

BIODIVERSITY SURVEY: PROPOSED DANA BAY ACCESS ROAD

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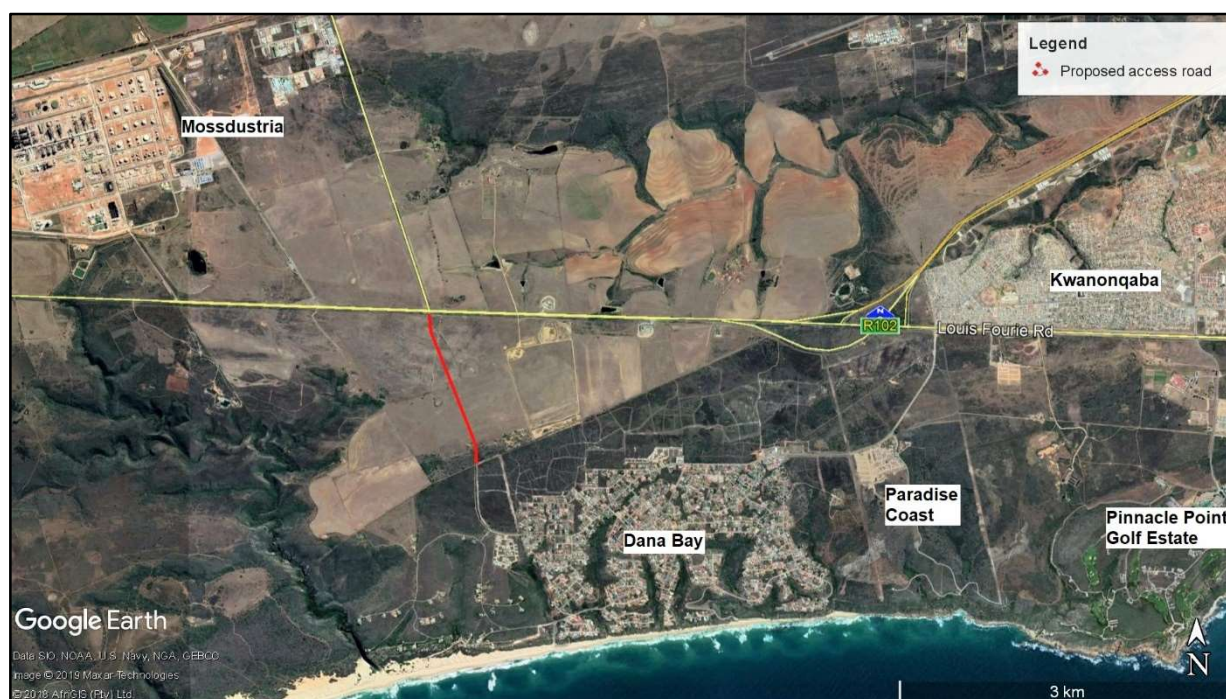
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1 INTRODUCTION

This report investigates the biodiversity aspects of the proposed route for a second access road to Dana Bay through the remainder of Portion 7 of Farm 225, northwest of Dana Bay (see Map 1). The proposed route passes through a grazing field (pasture), with a short passage through natural vegetation at the southern end and some fallow land on the northern side. The aim of the study, which was requested by Sharples Environmental Services (EAP), is to determine the biodiversity value of the site and to identify mitigation measures to ameliorate the impact. The main concern is that the route runs through areas mapped as critical biodiversity areas (CBA's). The latter forms part of a coastal biodiversity corridor that runs from Mossel Bay westwards around the northern side of Dana Bay.



Map 1 Satellite photo showing the position of the proposed access road (indicated in red) on the north-western side of Dana Bay.

2 PROPOSED PROJECT

Due to fire safety risks associated with having only one access road into Dana Bay and due to peak hour congestion, Mossel Bay Municipality proposes to construct an additional access road on the north-western side of Dana Bay, which will essentially extend Flora Road across the remainder of Portion 7 of Farm 225 and junction with the N2 opposite the existing R327 (Herbertsdale Rd) junction. The road surface will be 8.8 m wide and the road reserve is proposed to be 20 m wide. No construction activities will occur outside of the road reserve, apart from temporary disturbances from access and storage areas in certain disturbed areas. The

landowner (farmer) also requested for a cattle creep to allow cattle to move safely across the road.

3 TERMS OF REFERENCE

- Identify and describe biodiversity patterns at a community and ecosystem level (main vegetation type, plant communities and threatened/vulnerable ecosystems), at species level (Species of Conservation Concern, protected species, presence of alien species) and in terms of significant landscape features;
- Describe the sensitivity of the site and its immediate surroundings;
- Map the distribution and infestation levels of invasive alien plants;
- Identify the botanical constraints and potential development opportunities of the site;
- Review the relevant biodiversity plans compiled in terms of the National Environmental Management Biodiversity Act (Act 10 of 2004);
- Adhere to the Department of Environmental Affairs & Development Planning (DEA&DP) and CapeNature guidelines for biodiversity studies in the Western Cape.

4 METHODOLOGY

A botanical survey of the site was undertaken on 14 November 2019 by Mark Berry (see CV attached). A qualitative assessment of the type and condition of affected vegetation on site, disturbance and presence of alien species, Species of Conservation Concern and protected tree species was carried out. Plant species not identified in the field, were collected and/or photographed and identified at the office and Compton (Kirstenbosch) Herbarium. The 2012 South African Vegetation Map and the latest floristic taxonomic literature and reference books were used for the purpose of this specialist study. Any plants classified as rare or endangered in the Red List of South African Plants online database are highlighted. The assessment follows Brownlie's (2005), CapeNature and other relevant guidelines for biodiversity assessments.

The following information was recorded during the site visit:

1. The condition of the vegetation. Is the vegetation either disturbed or degraded? A disturbed or degraded area could range from agricultural fields (fallow land), or areas previously disturbed by construction activities, to an area that has been severely eroded or degraded as a result of bad land management or alien infestation.
2. The species diversity. This refers to the numbers of different indigenous plant species occurring on site. Indigenous fauna observed was also noted.
3. Species of Conservation Concern, as well as protected tree species occurring on site. This would include rare, vulnerable, endangered or critically endangered species. Species

listed as vulnerable were mapped using Easy GPS v2.5 software on an iPhone. Accuracy is given as ± 4 m.

4. Identification of the vegetation type(s) and communities (if discernible) on the site. This would include trying to establish the known range of a vegetation type and whether or not this vegetation type is vulnerable (VU), endangered (EN) or critically endangered (CR).

5 LIMITATIONS TO THE STUDY

Since fieldwork was carried out early in the summer season, flowering plants that only flower at other times of the year (e.g. winter to spring), such as certain bulbs (Iridaceae and Orchidaceae), may have been missed. The overall confidence in the completeness and accuracy of the botanical findings is however considered to be moderate to good.

6 LOCALITY & SITE DESCRIPTION

The proposed route (1.38 km) is located on an elevated coastal platform west of Mossel Bay between Dana Bay and the N2 (see Map 2). The site, situated between 150 and 175 m above sea level, slopes gently down from the southern end northwards to a halfway point after which it rises slightly again towards the N2. It is located on a dairy farm, a large part of which comprise a pasture and some fallow land (see Photos 1 & 2). The coastal town of Dana Bay is situated on the south-eastern side, while Mossdustryia is situated a little bit further away to the northwest (on northern side of N2).



Map 2 Satellite photo showing the proposed access road (red) in context with its surroundings.



Photo 1 Pasture, looking north towards the proposed junction with the N2.



Photo 2 Looking south across the fallow land portion of the site.

While the coastal strip between Mossel Bay and Glentana is largely transformed by coastal developments, the coastline west of Mossel Bay area is much better preserved. Alien infestation remains a big concern in the larger area, notably rooikrans, port jackson and spider gum. The southern end of the route passes through a narrow (± 130 m wide) strip of vegetation. Evidence of cattle grazing was noted here.

Rainfall in the region ranges from 350 mm in the west to 750 mm per annum in the east, with about 40% of the rain falling in summer (October-March) and 60% in the winter (April-September) as per Mucina & Rutherford's (2006) description of the climate for Groot Brak Dune Strandveld. It is even throughout the year, with slight peaks in March and October/November (Mucina & Rutherford 2006). Mean daily maximum and minimum temperatures are 26.8°C and 7.7°C for February and July, respectively (Mucina & Rutherford 2006). According to the 3422 AA Mossel Bay 1:50 000 geological map, the southern part of the site is underlain by non-shelly sand (a target for sand mining activities), which changes into loam and sandy loam soil in the northern part. The base rock comprises Table Mountain Group sandstone (see Photo 3).

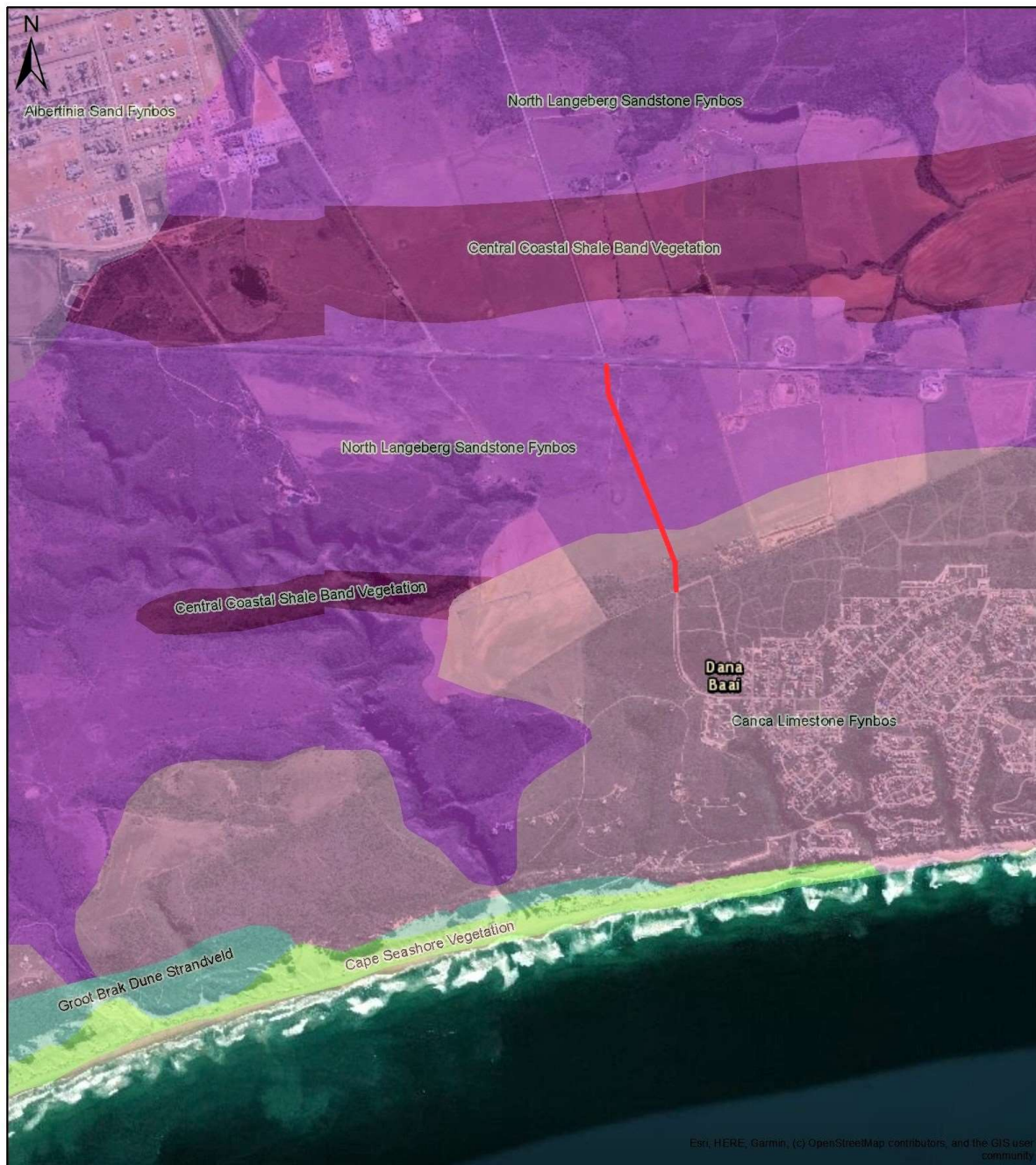


Photo 3 Exposed Table Mountain Group sandstone in the fallow land.

7 BIOGEOGRAPHICAL CONTEXT

Being located on the Southern Cape coastal plain in close proximity to the coast, the site occurs in a typical coastal fynbos/thicket environment. This is confirmed by the presence of fynbos

species, such as *Erica versicolor*, *Protea lanceolata*, *Leucadendron salignum* and restio species, as well as thicket species, such as *Putterlickia pyracantha*, *Diospyros dichrophylla*, *Pterocelastrus tricuspidatus* and *Lauridia tetragona*. According to the South African Vegetation Map, the southern part of the site has been mapped as Canca Limestone Fynbos and the northern part as North Langeberg Sandstone Fynbos (see Map 3). Groot Brak Dune Strandveld (along the coast), Albertinia Sand Fynbos and Central Coastal Shale Band Vegetation are also present in the larger area.



Map 3 Extract of the 2012 SA Vegetation Map (Source: Cape Farm Mapper), showing the position of the proposed road (red line) inside Canca Limestone Fynbos and North Langeberg Sandstone Fynbos.

Canca Limestone Fynbos stretches across the Southern Cape lowlands from Witsand (Cape Infanta) in the west to the Mossel Bay area in the east, while North Langeberg Sandstone Fynbos is associated with the northern slopes of the Langeberg, as well as the Aasvoëlberg hills from Albertinia to Mossel Bay (Mucina & Rutherford 2006). Groot Brak Dune Strandveld stretches from the Gouritz mouth in the west to Victoria Bay in the east (Mucina & Rutherford 2006). The latter, which is easy to spot with its impenetrable, thorny thicket structure, occurs in more sheltered areas along the coast and along drainage lines. Albertinia Sand Fynbos is associated with deeper sand habitats commonly found on the Albertinia flats.

During the site survey it was found that the vegetation in the southernmost part of the site comprises fynbos with a strong thicket influence. The latter could be the result of senescence. With regards to vegetation type, it leans more towards Albertinia Sand Fynbos, with *Passerina corymbosa*, *Erica versicolor*, *Leucadendron salignum*, *Bobartia robusta* and *Thamnochortus insignis* important taxa in the latter type. However, there is also an affinity with Canca Limestone Fynbos and North Langeberg Sandstone Fynbos, with *Protea lanceolata* an important taxon in the former, and *Erica versicolor* and *Leucadendron salignum* important in the latter. *Carissa bispinosa*, *Diospyros dichrophylla*, *Putterlickia pyracantha*, *Pterocelastrus tricuspidatus*, *Gymnosporia buxifolia* and *Lauridia tetragona* are important Groot Brak Dune Strandveld taxa.



Photo 4 Fynbos at southern end of proposed route.

8 VEGETATION & FLORA

The vegetation at the southern end of proposed route comprises a fynbos type that shows a strong affinity with Albertinia Sand Fynbos, Groot Brak Dune Strandveld and Canca Limestone Fynbos (see Map 4). Structurally, it can be described as a mid-high to tall (0.6-2.2 m) closed shrubland following Campbell's (1981) classification. Dominant species include *Helichrysum patulum*, *Searsia lucida* and *Passerina corymbosa* (bracts distinctly ribbed). Apart from *Erica versicolor*, ericas were not prominent (or not in flower). The fynbos shows clear signs of disturbance by cattle grazing and alien infestation, notably *Acacia cyclops* (rooikrans) and some *Opuntia ficus-indica* (prickly pear). It was also noted to be senescent (very woody) and in need of a fire. Fire is an important trigger for germination in fynbos and a lack thereof would favour sprouting species. It can also be used in an integrated manner to control aliens.



Map 4 Aerial photograph showing the biodiversity attributes of the site.

The history of the fallow land is not clear (see Map 4), but a fair bulb population was noted here, notably *Albuca cf. acuminata*, *Ornithogalum dubium*, *Drimia capensis*, *Haemanthus coccineus*, *Crossyne guttata* and *Boophone disticha* (see Photo 5). The shrub component (<0.4 m high) comprises scattered *Elytropappus rhinocerotis* (renosterbos), *Metalasia acuta*, *Athanasia quinquedentata*, *Delosperma neethlingiae*, *Lampranthus elegans*, *Muraltia ericoides* and *Crassula nudicaulis*. It shows some potential to revert back to the original vegetation (presumably North Langeberg Sandstone Fynbos), but only if further farming activities on it are ceased.

In addition to the species mentioned above, shrubs recorded (mainly inside the fynbos) include *Osteospermum moniliferum*, *Tarchonanthus littoralis*, *Stoebe plumosa*, *Helichrysum cymosum*, *H. cf. dasyanthum*, *Senecio ilicifolius*, *Ursinia discolor*, *Felicia aethiopica*, *Berkheya rigida*, *Indigofera nigromontana*, *Leucadendron salignum*, *Protea lanceolata*, *Searsia glauca*, *S. rosmarinifolia*, *Carpobrotus deliciosus*, *Delosperma inconspicuum*, *Ruschia tenella*, *Aloe maculata*, *Gnidia nodiflora*, *G. squarrosa*, *Struthiola striata*, *Pelargonium capitatum*, *Asparagus aethiopicus*, *Hermannia salviifolia*, *H. flammula*, *Leonotis ocymifolia*, *Salvia africana-lutea*, *Grewia occidentalis*, *Phylica cf. imberbis*, *Solanum rigescens*, *Anthospermum aethiopicum*, *Wahlenbergia desmantha*, *Carissa bispinosa*, *Pittosporum viridiflorum* (see Photo 5), *Diospyros dichrophylla*, *Putterlickia pyracantha*, *Pterocelastrus tricuspidatus*, *Gymnosporia buxifolia*, *Lauridia tetragona* and *Euclea crispa*.



Photo 5 *Pittosporum viridiflorum* (3.5 m) inside the fynbos component. Insert: *Boophone disticha*

Creepers and herbaceous species recorded include *Rhynchosia caribaea*, *Rhoicissus digitata*, *Cynanchum obtusifolium*, *Gerbera tomentosa* and *Lysimachia (= Anagallis) arvensis*. Additional hemicryptophytes and bulbs recorded (mainly inside the fynbos) include *Thamnochortus insignis*, *Eragrostis curvula*, *Albuca juncifolia*, *Moraea bulbillifera* and *Bobartia robusta*.

No Species of Conservation Concern were recorded on site. Regional endemics recorded include *Protea lanceolata* and *Bobartia robusta*. Both these species are common in the area. A single *Pittosporum viridiflorum*, a protected tree species in terms of the National Forests Act

(Act 84 of 1998), was recorded in the fynbos in close proximity to the proposed route. No milkwoods (*Sideroxylon inerme*), another protected tree species common in the area, were recorded. The removal of these trees requires a permit from the Department of Forestry.

9 CONSERVATION STATUS & BIODIVERSITY NETWORK

Being well represented in the larger area, Canca Limestone Fynbos is currently not considered a threatened vegetation type. However, agricultural activities, alien plant infestation and coastal developments remain major threats for certain species restricted to this vegetation type. According to Mucina & Rutherford (2006), 86% of Canca Limestone Fynbos is still left. However, due to its poor conservation status its protection in the coastal areas should remain a priority. Less than 1% is formally conserved in the Pauline Bohnen and Geelkrans Nature Reserves (Mucina & Rutherford 2006).

Albertinia Sand Fynbos, on the other hand, is listed as Vulnerable (DEA 2011). About 57% of it is still left, while 5% is formally protected in De Hoop, Pauline Bohnen, Geelkrans, Kleinjongensfontein, Blomboschfontein and Skulpiesbaai Nature Reserves (DEA 2011). Groot Brak Dune Strandveld is the most threatened vegetation type found in the area and is listed as Endangered (DEA 2011). About 52% of Groot Brak Dune Strandveld is still left, while 0% is currently protected (DEA 2011). North Langeberg Sandstone Fynbos is not listed as threatened. About 92% of it remains, while 13% is formally conserved in the Boosmansbos Wilderness Area and an additional 45% in mountain catchment areas (Mucina & Rutherford 2006). These ratings are reaffirmed in the Western Cape Biodiversity Spatial Plan Handbook (Pool-Stanvliet *et al.* 2017).

The proposed access road runs through two small areas mapped as critical biodiversity areas (CBA's) (see Map 5). The southern portion forms part of a biodiversity corridor that runs in an east-west direction past the northern side of Dana Bay. Apart from providing a backbone to the local biodiversity network, the latter corridor serves as an important passage along which fauna can migrate between the vegetation remnants. It is unclear what the rationale is behind the patchy CBA at the northern end of the route next to the N2. On the ground there does not seem to be any difference between the CBA patches and the areas in between, mapped as 'other natural areas' (see biodiversity network map on Cape Farm Mapper).

CBA's are defined as areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure (Pool-Stanvliet *et al.* 2017). These sites are selected for meeting national targets for species, habitats and ecological processes (Pool-Stanvliet *et al.* 2017). Many of these areas support known occurrences of

threatened plant species, and/or may be essential elements of designated ecological corridors. Loss of designated CBA's is therefore not recommended. With the proposed road running through the CBA corridor one can expect an impact on its functionality. However, compared to the road reserve extending into Dana Bay which runs through the main corridor, the portion in question is degraded and sits on the northern edge of the corridor.



Legend

BSP ESA: Restore

- ESA2: Restore from plantation or high density IAP
- ESA2: Restore from other land use
- ESA2: Restore where appropriate (CT)

BSP ESA

- ESA: Aquatic
- ESA: Terrestrial
- BSP CBA: Degraded**
- CBA2: Aquatic
- CBA2: Terrestrial

BSP CBA

- CBA: Terrestrial
- CBA: Terrestrial (CT)
- CBA: Forest
- CBA: River
- CBA: Estuary

- CBA: Wetland
- CBA: Aquatic (CT)

0 0.225 0.45 0.9 km

Map 5 Biodiversity network map (Source: Cape Farm Mapper), with the proposed road shown in red.

10 IMPACT ASSESSMENT

The impact on fynbos involves its removal in a ± 15 m wide strip over a 160 m length at the southern end of the route, as well as another ± 600 m through fallow land. The impact will further involve considerable earthworks and the constant movement of construction vehicles through the area. During this phase care must be exercised in the fynbos and fallow land areas to avoid the unnecessary disturbance of the adjacent veld. Given the disturbed/transformed state of the site, the impact on vegetation *per se* is of a moderate concern. Consideration should be given to a *Pittosporum viridiflorum* (protected tree species) in close proximity to the route inside the fynbos area (see Map 4). Table 1 below summarises the impact on vegetation type, habitat and species.

No Species of Conservation Concern were recorded. Most of the affected species are widespread and common. However, due to a considerable presence of bulbs in the fallow land portion, it is recommended that the affected bulbs (and succulents) be searched and rescued and replanted in the adjacent fallow land area. Search and rescue should be done at an appropriate time of the year, i.e. around July-August just before the main flowering season.

Finally, the disturbed surface will be rehabilitated at the end of the construction phase. In all likelihood, most of the species which originally occurred along the route will return to the road reserve, including the aliens. As an indirect impact, soil disturbance caused by earthworks will provide ideal conditions for the establishment of invasive alien species. The presence of aliens in the area, such as rooikrans and port jackson, will exacerbate this impact. As an operational phase impact, alien control will be required along the road reserves as an ongoing management requirement.

Table 1 Impact on vegetation type, habitat and species.

Mitigation	Extent	Duration	Intensity	Probability of occurrence	Significance – Current route option	Confidence
Without mitigation	Limited to site	Med term	Med-high	High	Med (-)	Med-high
With mitigation	Limited to site	Med term	Med-high	High	Low (-)	Med-high

Mitigation measures: Remove topsoil from fynbos and fallow land areas to be disturbed and distribute it in adjacent disturbed areas; demarcate/fence off the construction area in the fynbos and fallow land areas; contain disturbance to the demarcated construction areas; search and rescue of bulbs (and succulents) inside the fallow land area; give consideration to the protection of a *Pittosporum viridiflorum* (protected tree species) inside the fynbos area; control aliens as a long-term management requirement.

The proposed access road passes through two small CBA's. The southern portion forms part of an important biodiversity corridor that runs in an east-west direction past the northern side of Dana Bay. Apart from providing a backbone to the local biodiversity network, the latter corridor serves as an important passage along which fauna can migrate between the vegetation remnants. With the proposed road running through the CBA corridor one can expect an impact on its functionality. However, compared to the road reserve extending into Dana Bay which runs through the main corridor, the portion in question is degraded and sits on the northern edge of the corridor. This impact can unfortunately not be avoided by means of rerouting the road. The only practical mitigation measure would be to investigate speed control measures along the section of road through the CBA. Other measures, such as fencing and safe underpasses for fauna (e.g. large box culverts), can also be investigated. Table 2 below summarises the impact on CBA's.

Table 2 Impact on the biodiversity network, CBA's, etc.

Mitigation	Extent	Duration	Intensity	Probability of occurrence	Significance - Current route option	Confidence
Without mitigation	Limited to site & surroundings	Long term	Med-high	High	Med (-)	Med-high
With mitigation	Limited to site & surroundings	Long term	Med-high	High	Low-med (-)	Med-high
Mitigation measures: Investigate speed control measures along the section of road through the CBA, as well as other measures, such as fencing and underpasses for fauna (e.g. large box culverts); rehabilitate the road reserve.						

11 CONCLUSION & RECOMMENDATIONS

The vegetation at the southern end of proposed route comprises a fynbos type that shows an affinity with Albertinia Sand Fynbos, Groot Brak Dune Strandveld and Canca Limestone Fynbos. Disturbances noted here include cattle grazing and alien infestation. It was also noted to be senescent. The history of the fallow land in the northern part of the route is not clear, but a fair bulb population is present worth saving. No Species of Conservation Concern were recorded.

The potential impact of the road on vegetation type *per se* is of a lesser concern than the impact on the east-west biodiversity (CBA) corridor at the southern end of the route. The only practical mitigation measure that can be considered to lessen the impact would be to investigate speed control measures along the section of the road through the CBA, as well as fencing and a few underpasses (e.g. large box culverts) for fauna to move safely across the road. This impact can unfortunately not be avoided by means of rerouting the access road. With current information

in hand, the value of the northern patchy CBA is questionable and probably of a lesser concern than the southern CBA corridor. It is recommended that the affected bulbs (and succulents) here be searched and rescued and replanted in the adjacent fallow land area.

Lastly, alien control, especially port jackson and rooikrans, will be important in the road reserve, especially the sections through the fynbos and fallow land. A sustained effort will be required to control it. One-year old seedlings can be hand-pulled, preferably when soil is wet after a rainfall. If left to grow, removal becomes more difficult and costly. The use of heavy plant, such as bush cutters or D9 Caterpillar, for alien clearing is not recommended. Port jackson stumps must be treated with herbicides to prevent coppicing.

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CV OF SPECIALIST

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PROFESSIONAL STATEMENT

Environmental assessment professional and biodiversity specialist with over 20 years of experience mainly in the Western Cape Province, but also in the Northern Cape and Eastern Cape. Experience in Environmental Impact Assessments (EIA's), biodiversity assessments, Environmental Management Programmes (EMPr's), Environmental Control Officer (ECO) duties and environmental due diligence investigations.

WORK EXPERIENCE

- 1989-1990** Nature Conservation Officer in the South African Air Force, based at Langebaan Road Air Force Base
- 1997-2005** Employed as principal environmental specialist at Planning Partners, a multi-disciplinary consultancy specialising in town and regional planning, environmental planning and landscape architecture. Duties included the conducting of EIA's, compiling EMPr's, ECO duties, biodiversity surveys and status quo environmental assessments for spatial development frameworks.
- 2000-2006** Examiner for the Board of Control for Landscape Architects (BOCLA), responsible for the setting up and marking of the Environmental Planning Section of exam paper.
- 2005-current** Started Mark Berry Environmental Consultants in June 2005. Responsibilities include office management, seeking tenders, conducting EIA's, compiling EMPr's, construction site environmental audits, biodiversity surveys, etc. A relationship is maintained with previous employer, and, among other, undertook land-use surveys and reporting for the Eskom's site safety reports for three proposed nuclear power plants in the Western and Eastern Cape Provinces.

QUALIFICATIONS

- BSc (1988) University of Stellenbosch
- BSc-Hons in Botany (1991) University of Stellenbosch
- MSc in Botany (1993) Nelson Mandela Metropolitan University
- PhD in Botany (2000) Nelson Mandela Metropolitan University.

PROFESSIONAL MEMBERSHIP

Professional member (reg. no. 400073/98) of the South African Council for Natural Scientific Professions (SACNASP).

REFERENCES

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DECLARATION OF INDEPENDENCE

I Mark Gerald Berry, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I :

- in terms of the general requirement to be independent:
 - **other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity;** or
 - am not independent, but another specialist (the "Review Specialist") that meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);
- in terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all of the requirements;
- have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).

Signature of the Specialist:



Name of Company:

Mark Berry Environmental Consultants

Date:

11 December 2019