Compliance Statement for the Proposed Replacement of Bulk Water Supply Pipelines Along the R102 Road, George.

Specialist Plant Species and Terrestrial Biodiversity Report

Prepared For: Cape EAPrac

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No. 141757

Reviewer: Dr. Jackie Dabrowski

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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

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: 14 October 2024

BIANKE FOUCHÉ ABRIDGED CV

Qualifications

- B.Sc. Environmental Sciences (Nelson Mandela University),
- B.Sc. Honours in Botany (Nelson Mandela University),
- M.Sc. Conservation Biology (University of Cape Town)

SACNASP Registration No: 141757 (Professional Botanical; Candidate Ecological)

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 SACNASP, the International Association for Impact Assessment (IAIA) in South Africa, Botanical Society of South Africa, and the custodians for rare and endangered wildflowers (CREW-Outramps) in George.

References

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1. INTRODUCTION

1.1 Background

Confluent Environmental was contracted by Cape EAPrac to undertake a specialist assessment for the botanical and terrestrial sensitivity for the proposed upgraded bulk water supply pipeline along the R102. According to the Department of Forestry, Fisheries, and the Environment (DFFE) Screening Tool, the site sensitivity verification report (SSVR) is required because the terrestrial plant species theme has been highlighted as having a Medium and Low sensitivity along sections of the site, and the terrestrial biodiversity theme triggered a Very High sensitivity (Fig. 1).

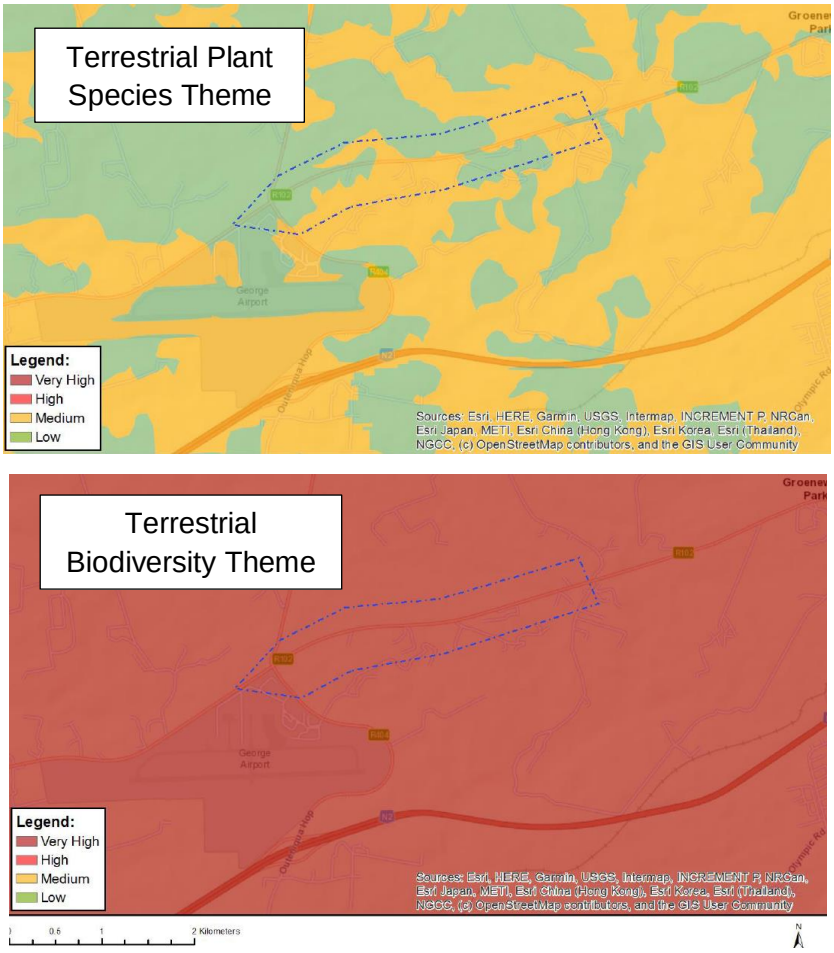

Figure 1: The Screening Tool generated sensitivity maps for the proposed pipeline upgrade along the R102. Both Low and Medium sensitivities are mapped for the plant species theme, while the terrestrial biodiversity sensitivity for the site is Very High throughout the entire area mapped for the proposed activity.

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 route having areas that are mapped as being part of a critical biodiversity area (CBA 2), ecological support area (ESA 2), 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 along the pipeline route.

1.2 General Site Location

The proposed pipeline upgrade will form part of the George Municipality infrastructure development and management mandate and includes the replacement of the existing bulk water supply pipelines from the Gwaing River Bridge to the George Airport (i.e., the while line section in Fig. 2).

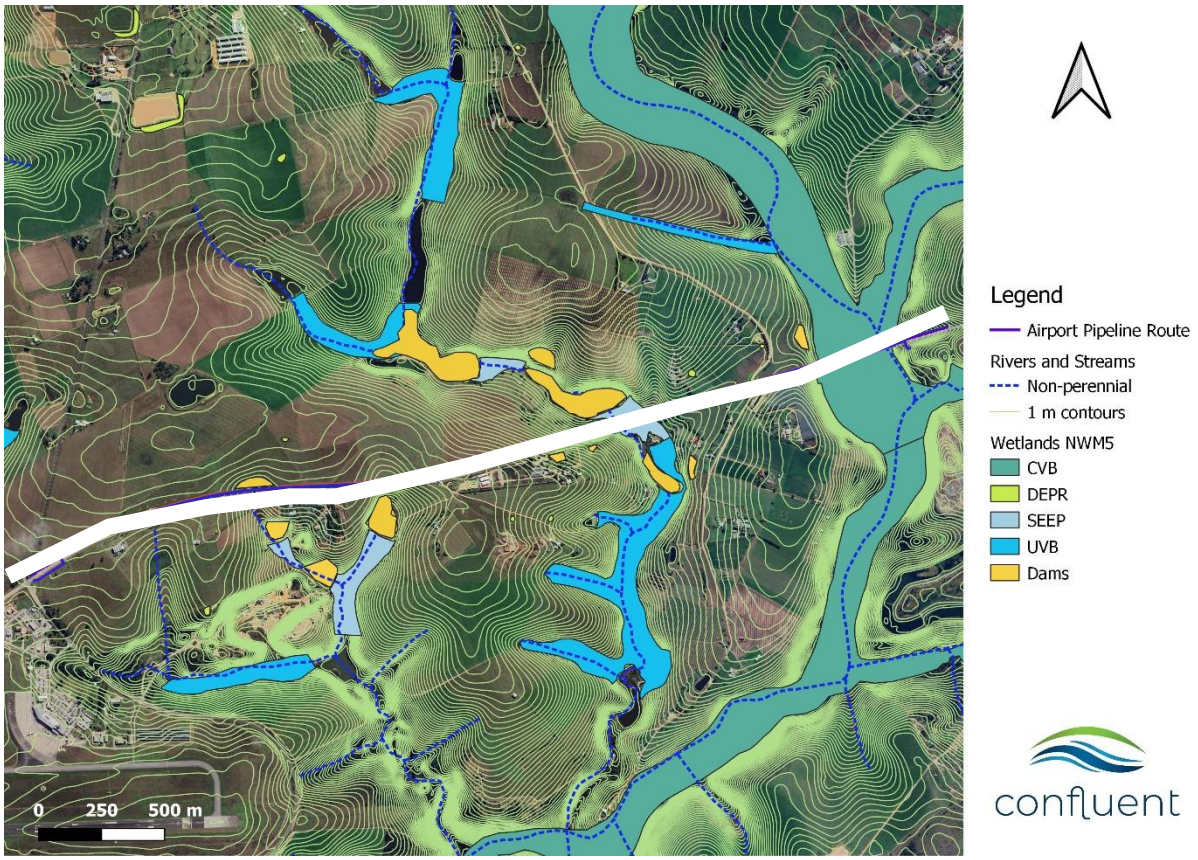

Figure 2: The general location of the proposed linear activity which regards the replacement of a bulk water supply pipeline proposed along the R102. The general area marked for pipeline upgrades is represented by a white line.

1.3 The proposed pipeline upgrade plan

The proposed development will include upgrading the existing water supply pipeline that runs along the R102 from George to the George Airport. The development plan at the time of this report update was provided in October 2024 by SMEC Engineering. More detail can be requested from SMEC Engineering or the George Municipality. The proposal according to the Department of Environmental Affairs and Development Planning (DEADP) is stated below:

- According to the information the existing pipeline is 200mm in diameter and located within the road reserve of the R102 Provincial Road. It is proposed as a replacement / upgrade for a section of existing pipeline as follows:
- Due to the fact that the existing pipeline needs to supply water to the airport area, the existing 200mm diameter pipeline cannot be decommissioned until the upgraded pipeline has been commissioned. However, it is understood that the existing pipeline will be left in place, and therefore not removed. The majority of the pipeline will not run north of the R102 and will therefore not lie adjacent to the existing pipeline. Approximately 3.1km (between 22 000m and 25 100m).of the

pipeline will run north of the road, which previously was planned south of the R102.

- Furthermore, according to the additional information the existing 200mm diameter pipeline has an existing throughput of between 32.73ℓ/s and 34.35ℓ/s. The ultimate flow of the "new pipeline" is expected to be 76.7ℓ/s over the 400mm diameter section of the pipeline, which is approximately 700m in length.

The proposed pipeline upgrade starts (0m) from the east at 25425m along the R102. The following summary was provided for the proposed pipeline Route as updated in October of 2024:

1. **Start of the pipeline**: The preferred alternative (and all previous SDPs) starts with the connection of the new pipeline with the scour chamber of Groeneweide Park water pipeline just east of Gwaing River Bridge, south of the R102. The water pipeline will cross the R102 by means of HDD (Horizontal Directional Drilling).
2. **Gwaing Bridge crossing**: All alternatives involve the replacement of the existing water pipe crossing the bridge with a 400mm steel pipe after which the pipeline will enter the 5m building lines of private properties.
    a. **The preferred alternative**
        i. Gwaing Bridge option 2 is where the pipeline will remain within the road reserve for approximately 250m from the bridge where it will diagonally enter a private property (Fig. 3).

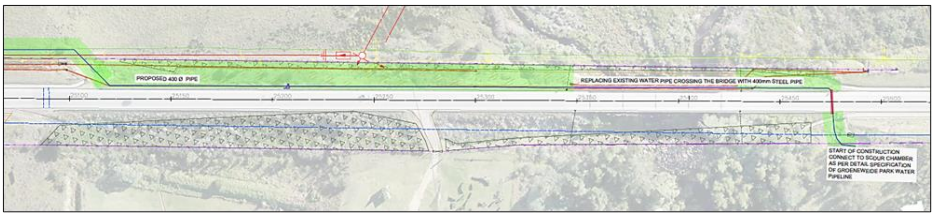

Figure 3: The Gwaing Bridge option 2 section of the preferred SDP, at the start of the upgrade area.

    b. **The non-preferred alternatives**
        i. Gwaing Bridge option 1 is where the upgraded pipeline will go straight from the bridge diagonally into a private property.
        ii. Gwaing Bridge option 3 is an alternative where the pipeline will remain within the road reserve for approximately 50m from the bridge where it will diagonally enter a private property.
3. **Norga River crossing options (Culvert crossing)**: The water pipeline remains within the 5m building line of private properties, north of the R102, up until a culvert crossing approximately 850m from the Gwaing River Bridge.
    a. **The preferred alternative**
        i. Culvert crossing option 3 is where a proposed 355 ø steel pipe within the road reserve over the culvert after which the pipeline will cross the R102 (HDD) to be installed within the 5m building line of private properties south of the R102. This pipeline will extend for approximately 300m where it will again cross the R102 (HDD) and proceed within the 5m building line to the north (Fig. 4). This section represents the greatest deviation from the previous layouts presented.

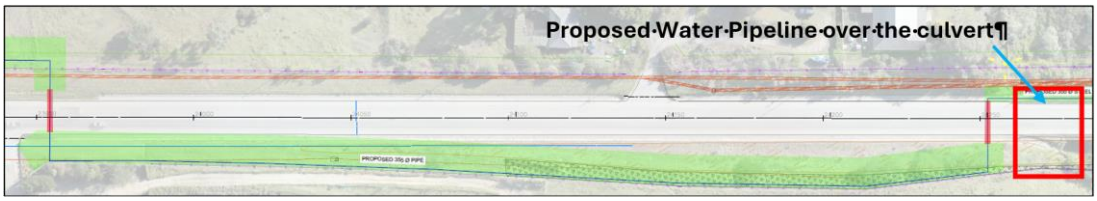

Figure 4: The Norga River culvert crossing option 3. This is the preferred option.

b. The non-preferred alternatives

i. Culvert Crossing Option 01: The water pipeline (proposed 355 ǿ pipe) will remain within the 5m building line of the private property north of the R102. The pipeline will be installed within the culvert just north of the existing fibre cables.

ii. Culvert Crossing Option 02: Proposed 355 ǿ steel pipe within the road reserve over the culvert after which it will return to the 5m building line of the private property.

4. **The end section of the pipeline**. This section involves a tie-in to connect the water pipeline to the existing water network at George Airport. Here, the preferred tie-in is option three presented in Fig. 5.

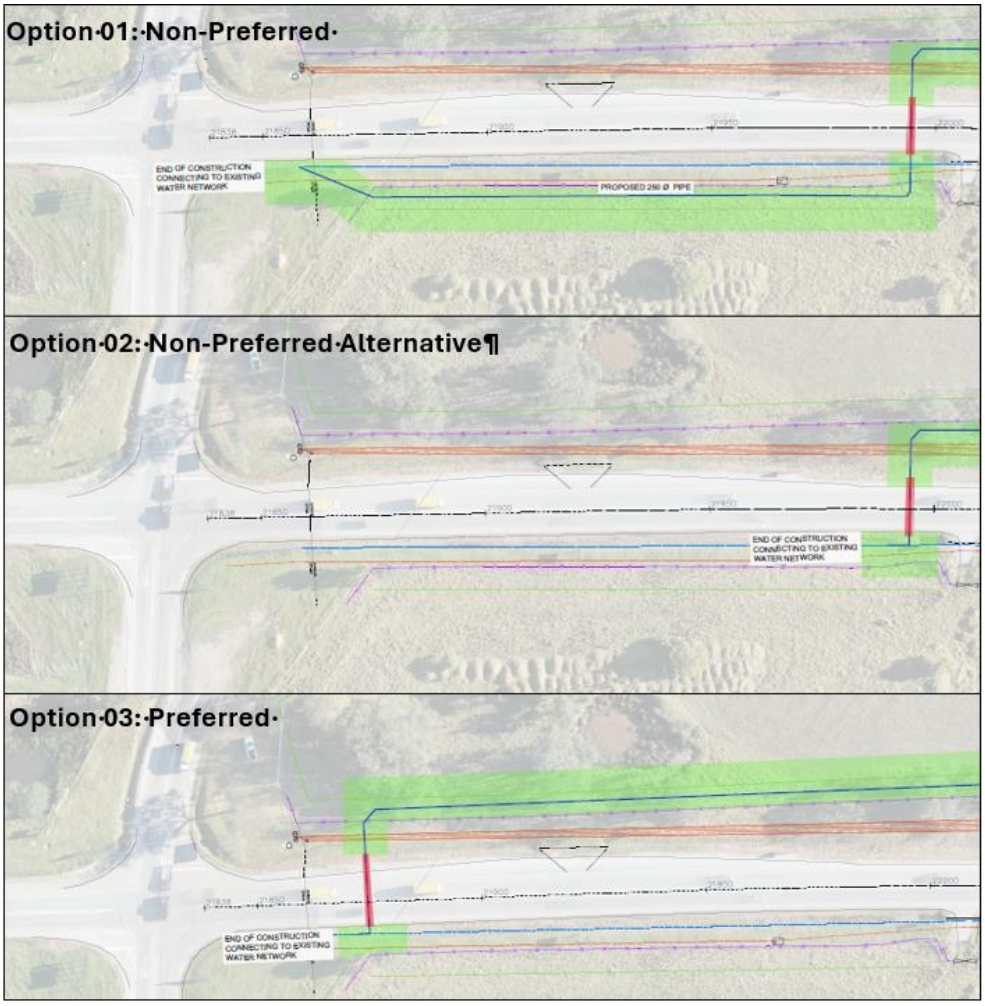

Figure 5: The three alternative pipeline layout options along the end section of the pipeline. Option three is the preferred layout.

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 and Low sensitivity in different areas along the proposed linear activity (see Fig. 1)**, and the **terrestrial biodiversity theme as having a Very High sensitivity (Fig. 1)**. 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.

Table 1: BPAs that were triggered for the Terrestrial Biodiversity Theme (Stewart et al., 2021).

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.
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 16th 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 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 a Nikon CoolPix camera. 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 16th 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. 6 were provided by worldweatheronline.com.

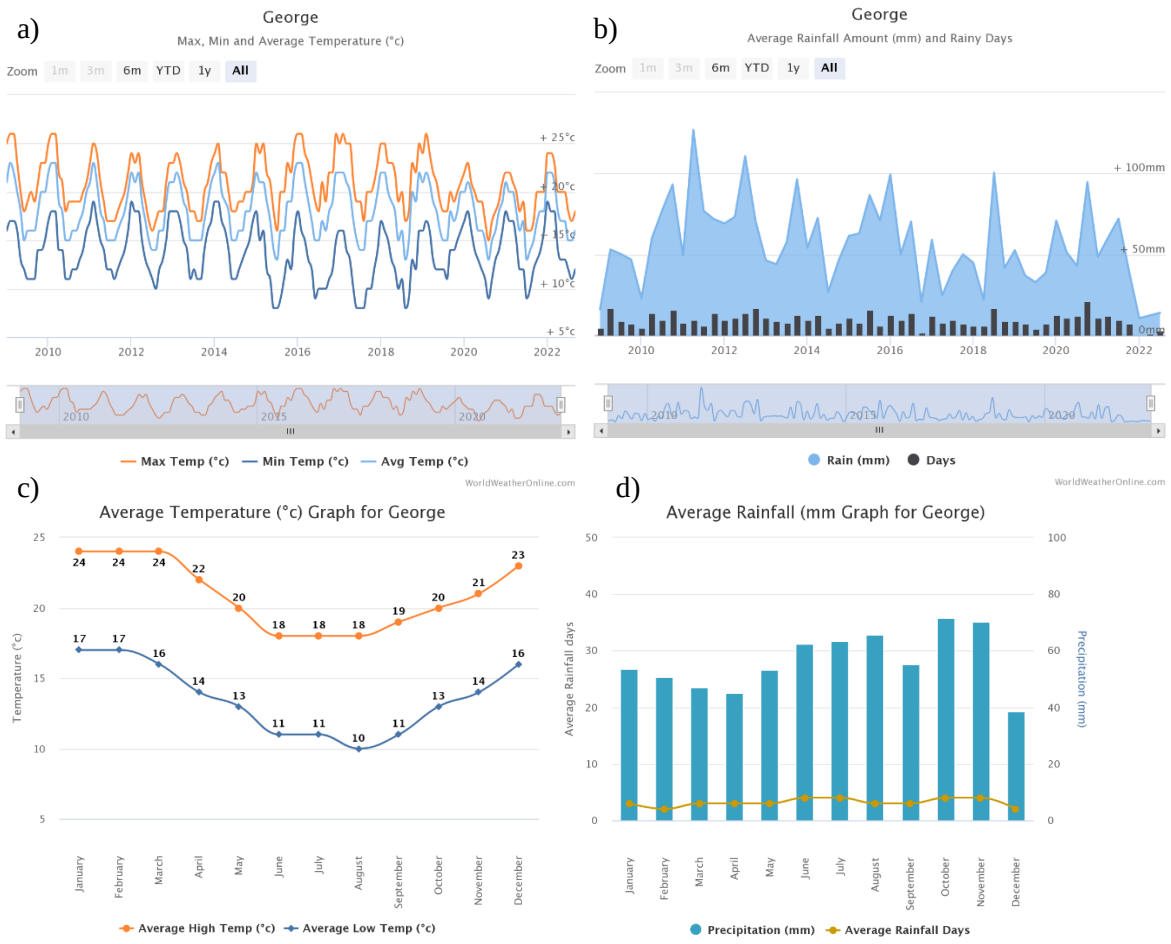

Figure 6: Climate charts for George in the Western Cape showing a) temperature ranges from 2010 to 2022, b) precipitation trends over the period 2010 to 2022, c) monthly minimum and maximum temperatures, and d) monthly average rainfall (mm) and days of rain.

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. 7. 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.

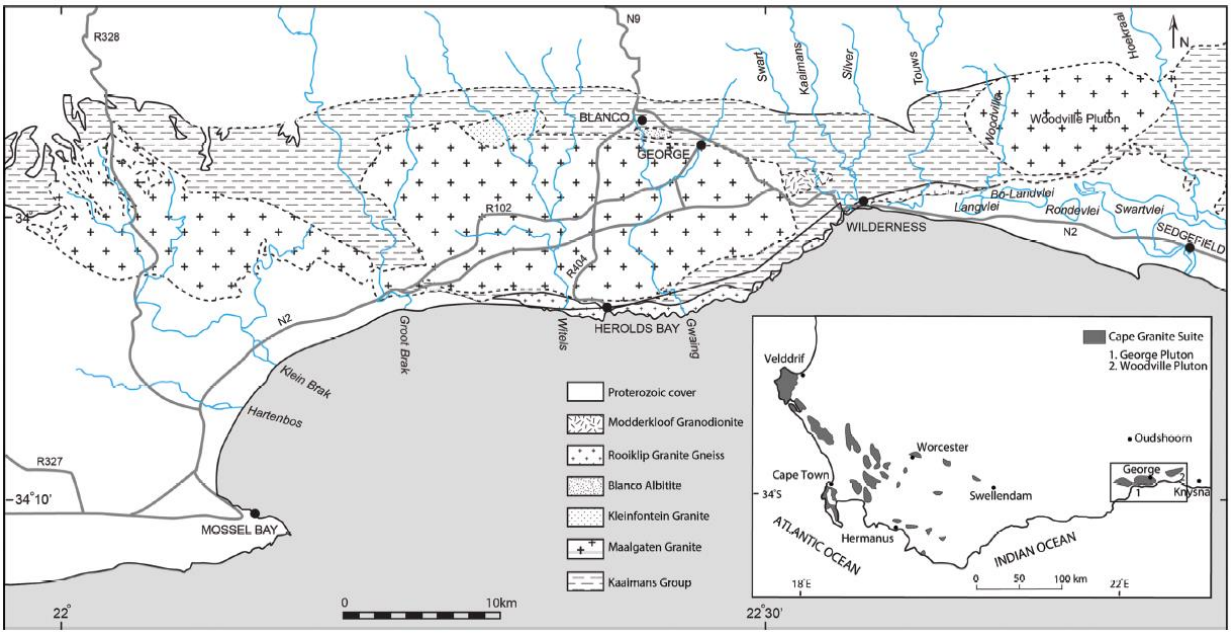

Figure 7: A map taken from the (Browning & Macey, 2015) paper showing the distribution of the George and Woodville Pluton granitoids. The inset illustrates additional areas where outcrops of the Cape Granite Suite occur.

4.1.3 Vegetation type(s)

The mapped vegetation is FFg 5 Graden Route Granite Fynbos (Fig. 8). 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” and “Moodkuils Perennial Stream” vegetation mapped along wetlands and drainage lines (including the Gwaing River) that cross the R102. The Vlok vegetation Map is not illustrated in this report

Garden Route Granite Fynbos is found only in the Western Cape Province in three main sections (Fig 9). 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. 9). 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 (none of the species listed below were found during the site assessment):

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*

The "Checklist for the determination of the applicability of the NEMA EIA regulations, 2014 for the airport precinct water pipeline replacement" prepared by Cape EAPrac also mentions that the route is significantly transformed and will likely remain transformed. This is due to the initial road construction disturbance as well as the maintenance of the road verge (within the road reserve), telephone, cable and fence maintenance, and the maintenance of a fire break. Furthermore, the surrounding farms are largely utilised for agricultural and business (nurseries and Barnyard kennels and cattery) purposes and are also significantly transformed in terms of their vegetation and ecosystem function.

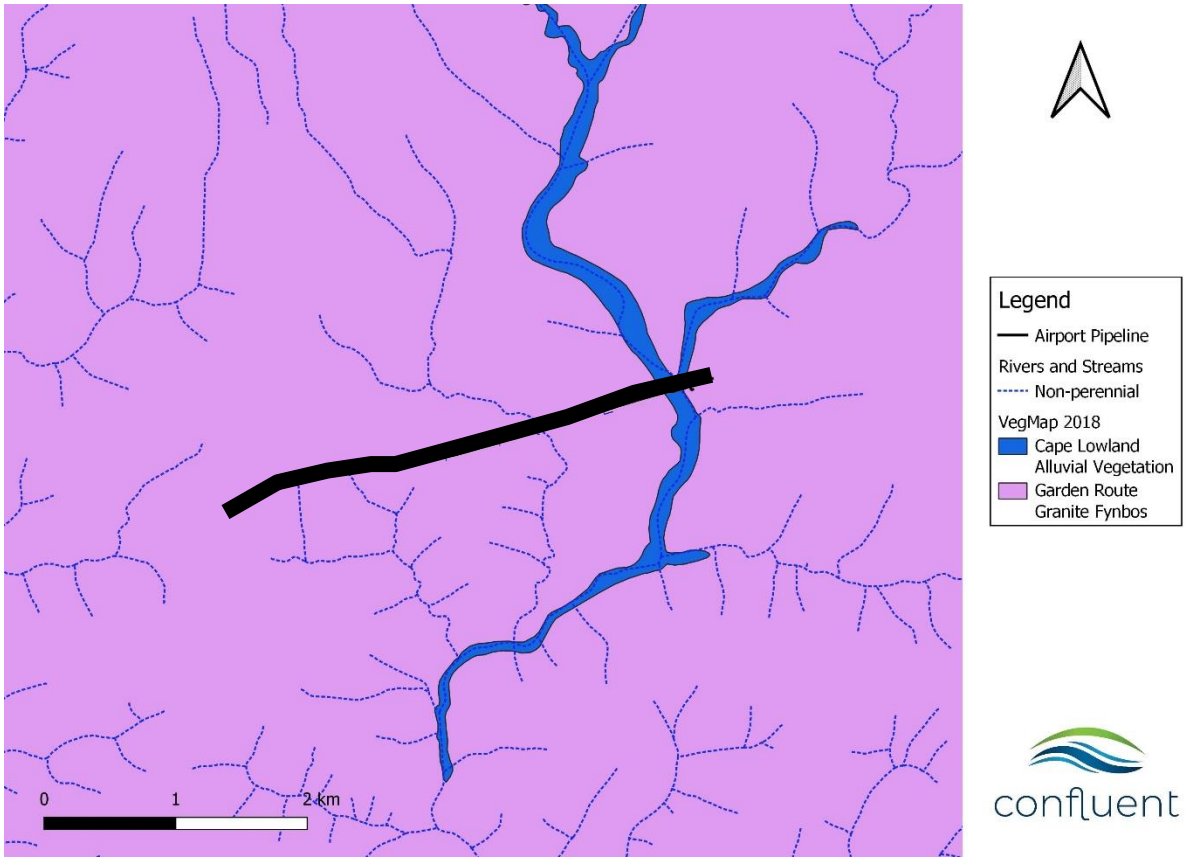

Figure 8: The mapped vegetation types according to the 2018 National Vegetation Map of South Africa (Dayaram et al., 2019; Mucina & Rutherford, 2006; left map), with the general location of the pipeline upgrade represented by a black line.

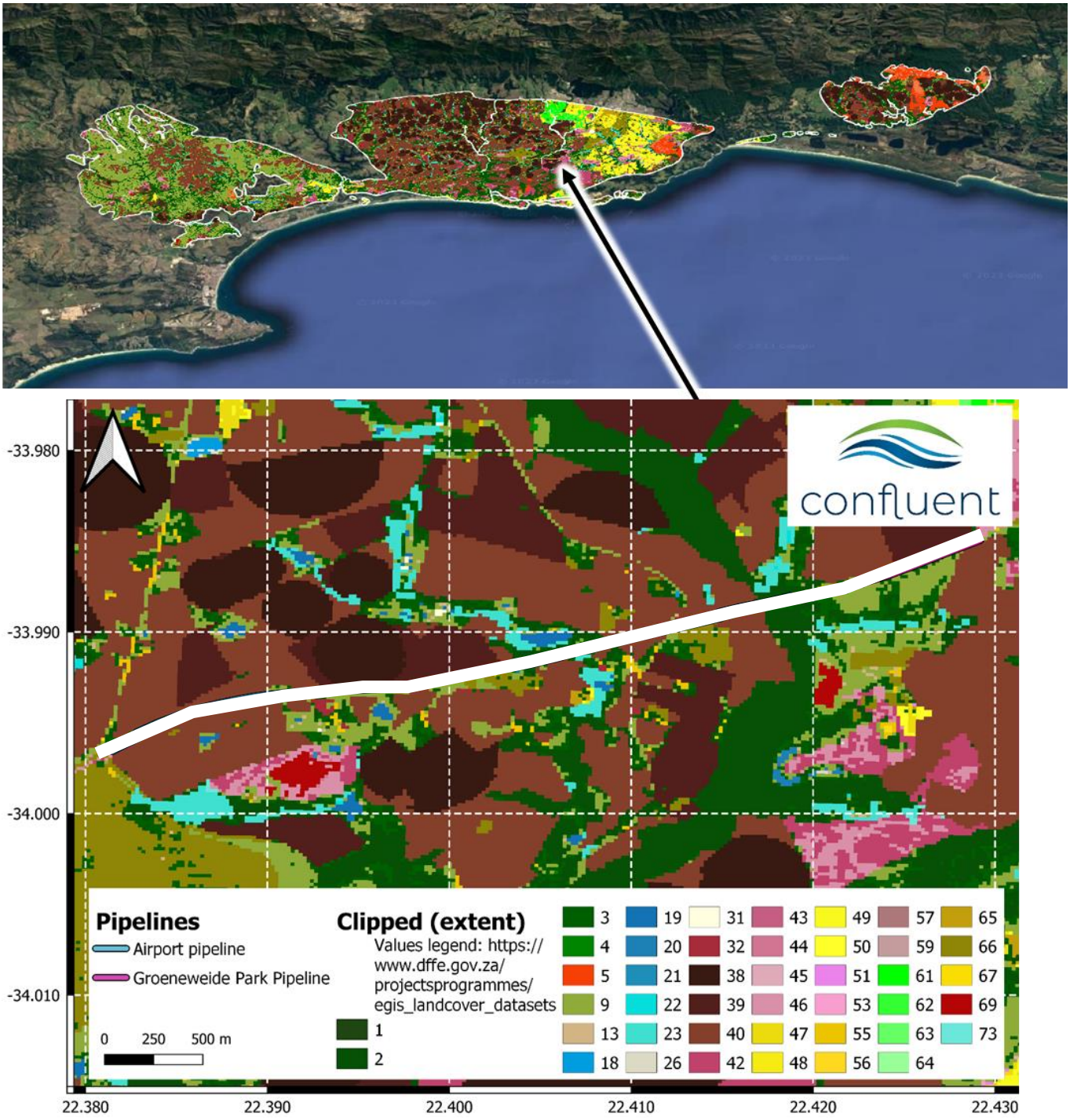

Figure 9: The 2020 land-use-land-cover (LULC) categories mapped for the full extent of Garden Route Granite Fynbos (top map). The for the various legend entries is available here: South African National Land-Cover (SANLC). Yellow areas are urbanised, brown and dark brown areas are agricultural areas, pink areas are old fallow fields, and red areas are open extraction sites. Dark green areas represent forest / thicket, and light green (no. 9) is low shrubby vegetation (fynbos). Blue areas represent Dams, rivers, and wetlands. The white line is the general location of the pipeline.

4.1.4 Western Cape Biodiversity Spatial Plan.

The Biodiversity Spatial Plan for the Western Cape (WC BSP) does not include the majority of the proposed pipeline route in their prioritised biodiversity planning areas (Fig. 10). The areas that are included in the BSP planning layers are associated with the Gwaing River crossing, and the non-perennial drainage line crossings. No BSP layers are mapped for the 1.9km stretch of road where the new pipeline stretch is planned north of the R102. The bridge crossing the Gwaing River is mapped as a critical biodiversity area no 1(CBA 1) for Rivers, Forest, and Terrestrial Biodiversity and a CBA 2 area for Wetlands (Fig. 10 & Box 1). The second existing bridge crossing as one moves westwards from the Gwaing River is mapped as a ecological support area no. 2 (ESA 2; Box 1).

The reasons for the BSP layers (mapped as hexagons) that have been mapped for this area are as follows:

- Along the eastern section going over the Gwaing River:
    - The Bontebok Extended Distributed Range
    - Cape Lowland Alluvial Vegetation (CR) and Garden Route Granite Fynbos (CR) which is Wolwedans Grassy Fynbos according to the Vlok vegetation map
    - Eastern Fynbos Renosterveld Granite Fynbos Floodplain Wetland
    - FEPA River Corridor
    - South-eastern Coastal Belt Ephemeral Upper Foothill River
    - Water source protection- Gwaing
    - Watercourse protection- Southern Coastal Belt
- ESA 2 sections along the second bridge crossing over the non-perennial drainage line:
    - The Bontebok Extended Distributed Range
    - Watercourse protection- Southern Coastal Belt
- The ESA 2 sections south of the R102 near “Norgarivier Nursery”:
    - Bontebok Extended Distribution Range
    - Water source protection- Gwaing
    - Watercourse protection- Southern Coastal Belt

BOX 1: The Biodiversity Spatial Plan

Critical Biodiversity Area 1

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

Objective: Maintain in a 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.

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.

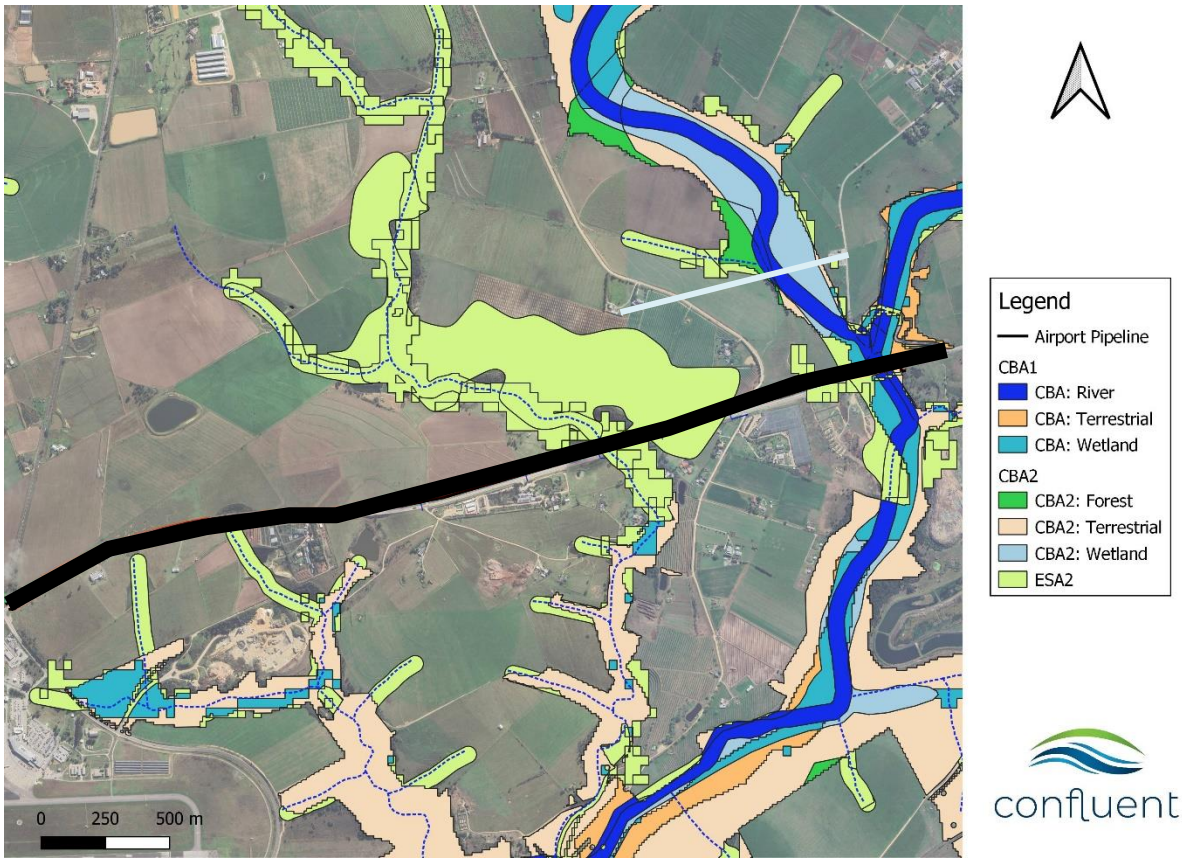

Figure 10: The mapped Western Cape Biodiversity Spatial Plan (WC BSP) categories that have been mapped for the site and surrounding landscape. The general pipeline upgrade area indicated by a black line.

4.1.5 Historical Aerial Imagery

High resolution historical imagery (Fig. 11) can be sourced upon request from the CD: NGI Geospatial portal, or from their offices in Mowbray, Cape Town. The earliest imagery available for the site is from December of 1936. At this time the R102 road was not yet constructed, however three years later in the December 1939 imagery the road is visible in the landscape. The R102 Road has therefore been existence in this area for over 80 years. Even in the earliest image before the construction of the road, it is evident that the site was already largely transformed for agricultural purposes, with little to no natural vegetation visible in the landscape. In the 1930s, all the vegetation around the rivers and streams of the road was also transformed for agricultural purposes. Over time, agriculture and general disturbance around the road seems to have intensified (with more recent appearances of the quarry near the airport and the George landfill and wastewater treatment works). No transformed vegetation was seen to recover to a more natural state, except in localised sections around drainage lines and the Gwaing River, but even here the little vegetation that grew back was likely mostly invasive species. This was likely the case since vegetation along these drainage lines today are highly invaded, mainly by black wattle (*Acacia mearnsii*) and bugweed (*Solanum mauritianum*).

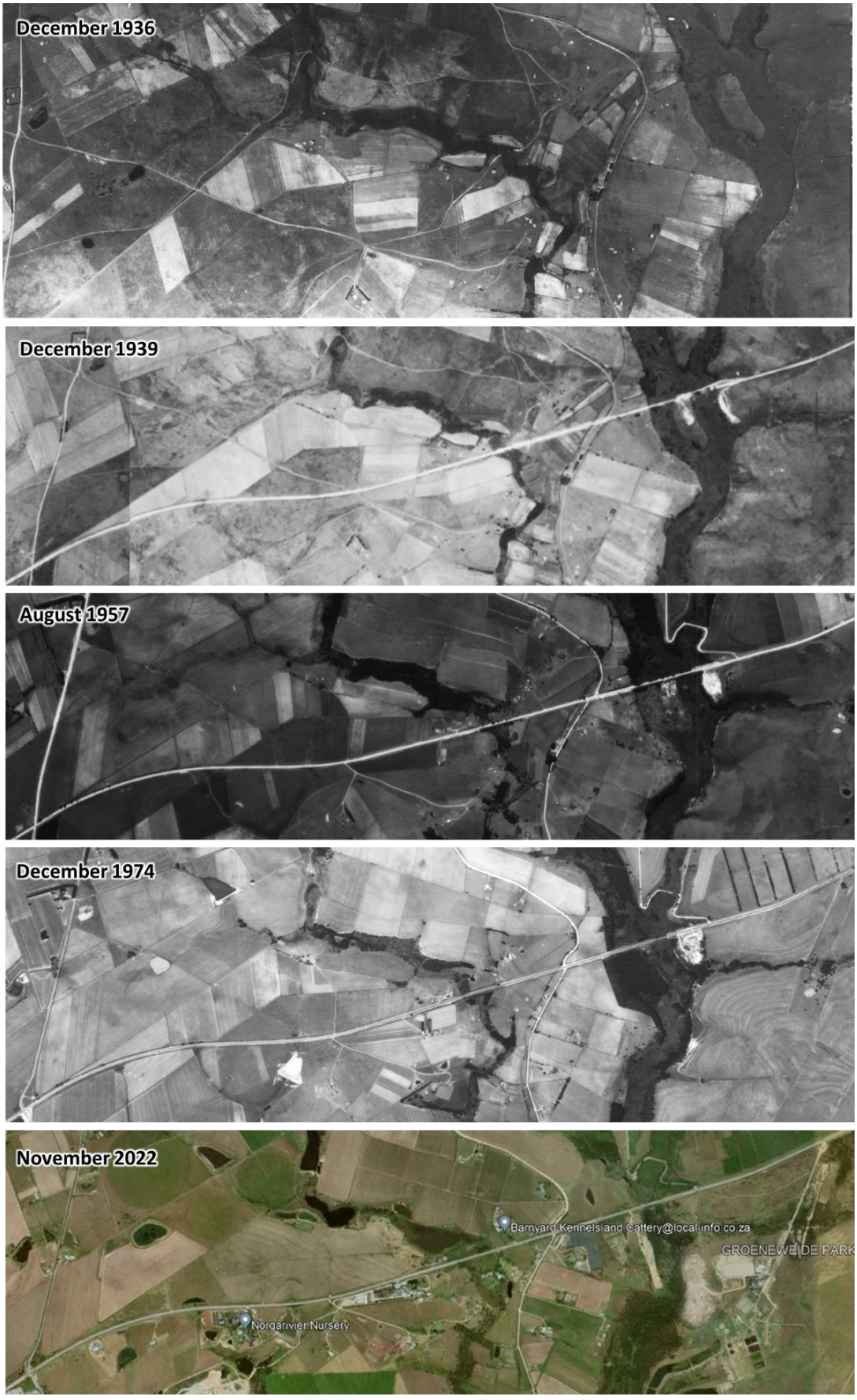

Figure 11: A series of historical imagery sourced from the CD: NGI geospatial portal. The R102 road was constructed in the late 1930s.

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:

- *Diosma passerinoides*
- *Erica unicolor* subsp*. mutica*
- *Euchaetis albertiana*
- *Lampranthus pauciflorus*
- *Leucospermum glabrum*
- Sensitive species 500
- Sensitive species 516
- 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 *Dioscorea sylvatica, Freesia leichtlinii,* and *Ocotea bullata*. On POSA no additional potential SCC are listed that were not already mentioned by the Screening tool and iNaturalist search. Since *Erica unicolor mutica* was mentioned by the Screening Tool, *E. unicolor georgensis* will also be considered as a possible SCC.

5. RESULTS: FIELD ASSESSMENT

5.1 Refined vegetation map

The revised vegetation map, compiled after the site assessment had been completed, is illustrated in Fig. 12. The vegetation along the “Groeneweide Park Pipeline” next to the R102 road does not represent Garden Route Granite Fynbos. Sections of degraded and invaded fynbos are present in small patches south of the Road, but none of these patches will be affected by the proposed upgrade of the pipelines. The small section of fynbos in the quarry area is under severe threat from the existing land-use and lack of invasive alien plant species control in that area. The same is true for the degraded fynbos corridor that is present north of the George landfill site. However, both of these fynbos sections fall completely outside of the area that will be influenced by the pipeline. The project area of influence (PAOI) is mostly restricted to the road reserve, and the section north of the R102 property fences, where the new pipeline will run for 1.9 km. The vegetation that will be affected by the PAOI is mostly various agricultural fields, and some adventive black wattle invaded vegetation (Fig. 12). The new 1.9km stretch of the pipeline north of the road will possibly affect a Pond with an herbaceous wetland (Fig. 12). This is discussed in more detail in the Aquatic specialist report. In the section where the upgraded pipe will follow the existing pipes south of the R102, it may likely affect a wetland in the area of the second bridge. In the east, the upgraded pipelines will not affect the Gwaing River and vegetation growing there because the new pipes will be installed on the existing bridge.

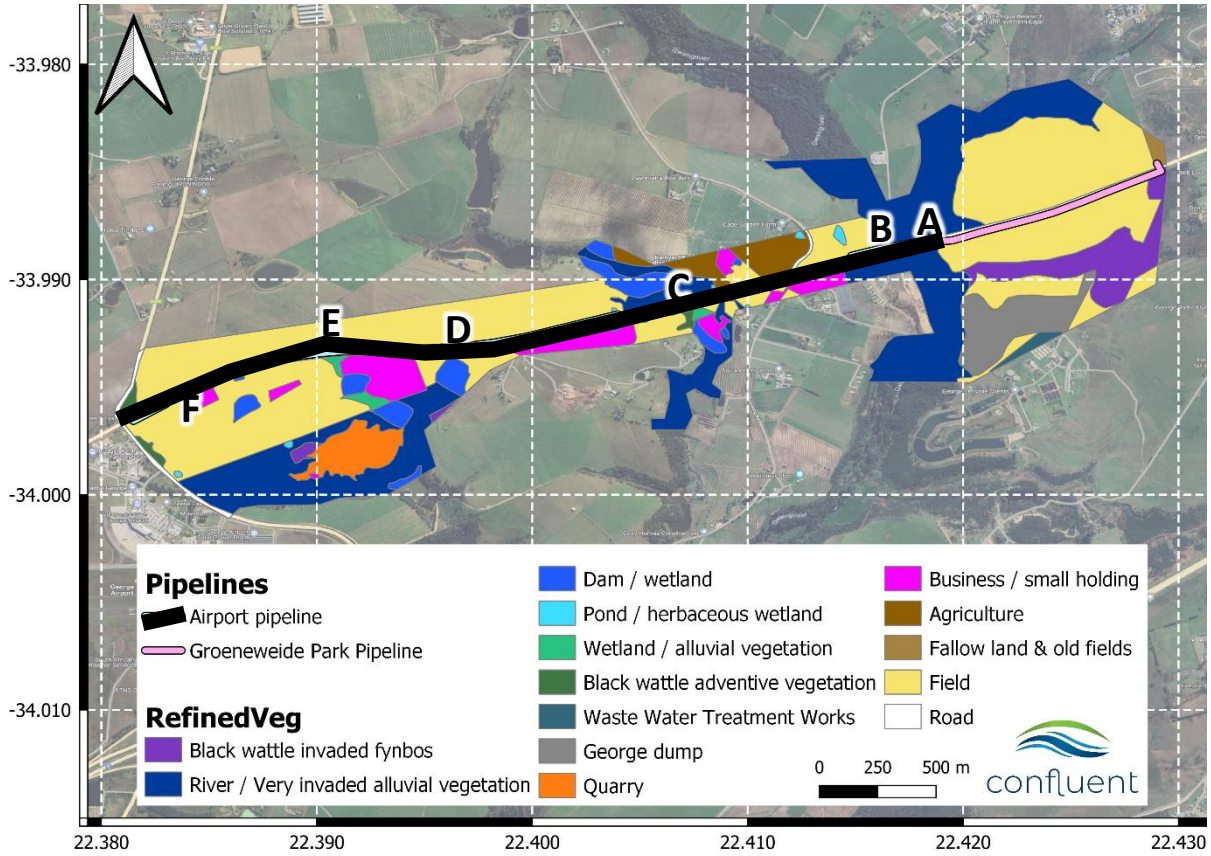

Figure 12: A revised vegetation map for the landscape surrounding the proposed pipeline upgrade area. The letters on the map represent the approximate position of the images illustrated in Figure 13.

The photos of Fig. 13 are as follows:

A) The existing pipelines of the bridge overlooking the Gwaing River. The vegetation here is highly invaded by gums and black wattle. The pipes also cross the river on the bridge, and upgraded pipes will not directly influence the river.

B) A view looking west right after the Gwaing River bridge crossing. No fynbos is visible.

C) A view of the northern section of the road across the non-perennial drainage line. The vegetation of this drainage line is dominated by listed invasive plants.

D) An image taken along the north of the R102 showing the agricultural fields where the new pipeline is proposed to be installed.

E) The small pond / herbaceous wetland north of the R102.

F) A view of the agricultural fields south of the R102 just before the intersection with the R404.

Figure 13: Photos taken during the site assessment during May 2023.

5.2 Nationally protected trees and SCC

No plant SCC (species of conservation concern) or protected tree species were observed within the area where the proposed pipeline will be installed. The potential for most of the vegetation observed alongside the R102 to support SCC is low. Wetland plants were observed in some sections of the site, and the sensitivity of aquatic features for the proposed pipeline is discussed further in the aquatic specialist report for the proposed pipeline upgrade.

5.3 Introduced and invasive Alien Plants

The invasive plants 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). Table 2 is coded by NEMBA and CARA listed species (highlighted in red), only on the NEMBA listed species (highlighted in orange), and species that are naturalised exotics (no highlight). NEMBA categories are described in BOX 2. The invasive species were spotted along the entire stretch of the road, and they were not confined to specific areas. Drainage line areas were more likely to have black wattle and bugweed invasions. Photos of all the IAPs are not provided in this report due to the large number of then that were observed during the site assessment.

Table 2: A list of all naturalised and invasive exotic species that were observed on the site. Invasive plants on NEMBA and CARA lists are highlighted in red and species only on the NEMBA list in Orange.

Family	Species	Common name	NEMBA	CARA
Fabaceae	*Acacia mearnsii*	black wattle	2	2
Fabaceae	*Acacia melanoxylon*	blackwood	2	2
Asparagaceae	*Agave americana*	American century plant	3 in Western Cape	NA
Amaranthaceae	*Alternanthera pungens*	creeping chaffweed	NA	NA
Basellaceae	*Anredera cordifolia*	Mignonette vine	1b	1
Asteraceae	*Bidens pilosa*	Hairy Beggarticks	NA	NA
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	1b	1
Apiaceae	*Centella asiatica*	Gotu Cola	NA	NA
Solanaceae	*Cestrum laevigatum*	inkberry	1b	1
Asteraceae	*Cirsium vulgare*	Bull Thistle	1b	1
Poaceae	*Cymbopogon pospischilii*	Narrowleaf Turpentine Grass	NA	NA
Asteraceae	*Erigeron sumatrensis*	tropical horseweed	NA	NA
Myrtaceae	*Eucalyptus sp.*	eucalyptus	1b	2
Euphorbiaceae	*Euphorbia ophthalmica*	Florida Hammock Sandmat	NA	NA
Euphorbiaceae	*Euphorbia serpens*	Matted Sandmat	NA	NA
Asteraceae	*Helminthotheca echioides*	bristly oxtongue	NA	NA
Verbenaceae	*Lantana camara*	common lantana	1b	1
Amaranthaceae	*Lipandra polysperma*	Many-seeded Goosefoot	NA	NA
Onagraceae	*Ludwigia palustris*	Water Purslane	1a	NA
Malvaceae	*Malva parviflora*	cheeseweed mallow		

Nephrolepidaceae	*Nephrolepis cordifolia*	Fishbone fern	1b in some provinces including the Western Cape	NA
Phytolaccaceae	*Phytolacca octandra*	Inkweed	1b	NA
Pinaceae	*Pinus pinaster*	Maritime pine	2 (plantations & wind-rows); 1b elsewhere	2
Pinaceae	*Pinus sp.*	Pine species	2	2
Plantaginaceae	*Plantago lanceolata*	ribwort plantain	NA	NA
Brassicaceae	*Raphanus raphanistrum*	Jointed Charlock	NA	NA
Rosaceae	*Rubus affinis*	Vigorous Bramble	NA	NA
Rosaceae	*Rubus bergii x rigidus*	Boland Bramble	NA	NA
Rosaceae	*Rubus sp.*	brambles	Possibly 1a or 1b	Possibly 1 or 2
Polygonaceae	*Rumex crispus*	curled dock	NA	NA
Solanaceae	*Solanum chenopodioides*	tall nightshade	NA	NA
Solanaceae	*Solanum mauritianum*	bugweed	1b	1
Asteraceae	*Sonchus asper*	prickly sowthistle	NA	NA
Asteraceae	*Tagetes minuta*	wild marigold	NA	NA
Asteraceae	*Taraxacum officinale*	common dandelion	NA	NA
Fabaceae	*Trifolium repens*	white clover	NA	NA
Verbenaceae	*Verbena bonariensis*	purpletop vervain	1b	NA
Fabaceae	*Vicia sativa*	Common Vetch	NA	NA
Asparagaceae	*Yucca gloriosa tristis*	Yucca species	NA	NA

BOX 2: NEMBA categories for listed invasive alien plants

Category 1a

- Species which must be combatted or eradicated.
- Immediate steps must be taken to eradicate and combat or eradicate.
- Authorised officials must be permitted to enter properties to monitor, assist with or implement the combatting or eradication.
- If an Invasive Species Management Programme has been developed, a person must combat or eradicate the listed invasive species in accordance with such programme.

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 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.

Table 3: Plant SCC probability of occurrence in the proposed pipeline upgrade area.

Species	Common name	Family	Growth form	Source	SANBI red list status	Probability of occurrence
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.
Erica unicolor georgensis	George two-onecolor heath	Ericaceae	Shrub	Specialist addition	Rare	**Low** This species is only found in the Outeniqua mountains above George. It is unlikely to occur.
Erica unicolor mutica	Two-onecolor heath	Ericaceae	Shrub	DFFE Screening Tool	Endangered B1ab(ii,iii,v)	**Low** This species is found from Mossel Bay to George in various fynbos and strandveld habitats. The habitat on the site does not match that required by the species.
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.
Freesia leichtlinii	Dune kammetjie	Iridaceae	Geophyte	iNaturalist	Near Threatened B1ab(ii,iii,iv,v)	**Low** This species is found from Stilbaai to Plettenberg Bay in fynbos habitats, mainly in sandy coastal dunes or limestone fynbos. It is unlikely to be here
Lampranthus pauciflorus	Beach brightfig	Aizoaceae	Succulent	DFFE Screening Tool	Endangered B1ab(ii,iii,iv,v)	**Low** This species is found from Cape Infanta to Plettenberg Bay in strandveld and fynbos. Because of the transformed state of the vegetation along the N2 route, the likelihood of occurrence for this species is Low..
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 found in the Outeniqua and Tsitsikamma Mountains. It is very unlikely that it occurs here.

Ocotea bullata	Stinkwood tree	Lauraceae	Tree	iNaturalist	Protected tree 118; Endangered A2bd	**Very 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.
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 here.
Sensitive species 516	-	Asphodelaceae	Succulent	DFFE Screening Tool	Endangered A2cd+4cd; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	**Very Low** This species is found from Mossel Bay to Herbertsdale and Groot Brak River in renosterveld, fynbos and strandveld. Given the long history of disturbance on the site, and that this site is slightly out of its range, this species is very unlikely to be found here.
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

Comments on the applicability of the first version of the report are given below in red:

- The proposed upgrade of bulk water supply pipelines does not negatively affect the drainage lines that are categorised as ESA 2 and CBA 1 and 2 areas. Existing land uses in the surrounding landscape outside of the pipeline upgrade project area of influence (PAOI) and a lack of management of invasive alien species pose a real threat to the drainage line ecosystems. The impact of this project on CBA and ESA areas mapped will not counter the objectives of these areas. The consideration of the environmentally sensitive resulting from meetins with the engineers has resulted in the proposed use of horizontal directional drilling (HDD) in these sensitive areas.
- The vegetation along the entire section of the R102 for the proposed upgrade is currently used as agricultural fields. These fields are at least a century old. The vegetation of the drainage lines are heavily invaded. No remaining Garden Route Granite Fynbos exists in the PAOI, and the vegetation is not consistent with any Red Listed ecosystem.
- Given this information, the Terrestrial Biodiversity sensitivity for the proposed pipeline upgrade is confirmed to be **Low**. A compliance statement is sufficient from a terrestrial biodiversity sensitivity point of view.

6.2 Botanical diversity

Comments on the applicability of the first version of the report are given below in red:

- The plant species sensitivity for the site is **Low** because no species of conservation concern were found and because none are likely to occur on the site. A compliance statement is sufficient from a terrestrial plant species sensitivity point of view.

7. CONCLUSION

The proposed upgrade for bulk water supply along the George Airport stretch of the R102 can go ahead, even though there have been some layout changes from the original plans provided. Ongoing alien clearing and eradication should occur along road verges as per the invasive management plan for George. Soils excavated for the laying of the new pipes should be covered when not in use and must be re-used to fill the pipeline holes once the pipelines have been installed. Soil from elsewhere should be minimised for the pipeline project. Care should be taken during the installation process to avoid erosion of soil and a loss of vegetation, especially near the Pond / wetland area (Fig. 13 J) and other areas where the pipeline will cross drainage lines with sensitive habitat. The aquatic specialist report will provide more details on the best practice in the areas crossing drainage lines and wetlands. So far, the engineers and project planners have tried to take environmentally sensitive areas into account, which has led to improvements in the project design to date.

Kikuyu grass may not be used to rehabilitate the road and fence line verges where the pipeline will be installed. Better grasses to use are *Cynodon dactylon* (bermuda grass) or *Stenotaphrum secundatum* (Saint Augustine grass). Construction materials and equipment should properly disposed of and cleared from the area during construction and while concluding the construction phase. Adequate ablution facilities must be available for all construction staff working on the installation of the new pipeline (approximately one toilet per

10 construction workers). And lastly, the construction area must be clearly defined to avoid unnecessary impacts on nearby farms, and to ensure workers are well informed about the area they are working in.

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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 4. 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.

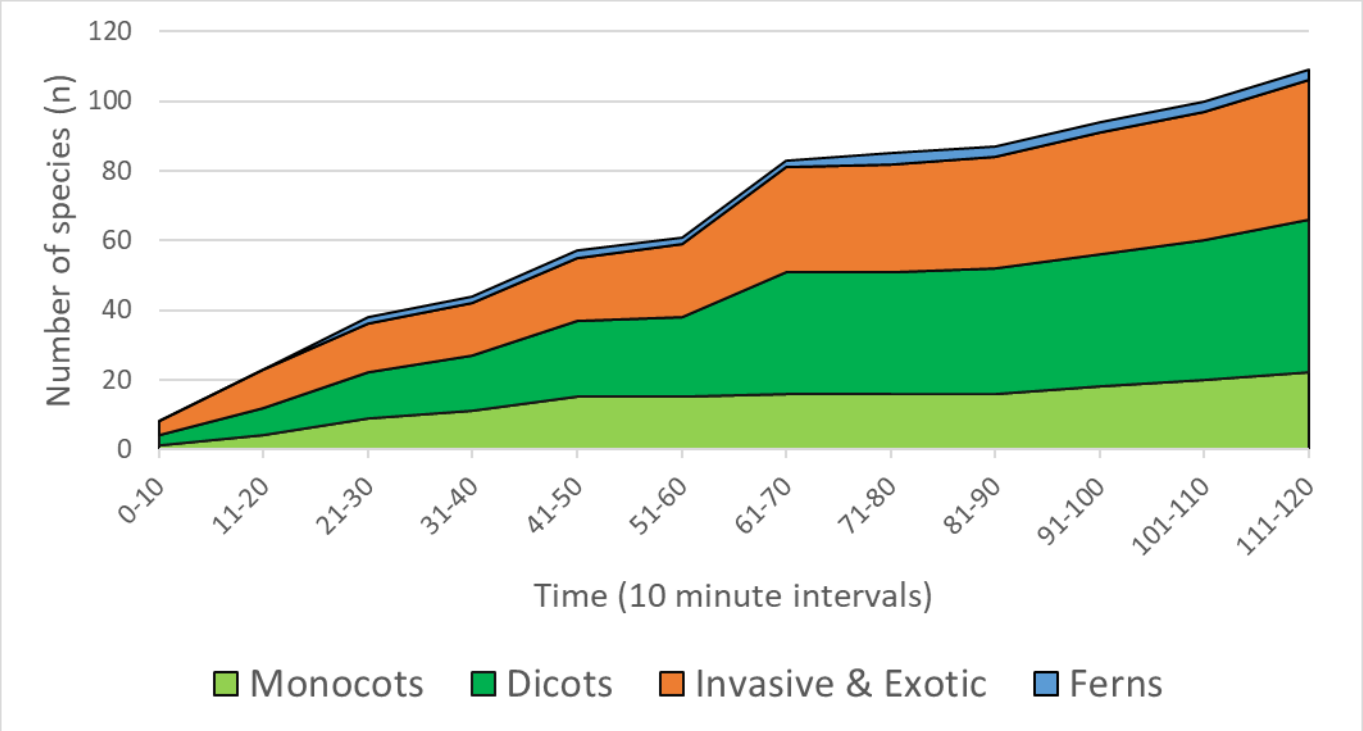

Figure 14: A plant species accumulation curve for the three area options, as they were included in the site assessment. Users who observed species that were not recorded during the site assessment are shown at the end of each graph.

Table 4: 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
Pteridophyta			
Dennstaedtiaceae	*Pteridium aquilinum capense*	Southern bracken fern	
Pteridaceae	*Cheilanthes viridis*	Green cliff brake	
Pteridaceae	*Pteris tremula*	Shaking brake	
Liliopsida (Monocots)			
Araceae	*Lemna minor*	Common Duckweed	Pond & wetland
Araceae	*Zantedeschia aethiopica*	calla lily	2nd bridge and Pond & wetland
Cyperaceae	*Cyperus congestus*	Purple Umbrella Sedge	Pond & wetland
Cyperaceae	*Cyperus papyrus*	Papyrus sedge	2nd bridge
Cyperaceae	*Cyperus polystachyos*	Manyspike Flatsedge	2nd bridge
Cyperaceae	*Cyperus sp.*	sedge	Gwayang River bridge
Cyperaceae	*Cyperus thunbergii*	Giant Sedge	2nd bridge
Cyperaceae	*Eleocharis limosa*	Finger Rush	2nd bridge and Pond & wetland
Cyperaceae	*Ficinia sp.*	Star Grasses	Fields and Pond & wetland
Cyperaceae	*Isolepis sp.*		2nd bridge
Iridaceae	*Chasmanthe aethiopica*	Cobra Lily	2nd bridge
Juncaceae	*Juncus effusus*	Soft Rush	Pond & wetland
Poaceae	*Chloris gayana*	Rhodes Grass	Fields
Poaceae	*Chloris virgata*	feather finger grass	Fields
Poaceae	*Cynodon dactylon*	Bermuda grass	Fields
Poaceae	*Eragrostis curvula*	African love grass	2nd bridge and Fields
Poaceae	*Eragrostis plana*	Fan Love Grass	Fields
Poaceae	*Hyparrhenia hirta*	thatching grass	2nd bridge
Poaceae	*Paspalum urvillei*	Vasey Grass	2nd bridge and Pond & wetland
Poaceae	*Phragmites australis*	common reed	2nd bridge
Poaceae	*Sporobolus africanus*	Parramatta Grass	Fields
Poaceae	*Stenotaphrum secundatum*	Saint Augustine grass	Pond & wetland
Typhaceae	*Typha capensis*	Cape Bulrush	2nd bridge
Magnoliopsida (Dicots)			
Aizoaceae	*Carpobrotus edulis*	sea fig	Fields
Amaranthaceae	*Exomis microphylla*	Brakbos	Fields
Anacardiaceae	*Searsia pyroides*	Common currant-rhus	2nd bridge
Anacardiaceae	*Searsia sp.*	Karees	2nd bridge
Asteraceae	*Arctotheca prostrata*	Prostrate Capeweed	2nd bridge and Fields
Asteraceae	*Cotula australis*	Common Cotula	Fields
Asteraceae	*Helichrysum cymosum*	Fume Everlasting	2nd bridge

Asteraceae	*Helichrysum dasyanthum*	Fynbos Everlasting	Fields
Asteraceae	*Helichrysum foetidum*	Stinking Everlasting	2nd bridge, Fields, and Gwaing River bridge
Asteraceae	*Helichrysum odoratissimum*	Kooigoed Everlasting	Fields and Pond & wetland
Asteraceae	*Helichrysum patulum*	Honey Everlasting	2nd bridge, Fields, Gwaing River bridge, and Pond & Wetland
Asteraceae	*Helichrysum petiolare*	Licorice plant	2nd bridge and Fields
Asteraceae	*Metalasia acuta*	Pointy Blombush	2nd bridge
Asteraceae	*Nidorella ivifolia*	Ivy Vleiweed	2nd bridge and Fields
Asteraceae	*Pulicaria scabra*	Fleabane	2nd bridge
Asteraceae	*Senecio ilicifolius*	Kowanna Ragwort	Pond & wetland
Asteraceae	*Senecio purpureus*	Purple Ragwort	Fields and Pond & wetland
Asteraceae	*Senecio sp.*	groundsels	2nd bridge
Brassicaceae	*Lepidium africanum*	African Pepperwort	Fields
Campanulaceae	*Lobelia erinus*	Garden Lobelia	Pond & wetland
Casuarinaceae	*Casuarina*	Beefwoods	2nd bridge
Celastraceae	*Gymnosporia buxifolia*	Common Spikethorn	2nd bridge and Pond & wetland
Geraniaceae	*Geranium incanum*	carpet crane's-bill	Pond & wetland
Geraniaceae	*Geranium ornithopodon*		2nd bridge
Geraniaceae	*Pelargonium alchemilloides*	Mantle Storksbill	2nd bridge
Malvaceae	*Grewia occidentalis*	Crossberry	2nd bridge
Nymphaeaceae	*Nymphaea nouchali*	Day Waterlily	Pond & wetland
Oxalidaceae	*Oxalis caprina*	Goat's-foot	2nd bridge
Oxalidaceae	*Oxalis ciliaris*	Fringe Sorrel	Pond & wetland
Polygonaceae	*Persicaria decipiens*	slender knotweed	Pond & wetland
Rubiaceae	*Anthospermum spathulatum*	Spoon Flowerseed	2nd bridge
Scrophulariaceae	*Selago corymbosa*	Stiff Bitterbush	Fields and Pond & wetland
Solanaceae	*Solanum linnaeanum*	Yellow Bitter-apple	Fields
Thymelaeaceae	*Passerina falcifolia*	Weeping Gonna	2nd bridge, Fields, and Pond & wetland

9.2 Land use recommendations according to the WC BSP

Recommended acceptable land-uses for each BSP layer is outlined and summarised in Table 5 below.

Table 5: 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