Specialist botanical and terrestrial compliance statement for the proposed development of a reservoir on a small section of the Municipal RE/325 in Pacaltsdorp.

Prepared for Cape EAPrac

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ABBREVIATIONS

BPA	Biodiversity Priority Area
BSP	Biodiversity Spatial Plan
CBA	Critical Biodiversity Area
CD:NGI	Chief Directorate: National Geo-spatial Information
DFFE	Department of Forestry, Fisheries and the Environment
ESA	Ecological Support Area
IAP	Invasive Alien Plants
NEM:BA	National Environmental Management: Biodiversity Act
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SDP	Site Development Plan
SEI	Site Ecological Importance
SSVR	Site Sensitivity Verification Report
VAST	Vegetation Assets, States, and Transitions

DECLARATION OF SPECIALIST INDEPENDENCE

The consulting services comprise an assessment of the potential sensitivity of the ecosystems and flora that fall within the development footprint for the site. The following declaration is given by the appointed specialist:

- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP).
- At the time of conducting the field assessment and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this report has reference to, except for financial compensation for work done in a professional capacity.
- Work performed for this site was done in an objective manner. Even if this results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being members of the general public.
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse any proposed developments, but aim to present facts, findings and recommendations based on relevant professional experience and scientific data.
- I do not have any influence over decisions made by the governing authorities.
- I undertake to disclose all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by a competent authority to such a relevant authority and the applicant.
- I have the necessary qualifications and guidance from professional experts in conducting specialist reports relevant to this application, including knowledge of the relevant Act, regulations and any guidelines that have relevance to the proposed activity.
- This document and all information contained herein is and will remain the intellectual property of Confluent Environmental. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the specialist investigators.
- All the particulars furnished by me in this document are true and correct.

Signed: 18 July 2023

BIANKE FOUCHÉ ABRIDGED CV

Qualifications

- B.Sc. Environmental Sciences,
- B.Sc. Honours (Botany),
- M.Sc. Conservation Biology 2022-2023 (currently completing at the University of Cape Town. Graduation is October 2023).

SACNASP Registration No: 141757 (Candidate Botanical Scientist)

Skills and Core Competencies

- My MSc research will add to our understanding of plant community niche construction and Alternative Stable State (ASS) theory. The knowledge gained will be used to advise landscape stewardship practices, especially regarding reforestation initiatives in the Overstrand.
- I have worked closely with the conservation team of the Grootbos Foundation, where I assisted with vegetation surveys, mounting voucher specimens in the Grootbos herbarium, and taken part in controlled fynbos fires in the Overberg.
- Postgraduate studies of mine included assessing the allelopathic effects of *Eucalyptus* leaves on garden peas and leeks and assessing the accuracy of the climate leaf analysis multivariate programme (CLAMP) in predicting the climate of fynbos vegetation.
- In Cape Town I regularly took part in alien clearing activities and helped to identify relevant listed invasive plants.
- I am currently a member of the Botanical Society of South Africa and the custodians for rare and endangered wildflowers (CREW) in George.

References

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1. INTRODUCTION

1.1 Background

Confluent Environmental was contracted by Cape EAPrac to undertake a site assessment and compile a specialist report for the botanical and terrestrial sensitivity of a section of RE/325 in Pacaltsdorp, George where a reservoir and water tower development for Pacaltsdorp is planned. According to the Department of Forestry, Fisheries, and the Environment (DFFE) Screening Tool, the SSVR is required because the terrestrial plant species theme has been highlighted as having a Medium sensitivity, and the terrestrial biodiversity theme triggered a Very High sensitivity. The plant species theme is triggered due to several species of conservation concern (SCC) that are modelled to potentially be present in the area. The terrestrial biodiversity theme sensitivity is due to the having areas that are mapped as being part of a critical biodiversity area (CBA 2), ecological support area (ESA 2), strategic water source area for surface water runoff (SWSA-sw, Outeniqua), and it is mapped as part of a critically endangered vegetation type (Garden Route Granite Fynbos). The purpose of this SSVR is to verify the presence of the ecosystem / vegetation types present on the site and confirm whether any plant species of conservation concern (SCC) are present.

1.2 General Site Location

The proposed development site is located in Pacaltsdorp on a section of the larger RE/325(Fig. 1). The site, which includes two alternative options for the development, is located to the west of Beach Road. There used to be a third alternative option on the sports field of Pacaltsdorp, but this option has been excluded as a possibility for the reservoir location.

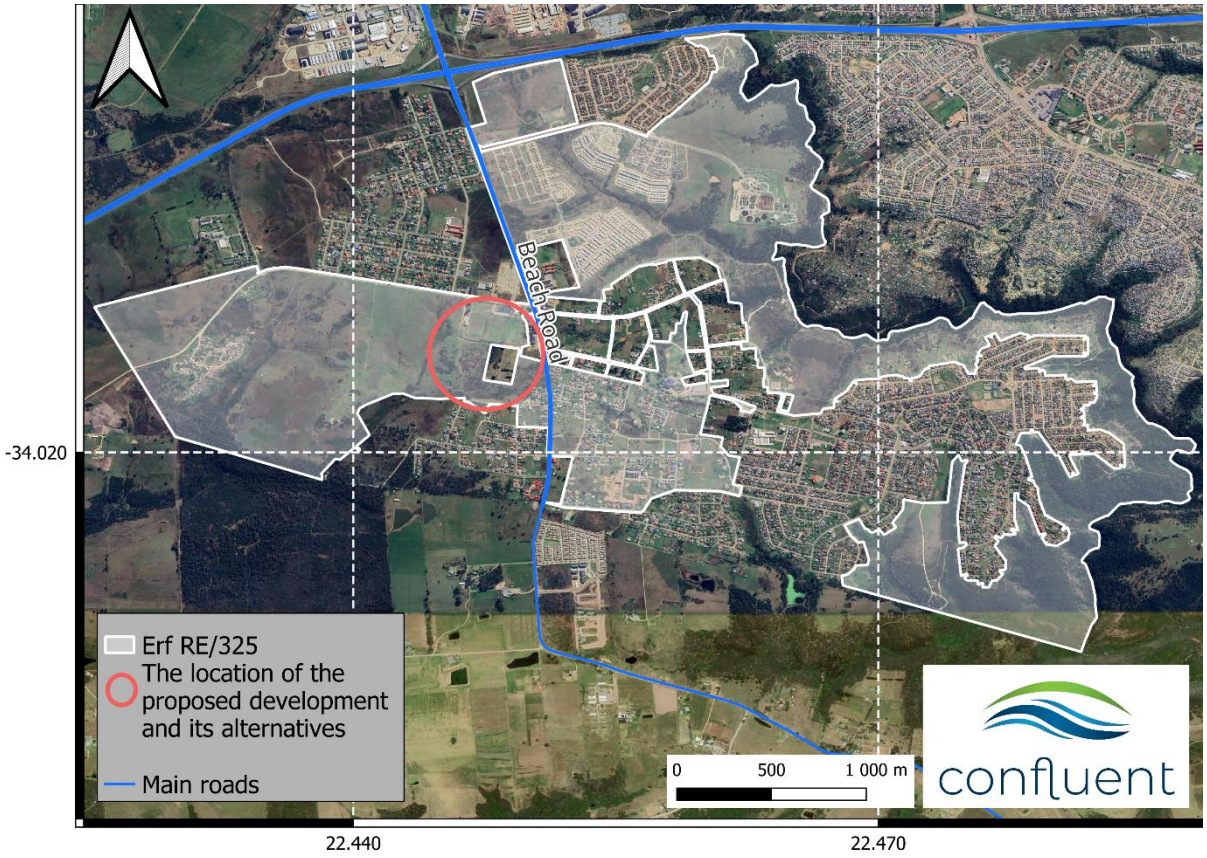

Figure 1: The general location of the proposed development site on a small portion of RE/325 of Pacaltsdorp.

1.3 The development layout

The proposed development will include the construction of a 14.5ML reservoir for bulk water supply to the Pacaltsdorp area of George. Demand for water is increasing due to residential development and densification in the area. The proposed reservoir currently has **two proposed alternative placements** on the municipal land (i.e., the George Municipality) of RE/325 (Fig. 2).

Figure 2: The locations of the proposed alternative development sites, as presented in the Aquatic Specialist report (Dabrowski, 2023).

The engineering report for the proposed development contains more details on the proposed reservoir and water tower designs (Mujinga & Turner, 2023). The layout of the proposed reservoir will include two construction phases:

1. The first phase is for the construction of a 14.5ML reservoir.
2. The second phase will include the construction of two water towers, a second reservoir, and a pump station.

A more detailed overview of the proposed layout is provided in Fig. 3. Pipelines will be required to connect the existing reservoir to the proposed reservoir (including the developments of the second phase). The majority of the proposed pipelines will run on the outside perimeter of the Pacaltsdorp sports field (Fig. 3).

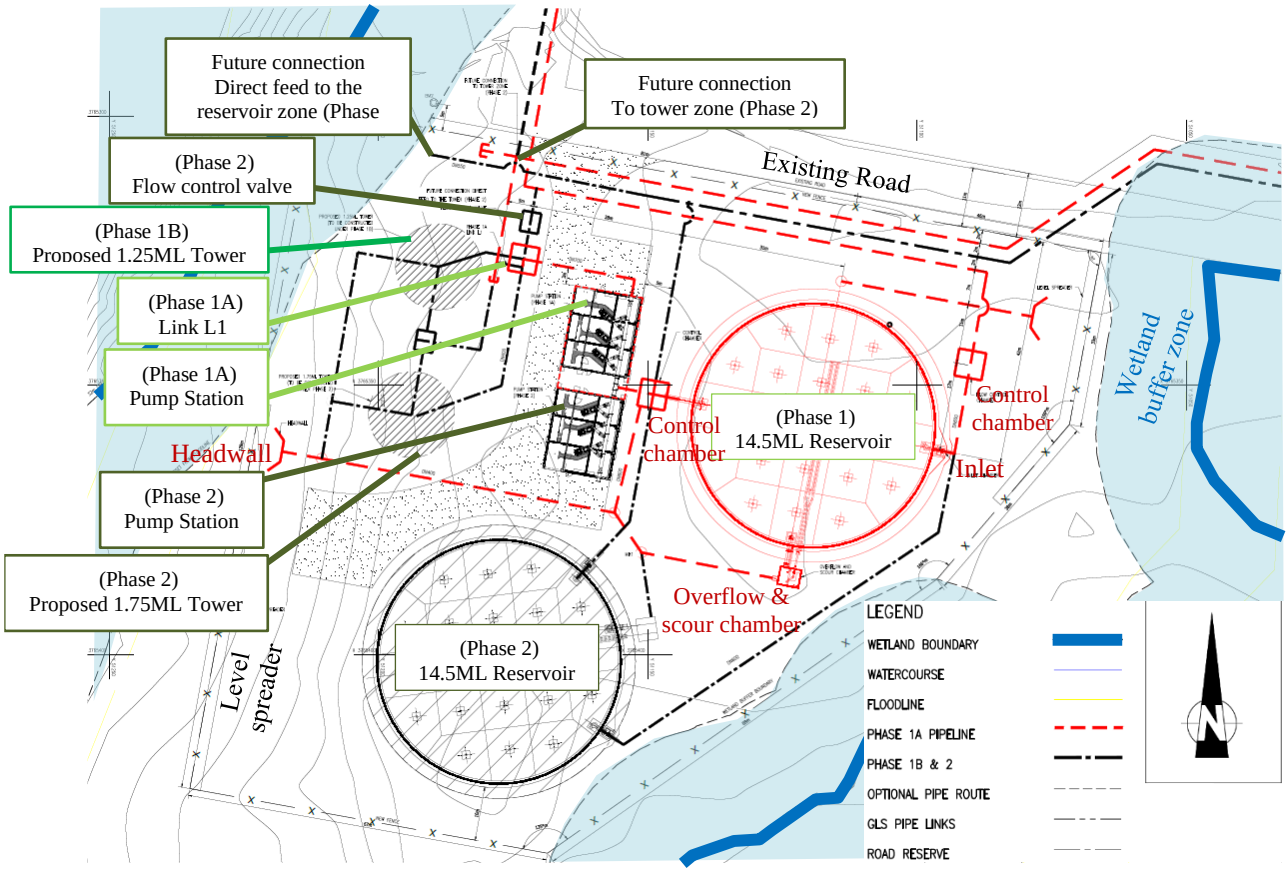

Figure 3: A detailed site development plan (SDP) for the preferred layout (Option B) of the proposed bulk water supply infrastructure, which has been adapted to take wetland buffers into account (Dabrowski, 2023).

2. TERMS OF REFERENCE

This screening tool sensitivity verification report provides information on Terrestrial and Botanical diversity and sensitivity of the proposed development. The results presented are based on a desktop and field assessment, which includes a consideration of historical photographic records of the site. The assessment presented in this report follows the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity, and Terrestrial Plant Species themes.

This site sensitivity assessment follows the requirements of:

- The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), which includes:
    - The protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial plant species (30 October 2020).
    - The protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity (20 March 2020).
- Additional guidelines for the terrestrial biodiversity theme:
    - Ecosystem Guidelines for Environmental Assessment in the Western Cape (de Villiers et al., 2016).

- The Western Cape Biodiversity Spatial Plan Handbook and summary booklet (CapeNature, 2017; Pool-Sandvliet et al., 2017).

- Additional guidelines for the terrestrial plant species theme:
  - Species Environmental Assessment Guideline: Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa (Verburgt et al., 2020).

The assessment was undertaken by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with relevant expertise in the field of Botanical and/or Ecological science.

2.1 Online Screening Tool

The Department of Forestry, Fisheries, and the Environment (DFFE) screening tool report for the development footprint has identified the **terrestrial plant species theme as having a Medium sensitivity**, and the **terrestrial biodiversity theme as having a Very High sensitivity**. The reasons for the terrestrial plant sensitivity theme are the possible occurrence of species of conservation concern (SCC) on the site. A Medium screening tool sensitivity for plants indicates that:

> *"Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. Two types of spatial models have been included. The first is a simple rule-based habitat suitability model where habitat attributes such as vegetation type and altitude are selected for all areas where a species has been recorded to occur. The second is a species distribution model which uses species occurrence records combined with multiple environmental variables to quantify and predict areas of suitable habitat. The models provide a probability-based distribution indicating a continuous range of habitat suitability across areas that have not been previously surveyed. A probability threshold of 75% for suitable habitat has been used to convert the modelled probability surface and reduce it into a single spatial area which defines areas that fall within the medium sensitivity level."* ~ (Verburgt et al., 2020)

A Very High sensitivity rating for terrestrial biodiversity according to the screening tool is triggered for all Biodiversity Priority Areas (BPAs) and other sensitive features (Stewart et al., 2021). BPAs include the various management layers of the Western Cape Biodiversity Spatial Plan (WCBSP), as well as the other sensitive features in Table 1 below. As discussed in the introduction, the highlighted rows of Table 1 were triggered for the proposed development area.

Table 1: Sources of BPA data for the Terrestrial Biodiversity Theme sensitivity (Stewart et al., 2021). Red rows indicate BPAs that have been triggered for the proposed development site.

Sensitivity layer	Data included and source
Critical Biodiversity Areas (CBAs)	Most recent terrestrial CBA spatial footprint for metros, provinces, or bioregional plans, combined to create a national data set.
Ecological Support Areas (ESAs)	Most recent ESA spatial footprint for metros, provinces, or bioregional plans, combined to create a national data set.
Protected Areas (PAs)	Most recent update from the DFFE's "South African Protected Area Database".
Priority Areas for Protected Areas Expansion	The latest priority expansion areas for each province, as well as the expansion footprint for national parks as per the approved management plan for national parks.
SAN Parks Buffer area	A buffer area for a National Park is defined in the February 2012 schedule on Biodiversity Policy and Strategy for South Africa's Strategy on Buffer Zones of National Parks.
Strategic Water Source Areas (SWSAs; terrestrial)	Surface strategic water source areas, delineated by Mervyn Lotter in October 2020 with substantial input from the SWSA spatial task team as part of the SWSA spatial task team. Note that the protocol only applies to the terrestrial parts of the SWSAs.
Freshwater Ecosystem Catchments (terrestrial)	Freshwater ecosystem catchments, determined through the National Freshwater Ecosystem Priority Area (NFEPA) process.
Indigenous Forests	Indigenous forests or forest patches are mapped in detail by the Forestry section in the DFFE. The Forest biome makes up less than 1% of South Africa's land area and is protected in terms of the NFA. Consequently, because of their legal status and small spatial footprint, they are the only terrestrial biome that is included in the Screening Tool in its entirety. The latest available data set from the national forest inventory (NFI) is used to represent forests in the Screening Tool.
Red Listed Ecosystems	Any ecosystem that is listed as Vulnerable, Endangered, or Critically Endangered according to the "Revised National List of Ecosystems that are Threatened and in Need of Protection (NEM:BA Act no.10 of 2004, as amended in November 2022)

3. METHODOLOGY

3.1 Desktop Assessment

The desktop assessment was performed using Cape Farm Mapper and QGIS version 3.28.3 "Firenze". Plant species data was sourced from the following sources:

- The DFFE screening tool listed SCC.
- Information on plant occurrence prior to the site visit was sourced from SANBIs Botanical Research and Herbarium Management System (BRAHMS) for the Plants of Southern Africa (POSA) database.
- iNaturalist observations of the property and surrounding areas.

Ecosystem/ vegetation type data was sourced from:

- The 2018 updated South African National Vegetation Map from SANBIs Biodiversity GIS (BGIS) database, and the National Biodiversity Assessment report of 2018 (Skowno et al., 2018).
- Shapefiles for the Western Cape Biodiversity Spatial Plan (WC-BSP) i.e., information on PAs, CBAs, ESAs, and ONAs were downloaded from BGIS database (CapeNature, 2017; Pool-Sandvliet et al., 2017).
- Cape Farm Mapper for additional spatial information required for the site.
- Chief Directorate: National Geo-spatial Information (CD: NGI) Geospatial Portal and Google Earth for the acquisition of historical aerial imagery of the site.
- The conservation status of ecosystems was found in the Revised National List of Ecosystems that are Threatened and in need of protection, published under the National Environmental

Management: Biodiversity Act (Act No. 10, 2004, as revised in Nov. 2022), and also using The Vegetation of South Africa, Lesotho, and Swaziland (Mucina & Rutherford, 2006).

3.2 Field Assessment

Field work was undertaken on the 17th of May 2023. The method for identifying species was similar to a BioBlitz, also described as a "timed meander," where the specialist especially keeps an eye out for rarer and threatened species (the path walked in Appendix 9.2). Some Red Listed Plant species are more easily spotted and found during a site survey than other species. This survey method is an attempt to account for the short and single survey period, where detection probability of some rare and threatened species (e.g., geophytes, small succulents, small perennials etc.) are low (Garrard et al., 2008; Wintle et al., 2012). Observations of individual species and environmental characteristics were documented using an android app "Spot Lens". A provisional species list for the plants not listed in the report body is provided in Appendix 9.1. The likelihood that the majority of plant species have been found during the survey is discussed in the results section of the report, with a species accumulation curve for the duration of the site assessment is also presented in Appendix 9.1.

3.3 Assumptions & Limitations

This assessment is subject to a few assumptions, uncertainties, and limitations, as listed below:

- Only one survey took place during late autumn on the 17th of May 2023. Seasonal and time constraints always play a role in limiting the findings of a terrestrial specialist report.
- Some rare and threatened plant species are difficult to locate and easily overlooked in the field (e.g., geophytes, small succulents, small shrubs, and cryptic spp.). The species list for the area is limited to the findings of the one field assessment, as well as past records on iNaturalist and the Plants of Southern Africa (POSA) database for the proposed development site and its surrounding areas. It is very likely that the species list and SCC reported are not exhaustive (Perret et al., 2023).
- Some species may not have been visible at the time of the site assessment (e.g., some geophytes, annuals, and parasitic plants). Many plant species flower seasonally and are therefore difficult to identify outside of their flowering season. Environmental factors such as the fire regime and level of alien invasion influence the successional stage of the vegetation present at the site, and therefore the species visible at the time of assessment (Cowling et al., 2010; Privett et al., 2001).

4. RESULTS: DESKTOP ASSESSMENT

4.1 Terrestrial Biodiversity

4.1.1 Climate

The climate of George is described as warm and temperate. The rainfall pattern is aseasonal, with rain typically occurring even in the driest months of the year. Mean annual precipitation (MAP) is over ca. 700 mm, with two seasonal peaks during the spring and winter. The mean annual temperature (MAT) for this area is around 21˚C. There is also far more annual variation in rainfall patterns compared to the more predictable annual temperature patterns. All graphs in Fig. 4 were provided by worldweatheronline.com.

Figure 4: Climate charts for George in the Western Cape showing a) temperature ranges from 2010 to 2022, b) precipitation trends over the period 2010 to 2022, c) monthly minimum and maximum temperatures, and d) monthly average rainfall (mm) and days of rain.

4.1.2 Geology and soil

The geology of the site is described as being part of the Cape Granite Suite (Browning & Macey, 2015). These granites are from the late Precambrian. The Maalgaten Granite, considered the main part of the George Pluton (i.e., a body if intrusive igneous rock), is likely present at the site and stretches from Wilderness in the East to the Klein Brak River in the West (Browning & Macey, 2015) as shown in Fig. 5. It is thought that this granite covers an approximate area of 248 km^2. Soil in the area of the proposed development is categorised as highly erodible (with an erodibility factor of 0.74), as described in Cape Farm Mapper. The soils in this area have strong textural contrasts in the soil profile, and therefore diagnostic horizons are usually clearly visible in the soil profile.

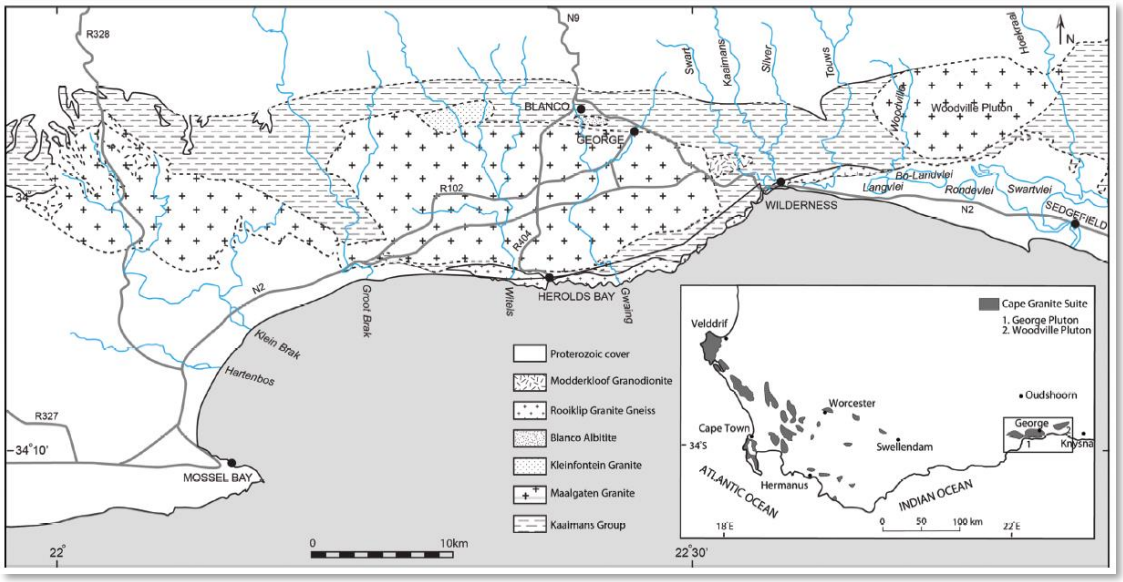

Figure 5: A map taken from the (Browning & Macey, 2015) paper showing the distribution of the George and Woodville Pluton granitoids. The inset illustrates additional areas where outcrops of the Cape Granite Suite occur.

4.1.3 Vegetation type(s)

The mapped vegetation for the proposed reservoir development on RE/325 is FFg 5 Graden Route Granite Fynbos (Fig. 6). This vegetation type is listed as a critically endangered vegetation type that has experienced ongoing habitat loss over the past two decades so that this vegetation type is at serious risk of collapse. The Vlok vegetation map for the area mapped the vegetation of the area as "Wolwedans grassy fynbos" with "Groot Brak River & Floodplain" vegetation mapped along wetlands drainage lines (Fig. 6; Dabrowski, 2023).

Garden Route Granite Fynbos is found only in the Western Cape Province in three main sections (Fig 7). The largest section of the is vegetation type is mapped from Groot Brak River to Woodfield. Like shale fynbos, it is associated with undulating hills on coastal forelands. Garden Route Granite Fynbos is typified by dense proteoid and/or ericoid shrubby grassy fynbos depending on the slope and aspect of the landscape. This vegetation type is listed as critically endangered as over 70% of its original extent has been transformed to agriculture or forestry land uses (Fig. 7). Remaining patches of this vegetation type is confined mostly to highly fragmented pockets on steeper slopes. Furthermore, even though it is thought that this vegetation type was once dominated by proteoid fynbos, it seems to be easily converted to graminoid fynbos with more frequent fires and / or augmentation with pasture grasses (Mucina & Rutherford, 2006). Some of the typical plants that are associated with Garden Route Granite Fynbos as described in (Mucina & Rutherford, 2006) include (green species were all found on the site in the option C alternative area):

Tall Shrubs: *Passerina corymbosa, Cliffortia serpyllifolia, Protea coronata, P. lanceolata, P. neriifolia*.

Low Shrubs: *Erica discolor variant 'speciosa', E. peltata, Phylica confusa, Syncarpha paniculata, Agathosma ovata, Anthospermum prostratum, Aspalathus asparagoides, Cliffortia falcata, Cullumia bisulca, Erica canaliculata, E. diaphana, E. formosa, Eriocephalus africanus, Hermannia angularis, Leucadendron salignum, Lobelia tomentosa, Metalasia pungens, Mimetes cucullatus, Pelargonium fruticosum, Oedera calycina*.

Succulent Shrub: *Lampranthus sociorum*.

Semiparasitic Shrubs: *Osyris compressa, Thesium virgatum*.

Semiparasitic Epiphytic Shrub: *Viscum capense*.

Geophytic Herb: *Schizaea pectinata*.

Graminoids: *Tetraria cuspidata, Brachiaria serrata, Eragrostis capensis, Ficinia nigrescens, Heteropogon contortus, Pentaschistis eriostoma, Restio triticeus, Themeda triandra*

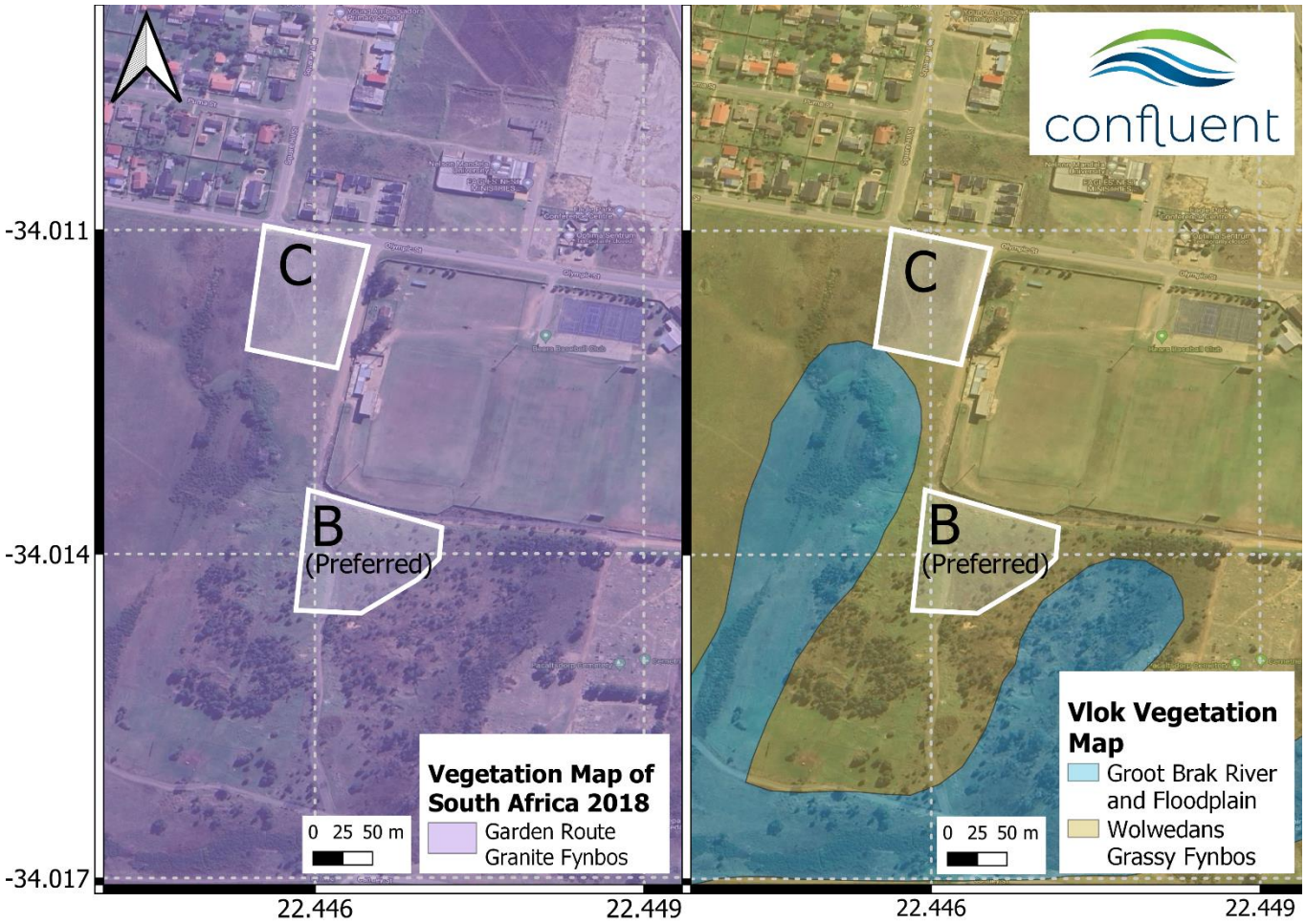

Figure 6: The mapped vegetation types according to the 2018 National Vegetation Map of South Africa (Dayaram et al., 2019; Mucina & Rutherford, 2006; left map) and the Vlok vegetation map categories (right map).

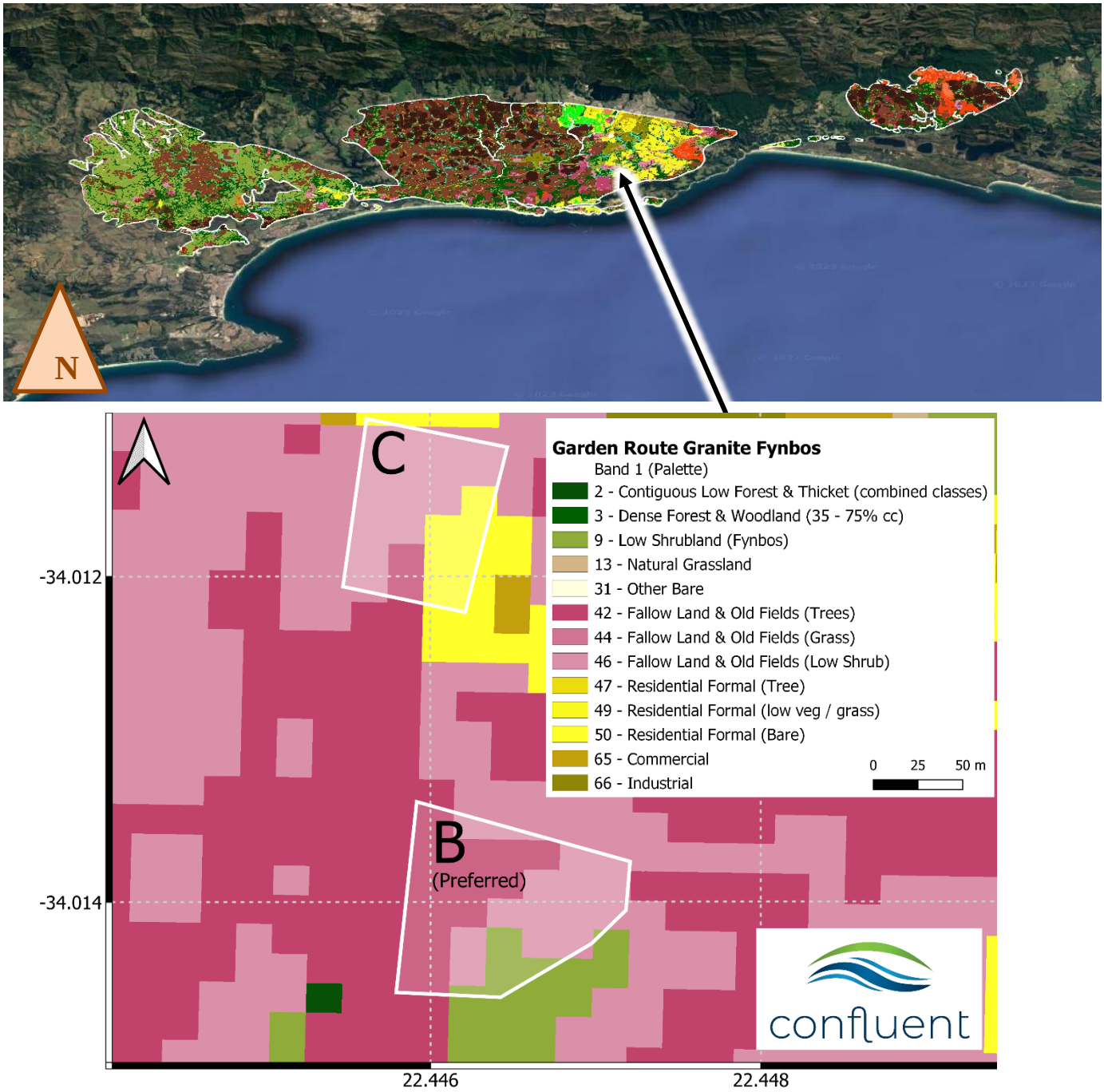

Figure 7: The 2020 land-use-land-cover (LULC) categories mapped for the full extent of Garden Route Granite Fynbos (top map). The legend provided is only for the map of the site at the bottom. The rest of the legend is available here: South African National Land-Cover (SANLC). The different development alternatives are presented with letters A to C.

4.1.4 Western Cape Biodiversity Spatial Plan.

The Biodiversity Spatial Plan for the Western Cape (WC BSP) has mapped the majority of the proposed development site (option B) as degraded critical biodiversity areas (CBA 2; Fig. 8) for terrestrial biodiversity (the definition and objectives of the different WC BSP layers are given in BOX 1). These areas are still important for meeting biodiversity targets as they support the ecological function of CBA 1 areas. The proposed alternative option C area was mapped as an Ecological Support Area 2 (ESA 2). The proposed land uses for various BSP categories are illustrated in Appendix 9.3. The reasons for the BSP layers (mapped as hexagons) that have been mapped for this area are as follows:

- The Bontebok Extended Distributed Range
- Water Source Protection for Gwaing, the Kaaimans, and Southern Coastal Belt

BOX 1: The Biodiversity Spatial Plan

Critical Biodiversity Area 2

Definition: Areas in a degraded or secondary condition. Required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.

Objective: Maintain in a functional, natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.

Ecological Support Area 2

Definition: Not essential for meeting biodiversity targets. Important in supporting functioning of PAs or CBAs. Often vital for ecosystem services.

Objective: Restore/minimise impact on ecological infrastructure functioning, especially soil and water-related services.

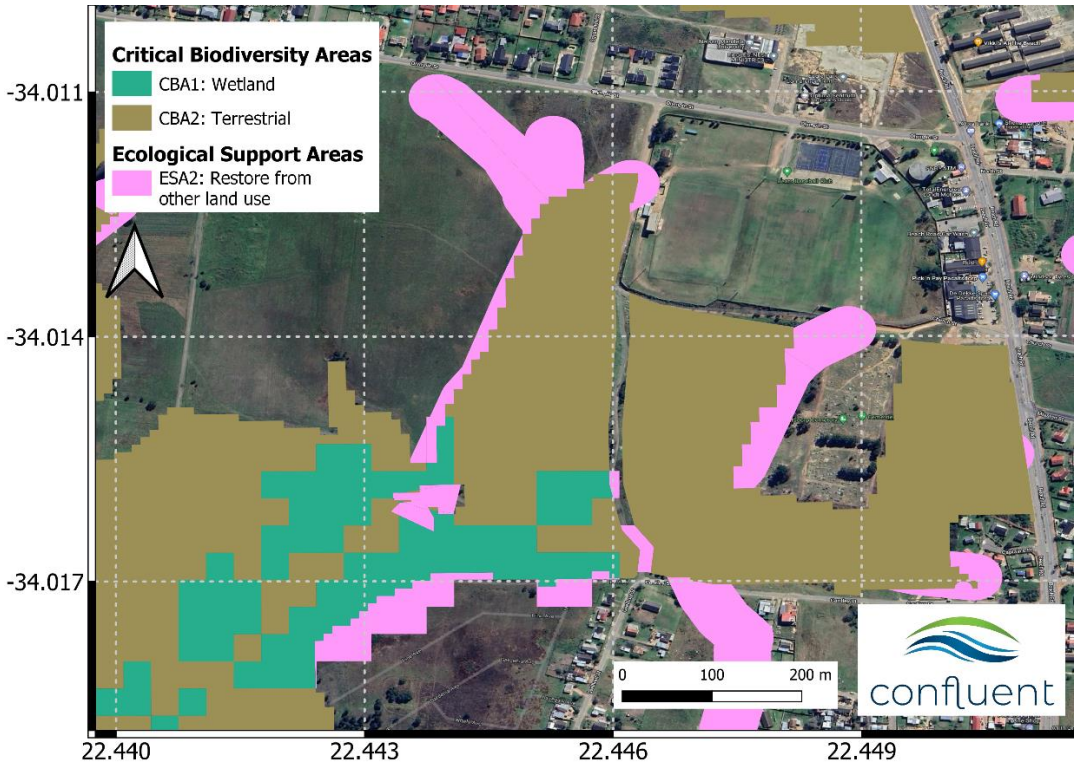

Figure 8: The mapped Western Cape Biodiversity Spatial Plan (WC BSP) categories that have been mapped for the site and surrounding landscape.

4.1.5 SWSA-sw

The site forms part of the Outeniqua Strategic Water Source Area for surface water (SWSA-sw) runoff. Please refer to the aquatic specialist report for the site for more comments on the mapped SWSA for the site (Dabrowski, 2023). From a desktop level, the development will occur on a site that is prone to erosion, and all options for the development is in close proximity to wetlands. Conscious effort should be made on the site to avoid erosion and pollution on the site and in the surrounding wetland habitat. The developers of this property should keep in mind that the objective and philosophy of a SWSA is:

"*Water is life. Clean water and sanitation underpin healthy lives and communities. Water drives job creation and economic growth. We need partnerships for living landscapes to achieve more clean water from our land. Partnerships that unlock benefits for people, water, and ecosystems and that recognise the connections between healthy ecosystems, healthy lives, economic growth, and job creation, between catchments and cities, between catchment management and maintenance of built infrastructure, and between our land and water. Healthy ecosystems in SWSAs including rivers, wetlands and land, help assure the quantity and quality of water flowing into our dams. Investing in maintaining and restoring SWSAs is a low risk and high return strategy for climate change adaptation. It is a form of ecosystem-based adaptation to climate change.*"

~ the South African Department of Forestry, Fisheries and the Environment (DFFE)
Biodiversity Sector Investment Portal

4.1.6 Historical Aerial Imagery

High resolution historical imagery (Fig. 9) can be sourced upon request from the CD: NGI Geospatial portal, or from their offices in Mowbray, Cape Town.

1939

The earliest historical image in Fig. 9 is from December of 1939. The aquatic specialist report mentions that part of a wetland has been visible in the area covered by the option C position for the development (yellow polygons in Fig. 9), while signs of wetlands from the historical imagery are not visible in the area for the proposed preferred option B (orange polygons in Fig. 9; Dabrowski, 2023).

1974

It is evident from the historical images that the vegetation surrounding the sports field and graveyard was disturbed and removed following agricultural development after 1939. Almost all the vegetation from the site was lost apart from a small section of vegetation next to the sports field in the alternative option C area. The aquatic report (Dabrowski, 2023) also mentions that the section of the old graveyard that covered the wetland was abandoned and allowed to revegetate (imagery from 1974 onwards).

1989

The sports field area (as it exists today) was cleared and fenced by 1989. More vegetation had returned to the alternative option C, while disturbance of the substrate and clearing of vegetation in the preferred option B area was increased. The establishment of random woody tree cover is also evident around the preferred option B (the woody cover visible is almost certainly invasive alien tree species).

2003

Some 14 years later, woody cover is also visible within the preferred option B area, but not in the alternative option C area.

2022

Recently, many young black wattles were cleared from the proposed option B area. The site assessment revealed that black wattles were also observed in the alternative option C area, and these merits continued clearing and monitoring to prevent a) the build-up of a black wattle seed bank, b) the loss of water from the wetland present in this area, c) an increase in safety risk posed by black wattle stands, and d) the loss of the remaining fynbos and wetland vegetation of this area.

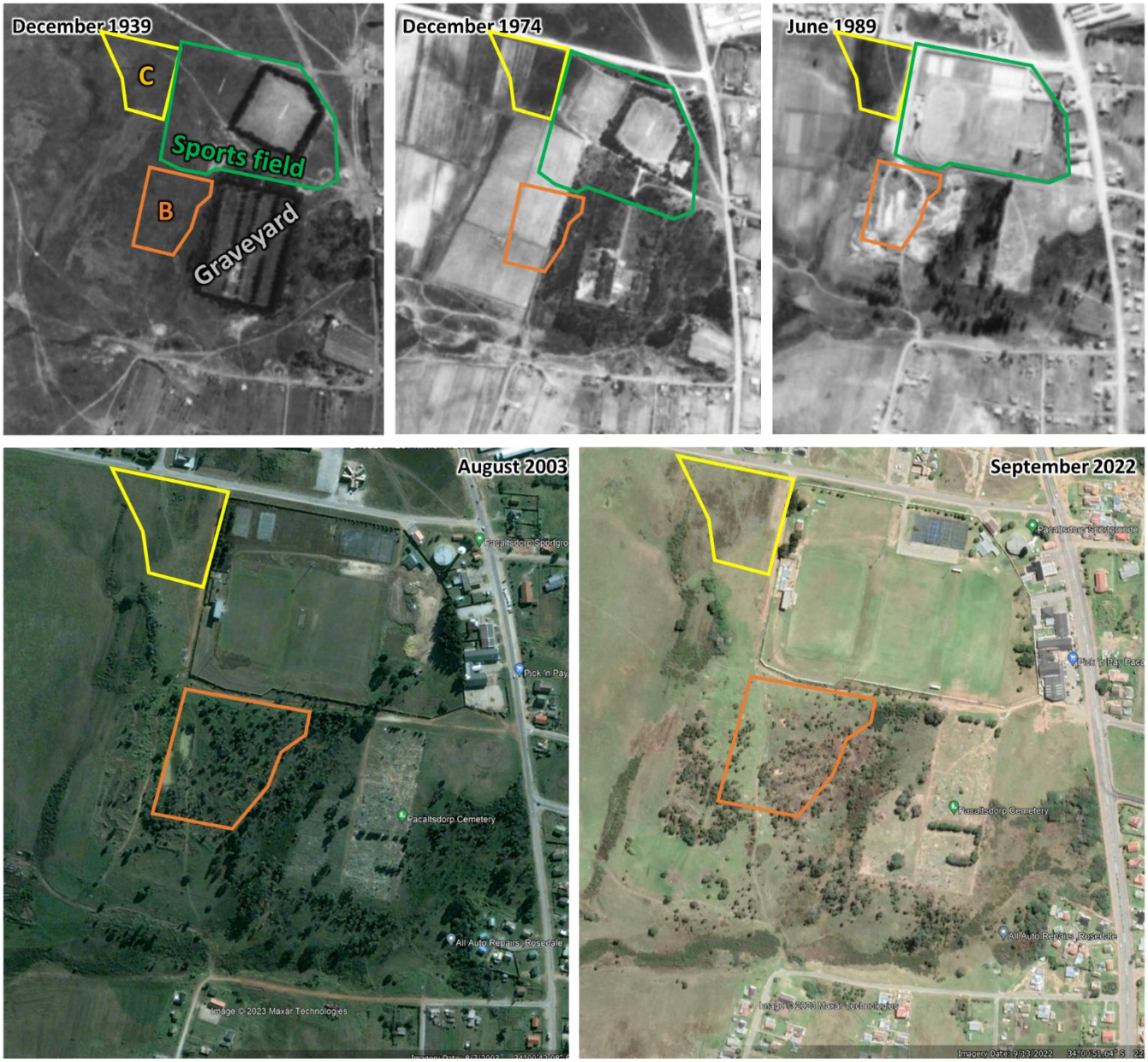

Figure 9: A series of historical imagery sourced from the CD: NGI geospatial portal. The yellow polygon indicates the approximate position of the alternative option C, and the orange polygon indicates the approximate location of the preferred option B area for the proposed development. The green polygon shows the approximate area covered by the sports field in older images.

4.2 Plant Species

The plant species theme sensitivity of Medium is dependent on the presence, or likely presence, of several plant species of conservation concern (SCC). The red list categories of the species listed in this section is revealed later in this report. The sensitive species listed by the screening tool may not be revealed in this report due to the nature of the threats that these species face.

4.2.1 SCC listed in the screening tool

The SCC that were listed in the screening tool report were:

- *Lampranthus pauciflorus*
- *Leucospermum glabrum*
- *Euchaetis albertiana*
- *Diosma passerinoides*
- Sensitive species 500
- Sensitive species 800
- Sensitive species 1024
- Sensitive species 1032

4.2.2 SCC identified nearby.

SCC that have been observed nearby on iNaturalist (Observations · iNaturalist) are:

- *Bartholina etheliae*
- *Clivia gardenii*
- *Crinum moorei*
- *Curtisia dentata*
- *Dioscorea sylvatica*
- *Disa arida*
- *Disa schlechteriana*
- *Disa spathulata*
- *Leucospermum praecox*
- *Mimetes pauciflorus*
- *Nemesia elata*
- *Ocotea bullat*
- *Prunus africana*

On POSA no additional potential SCC are listed that are not already mentioned by the Screening tool and iNaturalist search.

5. RESULTS: FIELD ASSESSMENT

5.1 Refined vegetation map and trajectory

The revised vegetation map, compiled after the site assessment had been completed, is illustrated in Fig. 10. The vegetation on the site is a modified version of Garden Route Granite Fynbos which faces numerous threats from invasive and exotic plant encroachment, human activities, pollution, and development.

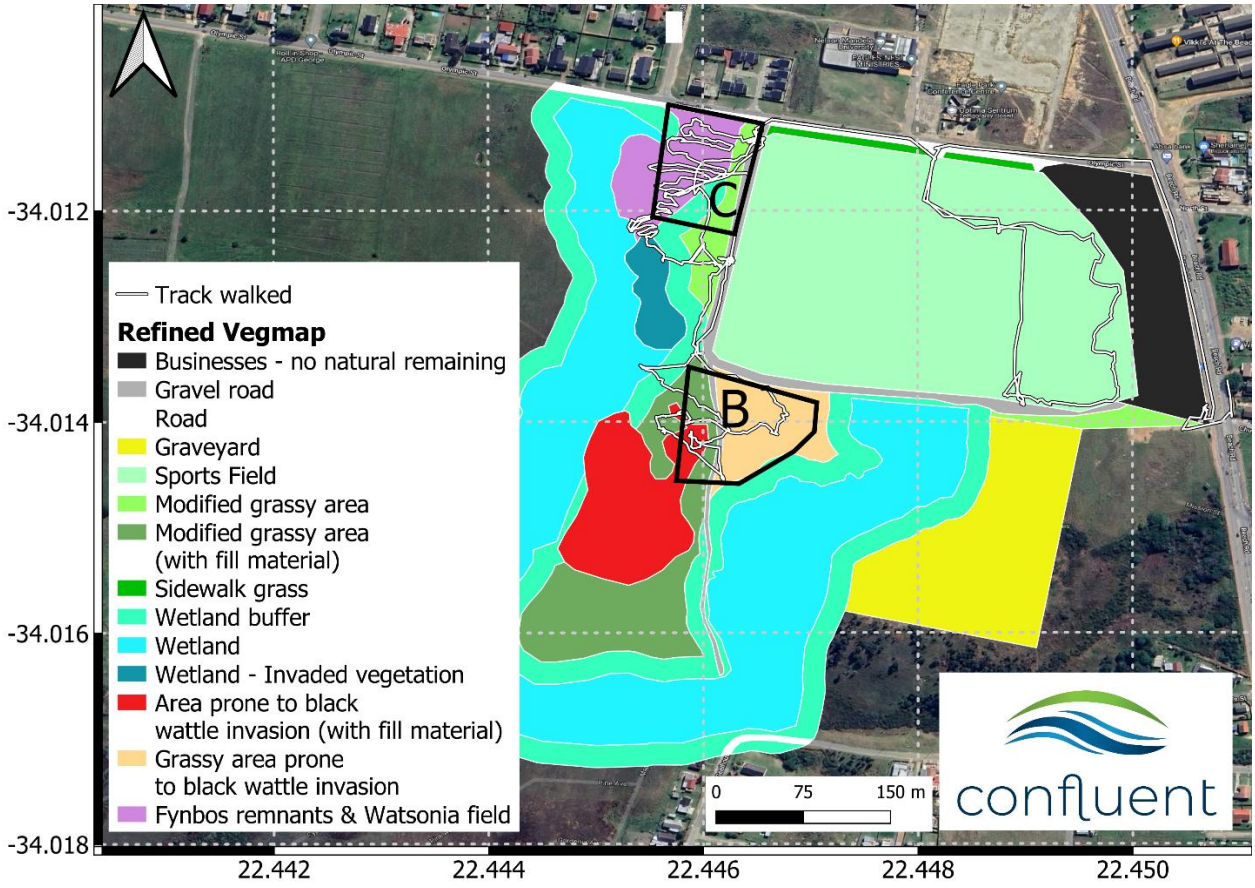

Figure 10: A revised vegetation map for the proposed development area.

The photos of Fig. 11 are as follows:

A) This is an image that was taken from the alternative option for the site from the alternative (option C) site and shows the "modified grassy areas" that cover part of the site and the wetland area. The photo also shows a small section of the "invaded vegetation" that was included in the wetland delineation for the site (Dabrowski, 2023).

B) This image shows remaining modified fynbos vegetation in the alternative option C area of the site.

C) The field of *Watsonia cf. pillansii* in the western section of the wetland. As the terrain becomes less sloped, this field transitions into fynbos as in image B).

D) A view of the vegetation growing in the wetland in the west from the preferred site (option B).

E) Cut down black wattles in the preferred option B area of the site.

F) A view from the preferred site to the cemetary (i.e., east) of modified grassy areas that are likely prone to black wattle invasion. A

G) Standing water following rain on the preferred option B area of the site.

H) Disturbed substrate on the preferred option B area of the site showing that fill is present in the soil in this area.

I) The sports field represented a highly modified section of land dominated by kikuyu grass, with some other invasives that were also dominant in sections along the periphery wall.

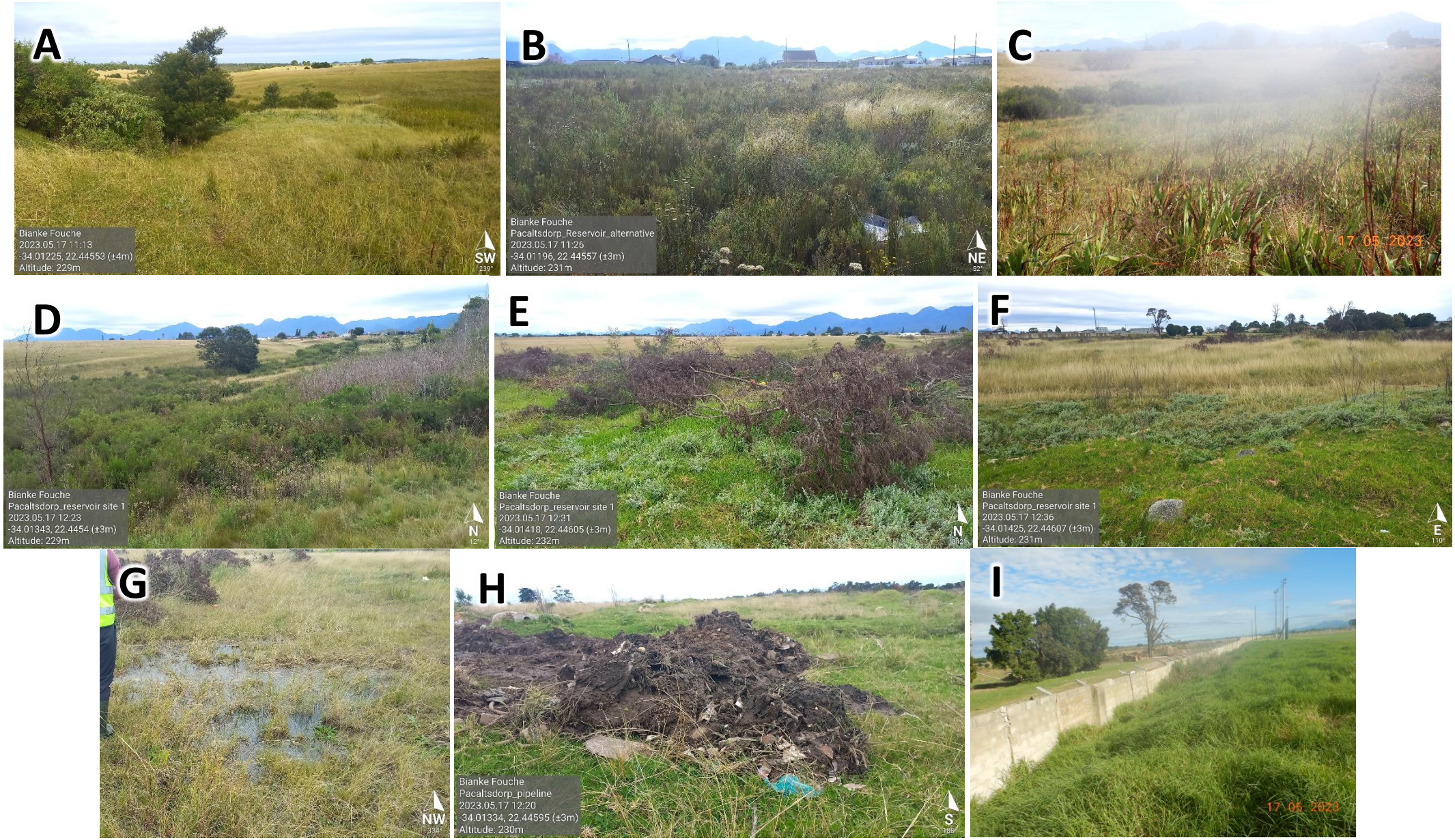

Figure 11: Photos taken of the site during the site assessment on the 17th of May 2023. Each photo has a stamp showing where it was taken (latitude and longitude) on the bottom left, and the direction faced in the bottom right. The various letters are discussed in the text.

5.2 Nationally protected trees and SCC

No plant SCC or protected tree species were observed on the site. Despite this, a section of the alternative option C contained fynbos and a *Watsonia* cf. *pillansii* field that would merit some conservation, as this vegetation has managed to persist in this area despite the long-term disturbance in the surrounding landscape. Some of the species that were found in this area (by Bianke Fouche, David Hoare, and iNaturalist user @cathya) includes:

Anthospermum aethiopicum, *Berzelia intermedia*, *Clutia laxa*, *Disa bracteata*, *Erica gracilis*, *Erica peltata*, *Eriospermum* cf. *pubescens*, *Gladiolus lilaceus*, *Gnidia squarrosa*, *Kniphofia uvaria*, *Lasiosiphon anthylloides*, *Ledebouria revoluta*, *Oxalis ciliaris*, *Oxalis purpurea*, *Selago corymbosa*, *Struthiola hirsuta*, *S. parviflora Tritonia securigera* etc.

5.3 Introduced and invasive Alien Plants (IAPs)

The IAPs observed on the site (Table 2) made up nearly half of all of the species that were observed on the site (see the species accumulation curve in Appendix 9.1). Photos of all of the red (NEMBA and CARA listed) and orange (only on the NEMBA list) species are shown in Fig. 12. NEMBA categories are described in BOX 2. The areas (i.e., options A to C) where all these species were found is in the appendix species list of this report.

Table 2: A list of all naturalised and invasive exotic species that were observed on the site. Invasive plants listed on both NEMBA and CARA lists are highlighted in red, and those listed only on one of the lists are in orange. Exotic species on neither list are not highlighted.

Species	Common name	Family	NEMBA	CARA
Acacia mearnsii	Black wattle	Fabaceae	2	2
Acacia melanoxylon	Blackwood	Fabaceae	2	2
Acer negudo	Ash-leaved maple; box elder	Sapindaceae	3 (sterile cultivars / hybrids not listed)	NA
Arundo donax	Giant reed; Spanish reed	Poaceae	1b	1
Cenchrus clandestinus	Kikuyu grass	Poaceae	1b	1
Centella asiatica	Gotu Cola	Apiaceae	NA	NA
Cestrum laevigatum	Inkberry	Solanaceae	1b	1
Cirsium vulgare	Bull thistle	Asteraceae	1b	1
Cortaderia selloana	Pampas grass	Poaceae	1b	1
Datura stramonium	Jimsonweed	Solanaceae	1b	1
Erigeron sumatrensis	Tropical horseweed	Asteraceae	NA	NA
Foeniculum vulgare	Fennel	Apiaceae	NA	NA
Lantana camara	Common lantana	Verbenaceae	1b	1
Narcissus tazetta	Bunch-flowered daffodil	Amaryllidaceae	NA	NA
Paspalum dilatatum	Dallis grass	Poaceae	NA	NA
Phytolacca octandra	Inkweed	Phytolaccaceae	1b	NA
Pinus radiata	Monterey Pine	Pinaceae	1b	2
Populus x canescens	Grey poplar	Salicaceae	2	2
Ricinus communis	castor bean	Euphorbiaceae	2	2
Sesbania punicea	Scarlet sesbane	Fabaceae	1b	1
Solanum mauritianum	Bugweed	Solanaceae	1b	1
Tagetes minuta	Wild marigold	Asteraceae	NA	NA
Trifolium repens	Narrow-leaved clover	Fabaceae	NA	NA
Verbena bonariensis	Purpletop vervain	Verbenaceae	1b	NA

Figure 12: Images taken of all IAPs on the site that are NEMBA and / or CARA listed. The names of all the species are one the photos. All these photos without a name written below them were taken by the author on the site during the field assessment. Only the photo be Erica Mitchell was not taken on the site, and it is only included as poplar trees were noted on the site, but not photographed during the site assessment.

BOX 2: NEMBA categories for listed invasive alien plants (IAPs)

Category 1b

- Species which must be controlled.
- Property owners and organs of state must control the listed invasive species within their properties.
- If an Invasive Species Management Programme has been developed, a person must control the listed invasive species in accordance with such programme.
- Authorised officials must be permitted to enter properties to monitor, assist with or implement the control of listed species.
- Any Category 2 listed species (where permits are applicable) which fall outside of containment and control, revert to Category 1b and must be controlled.
- Any Category 3 listed species which occur within a Protected Area or Riparian (wetland) revert to Category 1b and must be controlled.
- The Minister may require any person to develop a Category 1b Control Plan for one or more Category 1b species occurring on a property.

Category 2

Any species listed under Category 2 requires a permit issued by the Department of Forestry, Fisheries and the Environment (DFFE) to carry out a restricted activity (See Permit Applications.)

- A permit is required to carry out any restricted activity.
- No person may carry out a restricted activity in respect of a Category 2 listed invasive species without a permit.
- A person in control of a Category 2 listed species must take all necessary measures to ensure that specimens of the species do not spread outside of the land or area, such as an aviary) specified in the permit.

Category 3

- Category 3 listed invasive species are subject to certain exemptions in terms of section 70(1)(a) of the NEMBA Act, which applies to the listing of alien invasive species.
- Any category 3 listed plant species that occurs in riparian areas must be considered as category 1b and the appropriate control measures instituted.

5.4 Additional SCC that may be found

All SCC that may be present on the site have been identified using the screening tool report for the site, and nearby iNaturalist observations (Table 3). The probability of occurrence is reported as medium where the site meets the habitat requirements of a species, and / or recent observations have been made nearby. It is always possible that a species assessed as having a low probability of occurrence (meaning the habitat seems unsuitable for the species to occur there) can still occur on the site, and therefore the list of species in Table 3 below must only be used as a guideline only.

Table 3: Plant SCC probability of occurrence on the proposed development area of RE/325 in Pacaltsdorp.

Species	Common name	Family	Growth form	Source	SANBI red list status	Probability of occurrence
Bartholina etheliae	Club spider orchid	Orchidaceae	Geophytic ground orchid	iNaturalist	Global IUCN: Vulnerable D2; SANBI regional listing: LC	**Low** Thos orchid species is found in the Western Cape, Eastern Cape, and Northern Cape. Its habitat requirements are not quite met by the proposed development area.
Clivia gardenii	Boslelie, Forest clivia	Amaryllidaceae	Geophyte	iNaturalist	Vulnerable A2abcd; B1ab(ii,iv,v)	**Very Low** This species distribution does not extend to the Western Cape.
Crinum moorei	Natal Swamplily	Amaryllidaceae	Geophyte	iNaturalist	Vulnerable A4de	**Very Low** This species distribution does not extend to the Western Cape.
Curtisia dentata	Assegai tree	Curtisiaceae	Tree	iNaturalist	Protected tree 570; Near Threatened A2d	**Low** This species is found in forests up to 1800m elevation. It is unlikely to be present.
Disa spathulata	Begging-hand orchid	Orchidaceae	Geophytic ground orchid	iNaturalist	Endangered C1+2a(i)	**Low** Found in renosterveld & fynbos, which is not present on the site.
Diosma passerinoides	Silcrete bitterbuchu	Rutaceae	Shrub	DFFE Screening Tool	Vulnerable A2c; C2a(i)	**Low** Found in renosterveld & fynbos, which is not present on the site.
Euchaetis albertiana	Albertina beardbuchu	Rutaceae	Shrub	DFFE Screening Tool	Endangered A2c	**Low** This species is found in Albertinia on Limestone and sandstone fynbos, as well as in strandveld. The habitat on the site does not match that required by the species.
Lampranthus pauciflorus	Beach brightfig	Aizoaceae	Succulent	DFFE Screening Tool	Endangered B1ab(ii,iii,iv,v)	**Medium** This species is found from Cape Infanta to Plettenberg Bay in strandveld and fynbos. It is conceivable that this species might be present on the site.
Leucospermum glabrum	Outeniqua pincushion	Proteaceae	Shrub	DFFE Screening Tool	Endangered B1ab(iii,v)c(iv)+ 2ab(iii,v)c(iv); C2a(i)	**Very Low** This species is mostly found in mountainous areas in the Outeniqua and Tsitsikamma mountain fynbos habitats.
Leucospermum praecox	Mossel Bay pincushion	Proteaceae	Shrub	iNaturalist	Vulnerable A2c+3c+4c	**Very Low** The habitat requirements for this species are not met by the site.
Mimetes pauciflorus	Treeflower pagoda	Proteaceae	Shrub	iNaturalist	Vulnerable A2c+3c+4c	**Very Low** The habitat requirements for this species are not met by the site.
Nemesia elata	Lionfaces	Scrophulariaceae	Herbaceous perennial	iNaturalist	Vulnerable B1ab(iii,v)+2ab(iii,v)	**Low** This species is found from along the Langeberg and Outeniqua mountains between Swellendam and George. It is unlikely to be on the site.

Ocotea bullata	Stinkwood tree	Lauraceae	Tree	iNaturalist	Protected tree 118; Endangered A2bd	**Low** This species is widespread in South Africa from the Cape Peninsula to Wolkberg Mountains in Limpopo. It is found in high, cool, evergreen Afromontane Forests.
Prunus africana	Red stinkwood	Rosaceae	Tree	iNaturalist	Protected tree 147; Vulnerable A4acd; C1+2a(i)	**Low** This species is widespread in Africa, occurring in forests near the coast, up to 2100 m. This species is unlikely to be present on the site.
Sensitive species 500	-	Orchidaceae	Tuberous geophyte	DFFE Screening Tool	Endangered C2a(i)	**Low** This species is found from the Cape Flats to Port Elizabeth, but its sub-populations are highly fragmented sue to ongoing habitat loss. It is mostly found in coastal lowland areas in fynbos and strandveld. It is unlikely to be found in Pacaltsdorp.
Sensitive species 800	-	Iridaceae	Geophyte	DFFE Screening Tool	Vulnerable B1ab(iii)	**Very Low** This species occurs from the Cape Peninsula to Knysna in a variety of vegetation types, but mostly renosterveld. It is very unlikely to be present on the site.
Sensitive species 1024	-	Orchidaceae	Tuberous geophyte	DFFE Screening Tool	Endangered B1ab(iii,v)+2ab(iii,v); C2a(ii)	**Low** This species is found in renosterveld and fynbos vegetation from Riversdale to Knysna. It is found in coastal areas up to 200m elevation. This species is unlikely to be present on the site.
Sensitive species 1032	-	Orchidaceae	Tuberous geophyte	DFFE Screening Tool	Vulnerable C2a(i)	**Low** This species is found from Wilderness to Port Alfred in bushy areas on dunes and near the shoreline. It is unlikely to be on the site.

6. SITE SENSITIVITY VERIFICATION

6.1 Terrestrial Biodiversity

The sports field section (option A) was excluded from the alternatives for the proposed reservoir development.

6.1.1 Preferred option B

- Large portions of the site are covered with spontaneously growing alien vegetation, and fill is present in the substrate. The site also contains dumped soil, rubble, and refuse.
- This means that that a lot of effort will be required to restore the vegetation on most of the site, which is not practical. For this reason, the site will not easily be able to fulfil the objective for CBA2 areas, nor ESA 2 areas.
- The site forms part of the Outeniqua SWSA for surface water. Fill on the option B area has likely caused pollution to the environment and has contributed to the past introduction and establishment of invasive alien stands on the site. The proposed development could likely improve the state of this area and reduce pollution and erosion in an SWSA if the development is managed in an environmentally sensitive way.
- The site was mapped as Garden Route Granite Fynbos (CR). Past disturbance and the establishment of black wattles have caused a loss of any historically occurring fynbos in this area.
- Given the reasons above, the terrestrial biodiversity theme sensitivity for the site option B area is confirmed to be **Low** (where the screening tool stated Very High).

6.1.2 Alternative option C

- The vegetation on the site is consistent with the definition of CBA 2 and ESA 2 areas as the vegetation on the site is modified with many threats from surrounding development, trampling, poaching, and encroachment by invasive alien species.
- The site forms part of the Outeniqua SWSA for surface water. Part of this option C area overlays the delineated wetland and wetland buffer (Dabrowski, 2023), and is unsuitable for development.
- The site was mapped as Garden Route Granite Fynbos (CR), and there is a modified version of this vegetation present over a large area of the site here. The fynbos of the site is modified, but some species associated with this vegetation type is still persist, making it consistent with Garden Route Granite Fynbos.
- Given that this area could help fulfil the objectives of the biodiversity spatial plan layers for the Western Cape by performing an ecological supporting function, that the vegetation of the site still includes modified fynbos remnants, and because the site is mostly in a delineated wetland area, the terrestrial biodiversity theme is verified as being **Very High** for the majority of the option C area. The sensitivity is only **Low** for grassy modified vegetation outside of the wetland buffer and defined remaining modified fynbos area on the site. Note that invasive plants, altered fire regimes and other ecosystem drivers that have been changed or removed from the landscape affects the long-term stability of the fynbos elements that is still present in this area.

6.2 Botanical diversity

No SCC were found in any of the alternative development options for the proposed development area on RE/325. Only *Lampranthus pauciflorus* could conceivably be found on the proposed development area (especially the alternative option C). The site sensitivity in terms of the terrestrial plant species theme protocol is therefore also **Low** for options A, B, and C. However, Option C still contains natural

fynbos species and a Watsonia field, and it should not be disturbed as it has relatively high biodiversity value, and likely provides habitat for many other small mammals, insects, and birds. Option C fynbos vegetation also mostly falls within the delineated wetland area as per the aquatic specialist report (Dabrowski, 2023) .

7. SITE ECOLOGICAL IMPORTANCE

The site ecological importance map is intended to provide a more refined overview of the sensitivity of the various habitats that have been identified on the site (Fig 13). The SEI map speaks to the Mitigation hierarchy (Table 4), and it is not the same as the sensitivity of the site according to the terrestrial plant and terrestrial biodiversity protocols, as defined in the section above. The method for calculating the SEI is provided in Appendix 9.4. The map of Fig. 13 should be read and interpreted together with table 4 which describes the levels of the mitigation hierarchy that different SEI ratings are linked to. The site will require appropriate revegetation following construction, mainly to prevent erosion of the sensitive wetland habitats.

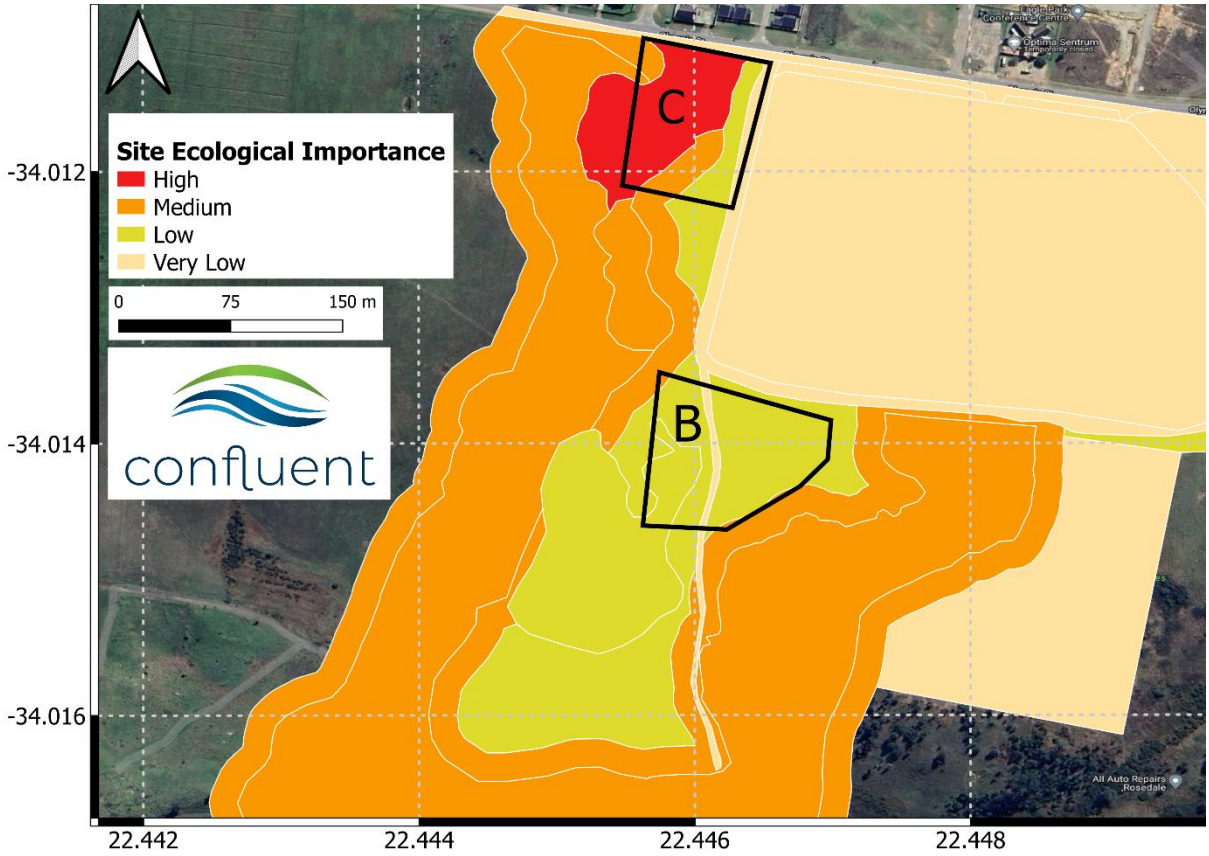

Figure 13: The SEI map for the proposed development of water reservoirs on RE/325 in Pacaltsdorp.

Table 4: The mitigation guidelines for interpreting the various SEI categories for the proposed development activities.

Site Ecological Importance	Recommendation for activities based on the mitigation hierarchy
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

The benchmark for "fully natural" vegetation according to the Vegetation Assets, States, and Transitions (VAST; Table 5) framework is set at pre-European conditions (i.e., period prior to the 1700s or 1600s). All of the vegetation on the site is no longer natural according to this definition. Although the VAST framework was originally devised for Australia, it can be applied equally well to sites here in South Africa being assessed for their ecological functioning and importance. The VAST framework was used as an aid in the process of assigning the various SEI categories to the ground-truthed vegetation for the site (Table 6). The VAST framework (Thackway & Lesslie, 2006):

- Describes and accounts for changes in the condition and status of vegetation.
- Makes explicit links between land management (current) and vegetation modification.
- Provides a mechanism for describing the consequences of certain land management on vegetation.
- Contributes to the analysis of terrestrial ecosystem services that are provided by vegetation, including comparison between various land-uses.

Table 5: Vegetation Assets, States, and Transitions (VAST) framework with columns representing states and shifts between them defined as transitions, as laid out in (Lesslie et al., 2010; Thackway & Lesslie, 2006).

Increasing modification

		Native vegetation cover Dominant plant species indigenous to the locality and spontaneous in occurrence, i.e. a vegetation community described using definitive vegetation types relative to estimated pre 1750 types				**Non-native vegetation cover** Dominant structuring plant species indigenous to the locality but cultivated; alien to the locality and cultivated; or alien to the locality and spontaneous		
Vegetation cover classes		**Class 0: RESIDUAL BARE** Areas where native vegetation does not naturally persist	**Class I: RESIDUAL** Native vegetation community structure, composition, and regenerative capacity intact—no significant perturbation from land use or land management practice. Class I forms the benchmark for classes II to VI	**Class II: MODIFIED** Native vegetation community structure, composition and regenerative capacity intact—perturbed by land use or land management practice	**Class III: TRANSFORMED** Native vegetation community structure, composition and regenerative capacity significantly altered by land use or land management practice	**Class IV: REPLACED -ADVENTIVE** Native vegetation replacement—species alien to the locality and spontaneous in occurrence	**Class V: REPLACED -MANAGED** Native vegetation replacement with cultivated vegetation	**Class VI: REMOVED** Vegetation removed
Diagnostic criteria	Current regenerative capacity	Natural regenerative capacity unmodified—ephemerals and lower plants	Natural regenerative capacity unmodified	Natural regeneration tolerates or endures under past and or current land management practices	Natural regenerative capacity limited or at risk under past and or current land use or land management practices. Rehabilitation and restoration possible through modified land management practice	Regeneration of native vegetation community has been suppressed by ongoing disturbances of the natural regenerative capacity; limited potential for restoration	Regeneration of native vegetation community lost or suppressed by intensive land management; limited potential for restoration	Nil or minimal
	Vegetation structure	Nil or minimal	Structural integrity of native vegetation community is very high	Structure is predominantly altered but intact, e.g. a layer or strata and or growth forms and or age classes removed	Dominant structuring species of native vegetation community significantly altered, e.g. a layer or strata frequently removed	Dominant structuring species of native vegetation community removed or predominantly cleared or extremely degraded	Dominant structuring species of native vegetation community removed	Vegetation absent or ornamental
	Vegetation composition	Nil or minimal	Compositional integrity of native vegetation community is very high	Composition of native vegetation community is altered but intact	Dominant structuring species present—species dominance significantly altered	Dominant structuring species of native vegetation community removed	Dominant structuring species of native vegetation community removed	Vegetation absent or ornamental

Table 6: The evaluation of the SEI for the various vegetation communities and habitats present within, and surrounding the PAOI.

Vegetation type	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
Business areas, the sportsfield, roads, gravel roads, the graveyard, and sidewalk grass	**Low** No confirmed or highly likely populations of SCC. No natural habitats / ecosystems.	**Very Low** VAST class IV & V: Replaced – adventive and managed. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Several major current negative ecological impacts.	**High** Species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, and that have a high likelihood of returning to a site once the disturbance or impact has been removed.	**Very Low** BI: Very Low RR: High
Modified grassy areas and arears prone to black wattle invasion	**Low** No confirmed or highly likely populations of SCC. < 50% of receptor contains natural habitat with limited potential to support SCC.	**Low** Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.	**Medium** Species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring	**Low** BI: Low RR: Medium
The delineated wetland and wetland buffer	**Medium** > 50% of receptor contains natural habitat (even though it is also dominated by graminoids and invasive species in some sections) with potential to support SCC.	**Low** VAST class III: Transformed Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential.	**Low** Species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, and that have a low likelihood of returning to a site once the disturbance or impact has been removed.	**Medium** BI: Low RR: Low
Fynbos remnants and *Watsonia* field	**Medium** > 50% of receptor contains natural habitat (even though it is also dominated by graminoids and invasive species in some sections) with potential to support SCC.	**Medium** VAST class II: Modified Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts with some major impacts (e.g., established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Low** Species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, and that have a low likelihood of returning to a site once the disturbance or impact has been removed.	**High** BI: Medium RR: Low

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9. APPENDIX

9.1 Provisional plant species list

A species accumulation curve for all the species recorded in in Fig. 14. All species that have not yet been mentioned that were observed during the site visit are in Table 7. The area for alternative option C did have the most recorded species, but the accumulation curve also shows that double the sampling effort was spent here compared to the preferred option B. However, the curve for option B seems nearly to have plateaued, and this means that many more species were likely not to be found in the area, even if sampling effort (i.e., time) was doubled.

Figure 14: A plant species accumulation curve for the three area options, as they were included in the site assessment. Users who observed species that were not recorded during the site assessment are shown at the end of each graph.

Table 7: A provisional species list for the proposed development, with invasive and exotic species mentioned in the report highlighted in light red.

Family	Species	Common name	Development area option
Cyanophyta			
Nostocaceae	*Nostoc commune*	Star jelly	B
Pinospida			
Pinaceae	*Pinus radiata*	Monterey pine	A
Liliopsida (Monocots)			
Amaryllidaceae	*Haemanthus sanguineus*	Smooth Blood lily	C
Amaryllidaceae	*Narcissus papyraceus*	Paperwhite	C
Amaryllidaceae	*Narcissus tazetta*	Bunch-flowered Daffodil	C
Araceae	*Zantedeschia aethiopica*	calla lily	B
Asparagaceae	*Agave sp*	century plants	B
Asparagaceae	*Eriospermum cf. pubescens*	Hairy-heart Woolseed	C
Asparagaceae	*Ledebouria revoluta*	common African hyacinth	C
Asphodelaceae	*Kniphofia uvaria*	Red Hot Poker	B & C
Cyperaceae	*Cyperus congestus*	Purple umbrella sedge	C
Cyperaceae	*Cyperus polystachyos polystachyos*	Many-spike flatsedge	A, B, & C
Cyperaceae	*Schoenoxiphium sp.*	Carex sect. Schoenoxiphium	C
Hypoxidaceae	*Hypoxis villosa*	Shaggy stargrass	B & C
Iridacea	*Gladiolus liliaceu*	Large Brown-Afrikane	C
Iridaceae	*Tritonia securigera*	Tooth Triton	C
Iridaceae	*Watsonia borbonica*	Bugle-lily	B
Iridaceae	*Watsonia pillansii*	Orange Watsonia	C
Juncaceae	*Juncus effusus*	Soft Rush	C
Juncaceae	*Juncus exsertus*	Beaked Rush	C
Juncaceae	*Juncus oxycarpus*	Lax Rush	B
Juncaceae	*Juncus tenuis*	Slender Path Rush	B
Orchidaceae	*Disa bracteata*	Bract Disa	C
Poaceae	*Andropogon eucomus*	Snowflake Grass	C
Poaceae	*Arundo donax*	giant reed	A
Poaceae	*Cenchrus clandestinus*	Kikuyu grass	A, B, & C
Poaceae	*Chloris gayana*	Rhodes Grass	A
Poaceae	*Cortaderia selloana*	Pampas Grass	C
Poaceae	*Cynodon dactylon*	Bermuda grass	C
Poaceae	*Eragrostis capensis*	Cape Love Grass	C
Poaceae	*Eragrostis curvula*	African love grass	B
Poaceae	*Hyparrhenia hirta*	Thatching grass	C
Poaceae	*Paspalum dilatatum*	Dallis grass	B & C
Poaceae	*Paspalum urvillei*	Vasey grass	A & C
Poaceae	*Sporobolus africanus*	Parramatta Grass	C
Poaceae	*Stenotaphrum secundatum*	Saint Augustine grass	A
Poaceae	*Themeda triandra*	Kangaroo Grass	C
Restionaceae	*Restio triticeus*	Wheat Capereed	C
Magnoliopsida (Dicots)			
Apiaceae	*Centella asiatica*	Gotu cola	B & C
Apiaceae	*Foeniculum vulgare*	Fennel	B
Apocynaceae	*Gomphocarpus sp.*	Balloon plants	A
Asteraceae	*Arctotheca prostrata*	Prostrate Capeweed	C
Asteraceae	*Athanasia dentata*	Tooth Kanniedood	C
Asteraceae	*Berkheya armata*	Giant Capethistle	C
Asteraceae	*Cirsium vulgare*	Bull Thistle	A, B, & C
Asteraceae	*Cotula discolor*	Beach Buttons	C
Asteraceae	*Cotula tenella*	Button species	C
Asteraceae	*Erigeron sumatrensis*	Tropical horseweed	B

Asteraceae	*Euryops chrysanthemoides*	Paris Daisy	C
Asteraceae	*Helichrysum anomalum*	Fimbril Everlasting	C
Asteraceae	*Helichrysum foetidum*	Stinking Everlasting	A & C
Asteraceae	*Helichrysum patulum*	Honey Everlasting	A, B, & C
Asteraceae	*Helminthotheca echioides*	Bristly oxtongue	A & B
Asteraceae	*Metalasia acuta*	Pointy Blombush	C
Asteraceae	*Metalasia densa*	Fynbos Blombush	C
Asteraceae	*Nidorella ivifolia*	Ivy Vleiweed	A & C
Asteraceae	*Senecio ilicifolius*	Kowanna Ragwort	C
Asteraceae	*Senecio purpureus*	Purple Ragwort	B & C
Asteraceae	*Senecio rigidus*	Hard Ragwort	C
Asteraceae	*Seriphium plumosum*	Bankrupt Bush	C
Asteraceae	*Tagetes minuta*	Wild marigold	B
Bruniaceae	*Berzelia intermedia*	Common Coppice Kolkol	C
Campanulaceae	*Lobelia flaccida*	Floppy Lobelia	A
Campanulaceae	*Lobelia tomentosa*	Woolly Lobelia	C
Campanulaceae	*Wahlenbergia neostricta*	Capebell species	C
Ericaceae	*Erica gracilis*	Graceful Heath	C
Ericaceae	*Erica peltata*	Shield Heath	C
Ericaceae	*Erica quadrangularis*	Smoke Heath	C
Euphorbiaceae	*Ricinus communis*	Caster bean	A & C
Fabaceae	*Acacia mearnsii*	Black wattle	A, B, & C
Fabaceae	*Acacia melanoxylon*	Blackwood wattle	A & B
Fabaceae	*Sesbania punicea*	Scarlet Sesbane	B
Fabaceae	*Tephrosia capensis*	Cape Hoarypea	C
Fabaceae	*Trifolium burchellianum*	Wild Clover	C
Fabaceae	*Trifolium repens*	White clover	A & B
Gentianaceae	*Sebaea aurea*	Golden Yellowwort	C
Geraniaceae	*Pelargonium candicans*	Velvet Storksbill	C
Geraniaceae	*Pelargonium capitatum*	Rose-scented geranium	B
Lamiaceae	*Coleus barbatus*	Woolly Plectranthus	C
Malvaceae	*Hermannia angularis*	Angular Dollsrose	C
Malvaceae	*Hibiscus aethiopicus*	Cape Hibiscus	C
Malvaceae	*Sida rhombifolia*	Cuban jute	B
Myricaceae	*Morella humilis*	Shy Waxberry	C
Myricaceae	*Morella serrata*	Water Waxberry	C
Oxalidaceae	*Oxalis ciliaris*	Fringe Sorrel	B & C
Oxalidaceae	*Oxalis purpurea*	Purple woodsorrel	C
Peraceae	*Clutia alaternoides*	Broad-leaf Clutia	C
Peraceae	*Clutia laxa*	Twiggy Clut	C
Phytolaccaceae	*Phytolacca octandra*	Inkweed	A
Ranunculaceae	*Ranunculus multifidus*	African buttercup	B
Rosaceae	*Rubus bergii x rigidus*	Boland Bramble	B
Rosaceae	*Rubus rigidus*	White Bramble	C
Rubiaceae	*Anthospermum aethiopicum*	Tall Flowerseed	B & C
Sapindaceae	*Acer negundo*	Box elder	A
Scrophulariaceae	*Selago corymbosa*	Stiff bitterbush	A & C
Solanaceae	*Cestrum laevigatum*	Inkberry	A
Solanaceae	*Datura stramonium*	Jimsonweed	A & B
Solanaceae	*Solanum mauritianum*	Bugweed	B & C
Solanaceae	*Solanum nigrum*	Black nightshade	A
Thymelaeaceae	*Gnidia squarrosa*	Saffron bush	C
Thymelaeaceae	*Lasiosiphon anthylloides*	Fire Curryflower	C
Thymelaeaceae	*Struthiola hirsuta*	Shaggy Capespray	C
Thymelaeaceae	*Struthiola parviflora*	Poor Capespray	C
Verbenaceae	*Lantana camara*	Common lantana	C
Verbenaceae	*Verbena bonariensis*	Purpletop vervain	A & B

9.2 Land use recommendations according to the WC BSP

Recommended acceptable land-uses for each BSP layer is outlined and summarised in Table 8 below.

Table 8: The land-use planning proposed by the Western Cape Biodiversity Spatial Plan.

LAND USE CATEGORIES		Conservation		Agriculture		Tourism and Recreational Facilities		Rural Accomodation		Urban			Business & Industrial				Infrastructure Installations			
LAND USE SUB-CATEGORIES (Refer to table 4.7 for descriptions)		Proclaimed Protected Areas	Other Nature Areas	Intensive Agriculture	Extensive Agriculture	Low Impact Facilities	High Impact Facilities	Agri-worker Accommodation	Small holdings	Urban Development & Expansion	Community Facilities & Institutions	New Settlements	Rural Business	Non-place-bound Industry (low-moderate impact)	Non-place-bound Industry (high impact)	Extractive Industry (incl. Prospecting)	Linear - roads & rail	Linear - pipelines & canals	Linear - powerlines	Other Utilities
MAP CATEGORY	DESIRED MANAGEMENT OBJECTIVE	Y = Yes: Permissible land uses that are not likely to compromise the biodiversity objective						R = Restricted: Land uses that may compromise the biodiversity objective are only permissible under certain conditions (refer to Table 4.7 for conditions)							N = No: Land uses that will compromise the biodiversity objective and are not permissible							
Protected Area	Must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity.	Land use within proclaimed protected areas are subject to management plan drawn up for that specific protected area.																		
Critical Biodiversity Area 1	Keep natural, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.	Y	Y	N	R	N	N	N	N	N	N	N	N	N	N	N	N	N	R	N
Critical Biodiversity Area 2	Keep natural, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.	Y	Y	N	R	R	N	N	N	N	N	N	N	N	N	N	R	R	R	N
Ecological Support Area 1: Terrestrial	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.	Y	Y	N	R	R	N	N	N	N	N	N	R	R	N	N	R	R	R	R
Ecological Support Area 1: Aquatic	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.	Y	Y	N	R	R	N	N	N	N	N	N	N	N	N	N	R	R	R	N
Ecological Support Area 2	Restore and/or manage to minimise impact on ecological infrastructure functioning, especially soil and water-related services.	Y	Y	N	R	R	N	N	R	N	N	N	N	N	N	N	R	R	R	R
ONA: Natural to Near-Natural	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land uses, but some authorisation may still be required for high impact land uses.	Y	Y	R	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
ONA: Degraded	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land uses, but some authorisation may still be required for high impact land uses.	R	R	R	Y	Y	R	R	Y	R	R	R	R	R	R	R	Y	Y	Y	Y
No Natural Remaining	These areas are suitable for development but may still provide limited biodiversity and ecological infrastructure functions and should be managed in a way that minimises impacts on biodiversity and ecological infrastructure.	R	R	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

9.3 Site Ecological Importance Methods

The site ecological importance (SEI) assessment is a function of biodiversity importance (BI) and receptor resilience (RR), which is defined as:

> *"The intrinsic capacity of the receptor (i.e., habitat type in question) to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention."*

The function is as follows: SEI = BI + RR. BI is a function of conservation importance (CI) and habitat functional integrity (FI), so that BI = CI + FI. The definition of CI given by the Species Environmental Assessment Guideline of 2022 is:

> *"The importance of a site for supporting biodiversity features of conservation concern present, e.g., populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), Rare species, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes."*

Most features included in CI are provided by the screening tool but needs to be evaluated at a finer scale from the field work assessment. FI is defined as:

> *"A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts."*

The criteria for defining RR, CI and FI are provided in the Species Environmental Assessment Guidelines of 2022. BI can be derived from a simple matrix of CI and FI, as illustrated in Table 9 below.

Table 9: The matrix that defines the biodiversity importance (BI) of a given habitat type, as identified from a desktop and field assessment.

Biodiversity Importance		**Conservation Importance**				
		Very High	High	Medium	Low	Very Low
Functional Integrity	Very High	Very High	Very High	High	Medium	Low
	High	Very High	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very Low
	Low	Medium	Medium	Low	Low	Very Low
	Very Low	Medium	Low	Very Low	Very Low	Very Low

SEI can then be derived from a second matrix, as depicted in Table 10. SEI is specific to the proposed development and can therefore only be compared between alternative layouts for the same proposed development, but not between developments.

Table 10: The matrix that defines the site ecological importance (SEI) of a given habitat type, as identified from a desktop and field assessment.

Site Ecological Importance		**Biodiversity Importance**				
		Very High	High	Medium	Low	Very Low
Receptor Resilience	Very High	Very High	Very High	High	Medium	Low
	High	Very High	Very High	High	Medium	Very Low
	Medium	Very High	High	Medium	Low	Very Low
	Low	High	Medium	Low	Very Low	Very Low
	Very Low	Medium	Low	Very Low	Very Low	Very Low