlined below:

- Conduct a comprehensive desktop study and identify potential risks relating to vegetation, flora and fauna of the site and surrounding area. This will include the relevant Regional Planning frameworks,
- Conduct a detailed site visit to assess the following:
 - Detailed field survey of current vegetation, flora and habitats and record any fauna present, with aim to postulate what the historical context may have been.
 - Compile comprehensive species list, highlighting species that are of special concern, threatened, Red Data species and species requiring permits for destruction/relocation in terms of NEMBA and the Provincial Nature Conservation Ordinance No. 19 of 1974, etc that may have been present.
 - Detailed mapping of the various habitat units and assessment of habitat integrity, ecological sensitivity, levels of degradation and transformation, alien invasion and Species of Conservation Concern, the outcome being a detailed sensitivity map ranked into high, medium or low classes.
- Reporting will be comprised of a preliminary summary, with identification of impacts that may have occurred, a draft detailed Assessment Report (for public review and comment) and should any comments be raised these will be addressed in a final Assessment Report. This report is for the draft BAR which will go for public consultation following which a final BAR will be issued. The draft and final detailed reports will address the following:
 - Indicate any assumptions made and gaps in available information. Assessment of all the vegetation types and habitat units within the relevant Regional Planning Frameworks;
 - A detailed potential species list highlighting the various Species of Conservation Concern categories (endemic, threatened, Red Data species and other protected species requiring permits for destruction/relocation and invasive/exotic weeds);
 - Description and assessment of the habitat units that may have been present and site sensitivities ranked into high, medium or low classes based on sensitivity and conservation importance. A standard methodology has been developed based on other projects in the specific area;
 - A habitat sensitivity map will be compiled, indicating the sensitivities as described above;
 - A map indicating buffers (if required) in order to accommodate Regional Planning requirements;
 - Assessment of Impacts that may have occurred, as well as specific measure that may be required for alternative development plans;
 - An assessment of the impact that may have occurred as a result of the unauthorised activity.

1.3 Legislation Framework

The following historical NEMA EIA Regulation listing notices would have had bearing on the unauthorised activities:

- A. **EIA Regulations promulgated in terms of the ECA, Act No 73 of 1989 - GNR 1182 & 1183: Government Gazette No 18261, Pretoria, 5 September 1997 (01 April 1998 – end of day 09 May 2002)**

- Activity 2(d) The change of land use for grazing to any other form of agricultural use
- B. **Amendment of the ECA EIA Regulations promulgated in terms of the ECA, Act No 73 of 1989 - GNR 670 and GNR 672 of 10 May 2002, Government Gazette No 23401 (10 May 2002 – end of day 02 July 2006.)**
- Activity 2(d) The change of land use for grazing to any other form of agricultural use
 - Activity 3 The concentration of livestock, aquatic organisms, poultry and game in a confined structure for the purpose of commercial production, including Aquaculture and Mariculture.

Based on on-site investigations and a detailed desktop study including analysis of available historical aerial imagery the entire site (including phases 1 and 2), it is concluded that, at the time of construction, the affected area was most likely vegetated with pastures (possibly containing indigenous species). The specific age and state of these pastures cannot be confirmed due to lack of aerial imagery, but a conservative assumption would be that they were likely to be very similar to today – i.e. containing indigenous species. This is addressed in this report.

Constitution of Republic of South Africa (1996): Section 24(a) of the Constitution states that everyone has the right 'to an environment that is not harmful to their health or well-being'. Construction activities must comply with South African constitutional law by conducting their activities with due diligence and care for the rights of others.

National Forests Act 84 of 1998 with Amendments: Lists Protected trees, requiring permits for removal Department of Agriculture, Forestry and Fisheries). **It is unlikely that any protected trees were removed.**

Conservation of Agricultural Resources Act 43 of 1993: Lists Alien invasive species requiring removal.

Eastern Cape Nature and Environmental Conservation Ordinance 19 of 1974: Lists Protected species, requiring permits for removal (Department of Economic Development, Environmental Affairs and Tourism). **It is possible but unlikely that any protected species were removed.**

1.4 Systematic Planning Frameworks and Biodiversity Features

At the time of the historical construction of the unauthorised (Phases 1 – 3) egg laying facilities and pack house (i.e. before 2006), no planning frameworks had yet been developed nor were conservation assessments in place.

For the purposes of assisting with their description of the site, the applicable planning frameworks from 2006 will be utilised as reference points. The current vegetation units would have been applicable, being *Kouga Grassy Sandstone Fynbos*, possibly with elements of *Loerie Conglomerate Fynbos*.

1.4.1 Vegetation of Southern Africa (VEGMAP)

As indicated in Figure 3 the primary vegetation unit that would have been affected by the development of phases 1 – 3 (Mucina & Rutherford, 2006) is *Kouga Grassy Sandstone Fynbos*. The site and surroundings may have also contained elements of *Loerie Conglomerate Fynbos*. At the time of first publication (2006) both these vegetation units had a Least Threatened conservation status.

Kouga Grassy Sandstone Fynbos

Distribution Western and Eastern Cape Provinces: Between Uniondale and Uitenhage, generally surrounding FFs 27 Kouga Sandstone Fynbos at lower altitudes and often on northerly aspects. Along the lower flanks of the Kouga Mountains in the Langkloof north of Joubertina and the northern and lower slopes of the Suuranysberge to the low mountains and flats north of Humansdorp. Along the lower slopes of the Kouga and Baviaanspoort Mountains in Baviaanspoort as well as the northern slopes of the Baviaanspoort Mountains and the northern and lower slopes of the Groot Winterhoekberge, Elandsberge and Van Stadensberg including the valleys of the upper reaches of the Elands

and Kwa-Zunga Rivers. Also on various ridges embedded in FRs 16 Uniondale Shale Renosterveld south to east of Willowmore including Antoniesberg and Witberg. Altitude 220–1 220 m, mainly 300–900 m (concentrated around 480–560 m).

Vegetation & Landscape Features Low shrubland with sparse, emergent tall shrubs and dominated by grasses in the undergrowth, or grassland with scattered ericoid shrubs. The lower dry slopes, where leaching is less severe and nutrient levels are higher, support a higher grassy cover.

Geology & Soils Acidic lithosol soils derived from sandstones of the Table Mountain Group as well as quartzitic sandstones of the Witteberg Group (Nardouw Subgroup). Glenrosa and Mispah forms prominent. Land types mainly lb and Fa.

Climate MAP 270–800 mm (mean: 540 mm), evenly throughout the year with a slight peak in March and October–November. Mean daily maximum and minimum temperatures 27.0°C and 4.2°C for February and July, respectively. Frost incidence 2–10 days per year.

Important Taxa Small Tree: *Protea nitida*. Succulent Tree: *Aloe ferox*. Tall Shrubs: *Aspalathus kougaensis*, *A. nivea*, *Dodonaea viscosa* var. *angustifolia*. Low Shrubs: *Agathosma mucronulata*, *A. pilifera*, *A. puberula*, *A. spinosa*, *Aspalathus fourcadei*, *Cliffortia drepanoides*, *Clutia alaternoides*, *C. polifolia*, *Diosma prama*, *D. rourkei*, *Disparago ericoides*, *Erica demissa*, *E. pectinifolia*, *E. sparsa*, *E. thamnoides*, *Euryops euryopoides*, *Helichrysum teretifolium*, *Leucadendron salignum*, *Leucospermum cuneiforme*, *Otholobium carneum*, *Passerina obtusifolia*, *P. pendula*, *Phyllica axillaris*, *P. lachneaeoides*, *Polygala myrtifolia*, *Protea foliosa*, *Pteronia incana*, *Stoebe plumosa*, *Tephrosia capensis*. Herbs: *Alepidea capensis*, *Centella virgata*, *Gazania krebsiana* subsp. *krebsiana*, *Helichrysum felinum*, *Knowltonia capensis*. Geophytic Herbs: *Bobartia orientalis* subsp. *orientalis*, *Geissorhiza roseoalba*, *Watsonia meriana*. Graminoids: *Anthochortus crinalis*, *Brachiaria serrata*, *Cannomois scirpoides*, *C. virgata*, *Cymbopogon marginatus*, *Digitaria eriantha*, *Diheteropogon filifolius*, *Eragrostis curvula*, *Heteropogon contortus*, *Hypodiscus albo-aristatus*, *H. striatus*, *H. synchronolepis*, *Ischyrolepis capensis*, *I. gaudichaudiana*, *Mastersiella purpurea*, *Melinis repens* subsp. *repens*, *Merxmuellera papposa*, *M. stricta*, *Pentameris distichophylla*, *Pentaschistis eriostoma*, *P. pallida*, *Restio triticeus*, *Rhodocoma fruticosa*, *Tetraria capillacea*, *T. cuspidata*, *T. fourcadei*, *T. involucrata*, *Thamnochortus fruticosus*, *Themeda triandra*, *Trachypogon spicatus*, *Tristachya leucothrix*.

Endemic Taxa Tall Shrub: *Freylinia crispa*. Low Shrubs: *Argyrobium parviflorum*, *A. trifoliatum*, *Cullumia cirsioides*, *Eriocephalus tenuipes*, *Euchaetis vallis-simiae*, *Sutera cinerea*. Succulent Shrub: *Lampranthus lavisii*. Herbs: *Annesorhiza thunbergii*, *Aster laevigatus*, *Centella didymocarpa*, *Peucedanum dregeanum*. Geophytic Herbs: *Cyrtanthus flammus*, *C. labiatus*, *C. montanus*, *Gladiolus uitenhagensis*. Succulent Herb: *Gasteria glauca*. Graminoid: *Restio vallis-simius*.

Conservation Least threatened. Target 23%. About 20% conserved in wilderness and conservation areas including the Baviaanskloof, Berg Plaatz, Groendal, Guerna, Kouga, Welbedacht State Forest, and in Mierhooplaats and Stinkhoutsberg Nature Reserves. About 2% in addition enjoy protection in private reserves such as Jumanji Game Farm, Rooi Banke Forest Reserve, Paardekop Game Farm, Thaba Manzi Game Farm, and in Beakosneck, Kouga and Sepree River Private Nature Reserves. Some 9% transformed (cultivation) but in addition much transformed to grassy pasture by too frequent burning. Notable aliens include *Pinus pinaster*, *Acacia cyclops* and *A. mearnsii*. Erosion very low and low, but also high in some areas.

FFt 2 Loerie Conglomerate Fynbos

Distribution Eastern Cape Province: Hankey Valley on both sides of the Gamtoos River, from Andrieskraal to Mondplaas on the southwestern side, and Patensie to Thornhill on the northeastern side. Also found in the lower Kwazunga Valley above Springfield and Rooikrans near Uitenhage. Altitude 80–400 m.

Vegetation & Landscape Features Moderately undulating plains dissected by major rivers. Vegetation low shrubland or grassland with sparse emergent tall shrubs, and rich in succulents and geophytes. Structurally these are graminoid, asteraceous and proteoid fynbos types.

Geology & Soils Acidic, moist clay-loam, Glenrosa and Mispah soils and conglomerates associated with shales and conglomerates of the Karoo Uitenhage sequence. Land types mainly Fc, Fa and Ib.

Climate MAP 360–780 mm (mean: 600 mm), even throughout the year with a slight bimodal peak in March and October–November. Mean daily maximum and minimum temperatures 26.1°C and 6.9°C for February and July, respectively. Frost incidence about 3 days per year.

Important Taxa (*TCape thickets*) Tall Shrubs: *Aspalathus nivea*, *Azima tetracantha*, *Cliffortia linearifolia*, *Diospyros pallens*, *Dodonaea viscosa* var. *angustifolia*, *Euclea undulata*, *Grewia occidentalis*, *Gymnosporia capitata*, *Protea neriifolia*, *P. repens*, *Schotia afra* var. *afra*T. Low Shrubs: *Anthospermum galioides* subsp. *galioides*, *Asparagus subulatus*, *Barleria pungens*, *Cliffortia ruscifolia*, *Clutia polifolia*, *Elytropappus rhinocerotis*, *Erica demissa*, *E. pectinifolia*, *Felicia muricata* subsp. *cinerascens*, *Galenia secunda*, *Helichrysum anomalum*, *H. odoratissimum*, *H. zeyheri*, *Indigofera denudata*, *Leucadendron salignum*, *Leucospermum cuneiforme*, *Otholobium pictum*, *Passerina obtusifolia*, *Pelargonium odoratissimum*, *Protea foliosa*, *Senecio linifolius*. Succulent Shrubs: *Cotyledon orbiculata* var. *oblonga*, *Crassula cultrata*, *C. tetragona*, *Euphorbia polygona*. Woody Climbers: *Capparis sepiaria* var. *citrifolia*, *Rhoicissus digitata*. Woody Succulent Climber: *Zygophyllum foetidum*. Small Tree: *Protea nitida*. Herbs: *Commelina africana*, *Hibiscus pusillus*, *Salvia triangularis*. Geophytic Herbs: *Babiana patersoniae*, *Drimia intricata*, *Geissorhiza bracteata*, *Gladiolus longicollis*, *Polyxena ensifolia*, *Sansevieria hyacinthoides*, *Spiloxene trifurcillata*. Succulent Herbs: *Crassula nemorosa*, *Haworthia cooperi*. Herbaceous Climber: *Cyphia sylvatica*. Herbaceous Succulent Climbers: *Ceropegia cancellata*, *Pelargonium peltatum*. Graminoids: *Aristida junciformis* subsp. *galpinii*, *Brachiaria serrata*, *Cymbopogon marginatus*, *Cynodon dactylon*, *Eragrostis obtusa*, *Eustachys paspaloides*, *Ficinia tristachya*, *Ischyrolepis gaudichaudiana*, *I. sieberi*, *Pentaschistis angustifolia*, *P. colorata*, *Restio triticeus*, *Sporobolus africanus*, *Stipa dregeana*, *Tetraria cuspidata*, *Themeda triandra*, *Trachypogon spicatus*.

Endemic Taxon Succulent Shrub: *Erepsia aristata*.

Conservation Least threatened. Target 23%. Some 11% statutorily conserved in the Groendal Wilderness Area. Small patches are also found in the private Kabeljous River Natural Heritage Site. About 9% transformed (cultivation). Erosion very variable, including significant areas of high and moderate erosion, but also very low in some areas.

Remarks Fire-protected gullies with AT 4 Gamtoos Thicket and a forest (dominated by *Ficus sur*) form an intricate mosaic with the fynbos. The boundary towards adjacent renosterveld is particularly indistinct and very broad, supporting communities of transitional character. The flatter, old African surfaces are dominated by *Cliffortia ruscifolia* and *Dodonaea viscosa* var. *angustifolia*.

1.4.2 National Biodiversity Assessment (NBA)

No National Biodiversity Assessment was available at the time of these activities

1.4.3 Eastern Cape Biodiversity Conservation Plan (ECBCP)

No Eastern Cape Biodiversity Conservation Plan was available at the time of these activities

1.4.4 Sub-Tropical Ecosystem Planning (STEP)

No Sub-Tropical Ecosystem Planning was available at the time of these activities

1.4.5 Garden Route Biodiversity Sector Plan (GRBSP)

No Garden Route Biodiversity Sector Plan was available at the time of these activities

1.4.6 National Rivers and Wetlands

No perennial or non-perennial rivers and/or natural or artificial wetlands/dams (Figure 4) will be affected by the proposed development.

1.5 Implications of Systematic Planning frameworks

The development of the site would unlikely have compromised any vegetation units or critical ecological processes at a national regional or local level significantly due to the following:

- the condition and sensitivity of the site, which is highly altered from its natural state and lacks any intact/semi intact vegetation.
- the site being located outside of any designated Critical Biodiversity Areas, which are priority conservation areas to meet conservation targets;

Loss of vegetation cover (habitat) and species (flora and fauna) would have been localised to the specific development footprint and have a minimal and negligible impact (including cumulative impact) at a local, regional and national level as the site is largely devoid of conservation worthy vegetation due to historical land use.

The impact of the proposed development of the site for development, within an area already disturbed from historical agricultural use is unlikely to have any significant negative ecological process impacts at a national, regional and local level. The site is furthermore not situated directly within any critical ecological corridors nor will the proposed development result in any ecological corridor fragmentation. The implementation of best practice guidelines and implementation of the recommendations of the EMPr will be effective management to minimise any negative consequences.

1.6 Systematic Planning Maps

Figure 2: Map indicating locality of the site

Figure 3: National Vegetation Type and Conservation Status (2006)

Figure 4: Rivers and Wetlands

Figure 5: Aerial Map

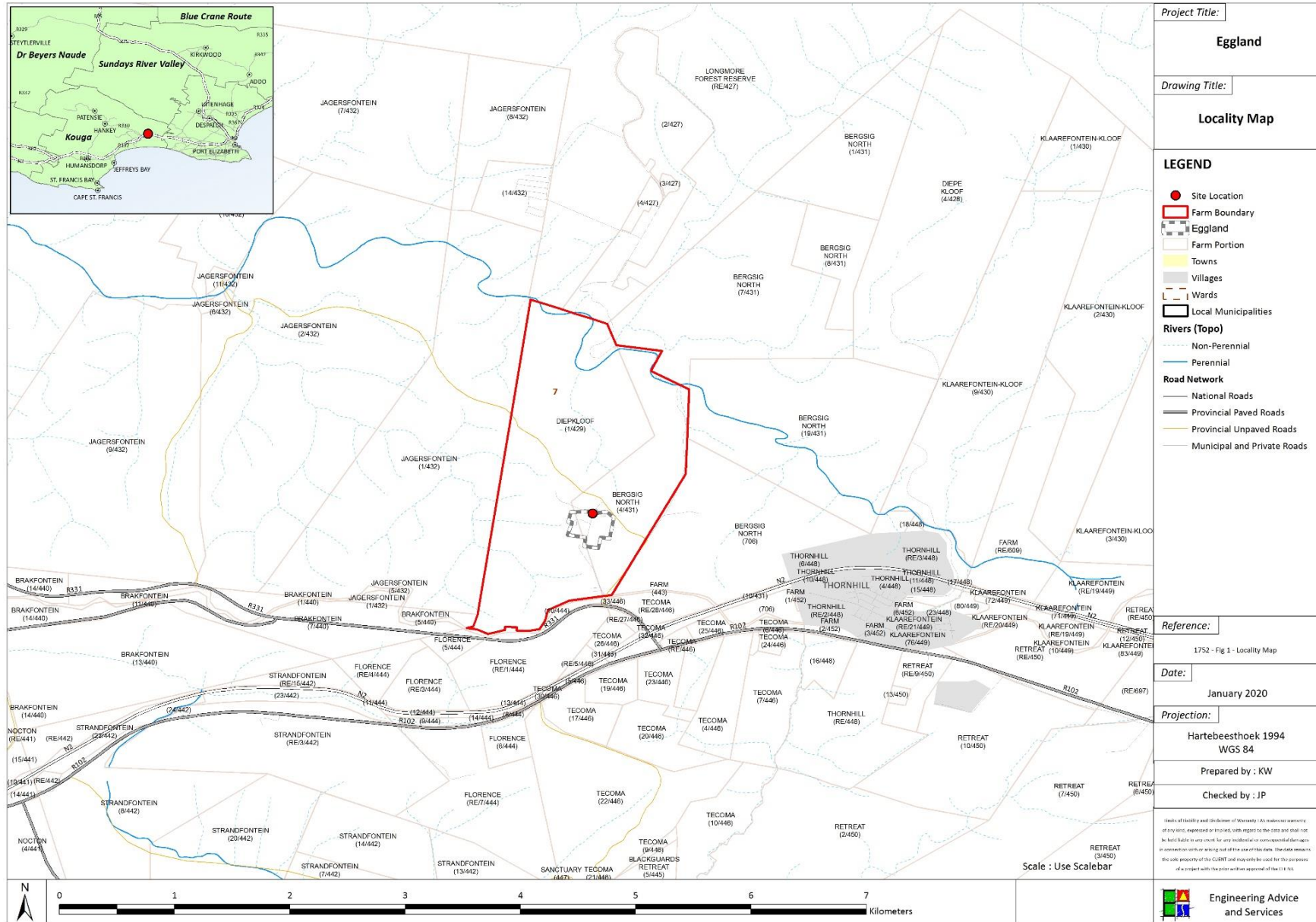


Figure 2: Map indicating locality of the site

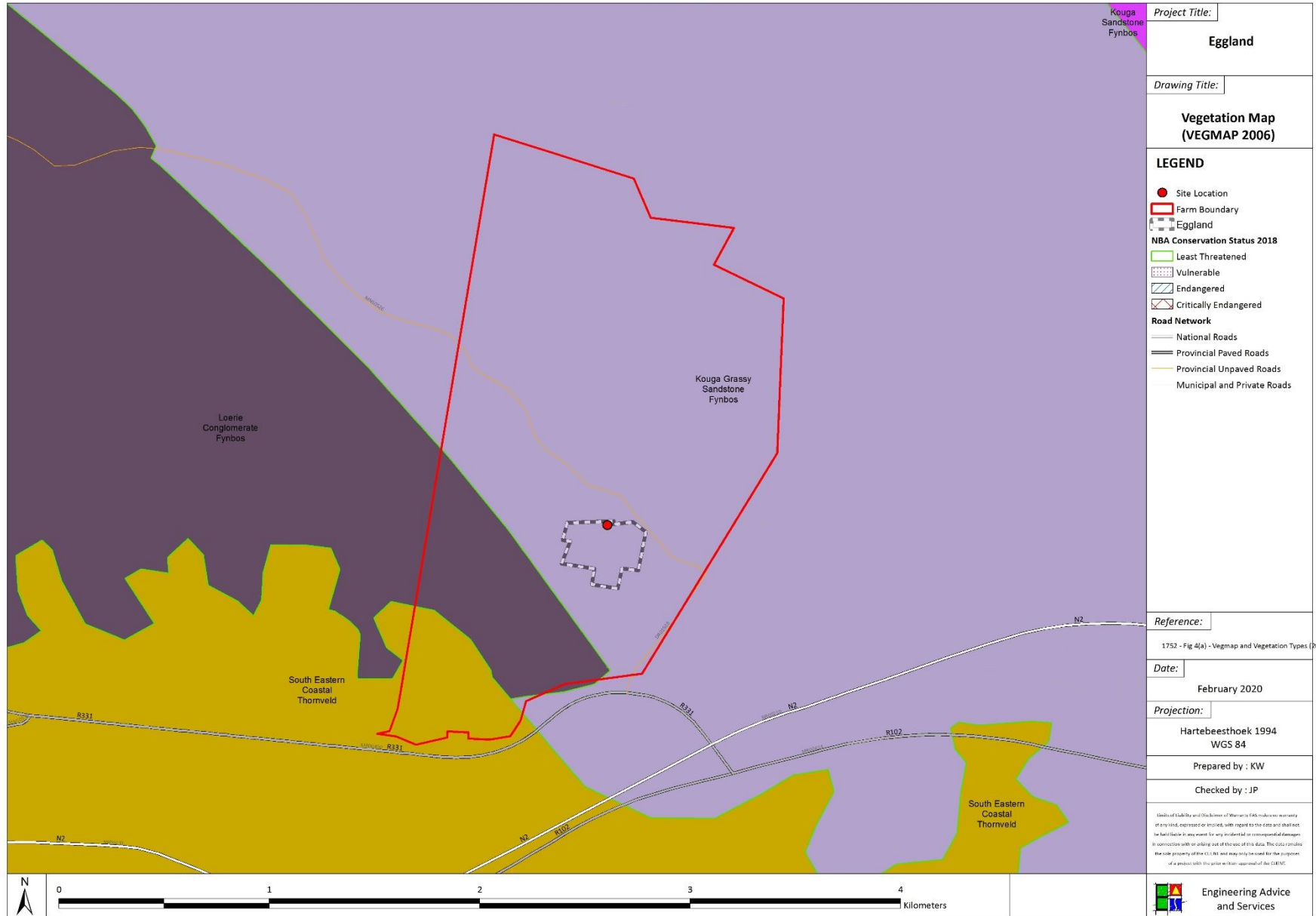


Figure 3: National Vegetation Type and Conservation Status (2006)

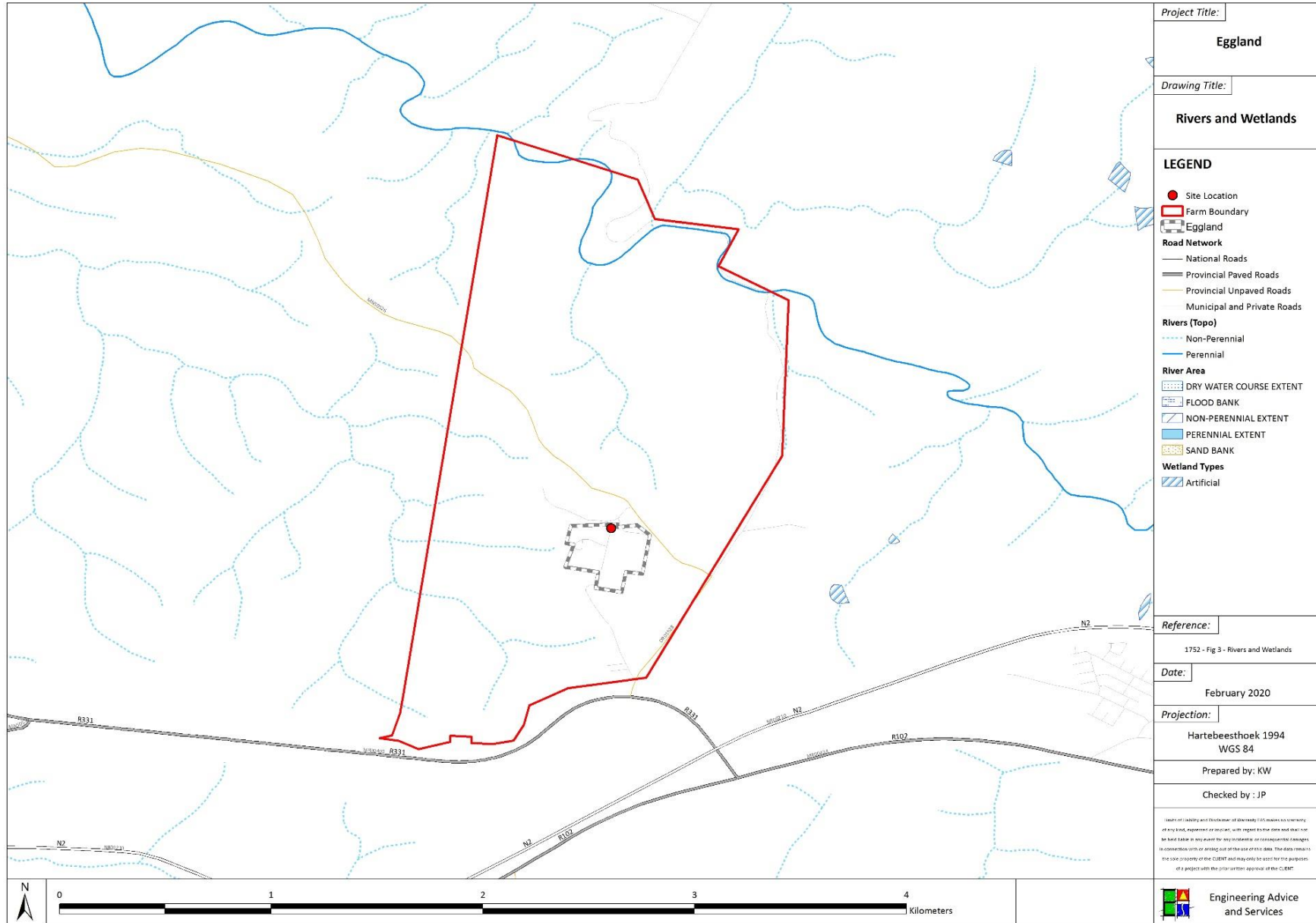


Figure 4: Rivers and Wetlands

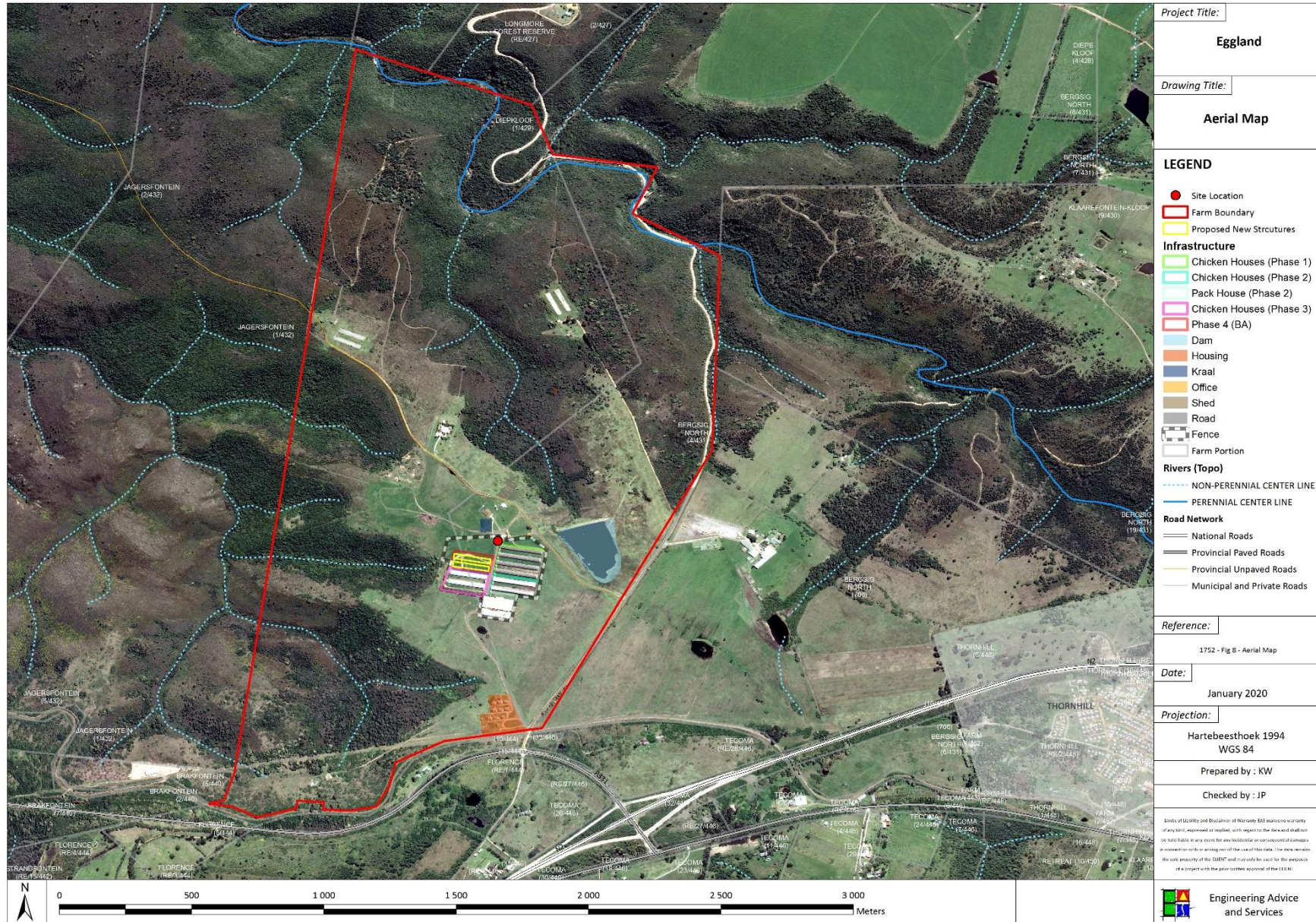


Figure 5: Aerial Map

2 Description of the Terrestrial Environment

2.1 Site Locality

The subject site (Quantum Foods Egglard) is situated on Farm Bergsig North (4/431) and Farm Diepkloof (1/429) along the DR01928, just outside of Thornhill, Eastern Cape. The Egg lying area is fenced off and currently has 8 laying buildings with the intention of constructing two new buildings. The portion of the farm fenced off is approximately 6.61 ha of that 0.4 ha will be developed. The area is currently vacant grass and is mowed regularly.

2.2 Summary of Terrestrial Environment

The table below provides a description of the on-site natural biophysical features:

Feature	Implication
Topography and drainage	
The site is generally flat, sloping slightly to the west. The area drains into the non-perennial river to the west.	
Vegetation	
Secondary vegetation, which is predominantly grasses with some shrubs and small ruderal weeds which is regularly mowed.	Site would most likely have been deemed suitable for the proposed activity.
Indigenous Flora	
No Species of Special Concern noted to be present	Permits for removal of protected flora and fauna would unlikely to have been required
Forest	
None	N/A
Indigenous and protected trees	
None	N/A
Fauna	
The grassy vegetation on the site may provide transient habitat for a wide range of small mammals, birds, reptiles and amphibians but is highly unlikely.	None of concern were likely to have been affected significantly. Any fauna on the site would most likely have migrate to surrounding areas during construction.
Alien Invasive Species	
None	N/A
Drainage Lines and Rivers	
Non-perennial river situated approximately 100 m to the west of the site.	Some local clearing may have taken place, which cannot be confirmed, but impact would have been negligible at a regional level.
Wetlands	
Man-made dam is located to the east of the site, no natural wetlands present. This may act as habitat for various water fowl.	Artificial wetland (dam) may have been constructed and/or modified.

2.3 Ecological Processes

With reference to the above summary:

1. The site was most likely situated within open pastures and possible some existing buildings that were repurposed.
2. The site was historically used as agricultural pastures and therefore degraded in nature. The original vegetation was historically *Kouga Grassy Sandstone Fynbos*, usually with rich elements of fynbos species, however these were most likely absent due to pastures and grazing.
3. The site was **not** located near any significant rivers or wetlands.
4. The site was **not** located within areas identified as Critical Biodiversity Area.
5. The vegetation on site was most likely a mosaic of common grasses, shrubs, ruderal weeds.

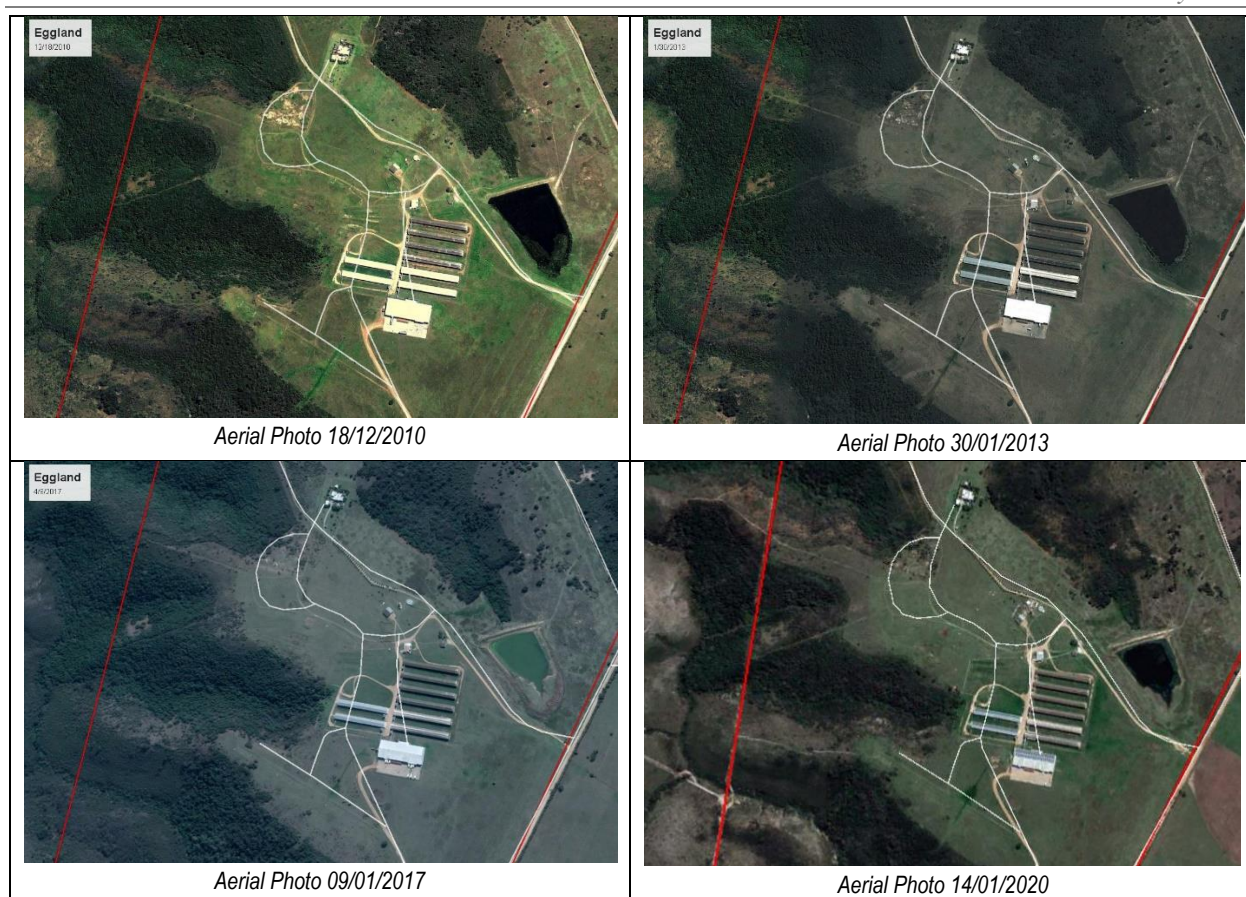
2.4 On-site Vegetation, Flora and Mapped Sensitivity

2.4.1 Pre-existing development

The earliest available aerial photography of the site is dated 2010 and already indicates that the phases 1 – 3 had been completed (refer to aerial photo table below). It is thus not possible to conclusively verify the earlier history of the site, but it would be realistic to conservatively assume that the pre-construction vegetation was pastures with some secondary indigenous elements (i.e. like the current situation in surrounding undeveloped pastures). These pre-existing pastures would most likely have been developed as the chicken houses. It would not be possible to confirm with certainty that this vegetation was 'indigenous' or not in terms of the definition of indigenous vegetation, as per NEMA, 1998 ('*vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years*'), as aerial photography is not available for the 10 year time period before the chicken houses were constructed. Due to lack of historical pre-development aerial photography, it thus cannot be confirmed with 100 % certainty if the site, before pastures were cleared, was vegetated with grassy fynbos or thicket elements, but since thicket tends to be restricted to the drainage lines (predominantly to the west of the site), it can be postulated with some certainty that the affected area was most likely historically a grassy fynbos community. From experience with similar situations, and based on the current condition of the vegetation it can however be postulated that it is likely that the pre-development vegetation was comprised of pasture grass species, which were most likely of an indigenous variety.



Figure 6: Mapped Vegetation and Sensitivity.



2.4.2 Species of Special Concern

Based on a desktop Assessment of existing online databases as well as field verification, the potential list of flora species that may have occurred near or within the site, is limited. No intact or semi-intact patches of fynbos were noted to be present within the site, which was most likely the historical situation.

Red Data Book, Rare, Endangered, Protected Species

- Within Kouga Grassy Sandstone Fynbos, there are some protected species which characteristically exist in the vegetation unit, however after a site investigation, no PNCO species were noted to be present within the affected area.
- No plant species listed as Critically Endangered, Endangered or Near Threatened in the National Red List for South African Plants were recorded at the study site.
- No flora species listed under Threatened and Protected Species (T.o.P.S.) were noted to be present during the site assessment.

Table 2 provides a detailed list of species protected in term of the P.N.C.O. and NFA, for which permits may have been required if they were present. No protected trees were likely to have been present. The likelihood of any Critically Endangered or Endangered species being present is Very Low. The species that may have been present (if any) were most likely commonly occurring species with a wide distribution range.

Table 1: Flora Species of Special Concern known to occur in the vicinity of the site

Botanical Name	Family	Status**	Pres	Comment
<i>Agathosma mucronulata</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Agathosma pilifera</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Agathosma puberula</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Agathosma spinosa</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Aloe ferox</i>	ASPHODELACEAE	PNCO	No	Succulent Tree

Botanical Name	Family	Status**	Pres	Comment
<i>Anthochortus crinalis</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Bobartia orientalis subsp. orientalis</i>	IRIDACEAE	PNCO	No	Geophytic Herbs
<i>Cannomois scirpoides</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Cannomois virgata</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Clutia alaternoides</i>	EUPHORBIACEAE	PNCO	No	Low Shrubs
<i>Clutia polifolia</i>	EUPHORBIACEAE	PNCO	No	Low Shrubs
<i>Cyrtanthus flammosus</i>	AMARYLLIDACEAE	End, PNCO	No	Geophytic Herbs
<i>Cyrtanthus labiatus</i>	AMARYLLIDACEAE	End, PNCO	No	Geophytic Herbs
<i>Cyrtanthus montanus</i>	AMARYLLIDACEAE	End, PNCO	No	Geophytic Herbs
<i>Diosma prama</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Diosma rourkei</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Erica demissa</i>	ERICACEAE	PNCO	No	Low Shrubs
<i>Erica pectinifolia</i>	ERICACEAE	PNCO	No	Low Shrubs
<i>Erica sparsa</i>	ERICACEAE	PNCO	No	Low Shrubs
<i>Erica thamnoides</i>	ERICACEAE	PNCO	No	Low Shrubs
<i>Euchaetis vallis-simiae</i>	RUTACEAE	End, PNCO	No	Low Shrubs
<i>Gasteria glauca</i>	ASPHODELACEAE	End, PNCO	No	Succulent Herb
<i>Geissorhiza rosealba</i>	IRIDACEAE	PNCO	No	Geophytic Herbs
<i>Gladiolus uitenhagensis</i>	IRIDACEAE	End, PNCO	No	Geophytic Herbs
<i>Hypodiscus albo-aristatus</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Hypodiscus striatus</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Hypodiscus synchroolepis</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Ischyrolepis capensis</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Ischyrolepis gaudichaudiana</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Leucadendron salignum</i>	PROTEACEAE	PNCO	No	Low Shrubs
<i>Leucospermum cuneiforme</i>	PROTEACEAE	PNCO	No	Low Shrubs
<i>Mastersiella purpurea</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Protea foliosa</i>	PROTEACEAE	PNCO	No	Low Shrubs
<i>Protea nitida</i>	PROTEACEAE	PNCO	No	Small Tree
<i>Restio triticeus</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Restio vallis-simius</i>	RESTIONACEAE	End, PNCO	No	Graminoid
<i>Rhodocoma fruticosa</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Thamnochortus fruticosus</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Watsonia meriana</i>	IRIDACEAE	PNCO	No	Geophytic Herbs

**PNCO – Provincial Nature Conservation Ordinance (19 of 1974); NFA – National Forests Act, End - Endemic

Permits from the relevant authority (Department of Economic Development, Environmental Affairs and Tourism) are required for the removal, translocation or destruction of all plants listed as protected; and all faunal species, in terms of the Provincial Nature and Conservation Ordinance (No. 19 of 1974). It is not anticipated that a comprehensive flora search and rescue will be required at this stage during construction due to the lack of protected flora species. It is however recommended that the permits are obtained as a precautionary measure and that a qualified botanist oversee a rapid flora search and rescue in order to address any species that may be present but that were not visible during the various site assessments.

2.4.3 Alien Invasive species

No alien invasive species with NEMBA status occurred within the proposed site. Several black wattle trees were noted to be present in surrounding area.

2.5 Fauna

The site under assessment lies within an area that is comprised of secondary vegetation and is likely habitat for several transient faunal species including small mammals, reptiles and birds. Further the piles of rubble from illegal dumping may be home to reptiles.

It is not likely that the development would have had any significant impact on faunal species. Most of the mobile fauna would have vacated the area once activities commenced.

2.5.1 Permit Requirements

It is unlikely that permits, in terms of the Provincial Nature and Environment Conservation Ordinance (No. 19 of 1974) would have been required.

3 Impact Assessment

3.1 Assessment of the significance of the potential impacts

3.1.1 Criteria of assigning significance to potential impacts

The following methodology is to be applied in the specialist studies for the assessment of potential impacts.

Criteria	Explanation
Nature of impact	Review the type of effect that a proposed activity will have on the environment and should include "what will be affected and how?"
Extent	Indicate whether the impact will be: <ul style="list-style-type: none"> • (S) <i>local</i> and limited to the immediate area of development (the site); • (L) limited to within 5 km of the development; or • (R) whether the impact may be realized regionally, nationally or even internationally.
Duration	Review the lifetime of the impact, as being: <ul style="list-style-type: none"> • (V) <i>very short term</i> (0 - 1 years), • (S) <i>short term</i> (1 - 5 years), • (M) <i>medium</i> (5 - 15 years), • (L) <i>long term</i> (>15 years but where the impacts will cease after the operation of the site), or • (P) <i>permanent</i>.
Intensity	Establish whether the impact is destructive or innocuous and should be described as either: <ul style="list-style-type: none"> • (L) <i>low</i> (where no environmental functions and processes are affected) • (M) <i>medium</i> (where the environment continues to function but in a modified manner) or • (H) <i>high</i> (where environmental functions and processes are altered such that they temporarily or permanently cease).
Probability	Consider the likelihood of the impact occurring and should be described as: <ul style="list-style-type: none"> • (I) <i>improbable</i> (low likelihood) • (P) <i>probable</i> (distinct possibility) • (H) <i>highly probable</i> (most likely) or • (D) <i>definite</i> (impact will occur regardless of prevention measures).
Status of the impact	Description as to whether the impact will be positive (a benefit), negative (a cost), or neutral.
Degree of confidence	The degree of confidence in the predictions, based on the availability of information and specialist knowledge. This should be assessed as high, medium or low. <ul style="list-style-type: none"> • (L) <i>Low</i>: Where the impact will not have an influence on the decision or require to be significantly accommodated in the project design
Significance	<ul style="list-style-type: none"> • (M) <i>Medium</i>: Where it could have an influence on the environment which will require modification of the project design or alternative mitigation; • (H) <i>High</i>: Where it could have a 'no-go' implication for the project unless mitigation or re-design is practically achievable.

3.1.2 Significance Rating

		Duration				
		Permanent	Long term	Medium term	Short term	Very short term
High Intensity						
Extent	National	High	High	High	High	Medium
	Regional	High	High	High	High	Medium
	Local	High	High	Medium	Medium	Medium
	Site specific	Medium	Medium	Medium	Medium	Medium
Medium Intensity						
Extent	National	High	High	High	Medium	Medium
	Regional	High	High	High	Medium	Medium
	Local	Medium	Medium	Medium	Medium	Medium
	Site specific	Medium	Medium	Medium	Medium	Low
Low Intensity						
Extent	National	Medium	Medium	Medium	Medium	Medium
	Regional	Medium	Medium	Medium	Medium	Medium
	Local	Medium	Medium	Medium	Medium	Low
	Site specific	Medium	Medium	Medium	Low	Low

Furthermore, the following must be considered:

- 1) Impacts should be described both before and after the proposed mitigation and management measures have been implemented.
- 2) All impacts should be evaluated for both the construction, operation and decommissioning phases of the project, where relevant.
- 3) The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region, if relevant.
- 4) Management actions: Where negative impacts are identified, specialists must specify practical mitigation objectives (i.e. ways of avoiding or reducing negative impacts). Where no mitigation is feasible, this should be stated and the reasons given. Where positive impacts are identified, management actions to enhance the benefit must also be recommended.

3.2 Identification of impacts that may have occurred

3.2.1 Possible impacts on biodiversity during construction and operations

Construction and operations can result in a range of negative impacts on terrestrial, marine and other aquatic ecosystems if not properly managed.

Table 2 describes impacts that may potentially occur in the site (as per DEDEAT guidelines) as well indicating the relevant EMP section. The predicted significance of these are summarised in

Table 2, where **SB** = Significance BEFORE mitigation and **SA** = Significance AFTER mitigation. No significant ancillary linear infrastructure, such as roads, conveyors, power lines, pipelines and railways, which can impact on biodiversity and ecosystem services are expected other than minor access roads.

3.2.2 Summary of actions, activities, or processes that have sufficiently significant impacts to require mitigation

The main impacts as a result of the proposed activity include the following:

1. Permanent or temporary loss of vegetation cover as a result of site clearing. Site clearing before construction may have resulted in the blanket clearing of vegetation within the affected footprint only.
2. Loss of species of special concern during pre-construction site clearing activities. Few species of special concern were likely to have been present within the affected area.
3. Susceptibility of some areas to erosion as a result of construction related disturbances. Removal of vegetation cover and soil disturbance may have resulted in some areas being temporarily susceptible to soil erosion.
4. Disturbances to ecological processes. Activity may have resulted in limited disturbances to surrounding ecological processes.
5. Loss of Faunal Habitat: Activity may have resulted in the limited loss of habitat for faunal species.
6. Loss of faunal SSC due to construction activities: Activities associated with bush clearing and site subsequent preparation, killing of perceived dangerous fauna, may have led to increased mortalities among faunal species.

3.2.3 Potential cumulative impacts

No cumulative impacts are expected to have resulted due to the development of the site, due to the limited disturbance area within an already modified landscape.

Table 2: Summary indicating significance of potential impacts (SB = Significance BEFORE Mitigation; SA = Significance AFTER Mitigation)

Impact	Comment	Extent	Duration	Intensity	Probability	SB
Indigenous vegetation cover loss	The permanent or temporary loss of vegetation cover as a result of site clearing is likely to be high during construction, however the species currently present are common grasses and invasive alien species.	Site	Long	Moderate	Definite	Low
Loss of flora species of special concern	Loss of species of special concern during pre-construction site clearing activities	Site	Long	Low	Definite	Low
Loss of faunal habitat	Activity will result in the loss of habitat for faunal species	Site	Long	Moderate	Definite	Low
Loss of faunal species	Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species	Site	Long	Low	Unlikely	Low
Erosion	Due to the flat nature of the site the risk of erosion resulting from loss of vegetation cover is minimal.	Site	Short	Low	Unlikely	Low
Disturbances to ecological processes	Disturbances to ecological processes	Site	Short	Low	Probable	Low
OVERALL						Low

4 Conclusions

The following conclusions can be made:"

1. The site is relatively flat and is suitable for the proposed development concept.
2. No noteworthy or conservation worthy vegetation or species are present within the site, or may have been present, which can be regarded as being transformed as a result of pre-chicken farm agricultural activities.
3. Vegetation on site is a mixture of secondary grasses and ruderal weeds which is mowed regularly. Historically it may have been used for livestock grazing (more than 10 years previously). The original transformation of the land from natural to agricultural use most likely took place a long time before any chicken houses were constructed.
4. The national vegetation unit is not represented in the species present (or most likely were present) as a result of grazing and mowing over many years.
5. The vegetation unit threat status is Least concern and no designated Critical Biodiversity Areas or Ecological Process Areas were affected.
6. The site falls just within 5 km of The Loerie Nature Reserve, however due to the transformed nature of the site, development would have had no significant consequences to the nature reserve or ecological processes.
7. It appears that some thornveld/thicket/fynbos surrounding the drainage line to the west of the facility may have been cleared but it would have been limited in extent. This vegetation should be allowed to regenerate, allowing an adequate buffer for fire management (~10 meters). Furthermore, some weed management would be recommended in this area.
8. The current vegetation on site is secondary (pastures) with some secondary colonisation of common grassy species and weeds from surrounding areas. The situation when the facility was constructed would most likely have been similar and it can be concluded that any significant ecological impacts to the area took place in a time before any chicken egg laying facilities and pack house were constructed.

In conclusion, based on this ecological assessment of the site and bearing in mind the historical context, where the site was most likely historically heavily utilised for grazing and pastures, the unauthorised expansion was unlikely to have had any significant direct ecological impacts to the terrestrial environment

5 References

1. Acocks, J. P. H. 1988. Veld Types of South Africa. Memoirs of the Botanical Survey of South Africa, No 57. Botanical Research Institute, Department of Agriculture and Water Supply, South Africa.
2. Batten, H., and Bokelmann, H. 2001. Eastern Cape: South African Wild Flower Guide 11. The Botanical Society of South Africa. pp 306.
3. Berliner D. & Desmet P. 2007. Eastern Cape Biodiversity Conservation Plan: Technical Report. Department of Water Affairs and Forestry Project No 2005-012, Pretoria. 1 August 2007
4. Bourquin, O. 1987. The recent geographical range extension of *Hemidactylus mabouia mabouia*. *Lammergeyer* 38: 12-14.
5. Branch, W. R. and H. Braack, 1987. The reptiles and amphibians of the Addo Elephant National Park. *Koedoe* 30: 61-112.
6. Branch, W.R. (ed.) 1988. South African Red Data Book - Reptiles and Amphibians. South African National Science Programme Report 151: i-iv, 242p.
7. Branch, W.R., 1998a. Field Guide to the Snakes and other Reptiles of Southern Africa. Rev ed. Struiks Publ., Cape Town, 399 pp, num. maps, 112 col. pls.
8. Bromilow, C. 2001. Problem Plants of South Africa. A Guide to the Identification and Control of More than 300 Invasive Plants and Other Weeds. Briza Publications. pp 258
9. Bruton, M. N., and Gess, F. W. 1988. Towards and Environmental Plan for the Eastern Cape. Conference proceedings from Rhodes University. Grocott and Sherry, Grahamstown.
10. De Villiers C.C., Driver A., Clark B., Euston-Brown D.I.W., Day E.G., Job N., Helme N.A., Holmes P.M., Brownlie S. and Rebelo A.B. 2005. Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape. Fynbos Forum and Botanical Society of South Africa, Kirstenbosch, 94p.
11. Friedmann, Y. and Daly, B. (eds.) 2004. Red Data Book of the Mammals of South Africa: A Conservation Assessment. CBSG Southern Africa, Conservation Breeding Specialist Group (SSG/IUCN), Endangered Wildlife Trust, South Africa. 722p.
12. Fuggle, R. F. and Rabie, M. A. 2003. Environmental Management in South Africa. Juta & Co, Johannesburg.
13. Gledhill, E. 1981. Veldblomme van Oos-Kaapland. The Department of Nature and Environmental Conservation of the Cape Province Administration. Galvin and Sales, Cape Town.
14. Golding, J. (Ed.) 2002. Southern African Plant Red Data Lists. Southern African Botanical Diversity Network Report No 14.
15. Henderson, L. 2001. Alien Weeds and Invasive Plants. Plant Protection Research Institute Handbook No 12. Agricultural Research Council. pp 300.
16. Henning, G.A., Terblanche, R.F. and Ball, J.B (eds) 2009. South African Red Data Book: Butterflies. SANBI Biodiversity Series 13. South African National Biodiversity Institute, Pretoria.
17. Hilton-Taylor, C. 1996. Red Data List of Southern African Plants. National Botanical Institute..
18. Köpke, D. 1988. The Climate of the Eastern Cape. In: Bruton, M. N., and Gess, F. W. (Eds). Towards and Environmental Plan for the Eastern Cape. Conference proceedings from Rhodes University. Grocott and Sherry, Grahamstown.
19. Low, A. B., and Rebelo, A. 1988. Vegetation of South Africa, Lesotho and Swaziland. A Companion to the Vegetation Map of South Africa, Lesotho and Swaziland. Department of Environmental Affairs and Tourism, Pretoria.
20. Minter, L.R., Burger, M., Harrison, J.A., Braack, H.H., Bishop, P.J & Kloepfer, D. (eds.) 2004. Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland, SI/MAB Series 9. Smithsonian Institute, Washington D.C., 360p.
21. Pienaar, K. 2000. The South African What Flower is That? Struik Publishers (Pty) Ltd. Cape Town.
22. Pierce, S. M. 2003. The STEP Handbook. Integrating the natural environment into land use decisions at the municipal level: towards sustainable development. Terrestrial Ecological Research Unit Report No 47. University of Port Elizabeth, South Africa.

23. Pierce SM and Mader AD. 2006. The STEP Handbook. Integrating the natural environment into land use decisions at the municipal level: towards sustainable development. Centre for African Conservation Ecology (ACE). Report Number 47 (Second Edition). Nelson Mandela Metropolitan University, South Africa.
24. Rouget, M., Reyers, B., Jonas, Z., Desmet, P., Driver, A., Maze, K., Egoh, B. & Cowling, R.M. 2004. South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 1: Terrestrial Component. Pretoria: South African National Biodiversity Institute. Skead, C.J. 2007. Historical incidence of the larger land mammals in the broader Eastern Cape. 2nd ed. (eds. Boshoff, A.F., Kerley, G.I.H. and Lloyd, P.H.), Port Elizabeth, Centre for African Conservation Ecology, Nelson Mandela Metropolitan University, 570 p.
25. Soil Classification Working Group (SCWG), 1991. Soil Classification, A Taxonomic System for South Africa. Memoirs on the Agricultural Natural Resources of South Africa, No 15. Department of Agricultural Development, Pretoria.
26. Stirton, C. H. 1987. Plant Invaders : Beautiful, but Dangerous. The Department of Nature and Environmental Conservation of the Cape Province Administration. Galvin and Sales, Cape Town.
27. Vlok, J, H, J., Euston-Brown, D.I.W. 2002. The patterns within, and the ecological processes that sustain, the subtropical thicket vegetation in the planning domain for the Subtropical Thicket Ecosystem Planning (STEP) project. TERU Report 40. University of Port Elizabeth.
28. Weather Bureau. 1988. Climate of South Africa - Climate statistics up to 1984 (WB40). Government Printer, Pretoria.

6 Appendix A: Site Photographic Record



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7: Affected site



Figure 8: Affected site



Figure 9: Affected site



Figure 10: Affected site



Figure 11: Affected site



Figure 12: Affected site



Figure 13: Surrounding area



Figure 14: Surrounding area



Figure 15: Surrounding area



Figure 16: Surrounding area



Figure 17: Surrounding area



Figure 18: Surrounding area



Figure 19: Surrounding area



Figure 20: Surrounding area



Figure 21: Surrounding area



Figure 22: Surrounding area



Figure 23: Surrounding area



Figure 24: Surrounding area

Appendix C: Flora and Fauna species

Botanical Name	Family Name	Status**	Present	Growth Form
FLORA				
<i>Agathosma mucronulata</i>	RUTACEAE	PNCO		Low Shrubs
<i>Agathosma pilifera</i>	RUTACEAE	PNCO		Low Shrubs
<i>Agathosma puberula</i>	RUTACEAE	PNCO		Low Shrubs
<i>Agathosma spinosa</i>	RUTACEAE	PNCO		Low Shrubs
<i>Alepidea capensis</i>	APIACEAE			Herbs
<i>Aloe ferox</i>	ASPHODELACEAE	PNCO		Succulent Tree
<i>Annesorhiza thunbergii</i>	APIACEAE	End		Herbs
<i>Anthochortus crinalis</i>	RESTIONACEAE	PNCO		Graminoids
<i>Argyrobium parviflorum</i>	FABACEAE	End		Low Shrubs
<i>Argyrobium trifoliatum</i>	FABACEAE	End		Low Shrubs
<i>Aspalathus fourcadei</i>	FABACEAE			Low Shrubs
<i>Aspalathus kougaensis</i>	FABACEAE			Tall Shrubs
<i>Aspalathus nivea</i>	FABACEAE			Tall Shrubs
<i>Aster laevigatus</i>	ASTERACEAE	End		Herbs
<i>Bobartia orientalis subsp. orientalis</i>	IRIDACEAE	PNCO		Geophytic Herbs
<i>Brachiaria serrata</i>	POACEAE			Graminoids
<i>Cannomois scirpoides</i>	RESTIONACEAE	PNCO		Graminoids
<i>Cannomois virgata</i>	RESTIONACEAE	PNCO		Graminoids
<i>Centella didymocarpa</i>	APIACEAE	End		Herbs
<i>Centella virgata</i>	APIACEAE			Herbs
<i>Cliffortia drepanoides</i>	ROSACEAE			Low Shrubs
<i>Clutia alaternoides</i>	EUPHORBIACEAE	PNCO		Low Shrubs
<i>Clutia polifolia</i>	EUPHORBIACEAE	PNCO		Low Shrubs
<i>Cullumia cirsioides</i>	ASTERACEAE	End		Low Shrubs
<i>Cymbopogon marginatus</i>	POACEAE			Graminoids
<i>Cyrtanthus flamosus</i>	AMARYLLIDACEAE	End, PNCO		Geophytic Herbs
<i>Cyrtanthus labiatus</i>	AMARYLLIDACEAE	End, PNCO		Geophytic Herbs
<i>Cyrtanthus montanus</i>	AMARYLLIDACEAE	End, PNCO		Geophytic Herbs
<i>Digitaria eriantha</i>	POACEAE			Graminoids
<i>Diheteropogon filifolius</i>	POACEAE			Graminoids
<i>Diosma prama</i>	RUTACEAE	PNCO		Low Shrubs
<i>Diosma rourkei</i>	RUTACEAE	PNCO		Low Shrubs
<i>Disparago ericoides</i>	ASTERACEAE			Low Shrubs
<i>Dodonaea viscosa var. angustifolia</i>	SAPINDACEAE			Tall Shrubs
<i>Eragrostis curvula</i>	POACEAE			Graminoids
<i>Erica demissa</i>	ERICACEAE	PNCO		Low Shrubs
<i>Erica pectinifolia</i>	ERICACEAE	PNCO		Low Shrubs
<i>Erica sparsa</i>	ERICACEAE	PNCO		Low Shrubs
<i>Erica thamnoides</i>	ERICACEAE	PNCO		Low Shrubs
<i>Eriocephalus tenuipes</i>	ASTERACEAE	End		Low Shrubs
<i>Euchaetis vallis-simiae</i>	RUTACEAE	End, PNCO		Low Shrubs
<i>Euryops euryopoides</i>	ASTERACEAE			Low Shrubs
<i>Freylinia crispa</i>	SCROPHULARIACEAE	End		Tall Shrub
<i>Gasteria glauca</i>	ASPHODELACEAE	End, PNCO		Succulent Herb
<i>Gazania krebsiana subsp. krebsiana</i>	ASTERACEAE			Herbs
<i>Geissorhiza roseoalba</i>	IRIDACEAE	PNCO		Geophytic Herbs
<i>Gladiolus uitenhagensis</i>	IRIDACEAE	End, PNCO		Geophytic Herbs
<i>Helichrysum felinum</i>	ASTERACEAE			Herbs
<i>Helichrysum teretifolium</i>	ASTERACEAE			Low Shrubs

Botanical Name	Family Name	Status**	Present	Growth Form
FLORA				
<i>Heteropogon contortus</i>	POACEAE			Graminoids
<i>Hypodiscus albo-aristatus</i>	RESTIONACEAE	PNCO		Graminoids
<i>Hypodiscus striatus</i>	RESTIONACEAE	PNCO		Graminoids
<i>Hypodiscus synchroolepis</i>	RESTIONACEAE	PNCO		Graminoids
<i>Ischyrolepis capensis</i>	RESTIONACEAE	PNCO		Graminoids
<i>Ischyrolepis gaudichaudiana</i>	RESTIONACEAE	PNCO		Graminoids
<i>Knowltonia capensis</i>	RANUNCULACEAE			Herbs
<i>Lampranthus lavisii</i>	MESEMBRYANTHEMACEAE	End		Succulent Shrub
<i>Leucadendron salignum</i>	PROTEACEAE	PNCO		Low Shrubs
<i>Leucospermum cuneiforme</i>	PROTEACEAE	PNCO		Low Shrubs
<i>Mastersiella purpurea</i>	RESTIONACEAE	PNCO		Graminoids
<i>Melinis repens</i> subsp. <i>repens</i>	POACEAE			Graminoids
<i>Merxmuellera papposa</i>	POACEAE			Graminoids
<i>Merxmuellera stricta</i>	POACEAE			Graminoids
<i>Otholobium carneum</i>	FABACEAE			Low Shrubs
<i>Passerina obtusifolia</i>	THYMELAEACEAE			Low Shrubs
<i>Passerina pendula</i>	THYMELAEACEAE			Low Shrubs
<i>Pentameris distichophylla</i>	POACEAE			Graminoids
<i>Pentaschistis eriostoma</i>	POACEAE			Graminoids
<i>Pentaschistis pallida</i>	POACEAE			Graminoids
<i>Peucedanum dregeanum</i>	APIACEAE	End		Herbs
<i>Phyllica axillaris</i>	RHAMNACEAE			Low Shrubs
<i>Phyllica lachneaeoides</i>	RHAMNACEAE			Low Shrubs
<i>Polygala myrtifolia</i>	POLYGALACEAE			Low Shrubs
<i>Protea foliosa</i>	PROTEACEAE	PNCO		Low Shrubs
<i>Protea nitida</i>	PROTEACEAE	PNCO		Small Tree
<i>Pteronia incana</i>	ASTERACEAE			Low Shrubs
<i>Restio triticeus</i>	RESTIONACEAE	PNCO		Graminoids
<i>Restio vallis-simius</i>	RESTIONACEAE	End, PNCO		Graminoid
<i>Rhodocoma fruticosa</i>	RESTIONACEAE	PNCO		Graminoids
<i>Stoebe plumosa</i>	ASTERACEAE			Low Shrubs
<i>Sutera cinerea</i>	SCROPHULARIACEAE	End		Low Shrubs
<i>Tephrosia capensis</i>	FABACEAE			Low Shrubs
<i>Tetragia capillacea</i>	CYPERACEAE			Graminoids
<i>Tetragia cuspidata</i>	CYPERACEAE			Graminoids
<i>Tetragia fourcadei</i>	CYPERACEAE			Graminoids
<i>Tetragia involucreta</i>	CYPERACEAE			Graminoids
<i>Thamnochortus fruticosus</i>	RESTIONACEAE	PNCO		Graminoids
<i>Themeda triandra</i>	POACEAE			Graminoids
<i>Trachypogon spicatus</i>	POACEAE			Graminoids
<i>Tristachya leucothrix</i>	POACEAE			Graminoids
<i>Watsonia meriana</i>	IRIDACEAE	PNCO		Geophytic Herbs

Scientific Name	Family	Status	Common Name
FAUNA			
Mammals			
<i>Philantomba monticola</i>	Bovidae	Vulnerable (2016)	Blue Duiker
<i>Tragelaphus scriptus</i>	Bovidae	Least Concern	Bushbuck
<i>Canis mesomelas</i>	Canidae	Least Concern (2016)	Black-backed Jackal

Scientific Name	Family	Status	Common Name
FAUNA			
<i>Papio ursinus</i>	Cercopithecidae	Least Concern (2016)	Chacma Baboon
<i>Amblysomus hottentotus</i>	Chrysochloridae	Least Concern (2016)	Hottentot Golden Mole
<i>Caracal caracal</i>	Felidae	Least Concern (2016)	Caracal
<i>Graphiurus (Graphiurus) murinus</i>	Gliridae	Least Concern	Forest African Dormouse
<i>Herpestes pulverulentus</i>	Herpestidae	Least Concern (2016)	Cape Gray Mongoose
<i>Aethomys namaquensis</i>	Muridae	Least Concern	Namaqua Rock Mouse
<i>Grammomys dolichurus</i>	Muridae	Least Concern (2016)	Common Grammomys
<i>Mastomys natalensis</i>	Muridae	Least Concern (2016)	Natal Mastomys
<i>Rattus rattus</i>	Muridae	Least Concern	Roof Rat
<i>Rhabdomys pumilio</i>	Muridae	Least Concern (2016)	Xeric Four-striped Grass Rat
<i>Orycteropus afer</i>	Orycteropodidae	Least Concern (2016)	Aardvark
Reptiles			
<i>Agama atra</i>	Agamidae	Least Concern (SARCA 2014)	Southern Rock Agama
<i>Bradypodion taeniabronchum</i>	Chamaeleonidae	Endangered (SARCA 2014)	Elandsberg Dwarf Chameleon
<i>Bradypodion ventrale</i>	Chamaeleonidae	Least Concern (SARCA 2014)	Eastern Cape Dwarf Chameleon
<i>Crotaphopeltis hotamboeia</i>	Colubridae	Least Concern (SARCA 2014)	Red-lipped Snake
<i>Dasypeltis scabra</i>	Colubridae	Least Concern (SARCA 2014)	Rhombic Egg-eater
<i>Dispholidus typus typus</i>	Colubridae	Least Concern (SARCA 2014)	Boomslang
<i>Chamaesaura anguina anguina</i>	Cordylidae	Least Concern (SARCA 2014)	Cape Grass Lizard
<i>Pseudocordylus microlepidotus microlepidotus</i>	Cordylidae	Least Concern (SARCA 2014)	Cape Crag Lizard
<i>Naja nivea</i>	Elapidae	Least Concern (SARCA 2014)	Cape Cobra
<i>Pachydactylus maculatus</i>	Gekkonidae	Least Concern (SARCA 2014)	Spotted Gecko
<i>Tetradactylus seps</i>	Gerrhosauridae	Least Concern (SARCA 2014)	Short-legged Seps
<i>Tropidosaura gularis</i>	Lacertidae	Least Concern (SARCA 2014)	Cape Mountain Lizard
<i>Boaedon capensis</i>	Lamprophiidae	Least Concern (SARCA 2014)	Brown House Snake
<i>Duberria lutrix lutrix</i>	Lamprophiidae	Least Concern (SARCA 2014)	South African Slug-eater
<i>Homoroselaps lacteus</i>	Lamprophiidae	Least Concern (SARCA 2014)	Spotted Harlequin Snake
<i>Lycodonomorphus inornatus</i>	Lamprophiidae	Least Concern (SARCA 2014)	Olive House Snake
<i>Lycodonomorphus rufulus</i>	Lamprophiidae	Least Concern (SARCA 2014)	Brown Water Snake
<i>Lycophidion capense capense</i>	Lamprophiidae	Least Concern (SARCA 2014)	Cape Wolf Snake
<i>Psammophylax rhombeatus</i>	Lamprophiidae	Least Concern (SARCA 2014)	Spotted Grass Snake
<i>Pelomedusa subrufa</i>	Pelomedusidae	Least Concern (SARCA 2014)	Central Marsh Terrapin
<i>Acontias gracilicauda</i>	Scincidae	Least Concern (SARCA 2014)	Thin-tailed Legless Skink
<i>Acontias meleagris</i>	Scincidae	Least Concern (SARCA 2014)	Cape Legless Skink
<i>Acontias orientalis</i>	Scincidae	Least Concern (SARCA 2014)	Eastern Legless Skink
<i>Trachylepis capensis</i>	Scincidae	Least Concern (SARCA 2014)	Cape Skink
<i>Trachylepis homalocephala</i>	Scincidae	Least Concern (SARCA 2014)	Red-sided Skink
<i>Trachylepis varia sensu lato</i>	Scincidae	Least Concern (SARCA 2014)	Common Variable Skink Complex
<i>Chersina angulata</i>	Testudinidae	Least Concern (SARCA 2014)	Angulate Tortoise
<i>Homopus areolatus</i>	Testudinidae	Least Concern (SARCA 2014)	Parrot-beaked Tortoise
<i>Stigmochelys pardalis</i>	Testudinidae	Least Concern (SARCA 2014)	Leopard Tortoise
<i>Varanus niloticus</i>	Varanidae	Least Concern (SARCA 2014)	Water Monitor

Scientific Name	Family	Status	Common Name
FAUNA			
<i>Bitis arietans arietans</i>	Viperidae	Least Concern (SARCA 2014)	Puff Adder
<i>Causus rhombatus</i>	Viperidae	Least Concern (SARCA 2014)	Rhombic Night Adder
Amphibians			
<i>Breviceps adspersus</i>	Brevicipitidae	Least Concern	Bushveld Rain Frog
<i>Sclerophrys capensis</i>	Bufoidea	Least Concern	Raucous Toad
<i>Sclerophrys pardalis</i>	Bufoidea	Least Concern	Eastern Leopard Toad
<i>Heleophryne hewitti</i>	Heleophrynidae	Critically Endangered	Hewitt's Ghost Frog
<i>Hyperolius marmoratus</i>	Hyperoliidae	Least Concern (IUCN ver 3.1, 2013)	Painted Reed Frog
<i>Kassina senegalensis</i>	Hyperoliidae	Least Concern	Bubbling Kassina
<i>Semnodactylus wealii</i>	Hyperoliidae	Least Concern	Rattling Frog
<i>Xenopus laevis</i>	Pipidae	Least Concern	Common Platanna
<i>Amietia delalandii</i>	Pyxicephalidae	Least Concern (2017)	Delalande's River Frog
<i>Amietia fuscigula</i>	Pyxicephalidae	Least Concern (2017)	Cape River Frog
<i>Cacosternum boettgeri</i>	Pyxicephalidae	Least Concern (2013)	Common Caco
<i>Cacosternum nanum</i>	Pyxicephalidae	Least Concern (2013)	Bronze Caco
<i>Strongylopus fasciatus</i>	Pyxicephalidae	Least Concern	Striped Stream Frog
<i>Strongylopus grayii</i>	Pyxicephalidae	Least Concern	Clicking Stream Frog
Invertebrates			
Scorpions		T.o.P.S.	
Baboon Spiders (All)		T.o.P.S.	
Butterflies			
None of concern			

**PNCO – Provincial Nature Conservation Ordinance (19 of 1974); NFA – National Forests Act; End – Endemic T.o.P.S. Threatened or Protected Species.

7 Appendix D: Specialist CV, SACNASP Registration and Declaration

Name of firm	Engineering Advice & Services (Pty) Ltd
Name of staff	JAMIE ROBERT CLAUDE POTE
ID Number	740515 5152 089
Profession	Registered Ecological Scientist and Environmental Scientist
Years with firm	5 Years
Nationality	South African
Membership to Professional Societies	The South African Council for Natural Scientific Professions (SACNASP): Pr. Sci. Nat.: 115233 International Association for Impact Assessment South Africa (IAIAsa Member Number 5045)South Africa (IAIAsa) Member Number 5045

KEY QUALIFICATIONS

Mr Jamie Pote has 15 years extensive professional experience in a wide range of Botanical and Ecological Specialist Assessments in South Africa (Eastern, Western & Northern Cape, Gauteng and Limpopo), Namibia, Mozambique, Democratic Republic of Congo, Republic of Congo and Ghana in the Infrastructure, Mining and Development Sectors. He also has experience in conducting Basic Assessment, Section 24 G, and Mining Permit (Borrow Pit) EMP applications, as well as developing GIS and other tools for Environmental related work.

He has broad ecological experience in a wide range of habitats and ecosystems in Southern, West and Central Africa and has been involved in all stages of project development from inception, through planning and environmental application and authorization (BAR and EMP) to implementation and compliance monitoring (ECO auditing) as an ecologist and as an Environmental Assessment Practitioner. Jamie has a well-deserved reputation for providing quality professional services. His strategy incorporates using proven methodologies with a highly responsive approach to sound environmental management, including developing adaptive methodologies and approaches with available technologies. He is highly capable of working within a team of qualified professionals or in an individual capacity.

EDUCATION

BSc	Rhodes University (Botany and Environmental Science)	2001
BSc (Hons)	Rhodes University (Botany)	2002

EMPLOYMENT RECORD

2003 – 2014	Self Employed Consultant	Specialist Environmental Consultant (Ecology)
2014 (Aug) – present	Engineering Advice & Services	Environmental Unit Manager

LANGUAGES

	<u>Speak</u>	<u>Read</u>	<u>Write</u>
English	Excellent	Excellent	Excellent
Afrikaans	Good	Excellent	Excellent

PROJECT EXPERIENCE

BASIC ASSESSMENT APPLICATION PROJECTS (DEDEAT)

- Basic Assessment Application for Citrus expansion on farm 960, Patensie (AIN du Preez Boerdery) 2014
- Basic Assessment Application for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape 2015
- Basic Assessment Application for Hankey Housing, Kouga District Municipality 2015

▪ Basic Assessment Application for Erf 14 Kabega, NMBM	2017
▪ Basic Assessment Application for Hankey Housing, Kouga District Municipality	2017
▪ Basic Assessment Application for Fairwest Rental Housing, Nelson Mandela Bay	2017
▪ Basic Assessment Application for South-End Precinct Mixed Use Development, Nelson Mandela Bay	2018
▪ Basic Assessment Application for Nelson Mandela University Access Road, NMB	2019
▪ Basic Assessment Application for Erf 599 Walmer Mixed Use Development, Nelson Mandela Bay	2019
▪ Basic Assessment Application for Cookhouse Bridge rehabilitation	2019
▪ Basic Assessment Application for Parsonsvelei Erf 984 & 1134 Parsonsvelei	2019

MINING PERMIT/ENVIRONMENTAL MANAGEMENT PROGRAMME APPLICATIONS (DMR)

▪ Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (DRPW)	2014
▪ Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR02581 (DRPW)	2014
▪ Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08041, DR08247, DR08248 & DR08504 (DRPW)	2014
▪ Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08599, DR08601 & DR08570 (DRPW)	2014
▪ Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08235, DR08551 & DR08038 (DRPW)	2014
▪ Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08092, DR08093 & DR08649 (DRPW)	2014
▪ Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08090, DR08412, DR08425, DR08129, DR08109, DR08106, DR08104 & DR08099 – Matatiele (DRPW)	2014
▪ Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (Tarkastad) (DRPW)	2015
▪ Mining BAR/EMP's for Chris Hani DM Borrow Pits – Intsika Yethu and Emalahleni (DRPW)	2015
▪ Mining BAR/EMP's for Joe Gqabi DM Borrow Pits – Senqu (DRPW)	2015
▪ Mining BAR/EMP's for Makana/Ndlambe LM Borrow Pits – Sarah Baartman (DRPW)	2015
▪ Mining BAR/EMP's for Amahlathi LM Borrow Pits – Amatole (DRPW)	2015
▪ Mining BAR/EMP's for Mbashe/Mqume LM Borrow Pits – Amatole (DRPW)	2015
▪ Mining BAR/EMP's for Sundays River Valley LM Borrow Pits – Sarah Baartman (DRPW)	2015
▪ Mining BAR/EMP's for Kouga LM Borrow Pits – Sarah Baartman (DRPW)	2015
▪ Mining BAR/EMP's for Nkonkobe LM Borrow Pits – (SANRAL)	2016
▪ Mining BAR/EMP's for Mbhashe LM Borrow Pits – (SANRAL)	2016
▪ Mining BAR/EMP's for Mbizana LM Borrow Pits – (SANRAL)	2016
▪ Mining BAR/EMP's for Senqu LM Borrow Pits – (SANRAL)	2016
▪ Mining BAR/EMP's for Elundini LM Borrow Pits – (SANRAL)	2016
▪ Mining BAR/EMP's for Emalahleni LM Borrow Pits – (SANRAL)	2016
▪ Mining BAR/EMP's for Emalahleni LM Borrow Pits – (DRPW)	2016
▪ Mining BAR/EMP's for Ikwezi/Baviaans LM Borrow Pits – (DRPW)	2016
▪ Mining BAR/EMP's for Ingquza Hill LM Borrow Pits – (SANRAL)	2017
▪ Mining BAR/EMP's for Baviaans LM Borrow Pits – (DRPW)	2017
▪ Mining BAR/EMP's for Senqu LM Borrow Pits – (DRPW)	2017
▪ Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW)	2017
▪ Mining BAR/EMP's for Inkwanca (Enoch Mgijima) LM Borrow Pits – (DRPW)	2017
▪ Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW)	2017
▪ Mining BAR/EMP's for Sakhisizwe/Engcobo LM Borrow Pits – (DRPW)	2017
▪ Mining BAR/EMP's for Raymond Mahlaba LM Borrow Pits – (DRPW)	2017
▪ Mining BAR/EMP's for Camdeboo LM Borrow Pits – (DRPW)	2017
▪ Mining BAR/EMP's for Elundini LM Borrow Pits – (DRPW)	2017
▪ Mining BAR/EMP's for Emalahleni/Intsika Yethu LM Borrow Pits – (DRPW)	2017
▪ Mining BAR/EMP's for 24 Borrow Pits in 6 districts within the Eastern Cape– (SANRAL)	2018
▪ Mining BAR/EMP's for Blue Crane Route LM Borrow Pits – (DoT)	2019

SECTION 24G APPLICATIONS

- 12 000 ML Dam constructed on farm 960, Patensie (MGM Trust) 2015
- Illegal clearing of 20 Ha of lands on Hitgeheim Farm, Sunland, Eastern Cape 2015

ENVIRONMENTAL MANAGEMENT, ENVIRONMENTAL CONTROL OFFICER, AUDITING AND MONITORING PROJECTS

- Flora Relocation Plan and Permit application for Wildemans Plaas, in NMB 2006
- EMP submission and ECO for Seaview Garden Estate in NMB 2010
- EMP and ECO for Sinati Golf Estate EMP in BCM, Eastern Cape 2009
- ECO audits for NMB Road surfacing in NMB (multiple contacts) 2011
- ECO for Mainstream Windfarm wind monitoring mast installation in Eastern Cape 2010
- Final EMP submission for Seaview Garden Estate in NMB 2012
- EMP and ECO for Utopia Estate in NMB 2013
- ECO for Riversbend Citrus Farm in NMB 2014
- ECO for Alfred Nzo DM Road resurfacing - DR08071, DR08649, DR08092, DR08418, DR08452, DR08015, DR08085, DR08639 & DR08073 in Eastern Cape - MSBA 2014
- ECO Audits for Koukamma Flood Damage Road Repairs – Hatch Goba 2014
- ECO for DRPW IRM Road Maintenance projects in Amahlathi Municipality 2015
- ECO for DRPW IRM Road Maintenance projects in Makana/Ndlambe Municipality 2015
- ECO for DRPW IRM Road Maintenance projects in Mbashe/Mqume Municipality 2015
- ECO for DRPW IRM Road Maintenance projects in Port St Johns, Mbizana, Ingquza Hill LMs 2015
- ECO and Botanical Specialist for the special maintenance of national route R61 Section 2 from Elinus Farm (km 42.2) to N10 (km 85.0) (SANRAL) 2016
- Environmental Control Officer (ECO): Construction of NSRI Slipway - Port Elizabeth Harbour 2016
- ECO for SANRAL RRP Road Maintenance projects in Mbashe LM 2016
- ECO for SANRAL RRP Road Maintenance projects in Nkonkobe LM 2016
- ECO for SANRAL RRP Road Maintenance projects in Mbizana LM 2016
- ECO for SANRAL RRP Road Maintenance projects in Senqu LM 2016
- ECO for SANRAL RRP Road Maintenance projects in Elundini LM 2016
- ECO and Environmental Management for closure of Bushmans River Landfill site 2016
- ECO for Citrus expansion on Farm 960, Patensie (AIN du Preez Boerdery) 2017
- ECO for Citrus expansion on Hitgeheim Farm (Farm 960), Sunland, Eastern Cape 2017
- DEO for improvement of national route R67 section 5 from Whittlesea (km 0.00) to Swart Kei river (km 15.40) – Murray & Roberts 2017
- ECO for SANRAL RRP Road Maintenance projects in Mbizana LM 2017
- ECO for DRPW IRM Road Maintenance projects in Raymond Mahlaba LM 2018
- ECO for DRPW IRM Road Maintenance projects in Inkwanca (Enoch Mjijima) LM 2018
- ECO for DRPW IRM Road Maintenance projects in Baviaans LM 2019
- ECO for DRPW IRM Road Maintenance projects in Senqu LM 2019
- ECO for DRPW IRM Road Maintenance projects in Kouga/Koukamma LM 2019
- ECO for DRPW IRM Road Maintenance projects in Sakhisizwe/Engcobo LM 2019
- ECO for DRPW IRM Road Maintenance projects in Elundini LM 2019
- ECO for DRPW IRM Road Maintenance projects in Emalahleni/Intsika Yethu LM 2019
- ECO for Construction of Fairwest Village Housing Project 2019
- ECO for Construction of Utopia Estate 2019
- ECO for Construction of NMU West End Student Residences Phases 1 & 3 2019

FLORA AND FAUNA RELOCATION PLANS, PERMITS AND IMPLEMENTATION

▪ Flora Relocation for Disco Poultry Farm in NMB	2010
▪ Flora Relocation for Mainstream Windfarm in Eastern Cape	2010
▪ Flora Search and Rescue Plan for Red Cap Wind Farm in Eastern Cape	2012
▪ Flora and Fauna Search and Rescue for Mainstream Windfarm in Eastern Cape	2013
▪ Flora Search and Rescue for Steytlerville Bulk Water Supply in Eastern Cape (Phase 1, 2 & 3)	2013
▪ Flora and Fauna Search and Rescue for OTGC Tank Farm, Coega IDZ in NMB	2013
▪ Flora and Fauna Search and Rescue for Jeffreys Bay School in Eastern Cape	2013
▪ Flora and Fauna Search and Rescue for Riversbend Citrus Farm in NMB	2014
▪ Flora Search and Rescue for Steytlerville Bulk Water Supply & WTW in Eastern Cape (Phase 4)	2015
▪ Flora Search and Rescue for Steytlerville Bulk Water Supply in Eastern Cape (Phase 5)	2016
▪ Flora Search and Rescue for Citrus expansion on Farm 960, Patensie (AIN du Preez Boerdery)	2016
▪ Flora Search and Rescue for Citrus expansion on Hitgeheim Farm (Farm 960), Sunland, Eastern Cape	2017
▪ Flora Search and Rescue for Citrus expansion on Boschkraal Citrus Farm, Sunland, Eastern Cape	2018
▪ Flora Search and Rescue for Wanhoop pipeline, Willowmore, Eastern Cape	2018
▪ Flora Search and Rescue for Wilgekloof pipeline, Willowmore, Eastern Cape	2019

ENVIRONMENTAL SCREENING PROJECTS

▪ Terrestrial Vegetation Risk Assessment for proposed Skietnek Citrus Farm development (Kirkwood)	2015
▪ Preliminary Environmental Risk Assessment: NSRI Slipway Port Elizabeth	2015
▪ Environmental Screening Report for Proposed Development of a Dwelling on Erf 899, Theescombe	2015
▪ Environmental Screening Report for Proposed Development on Erf 559, Walmer, Port Elizabeth	2015
▪ Environmental Screening Report for Proposed Housing Scheme Development of Erf 8709, Wells Estate	2015
▪ Environmental Screening Report for Development of Portion 10 of Little Chelsea No 87, NMB	2015
▪ Environmental Screening Report for Proposed Fairwest Social Housing project, Fairview, NMB	2016
▪ Environmental Screening Report for Development of Little Chelsea No 25, NMB	2016
▪ Environmental Screening Report for Proposed Housing Development of Erf 8700, Kabega Park, NMB	2017
▪ Environmental Screening Report for Proposed Housing Development of Erf 14, Kabega Park, NMB	2017
▪ Environmental Screening Report for proposed Khayaletu School, Buffalo City	2018
▪ Environmental Screening Report for Proposed Life Hospital parking expansion, NMB	2019
▪ Environmental Screening Report for Erf 984 & 1134 development, Parsonsvlei, NMB	2019

ROAD AND RAILWAY INFRASTRUCTURE PROJECTS

▪ Ecological Assessment for Road Layout for Whiskey Creek- Kenton in Eastern Cape	2006
▪ Botanical Assessment for Mn Conveyor Screening Report in NMB	2008
▪ Botanical Basic Assessment for Bholani Village Rd, Port St Johns in Eastern Cape	2009
▪ Botanical Report, EMP and Rehab Plan for Coega-Colchester N2 Upgrade in NMB	2009
▪ Botanical Assessment for Chelsea RD - Walker Drive Ext. in NMB	2010
▪ Botanical Assessment for Motherwell - Blue Water Bay Road in NMB	2010
▪ Ecological Assessment for Port St John Road in Eastern Cape	2010
▪ Ecological Assessment Review for Penhoek Road widening in Eastern Cape	2012
▪ Ecological Assessment for R61 road widening in Eastern Cape	2012
▪ Ecological Assessment for CDC IDZ Mn Terminal, conveyor and railway line	2013

MINING PROJECTS

▪	Biophysical Assessment for Humansdorp Quarry in Eastern Cape	2006
▪	Botanical Assessment, Rehab Plan & Maps for Quarry-Cathcart & Somerset East in Eastern Cape	2006
▪	Botanical Assessment, Rehab Plan & Maps for Quarry - Despatch Quarry in NMB	2006
▪	GIS Mapping & Botanical Assessment and Rehab Plan for Quarry - JBay Crushers in Eastern Cape	2006
▪	Botanical Assessment, EMP and Rehabilitation Plan for Polokwane Silicon Smelter in Limpopo	2006
▪	Application for Mining Permit for Bruce Howarth Quarry in Eastern Cape	2006
▪	Botanical Assessment for Scoping Report and Detailed Botanical Assessment and Rehab Plan for Elitheni Coal Mine in Eastern Cape	2007
▪	Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Oyster Bay in Eastern Cape	2007
▪	Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Bathurst/GHT in Eastern Cape	2007
▪	Botanical Assessment, Rehab Plan & Maps for Borrow Pit – Jeffreys Bay in Eastern Cape	2007
▪	Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Storms river/Kareedouw in Eastern Cape	2007
▪	Botanical Assessment for Zwartenbosch Quarry in Eastern Cape	2008
▪	Botanical description & map production for Quarry - Rudman Quarry in Eastern Cape	2008
▪	Botanical Basic Assessment, Rehab Plan & Maps for Borrow Pit - Rocklands/Patensie in Eastern Cape	2008
▪	Botanical Assessment & Maps for Sandman Sand Gravel Mine in Eastern Cape	2008
▪	Botanical Assessment & GIS maps for Shamwari Borrow Pit in Eastern Cape	2008
▪	Detailed Botanical Assessment, EMP and Rehab Plan for Kalakundi Copper/Cobalt Mine in Democratic Republic of Congo	2008
▪	Botanical Assessment, Rehab Plan & Maps for Borrow Pit Humansdorp/Oyster Bay in Eastern Cape	2008
▪	Botanical Assessment, Rehab Plan & Maps for AWRM - Cala in Eastern Cape	2008
▪	Botanical Assessment, Rehab Plan & Maps for AWRM - Camdeboo in Eastern Cape	2008
▪	Botanical Assessment, Rehab Plan & Maps for AWRM - Somerset East in Eastern Cape	2008
▪	Botanical Assessment, Rehab Plan & Maps for AWRM - Nkonkobe in Eastern Cape	2008
▪	Botanical Assessment, Rehab Plan & Maps for AWRM - Ndlambe in Eastern Cape	2008
▪	Botanical Assessment, Rehab Plan & Maps for AWRM - Blue Crane Route in Eastern Cape	2008
▪	Botanical Assessment, EMP and Rehabilitation Plan for AWRM - Cathcart in Eastern Cape	2008
▪	Botanical Assessment, GIS maps and Rehab Plan for Mthatha Prospecting in Eastern Cape	2008
▪	Regional Botanical Map for mining prospecting permit for Welkom Regional mapping in	2008
▪	Ecological Assessment and Mining and Rehabilitation Plan for Baghana Mining in Ghana	2010
▪	Ecological Assessment for Bochum Borrow Pits in Limpopo	2013
▪	Ecological Assessment and Mining and Rehabilitation Plan for Greater Soutpansberg Mining Project in Limpopo (3 proposed Mines)	2013
▪	Ecological Assessment for Thulwe Road Borrow Pits in Limpopo	2013

ENVIRONMENTAL MANAGEMENT PLANS

▪	Floral Survey for Mbotyi Conservation Assessment in Eastern Cape	2005
▪	Identifying and Assessment on Aquatic Weeds for Pumba Private Game Reserve in Eastern Cape	2005
▪	Biodiversity & Ecological Processes for Bathurst-Commonage in Eastern Cape	2006
▪	EMP for Kromensee EMP (Jeffries Bay) in Eastern Cape	2006
▪	Baseline Botanical Study, Vegetation mapping and EMP for Local Nature Reserve for Plettenberg Bay Lookout LNA in Western Cape	2009
▪	Basic Botanical Assessment for Kromensee EMP (Jeffries Bay) in Eastern Cape	2010
▪	Wetland Management Plan for NMB Portnet in NMB	2010

INFRASTRUCTURE DEVELOPMENT PROJECTS

▪ Botanical Assessment for PE Airport Extension in NMB	2006
▪ Botanical Assessment for Kidd's Beach Desalination Plant in BCM, Eastern Cape	2006
▪ Botanical Assessment and GIS mapping for golf course realignment for East London Golf Course in BCM, Eastern Cape	2007
▪ Botanical Assessment for Radar Mast construction for South African Weather Service - BCM and NMB	2008
▪ Botanical Assessment for Jansenville Cemetery in Eastern Cape	2009
▪ Botanical Assessment for Kouga Dam wall upgrade in Eastern Cape	2012
▪ Botanical Assessment for Zachtevlei Dam (Lady Grey)	2017
▪ Botanical Assessment for Gcebula River bridge (Peddie)	2017
▪ Ecological Assessment for Amalinda crossing, Buffalo City	2019

POWERLINE INFRASTRUCTURE PROJECTS

▪ Botanical Assessment for Steynsburg - Teebus 132 kV powerline in Eastern Cape	2004
▪ Botanical Assessment for Eskom 132kV Dedisa Grassridge Power line-Coega in NMB	2006
▪ Botanical Assessment for Eskom Power line – Tyalara-Wilo in Eastern Cape	2006
▪ Species of Special Concern Mapping Transmission Line for San Souci to Nivens Drift 132kV powerline in NMB	2009
▪ Botanical Assessment for Eskom Powerline - Albany-Kowie in Eastern Cape	2009
▪ Botanical Assessment for Dedisa-Grassridge Powerline in Eastern Cape	2010
▪ Ecological Assessment for Grahamstown-Kowie Powerline in Eastern Cape	2010
▪ Ecological Assessment for Dieprivier Karreedouw 132kV Powerline in Eastern Cape	2012
▪ Flora and Fauna search and Rescue plan for Van Stadens Windfarm Powerline in NMB	2012
▪ Rehabilitation Plan and Auditing for Grassridge-Poseidon Powerline Rehab in Eastern Cape	2013
▪ Eskom Solar one Ecological Walkdown: Nieuwehoop 400 kV powerline	2015
▪ Ecological Assessment: Dieprivier-Karreedouw 132kV Powerline realignment in Kouga LM	2016
▪ Eskom Ecological Walkdown: Dieprivier-Karreedouw 132 kV Powerline in Kouga LM	2016

PIPELINE INFRASTRUCTURE PROJECTS

▪ Detailed Botanical Assessment for Port Alfred water pipeline in Eastern Cape	2004
▪ Botanical & Floristic Report for Hankey pipeline in Eastern Cape	2006
▪ Environmental Risk Assessment for Elands River pipeline in Eastern Cape	2007
▪ Detailed Botanical Assessment for Motherwell Pipeline in NMB	2007
▪ Detailed Botanical Assessment, GIS maps for Erasmuskloof Pipeline in Eastern Cape	2007
▪ Map Production for Russell Rd Stormwater in NMB	2008
▪ Basic Botanical Assessment for Albany Pipeline in Eastern Cape	2008
▪ Species of Special Concern Mapping for Seaview Pipeline in NMB	2009
▪ Species of Special Concern Mapping for Chelsea Bulk Water Pipeline in NMB	2009
▪ Basic Botanical Assessment for Wanhoop farm pipeline in Eastern Cape	2010
▪ Basic Botanical Assessment for Chatty Sewer in NMB	2010
▪ Detailed Ecological Assessment for Suikerbos Pipeline in Gauteng	2012
▪ Ecological Assessment for Steytlerville Bulk Water Supply in Eastern Cape (Phase 4)	2013
▪ Ecological Assessment for Steytlerville Bulk Water Supply in Eastern Cape (Phase 5)	2013
▪ Ecological Assessment for Wanhoop-Willowmore Bulk Water Supply in Eastern Cape	2016
▪ Ecological Assessment for Butterworth Emergency Bulk Water Supply Scheme	2017
▪ Ecological Assessment for Karringmelkspruit Emergency Bulk Water Supply (Lady Grey)	2017
▪ Botanical Assessment for Ngqamakhwe Regional Water Supply Scheme (Phase 3)	2018

WIND FARM AND PHOTOVOLTAIC INFRASTRUCTURE PROJECTS

▪ Botanical Assessment for Electrawinds Windfarm Coega in NMB	2010
▪ Botanical Assessment and Open Space Management Plan for Mainstream Windfarm Phase 2 in Eastern Cape	2010
▪ Ecological Assessment for Inca Energy Windfarm in Northern Cape	2011
▪ Ecological Assessment for Universal Windfarm in NMB	2011
▪ Ecological Assessment for Broadlands Photovoltaic Farm in the Eastern Cape	2011
▪ Ecological Assessment for Windcurrent Wind Farm in Eastern Cape	2012

SPECIALISED ECOLOGICAL REPORTS

▪ Botanical & Riparian Assessment for Orange River Weirs-Boegoeberg, Douglas Dam and Sendelingsdrif in Northern Cape	2006
▪ Botanical Assessment for State of the Environment Report for Chris Hani District Municipality SoER in Eastern Cape	2003
▪ Forestry Rehabilitation Assessment Report for Amahlathi Forest Rehabilitation in Eastern Cape	2007
▪ Botanical Sensitivity Analysis for LSDP, Greenbushes-Hunters Retreat in NMB	2008
▪ Representative for landowner group for Seaview burial Park in NMB	2010
▪ Mapping of pipeline for Kenton Water Board in Eastern Cape	2010
▪ Rehabilitation Plan for N2 Upgrade - Coega to Colchester in NMB	2010
▪ Rehabilitation Plan for Nieu Bethesda in Eastern Cape	2011
▪ Mapping and Ecological services for Congo Agriculture in Republic of Congo	2013
▪ Section 24G Assessment and Rehabilitation Plan for Bingo Farm in Eastern Cape	2014
▪ Green Star Rating Ecological Assessment for SANRAL office, Bay West City, NMBM	2015
▪ Rehabilitation Plan for Hitgeheim Farm (Farm 960), Sunland, Eastern Cape	2017

AGRICULTURAL PROJECTS

▪ Botanical Assessment and Flora Relocation Plan for Wildemans Plaas, in NMB	2006
▪ Botanical Assessment and Open Space Management Plan for Kudukloof in NMB	2010
▪ Botanical Assessment and Open Space Management Plan for Landros Veeplaats in NMB	2010
▪ Ecological Assessment for Tzaneen Chicken Farm in Limpopo	2013
▪ Ecological Assessment for Doornkraal Pivot (Hankey) in Eastern Cape	2014
▪ Ecological Assessment for Citrus expansion on Farm 960, Patensie	2014
▪ Ecological Assessment for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape	2015

BUSINESS AND INDUSTRIAL DEVELOPMENT PROJECTS

▪ Botanical Assessment for Kenton Petrol Station in Eastern Cape	2005
▪ Botanical Assessment and RoD amendments for Colchester - Petrol Station in NMB	2005
▪ Ecological Assessment for Bay West City	2007
▪ Botanical Assessment for Bluewater Bay Erf 805 in NMB	2009
▪ Botanical Assessment and Open Space Management Plan for Petro SA Refinery, Coega IDZ in NMB	2010
▪ Ecological Assessment for OTGC Tank Farm in NMB	2012
▪ Ecological Assessment for Green Star grading for SANRAL in NMB	2014
▪ Ecological Assessment for Bay West City ENGEN Service Station	2015

HOUSING DEVELOPMENT PROJECTS

▪ Botanical Assessment for Bridgemead – Malabar PE in NMB	2004
▪ Botanical Basic Assessment for Trailees Wetland Assessment in Eastern Cape	2005
▪ Botanical Assessment and Rehab Plan for Arlington Racecourse - PE in NMB	2005
▪ Botanical Assessment for Smart Stone in NMB	2005
▪ Botanical Assessment for Peninsular Farm (Port Alfred) in Eastern Cape	2005
▪ Botanical Assessment for Mount Pleasant - Bathurst in Eastern Cape	2005
▪ Botanical Assessment and RoD amendments for Colchester Erven 1617 & 1618 (Riverside) in NMB	2005
▪ Basic Botanical Assessment for Parsonsvei 3/4 in Eastern Cape	2005
▪ Botanical Assessment for Gonubie Portion 809/9 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Glengariff Farm 723 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Gonubie Portion 809/10 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Gonubie Portion 809/4 & 5 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Plettenberg bay - Ladywood 438/1&3 in Western Cape	2006
▪ Botanical Assessment and Rehab Plan for Winterstrand Desalination Plant in BCM	2006
▪ Botanical Assessment for Bosch Hoogte in NMB	2006
▪ Botanical Assessment for Plettenberg bay Farm 444/38 in Western Cape	2006
▪ Botanical Assessment for Plettenberg Bay - 444/27 in Western Cape	2006
▪ Botanical Assessment for Leisure Homes in BCM, Eastern Cape	2006
▪ Botanical Assessment for Plettenberg Bay - 438/24 in Western Cape	2007
▪ Botanical Assessment for Plettenberg Bay - Olive Hills 438/7 in Western Cape	2007
▪ Vegetation Assessment for Kwanokuthula RDP housing project in Western Cape	2008
▪ Site screening assessment for Greenbushes Site screening in NMB	2008
▪ Botanical Assessment for Fairfax development in Eastern Cape	2008
▪ Botanical Assessment for Plettenberg Bay Brakkloof 50&51 in Western Cape	2008
▪ Botanical Assessment, GIS mapping for Theescombe Erf 325 in NMB	2008
▪ Site Screening for Mount Road in NMB	2008
▪ Botanical Assessment for Greenbushes Farm 40 Swinburne 404 in NMB	2008
▪ Botanical Assessment for Greenbushes 130 in NMB	2008
▪ Botanical Assessment for Greenbushes Kuyga no. 10 in NMB	2008
▪ Botanical Assessment for Kouga RDP Housing in Eastern Cape	2009
▪ Botanical Assessment for Fairview Erf 1226 (Wonderwonings) in NMB	2009
▪ Species List Compilation for Zeeloeirivier Humansdorp in Eastern Cape	2009
▪ Botanical Assessment for Woodlands Golf Estate (Farm 858) in BCM, Eastern Cape	2009
▪ Botanical Assessment for Plettenberg Bay - 438/4 in Western Cape	2009
▪ Botanical Assessment for The Craggs 288/03 in Western Cape	2010
▪ Revision of Ecological Assessment for Fairview Housing - revision in NMB	2010
▪ Botanical Assessment, EMP and Open Space Management Plan for Hornlee Housing Development in Western Cape	2010
▪ Botanical Assessment for Little Ladywood in Western Cape	2010
▪ Botanical Assessment and Open Space Management Plan for Motherwell NU31 in NMB	2010
▪ Botanical Assessment and Open Space Management Plan for Plett 443/07 in Western Cape	2010
▪ Botanical Assessment for Willow Tree Farm in NMB	2010
▪ Flora Search and Rescue Plan for Kwanobuhle Housing in Western Cape	2011
▪ Ecological Assessment for Ethembeni Housing in NMB	2012
▪ Ecological Assessment for Pelana Housing in Limpopo	2012
▪ Ecological Assessment for Lebowakgoma Housing in Limpopo	2013
▪ Ecological Assessment for Giyani Development in Limpopo	2013
▪ Ecological Assessment for Palmietfontein Development in Limpopo	2013

▪ Ecological Assessment for Seshego Development in Limpopo	2013
▪ Botanical Assessment for Sheerness Road in BCM, Eastern Cape	2013
▪ Ecological Assessment for Hankey Housing, Kouga District Municipality	2015
▪ Ecological Assessment for erf 14, Kabega, Port Elizabeth	2017
▪ Ecological Assessment for Fairwest Rental Housing, Port Elizabeth	2017
▪ Ecological Assessment for South-End Precinct Mixed Use Development, Nelson Mandela Bay	2018

GOLF ESTATE AND RESORT DEVELOPMENT PROJECTS

▪ Botanical Assessment, EMP and Rehabilitation Plan for Tiffendel Ski Resort in Eastern Cape	2006
▪ Botanical Assessment for Rockcliff Resort Development in BCM, Eastern Cape	2007
▪ Botanical Assessment for Rockcliff Golf Course in BCM, Eastern Cape	2008
▪ Species List& Comments Report for Kidds Beach Golf Course in BCM, Eastern Cape	2009
▪ Botanical Assessment for Plettenberg Bay -Farm 288/03 in Western Cape	2009

MIXED USE DEVELOPMENT PROJECTS

▪ Botanical Assessment and GIS mapping for Madiba Bay Leisure Park in NMB	2007
▪ Botanical Assessment and GIS mapping for Madiba Bay Leisure Park in NMB	2007
▪ Botanical Basic Assessment for Cuyler Manor (Farm 320), Uitenhage in NMB	2007
▪ Botanical Assessment and GIS maps for Utopia Estate PE in NMB	2008
▪ Botanical Assessment, GIS maps, Open Space and Rehab Plans for Fairview Erf 1082 in NMB	2009
▪ Botanical Assessment, EMP and Open Space Management Plan for Bay West City in NMB	2010

ECO-ESTATE DEVELOPMENT PROJECTS

▪ Botanical Assessment for Rosehill Farm in Eastern Cape	2005
▪ Botanical Assessment for Resolution Game Farm in Eastern Cape	2005
▪ Botanical Assessment for Gonubie Portion 809/11 in BCM, Eastern Cape	2005
▪ Botanical Assessment for Kidd's Beach portion 1075 in BCM, Eastern Cape	2005
▪ Botanical Assessment, EMP and Rehabilitation Plan for Seaview Eco-estate in NMB	2006
▪ Botanical Assessment for Kidd's Beach portion 1076 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Palm Springs, Kidds Beach East London in BCM, Eastern Cape	2006
▪ Botanical Assessment for Nahoon Farm 29082 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Roydon Game farm, Queenstown in Eastern Cape	2007
▪ Botanical Assessment for Winterstrand Estate (Farm 1008) in BCM, Eastern Cape	2007
▪ Botanical Assessment for Homeleigh Farm 820 in BCM, Eastern Cape	2007
▪ Botanical Basic Assessment, Rehab Plan & Maps for Candlewood, Tsitsikamma in Western Cape	2007
▪ Botanical Assessment, EMP and Rehab Plan for Carpe Diem Eco development in Eastern Cape	2007
▪ Botanical Assessment - Poultry Farm for Coega Kammaskloof Farm 191 in NMB	2008
▪ Botanical Assessment - Housing development for Coega Ridge in NMB	2008
▪ Botanical Assessment, Rehabilitation Plan, EMP and GIS maps for Amanzi Estate in NMB,	2008
▪ Detailed Botanical Assessment and Open Space Management Plan for Olive Hills in Western Cape	2010
▪ Botanical Assessment and EMP for Zwartbosch Road in Eastern Cape	2010
▪ Botanical Re-Assessment of Swanlake Eco Estate in Aston Bay, Eastern Cape	2018

GIS AND IT DEVELOPMENT

▪ Development of GIS databases and mapping tools for Manifold GIS software	2008
▪ Landsat Image classification and analysis (Congo Agriculture)	2010

- Development of *iAuditor* Environmental Audit templates (DRPW audits) 2014

CONFERENCES AND PUBLICATIONS

- Pote, J., Shackleton, C.M., Cocks, M. & Lubke, R. 2006. Fuelwood harvesting and selection in Valley Thicket, South Africa. Journal of Arid Environments, 67: 270-287.
- Pote, J., Cocks, M., Dold, T., Lubke, R.A. and Shackleton, C. 2004. The homegarden cultivation of indigenous medicinal plants in the Eastern Cape. Indigenous Plant Use Forum, 5 - 8 July 2004, Augsburg Agricultural School, Clanwilliam, Western Cape.
- Pote, J. & Lubke, R.A. 2003. The selection of indigenous species suitable for use as fuelwood and building materials as a replacement of invasive species that are currently used by the under-privileged in the Grahamstown commonage. Working for Water Inaugural Research Symposium 19 - 21 August 2003, Kirstenbosch. Poster presentation.
- Pote, J. & Lubke, R.A. 2003. The screening of indigenous pioneer species for use as a substitute cover crop for rehabilitation after removal of woody alien species by WfW in the grassy fynbos biome in the Eastern Cape. Working for Water Inaugural Research Symposium 19 - 21 August 2003, Kirstenbosch, South Africa.

RESEARCH EXPERIENCE

- Resource assessment of bark stripped trees in indigenous forests in Weza/Kokstad area (June 2000; Dr. C. Geldenhuis & Mr. M. Kaplin).
- Working for Water research project for indigenous trees for woodlots (December 2000/January 2001; Prof R.A. Lubke, Rhodes University).
- Project coordinator and leader of the REFYN project – A BP conservation gold award: Conservation and Restoration of Grassy-Fynbos. A multidisciplinary project focusing on management, restoration and public awareness/education (2001 – 2002).
- Conservation Project Management Training Workshops: Royal Geographical Society, London 2001 – Fieldwork Techniques, Habitat Assessment, Biological Surveys, Project Planning, Public Relations and Communications, Risk Assessment, Conservation Education
- Selection and availability of wood in Crossroads village, Eastern Cape, South Africa. Honours Research Project 2002. Supervisors: Prof. R.A. Lubke & Prof. C. Shackleton.
- Floral Morphology, Pollination and Reproduction in *Cyphia* (LOBELIACEAE). Honours Research Project 2002. Supervisor: Mr. P. Phillipson.
- Forestry resource assessment of bark-stripped species in Amatola District (December 2002; Prof R.A. Lubke).
- Homegarden Cultivation of Medicinal Plants in the Amathole area. Postgraduate Research Project (2003-2005; Prof R.A. Lubke, Prof C.M. Shackleton and Ms C.M., Cocks).



herewith certifies that
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(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)
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Effective **20 July 2016**

Expires **31 March 2021**



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Chairperson

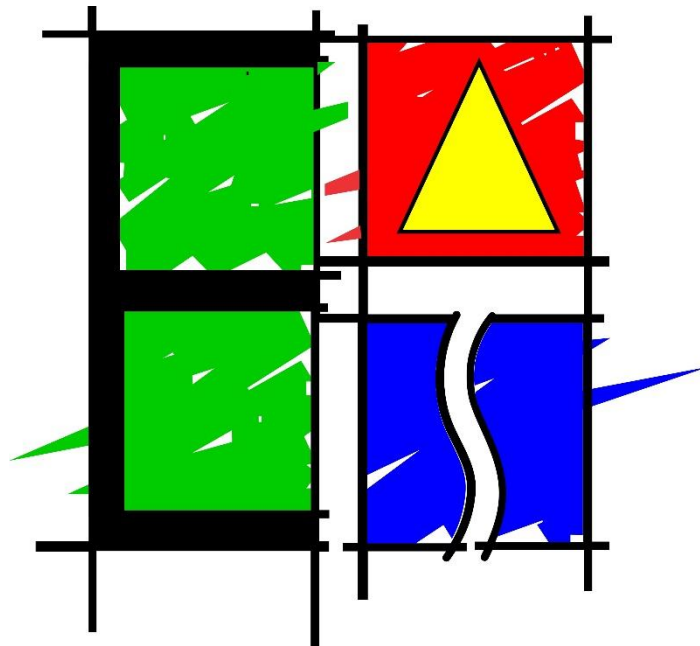
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Chief Executive Officer



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Quantum Foods Egglund: Ecological Assessment Report



Report Prepared by:
Engineering Advice & Services (Pty) Ltd

EAS Project Number: 1752

28 January 2020

Quantum Foods Egglund: Ecological Assessment Report (Expansion of Facilities)

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28 January 2020

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Table of Contents

1	INTRODUCTION & BACKGROUND	6
1.1	Background.....	6
1.1.1	<i>Basic Assessment for Future Expansion – Additional Chicken Houses</i>	6
1.2	Methodology and Approach	7
1.3	Legislation Framework.....	8
1.4	Systematic Planning Frameworks and Biodiversity Features	9
1.4.1	<i>Vegetation of Southern Africa (VEGMAP)</i>	10
1.4.2	<i>National Biodiversity Assessment (NBA)</i>	12
1.4.3	<i>Eastern Cape Biodiversity Conservation Plan (ECBCP)</i>	12
1.4.4	<i>Sub-Tropical Ecosystem Planning (STEP)</i>	12
1.4.5	<i>Garden Route Biodiversity Sector Plan (GRBSP)</i>	13
1.4.6	<i>Rivers and Wetlands</i>	13
1.5	Implications of Systematic Planning frameworks	13
1.6	Systematic Planning Maps.....	13
2	DESCRIPTION OF THE TERRESTRIAL ENVIRONMENT.....	21
2.1	Site Locality.....	21
2.2	Summary of Terrestrial Environment.....	21
2.3	Ecological Processes.....	21
2.4	On-site Vegetation, Flora and Mapped Sensitivity	22
2.4.1	<i>Proposed new chicken houses</i>	22
2.4.2	<i>Species of Special Concern</i>	22
2.4.3	<i>Alien Invasive species</i>	24
2.5	Fauna.....	24
2.5.1	<i>Permit Requirements</i>	25
3	IMPACT ASSESSMENT	26
3.1	Assessment of the significance of the potential impacts	26
3.1.1	<i>Criteria of assigning significance to potential impacts</i>	26
3.1.2	<i>Significance Rating</i>	26
3.2	Identification of potential impacts	27
3.2.1	<i>Possible impacts on biodiversity during construction and operations</i>	27
3.2.2	<i>Summary of actions, activities, or processes that have sufficiently significant impacts to require mitigation</i> 27	
3.2.3	<i>Potential cumulative impacts</i>	27
4	MITIGATION AND MANAGEMENT	29
4.1	Vegetation and Flora Clearing and Relocation Plan	29
5	CONCLUSIONS	29
6	REFERENCES	30
7	APPENDIX A: SITE PHOTOGRAPHIC RECORD.....	32
8	APPENDIX B: ENVIRONMENTAL MANAGEMENT PLAN.....	36
8.1	Biodiversity Requirements	36
8.1.1	<i>Infrastructural Requirements</i>	37

8.1.2	Final Rehabilitation.....	39
8.1.3	Monitoring and Reporting.....	40
8.1.4	Closure objectives and their extent of alignment to the pre-construction environment	40
APPENDIX C: FLORA AND FAUNA SPECIES		41
9	APPENDIX D: SPECIALIST CV, SACNASP REGISTRATION AND DECLARATION	45

List of Figures

Figure 1: Layout of existing and proposed facility.....	6
Figure 2: Map indicating locality of the site	13
Figure 3: National Vegetation Type and Conservation Status (Vegmap and NBA).....	13
Figure 4: Critical Biodiversity Areas (ECBCP and SAPAD 2019).....	13
Figure 5: Rivers and Wetlands	13
Figure 6: Geology.....	13
Figure 7: Land Use (2015).....	13
Figure 8: Aerial Map	13
Figure 9: Mapped Vegetation and Sensitivity.....	22

List of Tables

Table 1: Summary of Systematic Planning Frameworks and Biodiversity Features.	9
Table 2: Flora Species of Special Concern known to occur in the vicinity of the site.....	23
Table 3: Summary indicating significance of potential impacts (SB = Significance BEFORE Mitigation; SA = Significance AFTER Mitigation)	28

Abbreviations

CARA	Conservation of Agricultural Resources Act 43 of 1983
CBA	Critical Biodiversity Area
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DEMC	Desired Ecological Management Class
DWS	Department of Water Affairs and Sanitation
DWAF	Department of Water Affairs and Forestry (former department name)
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMC	Ecological Management Class
EMP	Environmental Management Plan
EMPr	Environmental Management Programme report
ER	Environmental Representative
ESS	Ecosystem Services
IAP's	Interested and Affected Parties
IEM	Integrated Environmental Management
LM	Local Municipality
masl	meters above sea level
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act 107 of 1998
NFA	National Forests Act
NEMBA	National Environmental Management: Biodiversity Act 10 of 2004
NFA	National Forest Act 84 of 1998
PEMC	Present Ecological Management Class
PES	Present Ecological State
PNCO	Provincial Nature and Environment Conservation Ordinance (No. 19 of 1974).
RDL	Red Data List
RHS	Right Hand Side
RoD	Record of Decision
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SoER	State of the Environment Report
SSC	Species of Special Concern
TOPS	Threatened of Protected Species
ToR	Terms of Reference
+ve	Positive
-ve	Negative

Glossary

Corridors:	Have important functions as strips of a particular type of landscape differing from adjacent land on both sides. Habitat, ecosystems or undeveloped areas that physically connect habitat patches. Smaller, intervening patches of surviving habitat can also serve as "stepping stones" that link fragmented ecosystems by ensuring that certain ecological processes are maintained within and between groups of habitat fragments.
Degraded habitat/land:	Land that has been impacted upon by human activities (including introduction of invasive alien plants, light to moderate overgrazing, accelerated soil erosion, dumping of waste), but still retains a degree of its original structure and species composition (although some species loss would have occurred) and where ecological processes still occur (albeit in an altered way). Degraded land is capable of being restored to a near-natural state with appropriate ecological management.
Ecological Processes:	Ecological processes typically only function well where natural vegetation remains, and in particular where the remaining vegetation is well-connected with other nearby patches of natural vegetation. Loss and fragmentation of natural habitat severely threatens the integrity of ecological processes. Where basic processes are intact, ecosystems are likely to recover more easily from disturbances or inappropriate actions if the actions themselves are not permanent. Conversely, the more interference there has been with basic processes, the greater the severity (and longevity) of effects. Natural processes are complex and interdependent, and it is not possible to predict all the consequences of loss of biodiversity or ecosystem integrity. When a region's natural or historic level of diversity and integrity is maintained, higher levels of system productivity are supported in the long run and the overall effects of disturbances may be dampened.
Ecosystem status:	Ecosystem status of terrestrial ecosystems is based on the degree of habitat loss that has occurred in each ecosystem, relative to two thresholds: one for maintaining healthy ecosystem functioning, and one for conserving the majority of species associated with the ecosystem. As natural habitat is lost in an ecosystem, its functioning is increasingly compromised, leading eventually to the collapse of the ecosystem and to loss of species associated with that ecosystem.
Ecosystem:	All the organisms of a particular habitat, such as a lake or forest, together with the physical environment in which they live.
Endangered:	Endangered terrestrial ecosystems have lost significant amounts (more than 60 % lost) of their original natural habitat, so their functioning is compromised.
Endemic:	A plant or animal species, or a vegetation type, which is naturally restricted to a particular defined region. It is often confused with indigenous, which means 'native, occurring naturally in a defined area'.
Environment:	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Exotic:	Non-indigenous; introduced from elsewhere, may also be a <i>weed</i> or alien <i>invasive</i> species. Exotic species may be invasive or non-invasive.
Fragmentation (habitat):	Causes land transformation, an important current process in landscapes as more and more development occurs.
Habitat:	The home of a plant or animal species. Generally, those features of an area inhabited by animal or plant which are essential to its survival.
Indigenous:	Native; occurring naturally in a defined area.

Indigenous vegetation	Refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Least threatened terrestrial ecosystems:	These ecosystems have lost only a small proportion (more than 80 % remains) of their original natural habitat, and are largely intact (although they may be degraded to varying degrees, for example by invasive alien species, overgrazing, or overharvesting from the wild).
Riparian:	Pertaining to, situated on or associated with a river bank.
River corridors:	River corridors perform several ecological functions such as modulating stream flow, storing water, removing harmful materials from water, and providing habitat for aquatic and terrestrial plants and animals. These corridors also have vegetation and soil characteristics distinctly different from surrounding uplands and support higher levels of species diversity, species densities, and rates of biological productivity than most other landscape elements. Rivers provide for migration and exchange between inland and coastal biotas.
Transformation:	In ecology, transformation refers to adverse changes to biodiversity, typically habitats or ecosystems, through processes such as cultivation, forestry, drainage of wetlands, urban development or invasion by alien plants or animals. Transformation results in habitat fragmentation – the breaking up of a continuous habitat, ecosystem, or landuse type into smaller fragments.
Transformed Habitat/Land:	Land that has been significantly impacted upon as a result of human interferences/disturbances (such as cultivation, urban development, mining, landscaping, severe overgrazing), and where the original structure, species composition and functioning of ecological processes have been irreversibly altered. Transformed habitats are not capable of being restored to their original states.
Tributary/ Drainage line:	A small stream or river flowing into a larger one.
Untransformed habitat/land:	Land that has not been significantly impacted upon by man's activities. These are ecosystems that are in a near-pristine condition in terms of structure, species composition and functioning of ecological processes.
Vulnerable:	Vulnerable terrestrial ecosystems have lost some (more than 60 % remains) of their original natural habitat and their functioning will be compromised if they continue to lose natural habitat.
Weed:	An indigenous or non-indigenous plant that grows and reproduces aggressively, usually a ruderal pioneer of disturbed areas. Weeds may be unwanted because they are unsightly, or they limit the growth of other plants by blocking light or using up nutrients from the soil. They can also harbour and spread plant pathogens.
Wetlands:	A collective term used to describe lands that are sometimes or always covered by shallow water or have saturated soils, and where plants adapted for life in wet conditions usually grow.

1 Introduction & Background

Engineering Advice and Services were commissioned by Quantum Foods (Pty) Ltd to undertake an Ecological Assessment for Egglard Farm egg laying facilities on Bergsig North Farm (Portion 4 of 431) and Diepkloof Farm (Portion 1 of 429). The purpose of this report is to assess the suitability of the site for the proposed expansion in terms of its ecological status, as well the requirements in terms of the relevant Environmental Legislation. The farm is situated along the R331 road between Thornhill and Loerie (Figure 2).

1.1 Background

1.1.1 Assessment for Expansion – Additional Chicken Houses

Quantum Foods (Pty) Ltd wishes to expand the existing egg laying facility by adding two (2) more lay houses to the existing eight (8). The proposed lay houses will each house 40 000 hens, bringing the total capacity of the facility to 360 000 hens.

The existing packhouse facility processes 17 500 dozen eggs per day. The two additional lay houses will increase the daily throughput of the pack house to 22 500 dozen eggs per day. The packing facility can accommodate this increase in throughput without further expansion.

The above egg laying and pack house facility is indicated in Figure 1 below.



Figure 1: Layout of existing and proposed facility.

The farm has historically been developed as follows:

1. Development of four chicken houses in Phase 1 (Green Block) occurred in 1994/1995 before any regulations required the activity to obtain environmental authorisation (~1.75 Ha).
2. Development of two more chicken houses (~1 Ha) was then constructed in 1996 and a pack house (~1 Ha) in 1997/1998 as Phase 2 (Turquoise Block). This is was undertaken before regulations required the activity to obtain environmental authorisation.
3. Development of two more chicken houses in Phase 3 (Pink Block) was completed in 2005 (~1.1 Ha). No environmental authorisation was undertaken before construction of this phase and hence the activity is deemed to be an illegal activity. This phase of development requires a Section 24G application, for which a separate Ecological Assessment Report has been compiled. The listing notices which were triggered by the development of this phase are listed below based on the 2006 NEMA regulations:

Listing Notice 1, Activity 1: *The construction of facilities or infrastructure, including associated structures or infrastructure, for – (h) the concentration of animals for the purpose of commercial production in densities that exceed - (v) three square metres per head of poultry and more than 250 poultry per facility at any time, excluding chicks younger than 20 days;*

Based on on-site investigations and a detailed desktop study including analysis of available historical aerial imagery the entire site (including phase 1 and 2), it is concluded that, at the time of construction, the affected area was most likely vegetated with pastures. The specific age and state of these unknown pastures cannot be confirmed due to lack of aerial imagery, but a conservative assumption would be that they were likely to be very similar to today. This is addressed in this report.

4. Phase 4 (Red Block) which entails the proposed construction of two additional chicken houses to expand (~0.84 Ha). A separate assessment is compiled for this expansion activity.

1.2 Methodology and Approach

The proposed methodology and approach are outlined below:

- Conduct a comprehensive desktop study and identify potential risks relating to vegetation, flora and fauna of the site and surrounding area. This will include the relevant Regional Planning frameworks,
- Conduct a detailed site visit to assess the following:
 - Detailed field survey of vegetation, flora and habitats and record any fauna present;
 - Compile comprehensive species list, highlighting species that are of special concern, threatened, Red Data species and species requiring permits for destruction/relocation in terms of NEMBA and the Provincial Nature Conservation Ordinance No. 19 of 1974, etc.
 - Detailed mapping of the various habitat units and assessment of habitat integrity, ecological sensitivity, levels of degradation and transformation, alien invasion and Species of Conservation Concern, the outcome being a detailed sensitivity map ranked into high, medium or low classes.
- Reporting will be comprised of a preliminary summary, with identification of anticipated impacts and risks, a draft detailed Assessment Report (for public review and comment) and should any comments be raised these will be addressed in a Final Assessment Report. This report is for the Draft BAR which will go for public consultation following which a Final BAR will be issued. The draft and final detailed reports will address the following:
 - Indicate any assumptions made and gaps in available information. Assessment of all the vegetation types and habitat units within the relevant Regional Planning Frameworks;
 - A detailed species list highlighting the various Species of Conservation Concern categories (endemic, threatened, Red Data species and other protected species requiring permits for destruction/relocation and invasive/exotic weeds);
 - Description and assessment of the habitat units and site sensitivities ranked into high, medium or low classes based on sensitivity and conservation importance. A standard methodology has been developed based on other projects in the specific area;
 - A habitat sensitivity map will be compiled, indicating the sensitivities as described above;
 - A map indicating buffers (if required) in order to accommodate Regional Planning requirements;

- Assessment of Impacts and Mitigation Measure, as well as specific measure that may be required for alternative development plans;
- A comprehensive EMP for inclusion in the reports and EMP with specific management actions for construction and Operation.

1.3 Legislation Framework

In terms of NEMA EIA Regulations (07 April 2017), the following Listing notices have bearing on this report:

LN1	Basic Assessment	
40.	<p><i>The expansion and related operation of facilities or infrastructure for the concentration of poultry—</i></p> <p><i>(i) more than 1 000 poultry per facility situated within an urban area, excluding chicks younger than 20 days;</i></p> <p><i>(ii) more than 5 000 poultry per facility situated outside an urban area, excluding chicks younger than 20 days;</i></p> <p><i>(iii) more than 5000 chicks younger than 20 days per facility situated within an urban area; or</i></p> <p><i>(iv) more than 25000 chicks younger than 20 days per facility situated outside an urban area.</i></p>	The proposed activity will result in the expansion and operation of additional egg laying facilities.
27.	<p><i>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—</i></p> <p><i>(i) the undertaking of a linear activity; or</i></p> <p><i>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</i></p>	Although there is 'indigenous vegetation' on site, it is confirmed to be secondary in nature. Vegetation now present is a result of colonisation by common grasses including kikuyu, most likely having origins in historical use as pastures, as well as some natural/secondary colonisation of common sandstone grassy-fynbos species as well as non-indigenous and weed species from surrounding areas.
LN 2	Full Scoping and EIA	
N/A	N/A	No affected triggers
N/A	N/A	No affected triggers

Other relevant legislation includes the following:

NEMA: Environmental management principles set out in NEMA, and other Specific Environmental Management Acts (SEMA) should guide decision making throughout the project life cycle to reflect the objective of sustainable

development. One of the most important and relevant principles is that disturbance of ecosystems, loss of biodiversity, pollution and degradation of environment and sites that constitute the nation's cultural heritage should be avoided, minimised or as a last option remedied. This is supported by the Biodiversity Act as it relates to loss of biodiversity.

Liability for any environmental damage, pollution, or ecological degradation: Arising from any and all -related activities occurring inside or outside the area to which the permission/right/permit relates is the responsibility of the rights holder. The National Water Act and NEMA both oblige any person to take all reasonable measures to prevent pollution or degradation from occurring, continuing or reoccurring (polluter pays principle). Where a person/company fails to take such measures, a relevant authority may direct specific measures to be taken and, failing that, may carry out such measures and recover costs from the person responsible.

Public participation: Public consultation and participation processes prior to granting licences or authorisations can be an effective way of ensuring that the range of ways in which the activities impact on the environment, social and economic conditions are addressed, and considered when the administrative discretion to grant or refuse the licence is made.

Constitution of Republic of South Africa (1996): Section 24(a) of the Constitution states that everyone has the right 'to an environment that is not harmful to their health or well-being'. Construction activities must comply with South African constitutional law by conducting their activities with due diligence and care for the rights of others.

National Forests Act 84 of 1998 with Amendments: Lists Protected trees, requiring permits for removal Department of Agriculture, Forestry and Fisheries).

Conservation of Agricultural Resources Act 43 of 1993: Lists Alien invasive species requiring removal.

Eastern Cape Nature and Environmental Conservation Ordinance 19 of 1974: Lists Protected species, requiring permits for removal (Department of Economic Development, Environmental Affairs and Tourism).

1.4 Systematic Planning Frameworks and Biodiversity Features

Table 1 below contains a summary of the following applicable regional Systematic Planning Framework features:

- Vegetation Types and Conservation Status
- Critically Endangered and Endangered Ecosystems (NBA)
- Vulnerable Ecosystems (NBA)
- Critical Biodiversity Areas (ECBCP)
- Ecological Support Areas (None)
- Protected Areas and Protected Area buffers (SAPAD)
- River and Wetland Freshwater Ecosystem Priority Areas (FEPAs)
 - Within 500/100/32 m of Perennial and Non-perennial Rivers and Natural/Artificial Wetlands

Table 1: Summary of Systematic Planning Frameworks and Biodiversity Features.

Feature	Description	Implications/Comment
Affected Vegetation Types (National - VegMap)	Kouga Grassy Sandstone Fynbos	Least Concern (National Biodiversity Assessment 2018)
Critically Endangered and Endangered Ecosystems (National) NEMBA, NBA 2018	N/A	None
Vulnerable Ecosystems (National)	None	N/A

Feature	Description	Implications/Comment
Affected Vegetation Types (Regional)	N/A	None
Critical Biodiversity Areas (Regional: ECBCP)	None	The recommendations for CBA's are as follows: <u>Functional landscapes:</u> Manage for sustainable development, keeping natural habitat intact in wetlands (including wetland buffers) and riparian zones. Environmental authorisations should support ecosystem integrity. <u>Transformed landscapes:</u> Manage for sustainable development.
Forests	None	N/A
Aquatic Critical Biodiversity Areas	None	N/A
International Bird Areas	None	N/A
Protected Areas within 5 km	Loerie Nature Reserve	Site is within 5 km of The Loerie Nature Reserve
National Parks within 10 km	None	N/A
Within 500 m of Rivers and Wetlands	Non-Perennial River	A non-perennial drainage line is located to the west and a man-made dam to the east of the site. Development of the site will have no direct impact on this watercourse or dam.
Within 100 m of River or Wetland	None	N/A
Within 32 m of a watercourse/wetland	None	N/A
Surrounding Land Uses	Agriculture	Area is predominantly surrounded by agricultural land (historical pastures with secondary vegetation)

1.4.1 Vegetation of Southern Africa (VEGMAP)

As indicated in

Figure 3 the primary vegetation unit affected by the proposed development (Mucina & Rutherford, 2006) is *Kouga Grassy Sandstone Fynbos* (**Least Threatened** – NBA 2018). The site and surroundings may also contain elements of *Loerie Conglomerate Fynbos* (**Least Threatened** – NBA 2018).

Kouga Grassy Sandstone Fynbos

Distribution Western and Eastern Cape Provinces: Between Uniondale and Uitenhage, generally surrounding FFs 27 Kouga Sandstone Fynbos at lower altitudes and often on northerly aspects. Along the lower flanks of the Kouga Mountains in the Langkloof north of Joubertina and the northern and lower slopes of the Suuranysberge to the low mountains and flats north of Humansdorp. Along the lower slopes of the Kouga and Baviaanspoort Mountains in Baviaanspoort as well as the northern slopes of the Baviaanspoort Mountains and the northern and lower slopes of the Groot Winterhoekberge, Elandsberge and Van Stadensberg including the valleys of the upper reaches of the Elands and Kwa-Zunga Rivers. Also on various ridges embedded in FRs 16 Uniondale Shale Renosterveld south to east of Willowmore including Antoniesberg and Witberg. Altitude 220–1 220 m, mainly 300–900 m (concentrated around 480–560 m).

Vegetation & Landscape Features Low shrubland with sparse, emergent tall shrubs and dominated by grasses in the undergrowth, or grassland with scattered ericoid shrubs. The lower dry slopes, where leaching is less severe and nutrient levels are higher, support a higher grassy cover.

Geology & Soils Acidic lithosol soils derived from sandstones of the Table Mountain Group as well as quartzitic sandstones of the Witteberg Group (Nardouw Subgroup). Glenrosa and Mispah forms prominent. Land types mainly Ib and Fa.

Climate MAP 270–800 mm (mean: 540 mm), evenly throughout the year with a slight peak in March and October–November. Mean daily maximum and minimum temperatures 27.0°C and 4.2°C for February and July, respectively. Frost incidence 2–10 days per year.

Important Taxa Small Tree: *Protea nitida*. Succulent Tree: *Aloe ferox*. Tall Shrubs: *Aspalathus kougaensis*, *A. nivea*, *Dodonaea viscosa* var. *angustifolia*. Low Shrubs: *Agathosma mucronulata*, *A. pilifera*, *A. puberula*, *A. spinosa*, *Aspalathus fourcadei*, *Cliffortia drepanoides*, *Clutia alaternoides*, *C. polifolia*, *Diosma prama*, *D. rourkei*, *Disparago ericoides*, *Erica demissa*, *E. pectinifolia*, *E. sparsa*, *E. thamnoides*, *Euryops euryopoides*, *Helichrysum teretifolium*, *Leucadendron salignum*, *Leucospermum cuneiforme*, *Otholobium carneum*, *Passerina obtusifolia*, *P. pendula*, *Phylica axillaris*, *P. lachneaeoides*, *Polygala myrtifolia*, *Protea foliosa*, *Pteronia incana*, *Stoebe plumosa*, *Tephrosia capensis*. Herbs: *Alepidea capensis*, *Centella virgata*, *Gazania krebsiana* subsp. *krebsiana*, *Helichrysum felinum*, *Knowltonia capensis*. Geophytic Herbs: *Bobartia orientalis* subsp. *orientalis*, *Geissorhiza roseoalba*, *Watsonia meriana*. Graminoids: *Anthochortus crinalis*, *Brachiaria serrata*, *Cannomois scirpoides*, *C. virgata*, *Cymbopogon marginatus*, *Digitaria eriantha*, *Diheteropogon filifolius*, *Eragrostis curvula*, *Heteropogon contortus*, *Hypodiscus albo-aristatus*, *H. striatus*, *H. synchronolepis*, *Ischyrolepis capensis*, *I. gaudichaudiana*, *Mastersiella purpurea*, *Melinis repens* subsp. *repens*, *Merxmullera papposa*, *M. stricta*, *Pentameris distichophylla*, *Pentaschistis eriostoma*, *P. pallida*, *Restio triticeus*, *Rhodocoma fruticosa*, *Tetaria capillacea*, *T. cuspidata*, *T. fourcadei*, *T. involucrata*, *Thamnochortus fruticosus*, *Themeda triandra*, *Trachypogon spicatus*, *Tristachya leucothrix*.

Endemic Taxa Tall Shrub: *Freylinia crispa*. Low Shrubs: *Argyrobolium parviflorum*, *A. trifoliatum*, *Cullumia cirsioides*, *Eriocephalus tenuipes*, *Euchaetis vallis-simiae*, *Sutera cinerea*. Succulent Shrub: *Lampranthus lavisii*. Herbs: *Annesorhiza thunbergii*, *Aster laevigatus*, *Centella didymocarpa*, *Peucedanum dregeanum*. Geophytic Herbs: *Cyrtanthus flamosus*, *C. labiatus*, *C. montanus*, *Gladiolus uitenhagensis*. Succulent Herb: *Gasteria glauca*. Graminoid: *Restio vallis-simius*.

Conservation Least threatened. Target 23%. About 20% conserved in wilderness and conservation areas including the Baviaanskloof, Berg Plaat, Groendal, Guerna, Kouga, Welbedacht State Forest, and in Mierhooplaats and Stinkhoutsberg Nature Reserves. About 2% in addition enjoy protection in private reserves such as Jumanji Game Farm, Rooi Banke Forest Reserve, Paardekop Game Farm, Thaba Manzi Game Farm, and in Beakosneck, Kouga and Sepree River Private Nature Reserves. Some 9% transformed (cultivation) but in addition much transformed to grassy pasture by too frequent burning. Notable aliens include *Pinus pinaster*, *Acacia cyclops* and *A. mearnsii*. Erosion very low and low, but also high in some areas.

Fft 2 Loerie Conglomerate Fynbos

Distribution Eastern Cape Province: Hankey Valley on both sides of the Gamtoos River, from Andrieskraal to Mondplaas on the southwestern side, and Patensie to Thornhill on the northeastern side. Also found in the lower Kwazungu Valley above Springfield and Rooikrans near Uitenhage. Altitude 80–400 m.

Vegetation & Landscape Features Moderately undulating plains dissected by major rivers. Vegetation low shrubland or grassland with sparse emergent tall shrubs, and rich in succulents and geophytes. Structurally these are graminoid, asteraceous and proteoid fynbos types.

Geology & Soils Acidic, moist clay-loam, Glenrosa and Mispah soils and conglomerates associated with shales and conglomerates of the Karoo Uitenhage sequence. Land types mainly Fc, Fa and Ib.

Climate MAP 360–780 mm (mean: 600 mm), even throughout the year with a slight bimodal peak in March and October–November. Mean daily maximum and minimum temperatures 26.1°C and 6.9°C for February and July, respectively. Frost incidence about 3 days per year.

Important Taxa (TCape thickets) Tall Shrubs: *Aspalathus nivea*, *Azima tetraacantha*, *Cliffortia linearifolia*, *Diospyros pallens*, *Dodonaea viscosa* var. *angustifolia*, *Euclea undulata*, *Grewia occidentalis*, *Gymnosporia capitata*, *Protea neriifolia*, *P. repens*, *Schotia afra* var. *afra*. Low Shrubs: *Anthospermum galioides* subsp. *galioides*, *Asparagus subulatus*, *Barleria pungens*, *Cliffortia ruscifolia*, *Clutia polifolia*, *Elytropappus rhinocerotis*, *Erica demissa*, *E. pectinifolia*, *Felicia muricata* subsp. *cinerascens*, *Galenia secunda*, *Helichrysum anomalum*, *H. odoratissimum*, *H. zeyheri*, *Indigofera denudata*, *Leucadendron salignum*, *Leucospermum cuneiforme*, *Otholobium pictum*, *Passerina obtusifolia*, *Pelargonium odoratissimum*, *Protea foliosa*, *Senecio linifolius*. Succulent Shrubs: *Cotyledon orbiculata* var. *oblonga*, *Crassula cultrata*, *C. tetragona*, *Euphorbia polygona*. Woody Climbers: *Capparis sepiaria* var. *citrifolia*, *Rhoicissus digitata*. Woody Succulent Climber: *Zygophyllum foetidum*. Small Tree: *Protea nitida*. Herbs: *Commelina africana*, *Hibiscus pusillus*, *Salvia triangularis*. Geophytic Herbs: *Babiana patersoniae*, *Drimia intricata*, *Geissorhiza bracteata*, *Gladiolus longicollis*, *Polyxena ensifolia*, *Sansevieria hyacinthoides*, *Spiloxene trifurcillata*. Succulent Herbs: *Crassula nemorosa*, *Haworthia cooperi*. Herbaceous Climber: *Cyphia sylvatica*. Herbaceous Succulent Climbers: *Ceropegia cancellata*, *Pelargonium peltatum*. Graminoids: *Aristida junciformis* subsp. *galpinii*, *Brachiaria serrata*, *Cymbopogon marginatus*, *Cynodon dactylon*, *Eragrostis obtusa*, *Eustachys paspaloides*, *Ficinia tristachya*, *Ischyrolepis gaudichaudiana*, *I. sieberi*, *Pentaschistis angustifolia*, *P. colorata*, *Restio triticeus*, *Sporobolus africanus*, *Stipa dregeana*, *Tetraria cuspidata*, *Themeda triandra*, *Trachypogon spicatus*.

Endemic Taxon Succulent Shrub: *Erepsia aristata*.

Conservation Least threatened. Target 23%. Some 11% statutorily conserved in the Groendal Wilderness Area. Small patches are also found in the private Kabeljous River Natural Heritage Site. About 9% transformed (cultivation). Erosion very variable, including significant areas of high and moderate erosion, but also very low in some areas.

Remarks Fire-protected gullies with AT 4 Gamtoos Thicket and a forest (dominated by *Ficus sur*) form an intricate mosaic with the fynbos. The boundary towards adjacent renosterveld is particularly indistinct and very broad, supporting communities of transitional character. The flatter, old African surfaces are dominated by *Cliffortia ruscifolia* and *Dodonaea viscosa* var. *angustifolia*.

1.4.2 National Biodiversity Assessment (NBA)

Status indicated in

Figure 3

Critically Endangered and Endangered Ecosystems (National) - None

Vulnerable Ecosystems (National) - None

IMPLICATIONS: None

1.4.3 Eastern Cape Biodiversity Conservation Plan (ECBCP)

Critical biodiversity areas (CBAs) are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning (SANBI 2007). These form the key output of the conservation plan. They are used to guide protected area selection and should remain in their natural state as far as possible.

As indicated in

Figure 4, the Eastern Cape Biodiversity Conservation Plan (ECBCP, 2007) the site is not situated within area designated as CBA status (terrestrial).

IMPLICATIONS: None

1.4.4 Sub-Tropical Ecosystem Planning (STEP)

No Sub-Tropical Ecosystem Planning (STEP) vegetation units are affected.

IMPLICATIONS: None

1.4.5 Garden Route Biodiversity Sector Plan (GRBSP)

Site does not fall within the Garden Route Biodiversity Sector Plan

IMPLICATIONS: None

1.4.6 Rivers and Wetlands

No perennial or non-perennial rivers and/or natural or artificial wetlands/dams (Figure 5) will be affected by the proposed development.

IMPLICATIONS: None

1.5 Implications of Systematic Planning frameworks

The development of the site is unlikely to compromise any vegetation units or critical ecological processes at a national regional or local level significantly due to the following:

- the condition and sensitivity of the site, which is highly altered from its natural state and lacks any intact/semi intact vegetation.
- the site being located outside of any designated Critical Biodiversity Areas, which are priority conservation areas to meet conservation targets;
- the implementation of a sound Environmental Management Plan during construction and operation.
- the implementation of a formalized rehabilitation and landscaping plan, utilising indigenous species and a water-wise approach.

Loss of vegetation cover (habitat) and species (flora and fauna) will be localised to the development footprint and have a minimal and negligible impact (including cumulative impact) at a local, regional and national level as the site is largely devoid of conservation worthy vegetation due to historical land use.

The impact of the proposed development of the site for development, within an area already disturbed from historical agricultural use is unlikely to have any significant negative ecological process impacts at a national, regional and local level. The site is furthermore not situated directly within any critical ecological corridors nor will the proposed development result in any ecological corridor fragmentation. The implementation of best practice guidelines and implementation of the recommendations of the EMPr will be effective management to minimise any negative consequences.

1.6 Systematic Planning Maps

Figure 2: Map indicating locality of the site

Figure 3: National Vegetation Type and Conservation Status (Vegmap and NBA)

Figure 4: Critical Biodiversity Areas (ECBCP and SAPAD 2019)

Figure 5: Rivers and Wetlands

Figure 6: Geology

Figure 7: Land Use (2015)

Figure 8: Aerial Map

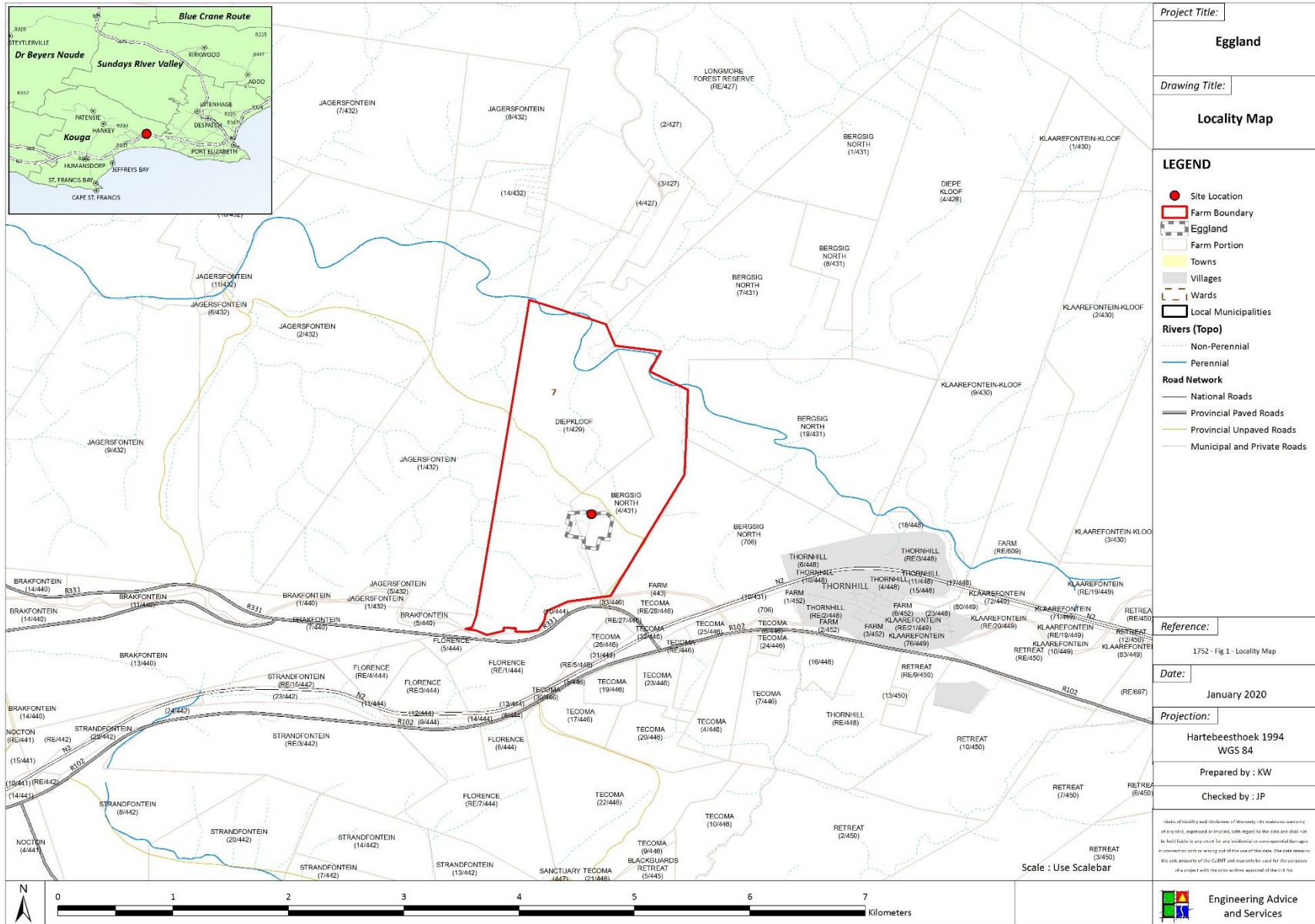


Figure 2: Map indicating locality of the site

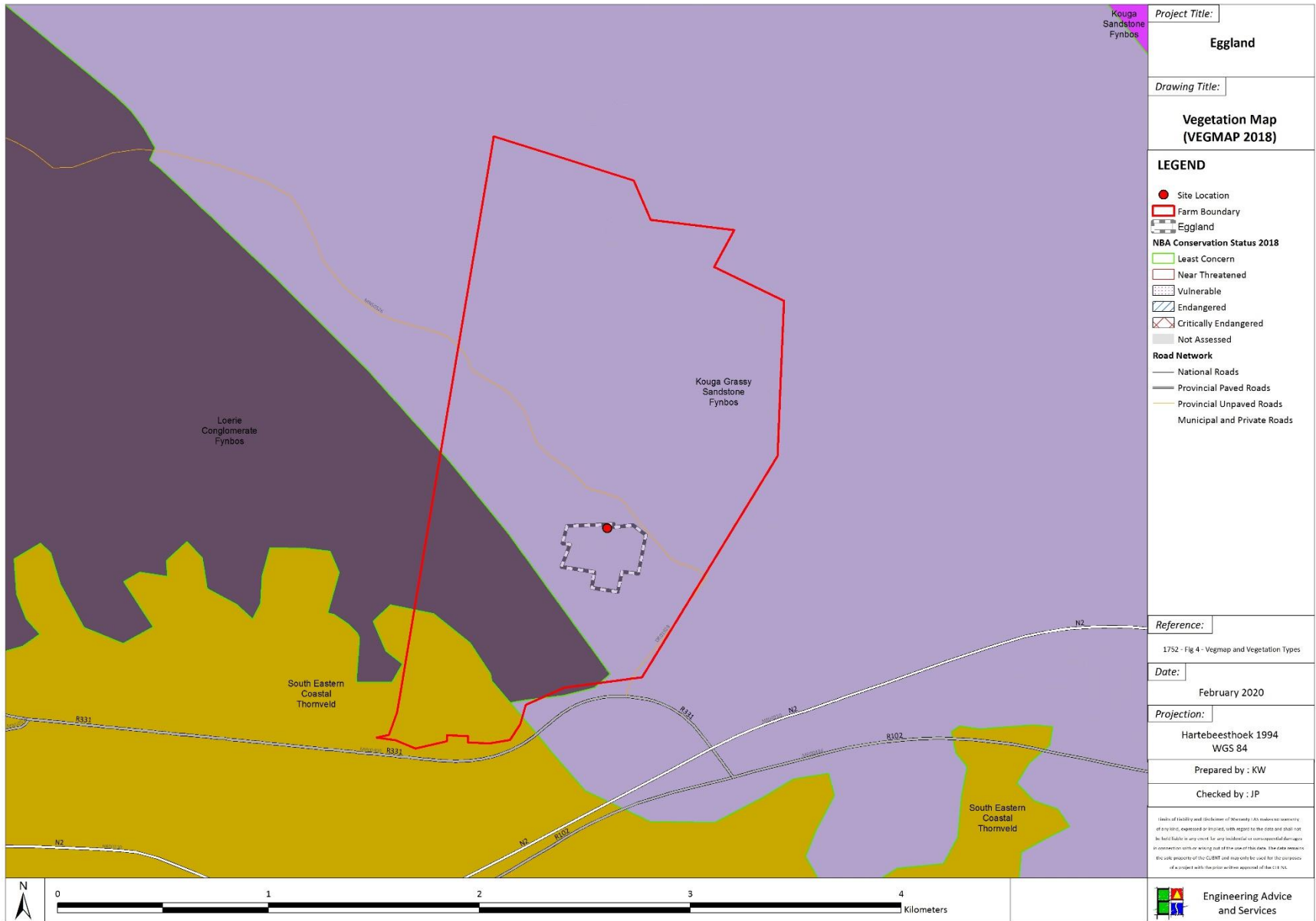


Figure 3: National Vegetation Type and Conservation Status.

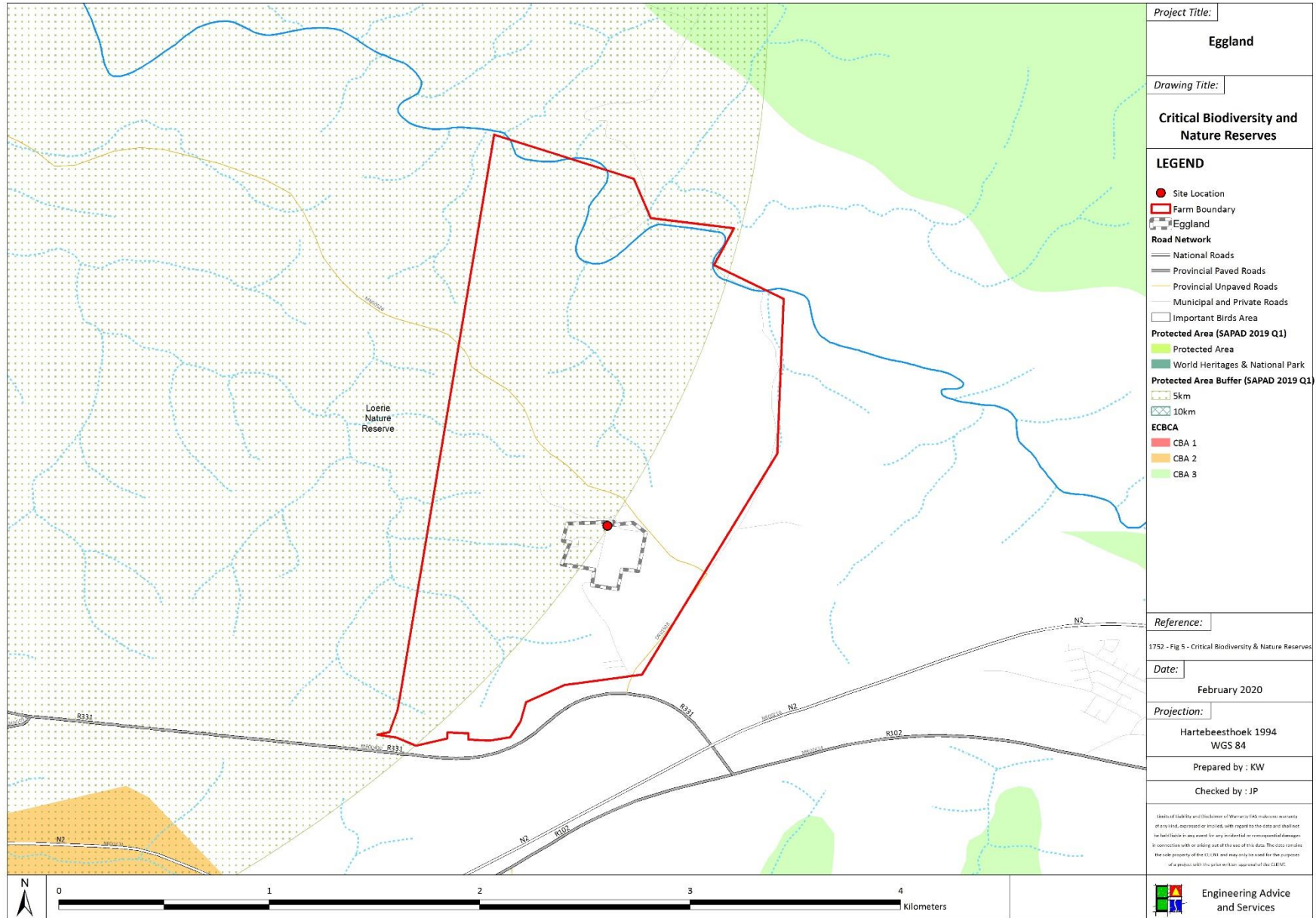


Figure 4: Critical Biodiversity Areas (ECBCP and SAPAD 2019)

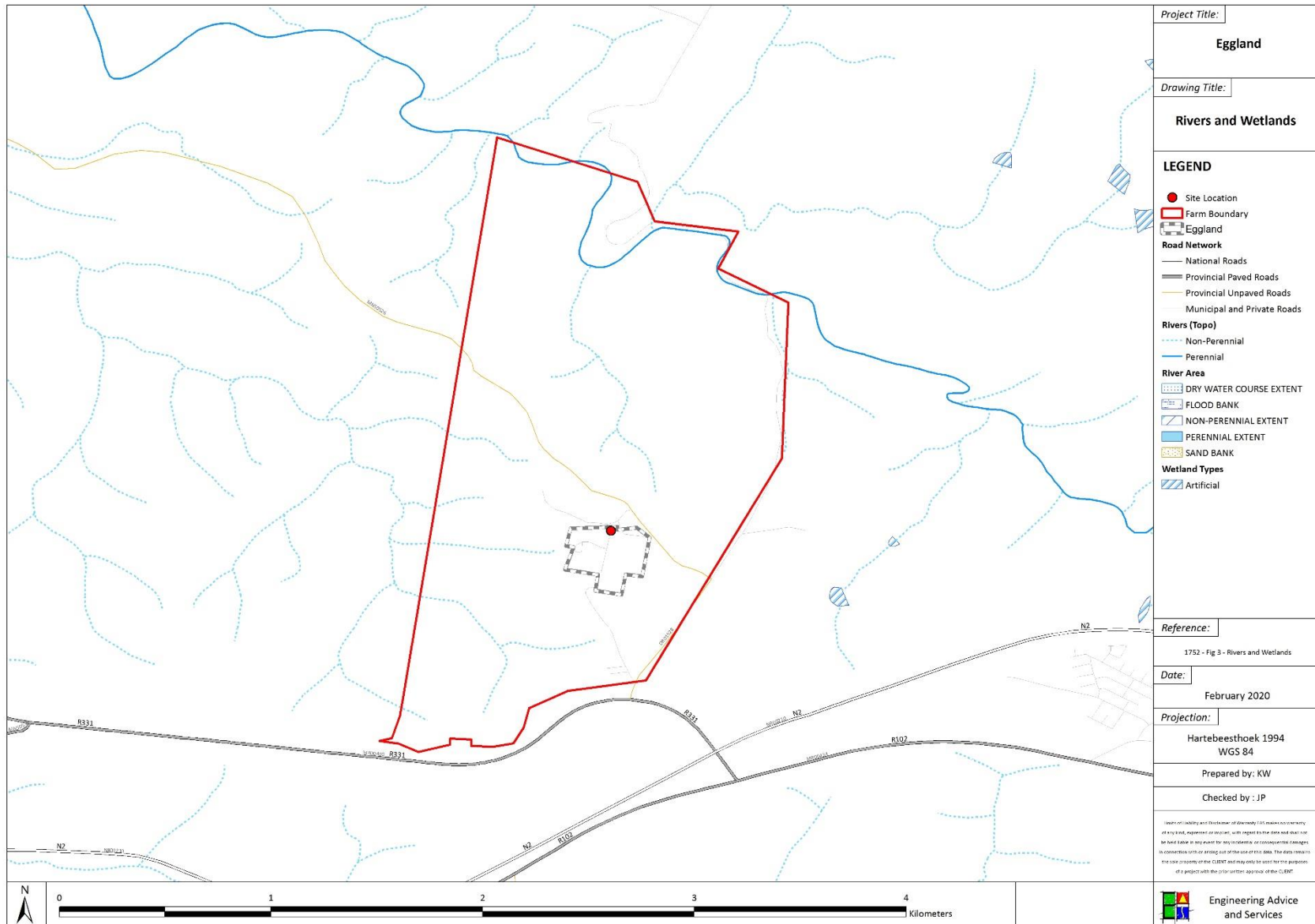


Figure 5: Rivers and Wetlands

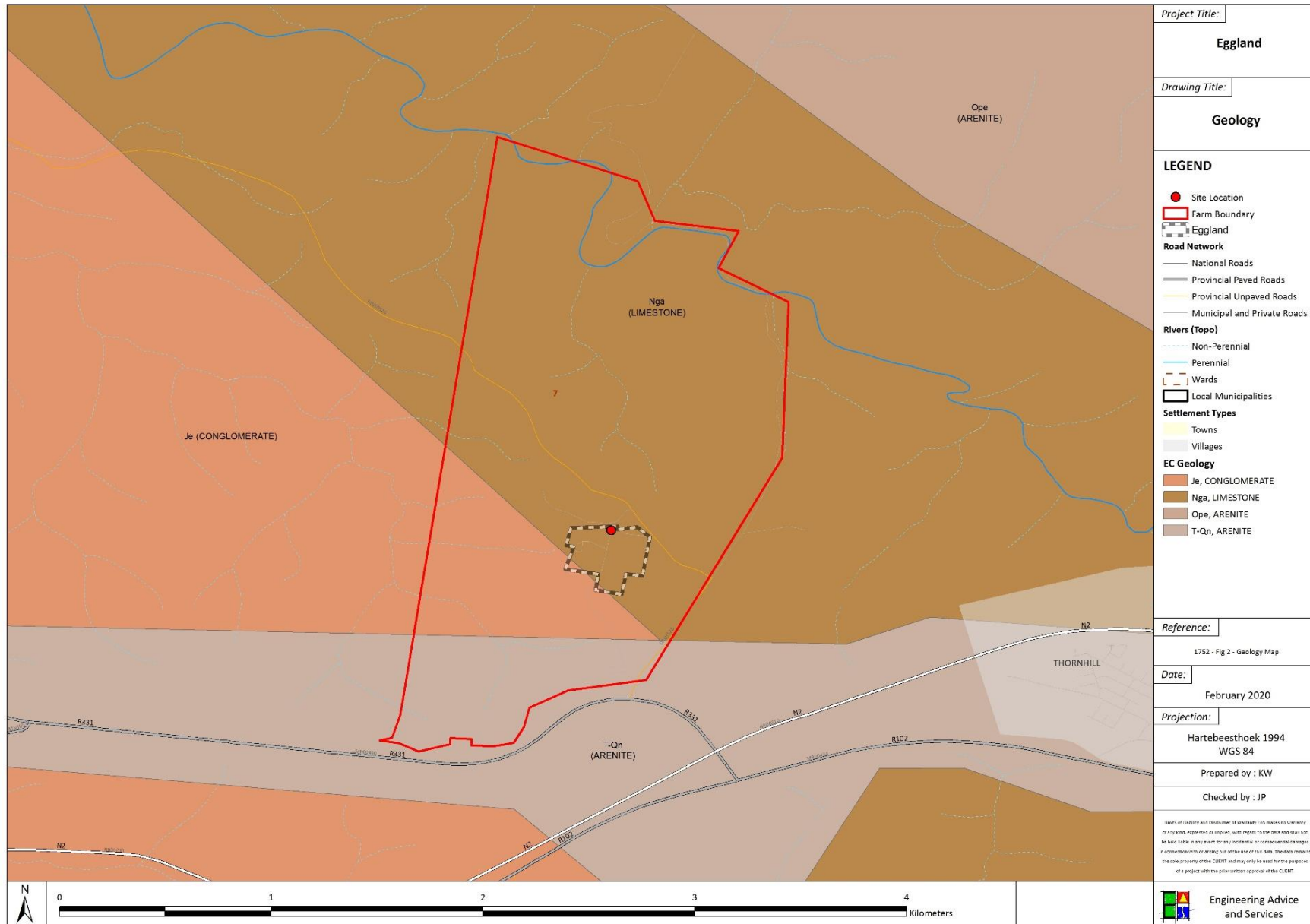


Figure 6: Geology

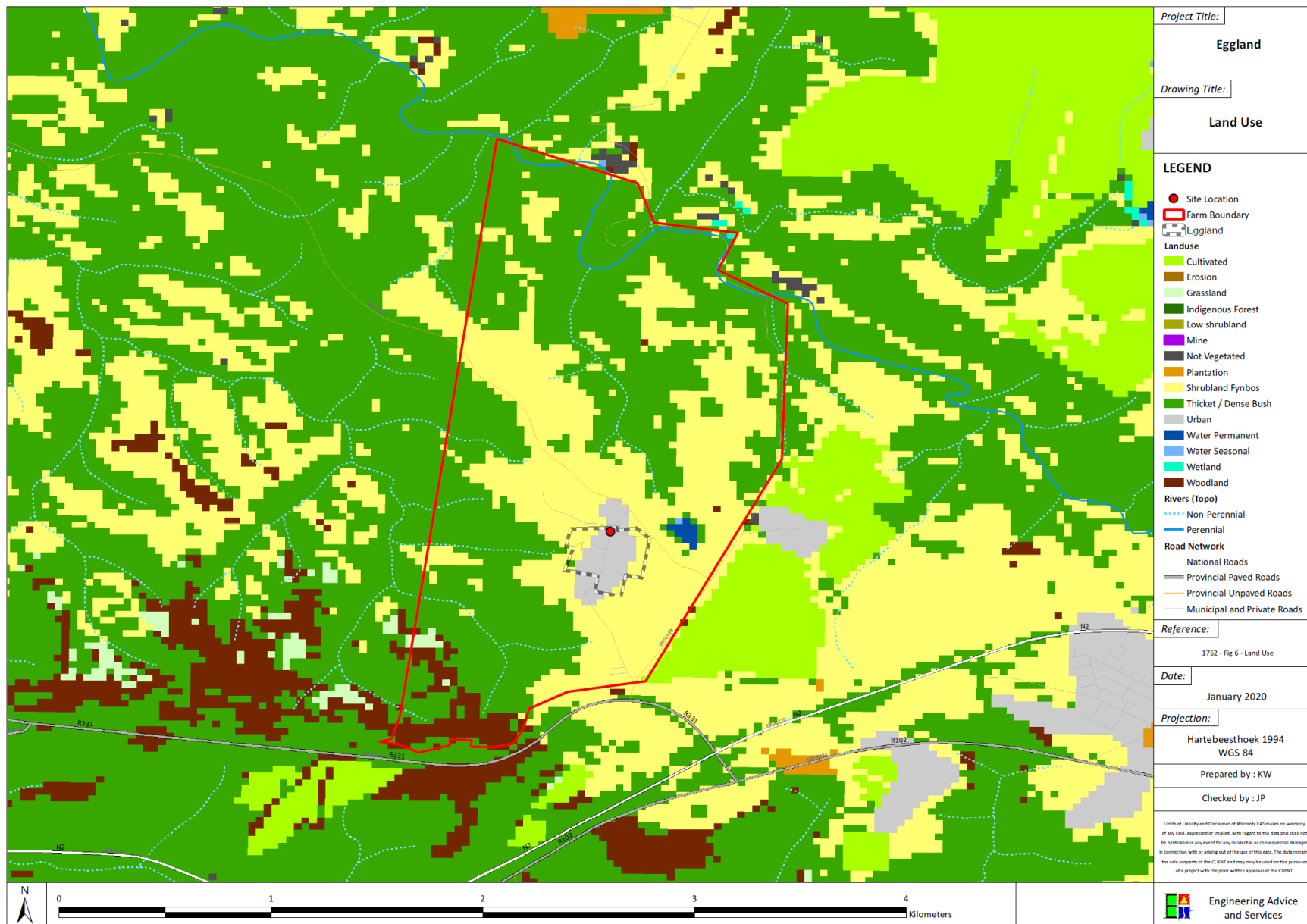


Figure 7: Land Use (2015)

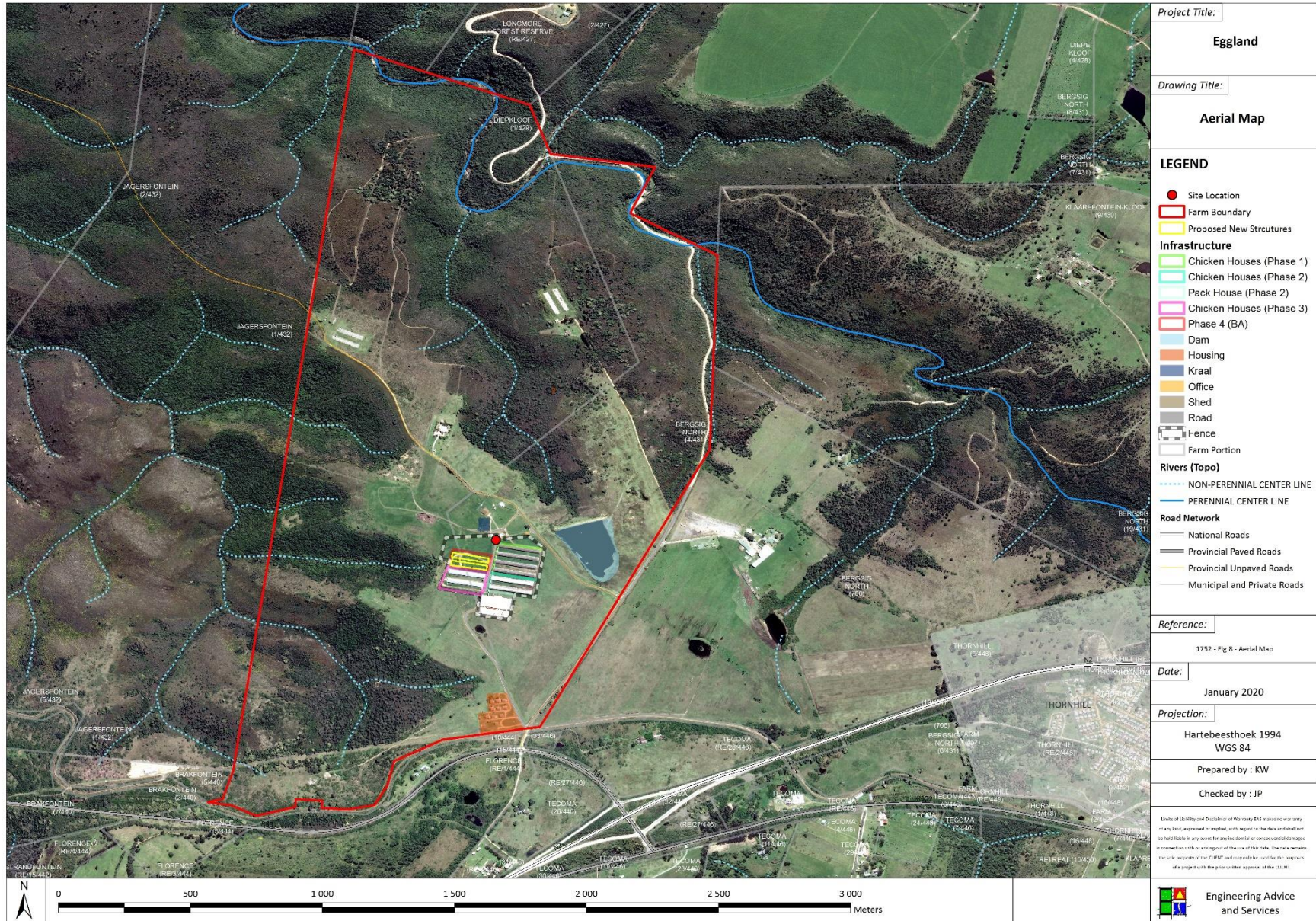


Figure 8: Aerial Map

2 Description of the Terrestrial Environment

2.1 Site Locality

The subject site (Quantum Foods Egglund) is situated on Farm Bergsig North (4/431) and Farm Diepkloof (1/429) along the DR01928, just outside of Thornhill, Eastern Cape. The Egg lying area is fenced off and currently has 8 laying buildings with the intention of constructing two new buildings. The portion of the farm fenced off is approximately 6.61 ha and it is proposed that an additional ± 0.4 ha of this will be expanded to accommodate two additional laying houses. The proposed expansion area is currently vacant and vegetated with predominantly grasses and is mowed regularly.

2.2 Summary of Terrestrial Environment

The table below provides a description of the on-site natural biophysical features:

Feature	Implication
Topography and drainage	
The site is generally flat, sloping slightly to the west. The area drains into the non-perennial river to the west.	The site is generally suited to the proposed development.
Vegetation	
Secondary vegetation, which is predominantly grasses with some shrubs and small ruderal weeds which is regularly mowed.	Suitable for proposed activity.
Indigenous Flora	
No Species of Special Concern noted to be present	Permits for removal of protected flora and fauna are unlikely to be required
Forest	
None	N/A
Indigenous and protected trees	
None	N/A
Fauna	
The grassy vegetation on the site may provide transient habitat for a wide range of commonly occurring small mammals, birds, reptiles and amphibians but is unlikely due to the transformed nature.	None of concern likely to be affected significantly. Any fauna on the site will most likely migrate to surrounding areas during construction.
Alien Invasive Species	
None	N/A
Drainage Lines and Rivers	
Non-perennial river situated approximately 100 m to the west of the site.	Drainage line will not be directly impacted by proposed activity.
Wetlands	
Man-made dam is located to the east of the site, no natural wetlands present. This may act as habitat for various water fowl.	Artificial wetland (dam) will not be directly impacted by proposed activity.

2.3 Ecological Processes

With reference to the above summary:

1. The site is surrounded by open pastures and the existing egg lying buildings as well as a packing station.
2. The site has been historically used as agricultural pastures and is therefore degraded in nature. It was historically Kouga Grassy Sandstone Fynbos, with rich elements of fynbos species.
3. The site is **not** located near any significant rivers or wetlands.
4. The site is **not** located within areas identified as Critical Biodiversity Area.
5. The vegetation on site is a mosaic of common grasses, shrubs, ruderal weeds.

2.4 On-site Vegetation, Flora and Mapped Sensitivity

2.4.1 Proposed new chicken houses

A site visit was conducted during January 2020. Site investigations confirmed that the site of the proposed new chicken house expansion is located in a heavily disturbed fenced off area that is dominated by grasses and some small ruderal weeds. The site appears to be mowed regularly and can thus be deemed to be transformed.

The proposed site for the two new chicken houses is highly transformed and lacks any of the species typical of the vegetation unit (Sandstone Grassy Fynbos and/or Thicket/Thornveld) which is likely to have historically occurred in this area, namely *Kouga Grassy Sandstone Fynbos* and/or *Thornhill Thornveld*. The area proposed for development is completely fenced off from the surrounding landscape including any ecological corridors or intact vegetation. The site is comprised up of grasses with some ruderal weeds. No trees are present. The immediate surrounding area has historically been used as pastures for livestock and are primarily vegetated with grasses and some secondary grassy fynbos (herbaceous) and occasional thicket/thornveld (tree and shrub) elements common to the surrounding vegetation units.

The site for the development of the two new chicken houses can be described as having a low to very low Ecological sensitivity (Figure 9).



Figure 9: Mapped Vegetation and Sensitivity.

2.4.2 Species of Special Concern

Based on a desktop Assessment of existing online databases as well as field verification, the potential list of flora species that may occur near or within the site, is limited. No intact or semi-intact patches of fynbos were noted to be present within the site.

Red Data Book, Rare, Endangered, Protected Species

- Within Kouga Grassy Sandstone Fynbos, there are some protected species which characteristically exist in the vegetation unit, however after a site investigation, no PNCO species were noted to be present within the affected area.

- No plant species listed as Critically Endangered, Endangered or Near Threatened in the National Red List for South African Plants were recorded at the study site.
- No flora species listed under Threatened and Protected Species (T.o.P.S.) were noted to be present during the site assessment.

Table 2 provides a detailed list of species protected in term of the P.N.C.O. and NFA, for which permits will be required should they occur and require removal. No protected trees were noted within the site. Due to limited sampling time, presence or absence of all species cannot be confirmed without detailed seasonal site visits, but the risk of any Critically Endangered or Endangered species being present is Very Low.

Table 2: Flora Species of Special Concern known to occur in the vicinity of the site

Botanical Name	Family	Status**	Pres	Comment
<i>Agathosma mucronulata</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Agathosma pillifera</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Agathosma puberula</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Agathosma spinosa</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Aloe ferox</i>	ASPHODELACEAE	PNCO	No	Succulent Tree
<i>Anthochortus crinalis</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Bobartia orientalis subsp. orientalis</i>	IRIDACEAE	PNCO	No	Geophytic Herbs
<i>Cannomois scirpoides</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Cannomois virgata</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Clutia alaternoides</i>	EUPHORBIACEAE	PNCO	No	Low Shrubs
<i>Clutia polifolia</i>	EUPHORBIACEAE	PNCO	No	Low Shrubs
<i>Cyrtanthus flammosus</i>	AMARYLLIDACEAE	End, PNCO	No	Geophytic Herbs
<i>Cyrtanthus labiatus</i>	AMARYLLIDACEAE	End, PNCO	No	Geophytic Herbs
<i>Cyrtanthus montanus</i>	AMARYLLIDACEAE	End, PNCO	No	Geophytic Herbs
<i>Diosma prama</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Diosma rourkei</i>	RUTACEAE	PNCO	No	Low Shrubs
<i>Erica demissa</i>	ERICACEAE	PNCO	No	Low Shrubs
<i>Erica pectinifolia</i>	ERICACEAE	PNCO	No	Low Shrubs
<i>Erica sparsa</i>	ERICACEAE	PNCO	No	Low Shrubs
<i>Erica thamnoides</i>	ERICACEAE	PNCO	No	Low Shrubs
<i>Euchaetis vallis-simiae</i>	RUTACEAE	End, PNCO	No	Low Shrubs
<i>Gasteria glauca</i>	ASPHODELACEAE	End, PNCO	No	Succulent Herb
<i>Geissorhiza roseoalba</i>	IRIDACEAE	PNCO	No	Geophytic Herbs
<i>Gladiolus uitenhagensis</i>	IRIDACEAE	End, PNCO	No	Geophytic Herbs
<i>Hypodiscus albo-aristatus</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Hypodiscus striatus</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Hypodiscus synchroolepis</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Ischyrolepis capensis</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Ischyrolepis gaudichaudiana</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Leucadendron salignum</i>	PROTEACEAE	PNCO	No	Low Shrubs
<i>Leucospermum cuneiforme</i>	PROTEACEAE	PNCO	No	Low Shrubs
<i>Mastersiella purpurea</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Protea foliosa</i>	PROTEACEAE	PNCO	No	Low Shrubs
<i>Protea nitida</i>	PROTEACEAE	PNCO	No	Small Tree
<i>Restio triticeus</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Restio vallis-simius</i>	RESTIONACEAE	End, PNCO	No	Graminoid
<i>Rhodocoma fruticosa</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Thamnochortus fruticosus</i>	RESTIONACEAE	PNCO	No	Graminoids
<i>Watsonia meriana</i>	IRIDACEAE	PNCO	No	Geophytic Herbs

**PNCO – Provincial Nature Conservation Ordinance (19 of 1974); NFA – National Forests Act, End - Endemic

Permits from the relevant authority (Department of Economic Development, Environmental Affairs and Tourism) are required for the removal, translocation or destruction of all plants listed as protected; and all faunal species, in terms of the Provincial Nature and Conservation Ordinance (No. 19 of 1974). It is not anticipated that a comprehensive flora search and rescue will be required at this stage during construction due to the lack of protected flora species. It is however recommended that the permits are obtained as a precautionary measure and that a qualified botanist oversee a rapid flora search and rescue in order to address any species that may be present but that were not visible during the various site assessments.

2.4.3 Alien Invasive species

Invasive alien plants have a significant negative impact on the environment by causing direct habitat destruction, increasing the risk and intensity of wildfires, and reducing surface and sub-surface water. Landowners are under legal obligation to control alien plants occurring on their properties. Alien Invasive Plants require removal according to the Conservation of Agricultural Resources Act 43 of 1983 (CARA) and the National Environmental Management: Biodiversity Act (10 of 2004; NEMBA): Alien and Invasive Species Lists (GN R598 and GN R599 of 2014). Alien control programs are long-term management projects and a clearing plan, which includes follow up actions for rehabilitation of the cleared area, is essential. This will save time, money and significant effort. Collective management and planning with neighbours allow for more cost-effective clearing and maintenance considering aliens seeds as easily dispersed across boundaries by wind or water courses. All clearing actions should be monitored and documented to keep track of which areas are due for follow-up clearing. A general rule of thumb is to first target lightly infested areas before tackling densely invaded areas, and prioritize sensitive areas such as river banks and wetlands. Alien grasses are among the worst invaders in lowland ecosystems adjacent to farms, but are often the most difficult to detect and control.

No alien invasive species with NEMBA status occurred within the proposed site. A number of black wattle trees were noted to be present in surrounding area.

Eradication protocol

Specific eradication and management procedures must be stipulated in the EMP as to the methods to be implemented to remove and control the various alien invasive species as they tend to require species specific techniques. A comprehensive management plan should be incorporated into the EMP and a detailed action plan compiled and implemented by the ECO. All removed trees must either be removed from site or disposed of at a registered waste disposal facility. Alternatively, the plant material can be mulched using a wood chipper on site. And seed-bearing material is to be disposed of.

2.5 Fauna

The site under assessment lies within an area that is comprised of a mix of heavily invaded and secondary vegetation and is likely habitat for several transient faunal species including small mammals, reptiles and birds. Further the piles of rubble from illegal dumping may be home to reptiles.

It is not likely that the proposed development will have any significant impact on faunal species. Most of the mobile fauna are fenced out from the site and any small animals are expected to vacate the area that is to be developed once vegetation clearing and other site preparation activities commence and will seek refuge in intact natural or near-natural surrounding areas. However, as a cautious measure, the following should be implemented:

- Measures should be implemented to ensure that fauna on site are not harmed during site preparation or operational phase activities associated with the development, e.g. environmental induction process for construction personnel.

- It is likely that any mobile animals will vacate the site once construction commences. No faunal search and rescue is likely to be required before commencement.
- All other reptile and small mammal species are extremely difficult to catch and it would be a futile attempt to try and relocate them. Before doing site clearing, affected areas should be thoroughly searched for tortoises, which must be released in a safe nearby area.
- Search and rescue operations undertaken before and during the site preparation phase will decrease the impacts considerably.

2.5.1 Permit Requirements

Permits from the relevant authority (Department of Economic Development, Environmental Affairs and Tourism) are required for the removal, translocation or destruction of protected faunal species, in terms of the Provincial Nature and Environment Conservation Ordinance (No. 19 of 1974).

3 Impact Assessment

3.1 Assessment of the significance of the potential impacts

3.1.1 Criteria of assigning significance to potential impacts

The following methodology is to be applied in the specialist studies for the assessment of potential impacts.

Criteria	Explanation
Nature of impact	Review the type of effect that a proposed activity will have on the environment and should include "what will be affected and how?"
Extent	Indicate whether the impact will be: <ul style="list-style-type: none"> • (S) <i>local</i> and limited to the immediate area of development (the site); • (L) limited to within 5 km of the development; or • (R) whether the impact may be realized regionally, nationally or even internationally.
Duration	Review the lifetime of the impact, as being: <ul style="list-style-type: none"> • (V) <i>very short term</i> (0 - 1 years), • (S) <i>short term</i> (1 - 5 years), • (M) <i>medium</i> (5 - 15 years), • (L) <i>long term</i> (>15 years but where the impacts will cease after the operation of the site), or • (P) <i>permanent</i>.
Intensity	Establish whether the impact is destructive or innocuous and should be described as either: <ul style="list-style-type: none"> • (L) <i>low</i> (where no environmental functions and processes are affected) • (M) <i>medium</i> (where the environment continues to function but in a modified manner) or • (H) <i>high</i> (where environmental functions and processes are altered such that they temporarily or permanently cease).
Probability	Consider the likelihood of the impact occurring and should be described as: <ul style="list-style-type: none"> • (I) <i>improbable</i> (low likelihood) • (P) <i>probable</i> (distinct possibility) • (H) <i>highly probable</i> (most likely) or • (D) <i>definite</i> (impact will occur regardless of prevention measures).
Status of the impact	Description as to whether the impact will be positive (a benefit), negative (a cost), or neutral.
Degree of confidence	The degree of confidence in the predictions, based on the availability of information and specialist knowledge. This should be assessed as high, medium or low. <ul style="list-style-type: none"> • (L) <i>Low</i>: Where the impact will not have an influence on the decision or require to be significantly accommodated in the project design
Significance	<ul style="list-style-type: none"> • (M) <i>Medium</i>: Where it could have an influence on the environment which will require modification of the project design or alternative mitigation; • (H) <i>High</i>: Where it could have a 'no-go' implication for the project unless mitigation or re-design is practically achievable.

3.1.2 Significance Rating

		Duration				
		Permanent	Long term	Medium term	Short term	Very short term
High Intensity						
Extent	National	High	High	High	High	Medium
	Regional	High	High	High	High	Medium
	Local	High	High	Medium	Medium	Medium
	Site specific	Medium	Medium	Medium	Medium	Medium
Medium Intensity						
Extent	National	High	High	High	Medium	Medium
	Regional	High	High	High	Medium	Medium
	Local	Medium	Medium	Medium	Medium	Medium
	Site specific	Medium	Medium	Medium	Medium	Low
Low Intensity						
Extent	National	Medium	Medium	Medium	Medium	Medium
	Regional	Medium	Medium	Medium	Medium	Medium
	Local	Medium	Medium	Medium	Medium	Low
	Site specific	Medium	Medium	Medium	Low	Low

Furthermore, the following must be considered:

- 1) Impacts should be described both before and after the proposed mitigation and management measures have been implemented.
- 2) All impacts should be evaluated for both the construction, operation and decommissioning phases of the project, where relevant.
- 3) The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region, if relevant.
- 4) Management actions: Where negative impacts are identified, specialists must specify practical mitigation objectives (i.e. ways of avoiding or reducing negative impacts). Where no mitigation is feasible, this should be stated and the reasons given. Where positive impacts are identified, management actions to enhance the benefit must also be recommended.

3.2 Identification of potential impacts

3.2.1 Possible impacts on biodiversity during construction and operations

Construction and operations can result in a range of negative impacts on terrestrial, marine and other aquatic ecosystems if not properly managed.

Table 3 describes impacts that may potentially occur in the site (as per DEDEAT guidelines) as well indicating the relevant EMP section. The predicted significance of these are summarised in

Table 3, where **SB** = Significance BEFORE mitigation and **SA** = Significance AFTER mitigation. No significant ancillary linear infrastructure, such as roads, conveyors, power lines, pipelines and railways, which can impact on biodiversity and ecosystem services are expected other than minor access roads.

3.2.2 Summary of actions, activities, or processes that have sufficiently significant impacts to require mitigation

The main impacts as a result of the proposed activity include the following:

1. Permanent or temporary loss of vegetation cover as a result of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint only.
2. Loss of species of special concern during pre-construction site clearing activities. Few species of special concern are present within the affected area, which will be destroyed during site preparation.
3. Susceptibility of some areas to erosion as a result of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being temporarily susceptible to soil erosion.
4. Susceptibility of post construction disturbed areas to invasion by exotic and alien species. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.
5. Disturbances to ecological processes. Activity may result in disturbances to surrounding ecological processes.
6. Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.
7. Loss of faunal SSC due to construction activities: Activities associated with bush clearing and site subsequent preparation, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.

3.2.3 Potential cumulative impacts

No cumulative impacts are expected because of the development of the site, due to the limited disturbance area.

Table 3: Summary indicating significance of potential impacts (SB = Significance BEFORE Mitigation; SA = Significance AFTER Mitigation)

Impact	Comment	Extent	Duration	Intensity	Probability	SB	SA
Indigenous vegetation cover loss	The permanent or temporary loss of vegetation cover as a result of site clearing is likely to be high during construction, however the species currently present are common grasses and invasive alien species.	Site	Long	Moderate	Definite	Low	Negligible
Loss of flora species of special concern	Loss of species of special concern during pre-construction site clearing activities	Site	Long	Low	Definite	Low	Negligible
Loss of faunal habitat	Activity will result in the loss of habitat for faunal species	Site	Long	Moderate	Definite	Low	Negligible
Loss of faunal species	Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species	Site	Long	Low	Unlikely	Low	Negligible
Alien species invasion	Susceptibility of post construction disturbed areas to invasion by exotic and alien species	Site	Long	High	Probable	Moderate	Moderate
Erosion	Due to the flat nature of the site the risk of erosion resulting from loss of vegetation cover is minimal.	Site	Short	Low	Unlikely	Low	Negligible
Disturbances to ecological processes	Disturbances to ecological processes	Site	Short	Low	Probable	Low	Negligible
OVERALL						Low	Negligible

4 Mitigation and Management

The following mitigation measures are recommended:

Impact	Mitigation Measures
Vegetation	Blanket clearing of vegetation will be limited to the development footprint. No clearing outside of the site will take place, except for construction of the access road and installation of other services, if necessary.
Flora	Any permits to be acquired beforehand. Flora and fauna search and rescue is unlikely to be required as the probability of finding any species of conservation concern is negligible.
Alien species	Alien trees must be removed from the site as per NEMBA requirements. A suitable weed management strategy to be implemented in construction and operation phases to prevent the spread of weeds into adjacent areas. After clearing is completed, an appropriate cover grass should be planted to minimise risk of weed regrowth.
Erosion	Suitable measures must be implemented in areas that are susceptible to erosion, including but not limited to gabions and runoff diversion berms (if necessary). Areas must be rehabilitated and a suitable grass cover planted once construction is completed.
Ecological Processes	Blanket clearing of vegetation must be limited to the footprint
Faunal Habitat	Blanket clearing of vegetation must be limited to the footprint.
Faunal Species	A faunal search and rescue may be undertaken before bush clearing by a competent person, especially for reptiles, if deemed necessary on commencement.

4.1 Vegetation and Flora Clearing and Relocation Plan

The following flora relocation plan is recommended:

1. If necessary once the site development plan has been determined a botanist should be consulted in order to undertake a rapid screening of the site in order to determine if any species require relocation that were not present during this assessment. This is to allow for any species that may come up subsequent to this assessment being conducted.
2. If necessary, any flora search and rescue is to be conducted before vegetation clearing takes place.
3. A permit may be required, depending of the findings of the above before site clearing commences, but is unlikely.

5 Conclusions

The following conclusions have been made:"

1. The site is relatively flat and is suitable for the proposed development concept.
2. No noteworthy or conservation worthy vegetation or species are present within the site, which can be regarded as being transformed.
3. Vegetation on site is a mixture of secondary grasses and ruderal weeds which is mowed regularly. Historically it may have been used for livestock grazing (more than 10 years previously).
4. The national vegetation unit is not represented in the species present as a result of grazing and mowing over many years.
5. The vegetation unit threat status is Least concern and no designated Critical Biodiversity Areas or Ecological Process Areas will be affected.
6. The site falls just within 5 km of The Loerie Nature Reserve, however due to the transformed nature of the site, development will have no consequences to the nature reserve or ecological processes.
7. No further clearing into the thicket/fynbos surrounding the drainage line to the west of the facility should be undertaken.

8. The current vegetation on site is secondary and a result of rehabilitation as well as secondary colonisation of common grassy species and weeds from surrounding areas. It should be noted that the site may have had fynbos elements in the past and if left over a long time period, with no intervention, more elements of surrounding vegetation may colonise the site through the process of succession, however due to the change in surrounding conditions it is unlikely to attain its original state.

In conclusion, based on this ecological assessment, the further expansion is unlikely to have any direct significant ecological impacts to the terrestrial environment if the recommendations of this report are adhered to, including implementation of an Environmental management Plan attached as Annexure B.

6 References

1. Acocks, J. P. H. 1988. Veld Types of South Africa. Memoirs of the Botanical Survey of South Africa, No 57. Botanical Research Institute, Department of Agriculture and Water Supply, South Africa.
2. Batten, H., and Bokelmann, H. 2001. Eastern Cape: South African Wild Flower Guide 11. The Botanical Society of South Africa. pp 306.
3. Berliner D. & Desmet P. 2007. Eastern Cape Biodiversity Conservation Plan: Technical Report. Department of Water Affairs and Forestry Project No 2005-012, Pretoria. 1 August 2007
4. Bourquin, O. 1987. The recent geographical range extension of *Hemidactylus mabouia mabouia*. *Lammergeyer* 38: 12-14.
5. Branch, W. R. and H. Braack, 1987. The reptiles and amphibians of the Addo Elephant National Park. *Koedoe* 30: 61-112.
6. Branch, W.R. (ed.) 1988. South African Red Data Book - Reptiles and Amphibians. South African National Science Programme Report 151: i-iv, 242p.
7. Branch, W.R., 1998a. Field Guide to the Snakes and other Reptiles of Southern Africa. Rev ed. Struiks Publ., Cape Town, 399 pp, num. maps, 112 col. pls.
8. Bromilow, C. 2001. Problem Plants of South Africa. A Guide to the Identification and Control of More than 300 Invasive Plants and Other Weeds. Briza Publications. pp 258
9. Bruton, M. N., and Gess, F. W. 1988. Towards an Environmental Plan for the Eastern Cape. Conference proceedings from Rhodes University. Grocott and Sherry, Grahamstown.
10. De Villiers C.C., Driver A., Clark B., Euston-Brown D.I.W., Day E.G., Job N., Helme N.A., Holmes P.M., Brownlie S. and Rebelo A.B. 2005. Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape. Fynbos Forum and Botanical Society of South Africa, Kirstenbosch, 94p.
11. Friedmann, Y. and Daly, B. (eds.) 2004. Red Data Book of the Mammals of South Africa: A Conservation Assessment. CBSG Southern Africa, Conservation Breeding Specialist Group (SSG/IUCN), Endangered Wildlife Trust, South Africa. 722p.
12. Fuggle, R. F. and Rabie, M. A. 2003. Environmental Management in South Africa. Juta & Co, Johannesburg.
13. Gledhill, E. 1981. Veldblomme van Oos-Kaapland. The Department of Nature and Environmental Conservation of the Cape Province Administration. Galvin and Sales, Cape Town.
14. Golding, J. (Ed.) 2002. Southern African Plant Red Data Lists. Southern African Botanical Diversity Network Report No 14.
15. Henderson, L. 2001. Alien Weeds and Invasive Plants. Plant Protection Research Institute Handbook No 12. Agricultural Research Council. pp 300.
16. Henning, G.A., Terblanche, R.F. and Ball, J.B (eds) 2009. South African Red Data Book: Butterflies. SANBI Biodiversity Series 13. South African National Biodiversity Institute, Pretoria.
17. Hilton-Taylor, C. 1996. Red Data List of Southern African Plants. National Botanical Institute..

18. Köpke, D. 1988. The Climate of the Eastern Cape. In: Bruton, M. N., and Gess, F. W. (Eds). Towards and Environmental Plan for the Eastern Cape. Conference proceedings from Rhodes University. Grocott and Sherry, Grahamstown.
19. Low, A. B., and Rebelo, A. 1988. Vegetation of South Africa, Lesotho and Swaziland. A Companion to the Vegetation Map of South Africa, Lesotho and Swaziland. Department of Environmental Affairs and Tourism, Pretoria.
20. Minter, L.R., Burger, M., Harrison, J.A., Braack, H.H., Bishop, P.J & Kloepfer, D. (eds.) 2004. Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland, SI/MAB Series 9. Smithsonian Institute, Washington D.C., 360p.
21. Pienaar, K. 2000. The South African What Flower is That? Struik Publishers (Pty) Ltd. Cape Town.
22. Pierce, S. M. 2003. The STEP Handbook. Integrating the natural environment into land use decisions at the municipal level: towards sustainable development. Terrestrial Ecological Research Unit Report No 47. University of Port Elizabeth, South Africa.
23. Pierce SM and Mader AD. 2006. The STEP Handbook. Integrating the natural environment into land use decisions at the municipal level: towards sustainable development. Centre for African Conservation Ecology (ACE). Report Number 47 (Second Edition). Nelson Mandela Metropolitan University, South Africa.
24. Rouget, M., Reyers, B., Jonas, Z., Desmet, P., Driver, A., Maze, K., Egoh, B. & Cowling, R.M. 2004. South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 1: Terrestrial Component. Pretoria: South African National Biodiversity Institute. Skead, C.J. 2007. Historical incidence of the larger land mammals in the broader Eastern Cape. 2nd ed. (eds. Boshoff, A.F., Kerley, G.I.H. and Lloyd, P.H.), Port Elizabeth, Centre for African Conservation Ecology, Nelson Mandela Metropolitan University, 570 p.
25. Soil Classification Working Group (SCWG), 1991. Soil Classification, A Taxonomic System for South Africa. Memoirs on the Agricultural Natural Resources of South Africa, No 15. Department of Agricultural Development, Pretoria.
26. Stirton, C. H. 1987. Plant Invaders : Beautiful, but Dangerous. The Department of Nature and Environmental Conservation of the Cape Province Administration. Galvin and Sales, Cape Town.
27. Vlok, J, H, J., Euston-Brown, D.I.W. 2002. The patterns within, and the ecological processes that sustain, the subtropical thicket vegetation in the planning domain for the Subtropical Thicket Ecosystem Planning (STEP) project. TERU Report 40. University of Port Elizabeth.
28. Weather Bureau. 1988. Climate of South Africa - Climate statistics up to 1984 (WB40). Government Printer, Pretoria.

7 Appendix A: Site Photographic Record



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7: Affected site



Figure 8: Affected site



Figure 9: Affected site



Figure 10: Affected site



Figure 11: Affected site



Figure 12: Affected site



Figure 13: Surrounding area



Figure 14: Surrounding area



Figure 15: Surrounding area



Figure 16: Surrounding area



Figure 17: Surrounding area



Figure 18: Surrounding area



Figure 19: Surrounding area



Figure 20: Surrounding area



Figure 21: Surrounding area



Figure 22: Surrounding area



Figure 23: Surrounding area



Figure 24: Surrounding area

8 Appendix B: Environmental Management Plan

This Environmental Management Plan (EMP) contains guidelines, operating procedures and rehabilitation control requirements, which will be binding on the holder of the environmental authorisation after approval of the EMP.

The impacts identified and listed in Table 1 of the previous chapter will be managed / controlled as set out under mitigating measures and as detailed in this part for the more significant impacts during the operational phase.

8.1 Biodiversity Requirements

Protection of Flora and Fauna

- Search and rescue operations for Red List Species must be undertaken before the commencement of site clearing activities.
- Indigenous vegetation encountered on the sites are to be conserved and left intact.
- It is important that clearing activities are kept to the minimum and take place in a phased manner. This allows animal species to move into safe areas and prevents wind and water erosion of the cleared areas.
- Stripped vegetation should be temporarily stored during operations and to be used later to stabilise slopes. This excludes exotic invasive species.
- No animals are to be harmed or killed during the course of operations.
- Workers are NOT allowed to collect any flora or snare any faunal species. All flora and fauna remain the property of the land owner and must not be disturbed, upset or used without their expressed consent.
- It is the responsibility of the Contractor to provide sufficient fuel for cooking and heated as needed by the staff.
- No domestic animals are permitted on the sites.
- Trees and shrubs that are directly affected by the operations may be felled or cleared but only by the expressed written permission of the ECO.
- Weeds and alien species must be cleared by hand before the rehabilitation phase of the areas. Removal of alien plants are to be done according to the Working for Water Guidelines.
- The Contractor is responsible for the removal of alien species within all areas disturbed during construction activities. Disturbed areas include (but are not limited to) access roads, construction camps, site areas and temporary storage areas.
- In consultation with relevant authorities, the Engineer may order the removal of alien plants (when necessary). Areas within the confines of the site are to be included.
- All alien plant material (including brushwood and seeds) should be removed from site and disposed of at a registered waste disposal site. Should brushwood be utilised for soil stabilization or mulching, it must be seed free.
- Rehabilitation of vegetation of the site must be done as described in the Rehabilitation Plans.

Fires

- The Contractor must ensure that an emergency preparedness plan is in place in order to fight accidental fires or veld fires, should they occur. The adjacent land owners/users/managers should also be informed or otherwise involved.
- Enclosed areas for food preparation should be provided and the Contractor must strictly prohibit the use of open fires for cooking and heating purposes.
- The use of branches of trees and shrubs for fire-making must be strictly prohibited.
- The Contractor should take all reasonable and active steps to avoid increasing the risk of fire through their activities on-site. No fires may be lit except at places approved by the ECO.
- The Contractor must ensure that the basic fire-fighting equipment is to the satisfaction of the Local Emergency Services.

- The Contractor must supply all living quarters, site offices, kitchen areas, workshop areas, materials, stores and any other relevant areas with tested and approved fire-fighting equipment.
- Fires and “hot work” must be restricted to demarcated areas.
- A braai facility may be considered at the discretion of the Contractor and in consultation with the ECO. The area must be away from flammable stores. All events must be under management’s supervision and a fire extinguisher will be immediately available. “Low-smoke” fuels must be used (e.g. charcoal) and smoke control regulations, if applicable, must be considered.
- The Contractor must take precautions when working with welding or grinding equipment near potential sources of combustion. Such precautions include having a suitable, tested and approved fire extinguisher immediately at hand and the use of welding curtains.

Soil Aspects

- Sufficient topsoil must be stored for later use during decommissioning, particularly from outcrop areas.
- Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
- All available topsoil shall be removed after consultation with the botanist and horticulturalist prior to commencement of any operations.
- The removed topsoil shall be stored on high ground within the site footprint outside the 1:50 flood level within demarcated areas.
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
- The stockpiled topsoil shall be protected from being blown away or being eroded. The application of a suitable grass seed/runner mix will facilitate this and reduce the minimise weeds.

Dust

- To manage complaints relation to impacts on the nearby communities, a dust register will be developed.
- If required, water spray vehicles will be used to control wind cause by strong winds during activities on the works.
- No over-watering of the site or road surfaces.
- Wind screens should be used to reduce wind and dust in open areas.

8.1.1 Infrastructural Requirements

Topsoil

- Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
- All available topsoil shall be removed after consultation with the Regional Manager prior to commencement of any operations.
- The removed topsoil shall be stored on high ground within the footprint outside the 1:50 flood level within demarcated areas (Appendix 1)
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
- The stockpiled topsoil shall be protected from being blown away or being eroded. The use of a suitable grass seed/runner mix will facilitate soil protection and minimise weeds/weed growth.

Stormwater and Erosion Control

- Stormwater Management Plans must be developed for the site and should include the following:
 - The management of stormwater during construction.
 - The installation of stormwater and erosion control infrastructure.
 - The management of infrastructure after completion of construction.
- Temporary drainage works may be required to prevent stormwater to prevent silt laden surface water from draining into river systems in proximity to the site. Stormwater must be prevented from entering or running off site.

- To ensure that site are not subjected to excessive erosion and capable of drainage runoff with minimum risk of scour, their slopes should be profiled at a maximum 1:3 gradient.
- Diversion channels should be constructed ahead of the open cuts, and above emplacement areas and stockpiles to intercept clean runoff and divert it around disturbed areas into the natural drainage system downstream of the site.
- Rehabilitation is necessary to control erosion and sedimentation of all eroded areas (where works will take place).
- Existing vegetation must be retained as far as possible to minimise erosion problems.
- It is importation that the rehabilitation of site are planned and completed in such a way that the runoff water will not cause erosion.
- Visual inspections will be done on a regular basis with regard to the stability of water control structure, erosion and siltation.
- Sediment-laden runoff from cleared areas must be prevented from entering rivers and streams.
- No river or surface water may be affected by silt emanating from the site.

Site Office / Camp Sites

- No site offices or camp sites will be constructed on the site under current operating conditions, existing structures will be used.

Operating Procedures in the Site

- Construction shall only take place within the approved demarcated site.
- Construction may be limited to the areas indicated by the Regional Manager on assessment of the application.
- The holder of the environmental authorisation shall ensure that operations take place only in the demarcated areas as described in this report.
- Watering to minimise the effect of dust generation should be carried out as frequently as necessary. Noise should also be kept within reason.
- No workers will be allowed to damage or collect any indigenous plant or snare any animal.
- Grass and vegetation of the immediate environment, or adapted grass / vegetation will be re-established on completion of construction activities, where applicable.
- No firewood to be collected on site and the lighting of fires must be prohibited.
- Cognisance is to be taken of the potential for endangered species occurring in the area. It is considered unlikely, however, that these species will be affected by the proposed activity, or the access road.

Excavations

Whenever any excavation is undertaken, the following procedures shall be adhered to:

- Topsoil shall be handled as described in this EMP.
- Excavations shall take place only within the approved demarcated site.
- Excavations must follow the contour lines where possible.
- The construction site will not be left in any way to deteriorate into an unacceptable state.
- The excavated area must serve as a final depositing area for waste rock and overburden during the rehabilitation process.
- Once excavations have been filled with overburden, rocks and coarse natural materials and profiled with acceptable contours (including erosion control measures), the previous stored topsoil shall be returned to its original depth over the area.
- The area shall be fertilised if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally occurring flora.

Rehabilitation of Processing and Excavation Areas

- On completion of construction, the surface of the processing areas especially if compacted due to hauling and dumping operations shall be scarified to a depth of at least 200 mm and graded to an even surface condition and the previously stored topsoil will be returned to its original depth over the area.
- The area shall be fertilised if necessary to allow vegetation to establish rapidly. The site shall be seeded with suitable grasses and local indigenous seed mix.
- Excavations may be used for the dumping of construction wastes. This shall be done in such a way as to aid rehabilitation.
- Waste (non-biodegradable refuse) will not be permitted to be deposited in the excavations.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the activity, be corrected and the area be seeded with a vegetation seed mix to his or her satisfaction. This must be done in conjunction with the ECO.
- Final rehabilitation must comply with the requirements mention in the Rehabilitation Plan.

8.1.2 Final Rehabilitation

Rehabilitation Objective

The overall objective of the rehabilitation plan is to minimize adverse environmental impacts associated with the activity whilst maximizing the future utilization of the property. Significant aspects to be borne in mind in this regard is visibility of the development, revegetation of the footprint and stability and environmental risk. The depression and immediate area of the working must also be free of alien vegetation.

Additional broad rehabilitation strategies / objectives include the following:

- Rehabilitating the worked-out areas to take place concurrently within prescribed framework established in the EMP.
- All infrastructure, equipment, plant and other items used during the construction period will be removed from the site.
- Waste material of any description, including scrap, rubble and tyres, will be removed entirely from the site and disposed of at a recognised landfill facility. It will not be permitted to be buried or burned on site.
- Final rehabilitation shall be completed within a period specified by the Regional Manager.

Topsoil and Subsoil Replacement

Topsoil and subsoil will be stripped separately during construction. The topsoil and subsoil removed from the initial cut will be stockpiled separately and only used in rehabilitation work towards the end of the operation. This is in contract to the gravel activity where rehabilitation and topsoil replacement was earmarked at the completion of each phase.

Stripped overburden will be backfilled into the worked-out areas where needed. Stripped topsoil will be spread over the re-profiled areas to an adequate depth to encourage plant regrowth. The vegetative cover will be stripped with the thin topsoil layer to provide organic matter to the relayed material and to ensure that the seed store contained in the topsoil is not diminished. Reseeding may be required should the stockpiles stand for too long and be considered barren from a seed bank point of view. Stockpiles should ideally be stored for no longer than a year.

The topsoil and overburden will be keyed into the reprofiled surfaces to ensure that they are not eroded or washed away. The topsoiled surface will be left fairly rough to enhance seedling establishment, reduce water runoff and increase infiltration.

Revegetation

All prepared surfaces will be seeded with suitable grass species to provide an initial ground cover and stabilize the soil surface.

Kikuyu grass may not be utilised and any sods must utilise indigenous species such as *Cynodon dactylon*. As a guide, the following is recommended, however this can be adjusted dependant on seed availability in consultation with a suitably qualified specialist. Different seed mixes to be applied for winter and summer months as follows:

- a. *Eragrostis tef*: 3 kg/ha
- b. *Eragrostis curvula*: 3 kg/ha
- c. *Panicum maximum*: 5 kg/ha
- d. *Chloris gayana*: 5 kg/ha
- e. *Cenchrus ciliaris*: 8 kg/ha
- f. *Cynodon dactylon*: 10 kg/ha

The overall revegetation plan will, therefore, be as follows:

- Ameliorate the aesthetic impact of the site
- Stabilise disturbed soil and rock faces
- Minimize surface erosion and consequent siltation of natural water course located on site
- Control wind-blown dust problems
- Enhance the physical properties of the soil
- Re-establish nutrient cycling
- Re-establish a stable ecological system

Every effort must be made to avoid unnecessary disturbance of the natural vegetation during operations.

Drainage and Erosion Control

To control the drainage and erosion at site the following procedures will be adopted:

- Areas works are complete should be rehabilitated immediately.
- Areas to be disturbed in future activities will be kept as small as possible (i.e. conducting the operations in phases), thereby limiting the scale of erosion.
- Slopes will be profiled to ensure that they are not subjected to excessive erosion but capable of drainage runoff with minimum risk of scour (maximum 1:3 gradient).
- All existing disturbed areas will be re-vegetated to control erosion and sedimentation
- Existing vegetation will be retained as far as possible to minimize erosion problems.
-

Visual Impacts Amelioration

The overall visual impact of the proposed activities will be minimised by the following mitigating measures:

- Confining the footprint to an area as small as possible
- Re-topsoiling and vegetating all disturbed areas

8.1.3 Monitoring and Reporting

Adequate management, maintenance and monitoring will be carried out annually by the applicant to ensure successful rehabilitation of the property until a closure certificate is obtained.

To minimise adverse environmental impacts associated with operations it is intended to adopt a progressive rehabilitation programme, which will entail carrying out the proposed rehabilitation procedures concurrently with activity.

8.1.4 Closure objectives and their extent of alignment to the pre-construction environment

Closure Objectives

The closure of the site will involve removal of all debris and rehabilitation of areas not rehabilitated during the operational phases of the project. This will comprise the scarification of compacted areas, reshaping of areas, topsoiling and regenerating all prepared surfaces.

Appendix C: Flora and Fauna species

Botanical Name	Family Name	Status**	Present	Growth Form
FLORA				
<i>Agathosma mucronulata</i>	RUTACEAE	PNCO		Low Shrubs
<i>Agathosma pilifera</i>	RUTACEAE	PNCO		Low Shrubs
<i>Agathosma puberula</i>	RUTACEAE	PNCO		Low Shrubs
<i>Agathosma spinosa</i>	RUTACEAE	PNCO		Low Shrubs
<i>Alepidea capensis</i>	APIACEAE			Herbs
<i>Aloe ferox</i>	ASPHODELACEAE	PNCO		Succulent Tree
<i>Annesorhiza thunbergii</i>	APIACEAE	End		Herbs
<i>Anthochortus crinalis</i>	RESTIONACEAE	PNCO		Graminoids
<i>Argyrobium parviflorum</i>	FABACEAE	End		Low Shrubs
<i>Argyrobium trifoliatum</i>	FABACEAE	End		Low Shrubs
<i>Aspalathus fourcadei</i>	FABACEAE			Low Shrubs
<i>Aspalathus kougaensis</i>	FABACEAE			Tall Shrubs
<i>Aspalathus nivea</i>	FABACEAE			Tall Shrubs
<i>Aster laevigatus</i>	ASTERACEAE	End		Herbs
<i>Bobartia orientalis subsp. orientalis</i>	IRIDACEAE	PNCO		Geophytic Herbs
<i>Brachiaria serrata</i>	POACEAE			Graminoids
<i>Cannomois scirpoides</i>	RESTIONACEAE	PNCO		Graminoids
<i>Cannomois virgata</i>	RESTIONACEAE	PNCO		Graminoids
<i>Centella didymocarpa</i>	APIACEAE	End		Herbs
<i>Centella virgata</i>	APIACEAE			Herbs
<i>Cliffortia drepanoides</i>	ROSACEAE			Low Shrubs
<i>Clutia alaternoides</i>	EUPHORBIACEAE	PNCO		Low Shrubs
<i>Clutia polifolia</i>	EUPHORBIACEAE	PNCO		Low Shrubs
<i>Cullumia cirsioides</i>	ASTERACEAE	End		Low Shrubs
<i>Cymbopogon marginatus</i>	POACEAE			Graminoids
<i>Cyrtanthus flammosus</i>	AMARYLLIDACEAE	End, PNCO		Geophytic Herbs
<i>Cyrtanthus labiatus</i>	AMARYLLIDACEAE	End, PNCO		Geophytic Herbs
<i>Cyrtanthus montanus</i>	AMARYLLIDACEAE	End, PNCO		Geophytic Herbs
<i>Digitaria eriantha</i>	POACEAE			Graminoids
<i>Diheteropogon filifolius</i>	POACEAE			Graminoids
<i>Diosma prama</i>	RUTACEAE	PNCO		Low Shrubs
<i>Diosma rourkei</i>	RUTACEAE	PNCO		Low Shrubs
<i>Disparago ericoides</i>	ASTERACEAE			Low Shrubs
<i>Dodonaea viscosa var. angustifolia</i>	SAPINDACEAE			Tall Shrubs
<i>Eragrostis curvula</i>	POACEAE			Graminoids
<i>Erica demissa</i>	ERICACEAE	PNCO		Low Shrubs
<i>Erica pectinifolia</i>	ERICACEAE	PNCO		Low Shrubs
<i>Erica sparsa</i>	ERICACEAE	PNCO		Low Shrubs
<i>Erica thamnoides</i>	ERICACEAE	PNCO		Low Shrubs
<i>Eriocephalus tenuipes</i>	ASTERACEAE	End		Low Shrubs
<i>Euchaetis vallis-simiae</i>	RUTACEAE	End, PNCO		Low Shrubs
<i>Euryops euryopoides</i>	ASTERACEAE			Low Shrubs
<i>Freylinia crispa</i>	SCROPHULARIACEAE	End		Tall Shrub
<i>Gasteria glauca</i>	ASPHODELACEAE	End, PNCO		Succulent Herb
<i>Gazania krebsiana subsp. krebsiana</i>	ASTERACEAE			Herbs
<i>Geissorhiza roseoalba</i>	IRIDACEAE	PNCO		Geophytic Herbs
<i>Gladiolus uitenhagensis</i>	IRIDACEAE	End, PNCO		Geophytic Herbs
<i>Helichrysum felinum</i>	ASTERACEAE			Herbs

Botanical Name	Family Name	Status**	Present	Growth Form
FLORA				
<i>Helichrysum teretifolium</i>	ASTERACEAE			Low Shrubs
<i>Heteropogon contortus</i>	POACEAE			Graminoids
<i>Hypodiscus albo-aristatus</i>	RESTIONACEAE	PNCO		Graminoids
<i>Hypodiscus striatus</i>	RESTIONACEAE	PNCO		Graminoids
<i>Hypodiscus synchroolepis</i>	RESTIONACEAE	PNCO		Graminoids
<i>Ischyrolepis capensis</i>	RESTIONACEAE	PNCO		Graminoids
<i>Ischyrolepis gaudichaudiana</i>	RESTIONACEAE	PNCO		Graminoids
<i>Knowltonia capensis</i>	RANUNCULACEAE			Herbs
<i>Lampranthus lavisii</i>	MESEMBRYANTHEMACEAE	End		Succulent Shrub
<i>Leucadendron salignum</i>	PROTEACEAE	PNCO		Low Shrubs
<i>Leucospermum cuneiforme</i>	PROTEACEAE	PNCO		Low Shrubs
<i>Mastersiella purpurea</i>	RESTIONACEAE	PNCO		Graminoids
<i>Melinis repens subsp. repens</i>	POACEAE			Graminoids
<i>Merxmuellera papposa</i>	POACEAE			Graminoids
<i>Merxmuellera stricta</i>	POACEAE			Graminoids
<i>Otholobium carneum</i>	FABACEAE			Low Shrubs
<i>Passerina obtusifolia</i>	THYMELAEACEAE			Low Shrubs
<i>Passerina pendula</i>	THYMELAEACEAE			Low Shrubs
<i>Pentameris distichophylla</i>	POACEAE			Graminoids
<i>Pentaschistis eriostoma</i>	POACEAE			Graminoids
<i>Pentaschistis pallida</i>	POACEAE			Graminoids
<i>Peucedanum dregeanum</i>	APIACEAE	End		Herbs
<i>Phyllica axillaris</i>	RHAMNACEAE			Low Shrubs
<i>Phyllica lachneaeoides</i>	RHAMNACEAE			Low Shrubs
<i>Polygala myrtifolia</i>	POLYGALACEAE			Low Shrubs
<i>Protea foliosa</i>	PROTEACEAE	PNCO		Low Shrubs
<i>Protea nitida</i>	PROTEACEAE	PNCO		Small Tree
<i>Pteronia incana</i>	ASTERACEAE			Low Shrubs
<i>Restio triticeus</i>	RESTIONACEAE	PNCO		Graminoids
<i>Restio vallis-simius</i>	RESTIONACEAE	End, PNCO		Graminoid
<i>Rhodocoma fruticosa</i>	RESTIONACEAE	PNCO		Graminoids
<i>Stoebe plumosa</i>	ASTERACEAE			Low Shrubs
<i>Sutera cinerea</i>	SCROPHULARIACEAE	End		Low Shrubs
<i>Tephrosia capensis</i>	FABACEAE			Low Shrubs
<i>Tetaria capillacea</i>	CYPERACEAE			Graminoids
<i>Tetaria cuspidata</i>	CYPERACEAE			Graminoids
<i>Tetaria fourcadei</i>	CYPERACEAE			Graminoids
<i>Tetaria involucrata</i>	CYPERACEAE			Graminoids
<i>Thamnochortus fruticosus</i>	RESTIONACEAE	PNCO		Graminoids
<i>Themeda triandra</i>	POACEAE			Graminoids
<i>Trachypogon spicatus</i>	POACEAE			Graminoids
<i>Tristachya leucothrix</i>	POACEAE			Graminoids
<i>Watsonia meriana</i>	IRIDACEAE	PNCO		Geophytic Herbs

Scientific Name	Family	Status	Common Name
FAUNA			
Mammals			
<i>Philantomba monticola</i>	Bovidae	Vulnerable (2016)	Blue Duiker
<i>Tragelaphus scriptus</i>	Bovidae	Least Concern	Bushbuck

Scientific Name	Family	Status	Common Name
FAUNA			
<i>Canis mesomelas</i>	Canidae	Least Concern (2016)	Black-backed Jackal
<i>Papio ursinus</i>	Cercopithecidae	Least Concern (2016)	Chacma Baboon
<i>Amblysomus hottentotus</i>	Chrysochloridae	Least Concern (2016)	Hottentot Golden Mole
<i>Caracal caracal</i>	Felidae	Least Concern (2016)	Caracal
<i>Graphiurus (Graphiurus) murinus</i>	Gliridae	Least Concern	Forest African Dormouse
<i>Herpestes pulverulentus</i>	Herpestidae	Least Concern (2016)	Cape Gray Mongoose
<i>Aethomys namaquensis</i>	Muridae	Least Concern	Namaqua Rock Mouse
<i>Grammomys dolichurus</i>	Muridae	Least Concern (2016)	Common Grammomys
<i>Mastomys natalensis</i>	Muridae	Least Concern (2016)	Natal Mastomys
<i>Rattus rattus</i>	Muridae	Least Concern	Roof Rat
<i>Rhabdomys pumilio</i>	Muridae	Least Concern (2016)	Xeric Four-striped Grass Rat
<i>Orycteropus afer</i>	Orycteropodidae	Least Concern (2016)	Aardvark
Reptiles			
<i>Agama atra</i>	Agamidae	Least Concern (SARCA 2014)	Southern Rock Agama
<i>Bradypodion taeniabronchum</i>	Chamaeleonidae	Endangered (SARCA 2014)	Elandsberg Dwarf Chameleon
<i>Bradypodion ventrale</i>	Chamaeleonidae	Least Concern (SARCA 2014)	Eastern Cape Dwarf Chameleon
<i>Crotaphopeltis hotamboeia</i>	Colubridae	Least Concern (SARCA 2014)	Red-lipped Snake
<i>Dasypeltis scabra</i>	Colubridae	Least Concern (SARCA 2014)	Rhombic Egg-eater
<i>Dispholidus typus typus</i>	Colubridae	Least Concern (SARCA 2014)	Boomslang
<i>Chamaesaura anguina anguina</i>	Cordylidae	Least Concern (SARCA 2014)	Cape Grass Lizard
<i>Pseudocordylus microlepidotus microlepidotus</i>	Cordylidae	Least Concern (SARCA 2014)	Cape Crag Lizard
<i>Naja nivea</i>	Elapidae	Least Concern (SARCA 2014)	Cape Cobra
<i>Pachydactylus maculatus</i>	Gekkonidae	Least Concern (SARCA 2014)	Spotted Gecko
<i>Tetradactylus seps</i>	Gerrhosauridae	Least Concern (SARCA 2014)	Short-legged Seps
<i>Tropidosaura gularis</i>	Lacertidae	Least Concern (SARCA 2014)	Cape Mountain Lizard
<i>Boaedon capensis</i>	Lamprophiidae	Least Concern (SARCA 2014)	Brown House Snake
<i>Duberria lutrix lutrix</i>	Lamprophiidae	Least Concern (SARCA 2014)	South African Slug-eater
<i>Homoroselaps lacteus</i>	Lamprophiidae	Least Concern (SARCA 2014)	Spotted Harlequin Snake
<i>Lycodonomorphus inornatus</i>	Lamprophiidae	Least Concern (SARCA 2014)	Olive House Snake
<i>Lycodonomorphus rufulus</i>	Lamprophiidae	Least Concern (SARCA 2014)	Brown Water Snake
<i>Lycophidion capense capense</i>	Lamprophiidae	Least Concern (SARCA 2014)	Cape Wolf Snake
<i>Psammophylax rhombeatus</i>	Lamprophiidae	Least Concern (SARCA 2014)	Spotted Grass Snake
<i>Pelomedusa subrufa</i>	Pelomedusidae	Least Concern (SARCA 2014)	Central Marsh Terrapin
<i>Acontias gracilicauda</i>	Scincidae	Least Concern (SARCA 2014)	Thin-tailed Legless Skink
<i>Acontias meleagris</i>	Scincidae	Least Concern (SARCA 2014)	Cape Legless Skink
<i>Acontias orientalis</i>	Scincidae	Least Concern (SARCA 2014)	Eastern Legless Skink
<i>Trachylepis capensis</i>	Scincidae	Least Concern (SARCA 2014)	Cape Skink
<i>Trachylepis homalocephala</i>	Scincidae	Least Concern (SARCA 2014)	Red-sided Skink
<i>Trachylepis varia sensu lato</i>	Scincidae	Least Concern (SARCA 2014)	Common Variable Skink Complex
<i>Chersina angulata</i>	Testudinidae	Least Concern (SARCA 2014)	Angulate Tortoise
<i>Homopus areolatus</i>	Testudinidae	Least Concern (SARCA 2014)	Parrot-beaked Tortoise
<i>Stigmochelys pardalis</i>	Testudinidae	Least Concern (SARCA 2014)	Leopard Tortoise

Scientific Name	Family	Status	Common Name
FAUNA			
<i>Varanus niloticus</i>	Varanidae	Least Concern (SARCA 2014)	Water Monitor
<i>Bitis arietans arietans</i>	Viperidae	Least Concern (SARCA 2014)	Puff Adder
<i>Causus rhombeatus</i>	Viperidae	Least Concern (SARCA 2014)	Rhombic Night Adder
Amphibians			
<i>Breviceps adspersus</i>	Brevicipitidae	Least Concern	Bushveld Rain Frog
<i>Sclerophrys capensis</i>	Bufoidea	Least Concern	Raucous Toad
<i>Sclerophrys pardalis</i>	Bufoidea	Least Concern	Eastern Leopard Toad
<i>Heleophryne hewitti</i>	Heleophryinidae	Critically Endangered	Hewitt's Ghost Frog
<i>Hyperolius marmoratus</i>	Hyperoliidae	Least Concern (IUCN ver 3.1, 2013)	Painted Reed Frog
<i>Kassina senegalensis</i>	Hyperoliidae	Least Concern	Bubbling Kassina
<i>Semnodactylus wealii</i>	Hyperoliidae	Least Concern	Rattling Frog
<i>Xenopus laevis</i>	Pipidae	Least Concern	Common Platanna
<i>Amietia delalandii</i>	Pyxicephalidae	Least Concern (2017)	Delalande's River Frog
<i>Amietia fuscigula</i>	Pyxicephalidae	Least Concern (2017)	Cape River Frog
<i>Cacosternum boettgeri</i>	Pyxicephalidae	Least Concern (2013)	Common Caco
<i>Cacosternum nanum</i>	Pyxicephalidae	Least Concern (2013)	Bronze Caco
<i>Strongylopus fasciatus</i>	Pyxicephalidae	Least Concern	Striped Stream Frog
<i>Strongylopus grayii</i>	Pyxicephalidae	Least Concern	Clicking Stream Frog
Invertebrates			
Scorpions		T.o.P.S.	
Baboon Spiders (All)		T.o.P.S.	
Butterflies			
None of concern			

**PNCO – Provincial Nature Conservation Ordinance (19 of 1974); NFA – National Forests Act; End – Endemic T.o.P.S. Threatened or Protected Species.

9 Appendix D: Specialist CV, SACNASP Registration and Declaration

Name of firm	Engineering Advice & Services (Pty) Ltd
Name of staff	JAMIE ROBERT CLAUDE POTE
ID Number	740515 5152 089
Profession	Registered Ecological Scientist and Environmental Scientist
Years with firm	5 Years
Nationality	South African
Membership to Professional Societies	The South African Council for Natural Scientific Professions (SACNASP): Pr. Sci. Nat.: 115233 International Association for Impact Assessment South Africa (IAIAsa Member Number 5045)South Africa (IAIAsa) Member Number 5045

KEY QUALIFICATIONS

Mr Jamie Pote has 15 years extensive professional experience in a wide range of Botanical and Ecological Specialist Assessments in South Africa (Eastern, Western & Northern Cape, Gauteng and Limpopo), Namibia, Mozambique, Democratic Republic of Congo, Republic of Congo and Ghana in the Infrastructure, Mining and Development Sectors. He also has experience in conducting Basic Assessment, Section 24 G, and Mining Permit (Borrow Pit) EMP applications, as well as developing GIS and other tools for Environmental related work.

He has broad ecological experience in a wide range of habitats and ecosystems in Southern, West and Central Africa and has been involved in all stages of project development from inception, through planning and environmental application and authorization (BAR and EMP) to implementation and compliance monitoring (ECO auditing) as an ecologist and as an Environmental Assessment Practitioner. Jamie has a well-deserved reputation for providing quality professional services. His strategy incorporates using proven methodologies with a highly responsive approach to sound environmental management, including developing adaptive methodologies and approaches with available technologies. He is highly capable of working within a team of qualified professionals or in an individual capacity.

EDUCATION

BSc	Rhodes University (Botany and Environmental Science)	2001
BSc (Hons)	Rhodes University (Botany)	2002

EMPLOYMENT RECORD

2003 – 2014	Self Employed Consultant	Specialist Environmental Consultant (Ecology)
2014 (Aug) – present	Engineering Advice & Services	Environmental Unit Manager

LANGUAGES

	<u>Speak</u>	<u>Read</u>	<u>Write</u>
English	Excellent	Excellent	Excellent
Afrikaans	Good	Excellent	Excellent

PROJECT EXPERIENCE

BASIC ASSESSMENT APPLICATION PROJECTS (DEDEAT)

- Basic Assessment Application for Citrus expansion on farm 960, Patensie (AIN du Preez Boerdery) 2014
- Basic Assessment Application for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape 2015
- Basic Assessment Application for Hankey Housing, Kouga District Municipality 2015

- Basic Assessment Application for Erf 14 Kabega, NMBM 2017
- Basic Assessment Application for Hankey Housing, Kouga District Municipality 2017
- Basic Assessment Application for Fairwest Rental Housing, Nelson Mandela Bay 2017
- Basic Assessment Application for South-End Precinct Mixed Use Development, Nelson Mandela Bay 2018
- Basic Assessment Application for Nelson Mandela University Access Road, NMB 2019
- Basic Assessment Application for Erf 599 Walmer Mixed Use Development, Nelson Mandela Bay 2019
- Basic Assessment Application for Cookhouse Bridge rehabilitation 2019
- Basic Assessment Application for Parsonsvelei Erf 984 & 1134 Parsonsvelei 2019

MINING PERMIT/ENVIRONMENTAL MANAGEMENT PROGRAMME APPLICATIONS (DMR)

- Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR02581 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08041, DR08247, DR08248 & DR08504 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08599, DR08601 & DR08570 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08235, DR08551 & DR08038 (DRPW) 2014
- Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08092, DR08093 & DR08649 (DRPW) 2014
- Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08090, DR08412, DR08425, DR08129, DR08109, DR08106, DR08104 & DR08099 – Matatiele (DRPW)
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (Tarkastad) (DRPW) 2015
- Mining BAR/EMP's for Chris Hani DM Borrow Pits – Intsika Yethu and Emalahleni (DRPW) 2015
- Mining BAR/EMP's for Joe Gqabi DM Borrow Pits – Senqu (DRPW) 2015
- Mining BAR/EMP's for Makana/Ndlambe LM Borrow Pits – Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Amahlathi LM Borrow Pits – Amatole (DRPW) 2015
- Mining BAR/EMP's for Mbashe/Mqume LM Borrow Pits – Amatole (DRPW) 2015
- Mining BAR/EMP's for Sundays River Valley LM Borrow Pits – Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Kouga LM Borrow Pits – Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Nkonkobe LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Mbhashe LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Mbizana LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Senqu LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Elundini LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Emalahleni LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Emalahleni LM Borrow Pits – (DRPW) 2016
- Mining BAR/EMP's for Ikwezi/Baviaans LM Borrow Pits – (DRPW) 2016
- Mining BAR/EMP's for Ingquza Hill LM Borrow Pits – (SANRAL) 2017
- Mining BAR/EMP's for Baviaans LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Senqu LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Inkwanca (Enoch Mgijima) LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Sakhisizwe/Engcobo LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Raymond Mahlaba LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Camdeboo LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Elundini LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Emalahleni/Intsika Yethu LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for 24 Borrow Pits in 6 districts within the Eastern Cape– (SANRAL) 2018
- Mining BAR/EMP's for Blue Crane Route LM Borrow Pits – (DoT) 2019

SECTION 24G APPLICATIONS

- 12 000 ML Dam constructed on farm 960, Patensie (MGM Trust) 2015
- Illegal clearing of 20 Ha of lands on Hitgeheim Farm, Sunland, Eastern Cape 2015

ENVIRONMENTAL MANAGEMENT, ENVIRONMENTAL CONTROL OFFICER, AUDITING AND MONITORING PROJECTS

- Flora Relocation Plan and Permit application for Wildemans Plaas, in NMB 2006
- EMP submission and ECO for Seaview Garden Estate in NMB 2010
- EMP and ECO for Sinati Golf Estate EMP in BCM, Eastern Cape 2009
- ECO audits for NMB Road surfacing in NMB (multiple contacts) 2011
- ECO for Mainstream Windfarm wind monitoring mast installation in Eastern Cape 2010
- Final EMP submission for Seaview Garden Estate in NMB 2012
- EMP and ECO for Utopia Estate in NMB 2013
- ECO for Riversbend Citrus Farm in NMB 2014
- ECO for Alfred Nzo DM Road resurfacing - DR08071, DR08649, DR08092, DR08418, DR08452, DR08015, DR08085, DR08639 & DR08073 in Eastern Cape - MSBA 2014
- ECO Audits for Koukamma Flood Damage Road Repairs – Hatch Goba 2014
- ECO for DRPW IRM Road Maintenance projects in Amahlathi Municipality 2015
- ECO for DRPW IRM Road Maintenance projects in Makana/Ndlambe Municipality 2015
- ECO for DRPW IRM Road Maintenance projects in Mbashe/Mqume Municipality 2015
- ECO for DRPW IRM Road Maintenance projects in Port St Johns, Mbizana, Ingquza Hill LMs 2015
- ECO and Botanical Specialist for the special maintenance of national route R61 Section 2 from Elinus Farm (km 42.2) to N10 (km 85.0) (SANRAL) 2016
- Environmental Control Officer (ECO): Construction of NSRI Slipway - Port Elizabeth Harbour 2016
- ECO for SANRAL RRP Road Maintenance projects in Mbashe LM 2016
- ECO for SANRAL RRP Road Maintenance projects in Nkonkobe LM 2016
- ECO for SANRAL RRP Road Maintenance projects in Mbizana LM 2016
- ECO for SANRAL RRP Road Maintenance projects in Senqu LM 2016
- ECO for SANRAL RRP Road Maintenance projects in Elundini LM 2016
- ECO and Environmental Management for closure of Bushmans River Landfill site 2016
- ECO for Citrus expansion on Farm 960, Patensie (AIN du Preez Boerdery) 2017
- ECO for Citrus expansion on Hitgeheim Farm (Farm 960), Sunland, Eastern Cape 2017
- DEO for improvement of national route R67 section 5 from Whittlesea (km 0.00) to Swart Kei river (km 15.40) – Murray & Roberts 2017
- ECO for SANRAL RRP Road Maintenance projects in Mbizana LM 2017
- ECO for DRPW IRM Road Maintenance projects in Raymond Mahlaba LM 2018
- ECO for DRPW IRM Road Maintenance projects in Inkwanca (Enoch Mjijima) LM 2018
- ECO for DRPW IRM Road Maintenance projects in Baviaans LM 2019
- ECO for DRPW IRM Road Maintenance projects in Senqu LM 2019
- ECO for DRPW IRM Road Maintenance projects in Kouga/Koukamma LM 2019
- ECO for DRPW IRM Road Maintenance projects in Sakhisizwe/Engcobo LM 2019
- ECO for DRPW IRM Road Maintenance projects in Elundini LM 2019
- ECO for DRPW IRM Road Maintenance projects in Emalahleni/Intsika Yethu LM 2019
- ECO for Construction of Fairwest Village Housing Project 2019
- ECO for Construction of Utopia Estate 2019
- ECO for Construction of NMU West End Student Residences Phases 1 & 3 2019

FLORA AND FAUNA RELOCATION PLANS, PERMITS AND IMPLEMENTATION

▪ Flora Relocation for Disco Poultry Farm in NMB	2010
▪ Flora Relocation for Mainstream Windfarm in Eastern Cape	2010
▪ Flora Search and Rescue Plan for Red Cap Wind Farm in Eastern Cape	2012
▪ Flora and Fauna Search and Rescue for Mainstream Windfarm in Eastern Cape	2013
▪ Flora Search and Rescue for Steytlerville Bulk Water Supply in Eastern Cape (Phase 1, 2 & 3)	2013
▪ Flora and Fauna Search and Rescue for OTGC Tank Farm, Coega IDZ in NMB	2013
▪ Flora and Fauna Search and Rescue for Jeffreys Bay School in Eastern Cape	2013
▪ Flora and Fauna Search and Rescue for Riversbend Citrus Farm in NMB	2014
▪ Flora Search and Rescue for Steytlerville Bulk Water Supply & WTW in Eastern Cape (Phase 4)	2015
▪ Flora Search and Rescue for Steytlerville Bulk Water Supply in Eastern Cape (Phase 5)	2016
▪ Flora Search and Rescue for Citrus expansion on Farm 960, Patensie (AIN du Preez Boerdery)	2016
▪ Flora Search and Rescue for Citrus expansion on Hitgeheim Farm (Farm 960), Sunland, Eastern Cape	2017
▪ Flora Search and Rescue for Citrus expansion on Boschkraal Citrus Farm, Sunland, Eastern Cape	2018
▪ Flora Search and Rescue for Wanhoop pipeline, Willowmore, Eastern Cape	2018
▪ Flora Search and Rescue for Wilgekloof pipeline, Willowmore, Eastern Cape	2019

ENVIRONMENTAL SCREENING PROJECTS

▪ Terrestrial Vegetation Risk Assessment for proposed Skietnek Citrus Farm development (Kirkwood)	2015
▪ Preliminary Environmental Risk Assessment: NSRI Slipway Port Elizabeth	2015
▪ Environmental Screening Report for Proposed Development of a Dwelling on Erf 899, Theescombe	2015
▪ Environmental Screening Report for Proposed Development on Erf 559, Walmer, Port Elizabeth	2015
▪ Environmental Screening Report for Proposed Housing Scheme Development of Erf 8709, Wells Estate	2015
▪ Environmental Screening Report for Development of Portion 10 of Little Chelsea No 87, NMB	2015
▪ Environmental Screening Report for Proposed Fairwest Social Housing project, Fairview, NMB	2016
▪ Environmental Screening Report for Development of Little Chelsea No 25, NMB	2016
▪ Environmental Screening Report for Proposed Housing Development of Erf 8700, Kabega Park, NMB	2017
▪ Environmental Screening Report for Proposed Housing Development of Erf 14, Kabega Park, NMB	2017
▪ Environmental Screening Report for proposed Khayaletu School, Buffalo City	2018
▪ Environmental Screening Report for Proposed Life Hospital parking expansion, NMB	2019
▪ Environmental Screening Report for Erf 984 & 1134 development, Parsonsvlei, NMB	2019

ROAD AND RAILWAY INFRASTRUCTURE PROJECTS

▪ Ecological Assessment for Road Layout for Whiskey Creek- Kenton in Eastern Cape	2006
▪ Botanical Assessment for Mn Conveyor Screening Report in NMB	2008
▪ Botanical Basic Assessment for Bholani Village Rd, Port St Johns in Eastern Cape	2009
▪ Botanical Report, EMP and Rehab Plan for Coega-Colchester N2 Upgrade in NMB	2009
▪ Botanical Assessment for Chelsea RD - Walker Drive Ext. in NMB	2010
▪ Botanical Assessment for Motherwell - Blue Water Bay Road in NMB	2010
▪ Ecological Assessment for Port St John Road in Eastern Cape	2010
▪ Ecological Assessment Review for Penhoek Road widening in Eastern Cape	2012
▪ Ecological Assessment for R61 road widening in Eastern Cape	2012
▪ Ecological Assessment for CDC IDZ Mn Terminal, conveyor and railway line	2013

MINING PROJECTS

- Biophysical Assessment for Humansdorp Quarry in Eastern Cape 2006
- Botanical Assessment, Rehab Plan & Maps for Quarry-Cathcart & Somerset East in Eastern Cape 2006
- Botanical Assessment, Rehab Plan & Maps for Quarry - Despatch Quarry in NMB 2006
- GIS Mapping & Botanical Assessment and Rehab Plan for Quarry - JBay Crushers in Eastern Cape 2006
- Botanical Assessment, EMP and Rehabilitation Plan for Polokwane Silicon Smelter in Limpopo 2006
- Application for Mining Permit for Bruce Howarth Quarry in Eastern Cape 2006
- Botanical Assessment for Scoping Report and Detailed Botanical Assessment and Rehab Plan for Elitheni Coal Mine in Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Oyster Bay in Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Bathurst/GHT in Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit – Jeffreys Bay in Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Storms river/Kareedouw in Eastern Cape 2007
- Botanical Assessment for Zwartenbosch Quarry in Eastern Cape 2008
- Botanical description & map production for Quarry - Rudman Quarry in Eastern Cape 2008
- Botanical Basic Assessment, Rehab Plan & Maps for Borrow Pit - Rocklands/Patensie in Eastern Cape 2008
- Botanical Assessment & Maps for Sandman Sand Gravel Mine in Eastern Cape 2008
- Botanical Assessment & GIS maps for Shamwari Borrow Pit in Eastern Cape 2008
- Detailed Botanical Assessment, EMP and Rehab Plan for Kalakundi Copper/Cobalt Mine in Democratic Republic of Congo 2008
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit Humansdorp/Oyster Bay in Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Cala in Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Camdeboo in Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Somerset East in Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Nkonkobe in Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Ndlambe in Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Blue Crane Route in Eastern Cape 2008
- Botanical Assessment, EMP and Rehabilitation Plan for AWRM - Cathcart in Eastern Cape 2008
- Botanical Assessment, GIS maps and Rehab Plan for Mthatha Prospecting in Eastern Cape 2008
- Regional Botanical Map for mining prospecting permit for Welkom Regional mapping in 2008
- Ecological Assessment and Mining and Rehabilitation Plan for Baghana Mining in Ghana 2010
- Ecological Assessment for Bochum Borrow Pits in Limpopo 2013
- Ecological Assessment and Mining and Rehabilitation Plan for Greater Soutpansberg Mining Project in Limpopo (3 proposed Mines) 2013
- Ecological Assessment for Thulwe Road Borrow Pits in Limpopo 2013

ENVIRONMENTAL MANAGEMENT PLANS

- Floral Survey for Mbotyi Conservation Assessment in Eastern Cape 2005
- Identifying and Assessment on Aquatic Weeds for Pumba Private Game Reserve in Eastern Cape 2005
- Biodiversity & Ecological Processes for Bathurst-Commonage in Eastern Cape 2006
- EMP for Kromensee EMP (Jeffries Bay) in Eastern Cape 2006
- Baseline Botanical Study, Vegetation mapping and EMP for Local Nature Reserve for Plettenberg Bay Lookout LNA in Western Cape 2009
- Basic Botanical Assessment for Kromensee EMP (Jeffries Bay) in Eastern Cape 2010
- Wetland Management Plan for NMB Portnet in NMB 2010

INFRASTRUCTURE DEVELOPMENT PROJECTS

▪ Botanical Assessment for PE Airport Extension in NMB	2006
▪ Botanical Assessment for Kidd's Beach Desalination Plant in BCM, Eastern Cape	2006
▪ Botanical Assessment and GIS mapping for golf course realignment for East London Golf Course in BCM, Eastern Cape	2007
▪ Botanical Assessment for Radar Mast construction for South African Weather Service - BCM and NMB	2008
▪ Botanical Assessment for Jansenville Cemetery in Eastern Cape	2009
▪ Botanical Assessment for Kouga Dam wall upgrade in Eastern Cape	2012
▪ Botanical Assessment for Zachtevlei Dam (Lady Grey)	2017
▪ Botanical Assessment for Gcebula River bridge (Peddie)	2017
▪ Ecological Assessment for Amalinda crossing, Buffalo City	2019

POWERLINE INFRASTRUCTURE PROJECTS

▪ Botanical Assessment for Steynsburg - Teebus 132 kV powerline in Eastern Cape	2004
▪ Botanical Assessment for Eskom 132kV Dedisa Grassridge Power line-Coega in NMB	2006
▪ Botanical Assessment for Eskom Power line – Tyalara-Wilo in Eastern Cape	2006
▪ Species of Special Concern Mapping Transmission Line for San Souci to Nivens Drift 132kV powerline in NMB	2009
▪ Botanical Assessment for Eskom Powerline - Albany-Kowie in Eastern Cape	2009
▪ Botanical Assessment for Dedisa-Grassridge Powerline in Eastern Cape	2010
▪ Ecological Assessment for Grahamstown-Kowie Powerline in Eastern Cape	2010
▪ Ecological Assessment for Dieprivier Karreedouw 132kV Powerline in Eastern Cape	2012
▪ Flora and Fauna search and Rescue plan for Van Stadens Windfarm Powerline in NMB	2012
▪ Rehabilitation Plan and Auditing for Grassridge-Poseidon Powerline Rehab in Eastern Cape	2013
▪ Eskom Solar one Ecological Walkdown: Nieuwehoop 400 kV powerline	2015
▪ Ecological Assessment: Dieprivier-Karreedouw 132kV Powerline realignment in Kouga LM	2016
▪ Eskom Ecological Walkdown: Dieprivier-Karreedouw 132 kV Powerline in Kouga LM	2016

PIPELINE INFRASTRUCTURE PROJECTS

▪ Detailed Botanical Assessment for Port Alfred water pipeline in Eastern Cape	2004
▪ Botanical & Floristic Report for Hankey pipeline in Eastern Cape	2006
▪ Environmental Risk Assessment for Elands River pipeline in Eastern Cape	2007
▪ Detailed Botanical Assessment for Motherwell Pipeline in NMB	2007
▪ Detailed Botanical Assessment, GIS maps for Erasmuskloof Pipeline in Eastern Cape	2007
▪ Map Production for Russell Rd Stormwater in NMB	2008
▪ Basic Botanical Assessment for Albany Pipeline in Eastern Cape	2008
▪ Species of Special Concern Mapping for Seaview Pipeline in NMB	2009
▪ Species of Special Concern Mapping for Chelsea Bulk Water Pipeline in NMB	2009
▪ Basic Botanical Assessment for Wanhoop farm pipeline in Eastern Cape	2010
▪ Basic Botanical Assessment for Chatty Sewer in NMB	2010
▪ Detailed Ecological Assessment for Suikerbos Pipeline in Gauteng	2012
▪ Ecological Assessment for Steytlerville Bulk Water Supply in Eastern Cape (Phase 4)	2013
▪ Ecological Assessment for Steytlerville Bulk Water Supply in Eastern Cape (Phase 5)	2013
▪ Ecological Assessment for Wanhoop-Willowmore Bulk Water Supply in Eastern Cape	2016
▪ Ecological Assessment for Butterworth Emergency Bulk Water Supply Scheme	2017
▪ Ecological Assessment for Karringmelkspruit Emergency Bulk Water Supply (Lady Grey)	2017
▪ Botanical Assessment for Ngqamakhwe Regional Water Supply Scheme (Phase 3)	2018

WIND FARM AND PHOTOVOLTAIC INFRASTRUCTURE PROJECTS

▪ Botanical Assessment for Electrawinds Windfarm Coega in NMB	2010
▪ Botanical Assessment and Open Space Management Plan for Mainstream Windfarm Phase 2 in Eastern Cape	2010
▪ Ecological Assessment for Inca Energy Windfarm in Northern Cape	2011
▪ Ecological Assessment for Universal Windfarm in NMB	2011
▪ Ecological Assessment for Broadlands Photovoltaic Farm in the Eastern Cape	2011
▪ Ecological Assessment for Windcurrent Wind Farm in Eastern Cape	2012

SPECIALISED ECOLOGICAL REPORTS

▪ Botanical & Riparian Assessment for Orange River Weirs-Boegoeberg, Douglas Dam and Sendelingsdrif in Northern Cape	2006
▪ Botanical Assessment for State of the Environment Report for Chris Hani District Municipality SoER in Eastern Cape	2003
▪ Forestry Rehabilitation Assessment Report for Amahlathi Forest Rehabilitation in Eastern Cape	2007
▪ Botanical Sensitivity Analysis for LSDP, Greenbushes-Hunters Retreat in NMB	2008
▪ Representative for landowner group for Seaview burial Park in NMB	2010
▪ Mapping of pipeline for Kenton Water Board in Eastern Cape	2010
▪ Rehabilitation Plan for N2 Upgrade - Coega to Colchester in NMB	2010
▪ Rehabilitation Plan for Nieu Bethesda in Eastern Cape	2011
▪ Mapping and Ecological services for Congo Agriculture in Republic of Congo	2013
▪ Section 24G Assessment and Rehabilitation Plan for Bingo Farm in Eastern Cape	2014
▪ Green Star Rating Ecological Assessment for SANRAL office, Bay West City, NMBM	2015
▪ Rehabilitation Plan for Hitgeheim Farm (Farm 960), Sunland, Eastern Cape	2017

AGRICULTURAL PROJECTS

▪ Botanical Assessment and Flora Relocation Plan for Wildemans Plaas, in NMB	2006
▪ Botanical Assessment and Open Space Management Plan for Kudukloof in NMB	2010
▪ Botanical Assessment and Open Space Management Plan for Landros Veeplaats in NMB	2010
▪ Ecological Assessment for Tzaneen Chicken Farm in Limpopo	2013
▪ Ecological Assessment for Doornkraal Pivot (Hankey) in Eastern Cape	2014
▪ Ecological Assessment for Citrus expansion on Farm 960, Patensie	2014
▪ Ecological Assessment for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape	2015

BUSINESS AND INDUSTRIAL DEVELOPMENT PROJECTS

▪ Botanical Assessment for Kenton Petrol Station in Eastern Cape	2005
▪ Botanical Assessment and RoD amendments for Colchester - Petrol Station in NMB	2005
▪ Ecological Assessment for Bay West City	2007
▪ Botanical Assessment for Bluewater Bay Erf 805 in NMB	2009
▪ Botanical Assessment and Open Space Management Plan for Petro SA Refinery, Coega IDZ in NMB	2010
▪ Ecological Assessment for OTGC Tank Farm in NMB	2012
▪ Ecological Assessment for Green Star grading for SANRAL in NMB	2014
▪ Ecological Assessment for Bay West City ENGEN Service Station	2015

HOUSING DEVELOPMENT PROJECTS

▪ Botanical Assessment for Bridgemead – Malabar PE in NMB	2004
▪ Botanical Basic Assessment for Trailees Wetland Assessment in Eastern Cape	2005
▪ Botanical Assessment and Rehab Plan for Arlington Racecourse - PE in NMB	2005
▪ Botanical Assessment for Smart Stone in NMB	2005
▪ Botanical Assessment for Peninsular Farm (Port Alfred) in Eastern Cape	2005
▪ Botanical Assessment for Mount Pleasant - Bathurst in Eastern Cape	2005
▪ Botanical Assessment and RoD amendments for Colchester Erven 1617 & 1618 (Riverside) in NMB	2005
▪ Basic Botanical Assessment for Parsonsvei 3/4 in Eastern Cape	2005
▪ Botanical Assessment for Gonubie Portion 809/9 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Glengariff Farm 723 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Gonubie Portion 809/10 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Gonubie Portion 809/4 & 5 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Plettenberg bay - Ladywood 438/1&3 in Western Cape	2006
▪ Botanical Assessment and Rehab Plan for Winterstrand Desalination Plant in BCM	2006
▪ Botanical Assessment for Bosch Hoogte in NMB	2006
▪ Botanical Assessment for Plettenberg bay Farm 444/38 in Western Cape	2006
▪ Botanical Assessment for Plettenberg Bay - 444/27 in Western Cape	2006
▪ Botanical Assessment for Leisure Homes in BCM, Eastern Cape	2006
▪ Botanical Assessment for Plettenberg Bay - 438/24 in Western Cape	2007
▪ Botanical Assessment for Plettenberg Bay - Olive Hills 438/7 in Western Cape	2007
▪ Vegetation Assessment for Kwanokuthula RDP housing project in Western Cape	2008
▪ Site screening assessment for Greenbushes Site screening in NMB	2008
▪ Botanical Assessment for Fairfax development in Eastern Cape	2008
▪ Botanical Assessment for Plettenberg Bay Brakkloof 50&51 in Western Cape	2008
▪ Botanical Assessment, GIS mapping for Theescombe Erf 325 in NMB	2008
▪ Site Screening for Mount Road in NMB	2008
▪ Botanical Assessment for Greenbushes Farm 40 Swinburne 404 in NMB	2008
▪ Botanical Assessment for Greenbushes 130 in NMB	2008
▪ Botanical Assessment for Greenbushes Kuyga no. 10 in NMB	2008
▪ Botanical Assessment for Kouga RDP Housing in Eastern Cape	2009
▪ Botanical Assessment for Fairview Erf 1226 (Wonderwonings) in NMB	2009
▪ Species List Compilation for Zeeloeirivier Humansdorp in Eastern Cape	2009
▪ Botanical Assessment for Woodlands Golf Estate (Farm 858) in BCM, Eastern Cape	2009
▪ Botanical Assessment for Plettenberg Bay - 438/4 in Western Cape	2009
▪ Botanical Assessment for The Crags 288/03 in Western Cape	2010
▪ Revision of Ecological Assessment for Fairview Housing - revision in NMB	2010
▪ Botanical Assessment, EMP and Open Space Management Plan for Hornlee Housing Development in Western Cape	2010
▪ Botanical Assessment for Little Ladywood in Western Cape	2010
▪ Botanical Assessment and Open Space Management Plan for Motherwell NU31 in NMB	2010
▪ Botanical Assessment and Open Space Management Plan for Plett 443/07 in Western Cape	2010
▪ Botanical Assessment for Willow Tree Farm in NMB	2010
▪ Flora Search and Rescue Plan for Kwanobuhle Housing in Western Cape	2011
▪ Ecological Assessment for Ethembeni Housing in NMB	2012
▪ Ecological Assessment for Pelana Housing in Limpopo	2012
▪ Ecological Assessment for Lebowakgoma Housing in Limpopo	2013
▪ Ecological Assessment for Giyani Development in Limpopo	2013
▪ Ecological Assessment for Palmietfontein Development in Limpopo	2013

▪ Ecological Assessment for Seshego Development in Limpopo	2013
▪ Botanical Assessment for Sheerness Road in BCM, Eastern Cape	2013
▪ Ecological Assessment for Hankey Housing, Kouga District Municipality	2015
▪ Ecological Assessment for erf 14, Kabega, Port Elizabeth	2017
▪ Ecological Assessment for Fairwest Rental Housing, Port Elizabeth	2017
▪ Ecological Assessment for South-End Precinct Mixed Use Development, Nelson Mandela Bay	2018

GOLF ESTATE AND RESORT DEVELOPMENT PROJECTS

▪ Botanical Assessment, EMP and Rehabilitation Plan for Tiffendel Ski Resort in Eastern Cape	2006
▪ Botanical Assessment for Rockcliff Resort Development in BCM, Eastern Cape	2007
▪ Botanical Assessment for Rockcliff Golf Course in BCM, Eastern Cape	2008
▪ Species List& Comments Report for Kidds Beach Golf Course in BCM, Eastern Cape	2009
▪ Botanical Assessment for Plettenberg Bay -Farm 288/03 in Western Cape	2009

MIXED USE DEVELOPMENT PROJECTS

▪ Botanical Assessment and GIS mapping for Madiba Bay Leisure Park in NMB	2007
▪ Botanical Assessment and GIS mapping for Madiba Bay Leisure Park in NMB	2007
▪ Botanical Basic Assessment for Cuyler Manor (Farm 320), Uitenhage in NMB	2007
▪ Botanical Assessment and GIS maps for Utopia Estate PE in NMB	2008
▪ Botanical Assessment, GIS maps, Open Space and Rehab Plans for Fairview Erf 1082 in NMB	2009
▪ Botanical Assessment, EMP and Open Space Management Plan for Bay West City in NMB	2010

ECO-ESTATE DEVELOPMENT PROJECTS

▪ Botanical Assessment for Rosehill Farm in Eastern Cape	2005
▪ Botanical Assessment for Resolution Game Farm in Eastern Cape	2005
▪ Botanical Assessment for Gonubie Portion 809/11 in BCM, Eastern Cape	2005
▪ Botanical Assessment for Kidd's Beach portion 1075 in BCM, Eastern Cape	2005
▪ Botanical Assessment, EMP and Rehabilitation Plan for Seaview Eco-estate in NMB	2006
▪ Botanical Assessment for Kidd's Beach portion 1076 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Palm Springs, Kidds Beach East London in BCM, Eastern Cape	2006
▪ Botanical Assessment for Nahoon Farm 29082 in BCM, Eastern Cape	2006
▪ Botanical Assessment for Roydon Game farm, Queenstown in Eastern Cape	2007
▪ Botanical Assessment for Winterstrand Estate (Farm 1008) in BCM, Eastern Cape	2007
▪ Botanical Assessment for Homeleigh Farm 820 in BCM, Eastern Cape	2007
▪ Botanical Basic Assessment, Rehab Plan & Maps for Candlewood, Tsitsikamma in Western Cape	2007
▪ Botanical Assessment, EMP and Rehab Plan for Carpe Diem Eco development in Eastern Cape	2007
▪ Botanical Assessment - Poultry Farm for Coega Kammaskloof Farm 191 in NMB	2008
▪ Botanical Assessment - Housing development for Coega Ridge in NMB	2008
▪ Botanical Assessment, Rehabilitation Plan, EMP and GIS maps for Amanzi Estate in NMB,	2008
▪ Detailed Botanical Assessment and Open Space Management Plan for Olive Hills in Western Cape	2010
▪ Botanical Assessment and EMP for Zwartbosch Road in Eastern Cape	2010
▪ Botanical Re-Assessment of Swanlake Eco Estate in Aston Bay, Eastern Cape	2018

GIS AND IT DEVELOPMENT

▪ Development of GIS databases and mapping tools for Manifold GIS software	2008
▪ Landsat Image classification and analysis (Congo Agriculture)	2010

- Development of *iAuditor* Environmental Audit templates (DRPW audits) 2014

CONFERENCES AND PUBLICATIONS

- Pote, J., Shackleton, C.M., Cocks, M. & Lubke, R. 2006. Fuelwood harvesting and selection in Valley Thicket, South Africa. Journal of Arid Environments, 67: 270-287.
- Pote, J., Cocks, M., Dold, T., Lubke, R.A. and Shackleton, C. 2004. The homegarden cultivation of indigenous medicinal plants in the Eastern Cape. Indigenous Plant Use Forum, 5 - 8 July 2004, Augsburg Agricultural School, Clanwilliam, Western Cape.
- Pote, J. & Lubke, R.A. 2003. The selection of indigenous species suitable for use as fuelwood and building materials as a replacement of invasive species that are currently used by the under-privileged in the Grahamstown commonage. Working for Water Inaugural Research Symposium 19 - 21 August 2003, Kirstenbosch. Poster presentation.
- Pote, J. & Lubke, R.A. 2003. The screening of indigenous pioneer species for use as a substitute cover crop for rehabilitation after removal of woody alien species by WfW in the grassy fynbos biome in the Eastern Cape. Working for Water Inaugural Research Symposium 19 - 21 August 2003, Kirstenbosch, South Africa.

RESEARCH EXPERIENCE

- Resource assessment of bark stripped trees in indigenous forests in Weza/Kokstad area (June 2000; Dr. C. Geldenhuis & Mr. M. Kaplin).
- Working for Water research project for indigenous trees for woodlots (December 2000/January 2001; Prof R.A. Lubke, Rhodes University).
- Project coordinator and leader of the REFYN project – A BP conservation gold award: Conservation and Restoration of Grassy-Fynbos. A multidisciplinary project focusing on management, restoration and public awareness/education (2001 – 2002).
- Conservation Project Management Training Workshops: Royal Geographical Society, London 2001 – Fieldwork Techniques, Habitat Assessment, Biological Surveys, Project Planning, Public Relations and Communications, Risk Assessment, Conservation Education
- Selection and availability of wood in Crossroads village, Eastern Cape, South Africa. Honours Research Project 2002. Supervisors: Prof. R.A. Lubke & Prof. C. Shackleton.
- Floral Morphology, Pollination and Reproduction in *Cyphia* (LOBELIACEAE). Honours Research Project 2002. Supervisor: Mr. P. Phillipson.
- Forestry resource assessment of bark-stripped species in Amatola District (December 2002; Prof R.A. Lubke).
- Homegarden Cultivation of Medicinal Plants in the Amathole area. Postgraduate Research Project (2003-2005; Prof R.A. Lubke, Prof C.M. Shackleton and Ms C.M., Cocks).



herewith certifies that
Jamie Robert Claude Pote
Registration Number: 115233
is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)
Ecological Science (Professional Natural Scientist)

Effective 20 July 2016

Expires 31 March 2021



A handwritten signature in black ink, appearing to read 'Botha', written over a horizontal line.

Chairperson

A handwritten signature in black ink, appearing to read 'M. Prinsloo', written over a horizontal line.

Chief Executive Officer



To verify this certificate scan this code