



Terrestrial Biodiversity Assessment

Woodlands Sewer Pipeline & WWTW

Date: 23/05/2025
Version: Draft
Author: J. Pote

Terrestrial Biodiversity Assessment

Woodlands Sewer Pipeline & WWTW

Compiled by: **Jamie Pote** (Pr. Sci. Nat.)

Postnet Suite 57, Private Bag X13130, Humewood, Port Elizabeth, 6013, South Africa

jamiepote@live.co.za +27 (0)76 888 9890

Compiled for: **Bluepebble Sustainable Solutions**

Date of report: **23/05/2025**

Draft Report

This Report has been prepared with all reasonable skill, care and diligence within the scope of appointment by Mr Jamie Pote, with consideration to the resources devoted to it by agreement with the client, incorporating our Standard Terms and Conditions of Business.

This Report is prepared exclusively for use by the client, and the author disclaims any liability in respect of its use by any party other than the client and for the purpose for which it was written. The Report is subject to all the copyright and intellectual property laws and practices of South Africa and contains intellectual property and proprietary information that is protected by such copyright in favour of the author. No person, other than the client, may reproduce, distribute to any third party, or rely on the content of any portion of this report, without the prior written consent of the author.

The author accepts no responsibility of whatsoever nature to third parties to whom this Report, or any part thereof, is made known. Any such persons or parties rely on the report at their own risk.

Revisions

Report/Revision Version	Date:	Approved by:
First Draft	2025/05/23	Jamie Pote
Revisions/Comments		
Final Draft		
IAP comments		
Final Version		

Table of Contents

Revisions.....	ii
Table of Contents.....	i
List of Figures.....	iii
List of Tables.....	iii
1 Introduction & Background	1
1.1 Background.....	1
1.2 Activity Description	1
1.3 Purpose of Report	2
1.3.1 Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes	2
1.4 Methodology and Approach	3
1.4.1 Site visit	4
1.4.2 Assumptions, Uncertainties and Gaps in Knowledge	4
2 Policy.....	4
2.1 Legislation Framework.....	4
2.2 Systematic Planning Frameworks.....	6
2.2.1 National Environmental Screening Tool	7
2.2.2 Vegetation of Southern Africa	9
2.2.3 National Biodiversity Assessment and Red Listed Ecosystems	9
2.2.4 Eastern Cape Biodiversity Conservation Plan (ECBCP, 2019) – Terrestrial.....	12
2.2.5 Key Biodiversity Areas	13
2.2.6 Protected areas	13
2.2.7 Vegetation and Ecological Processes and Corridors	13
2.2.8 Rivers and Wetlands.....	14
3 Biodiversity Risk Identification and Assessment.....	15
3.1 Baseline Biodiversity Description.....	15
3.1.1 Present Ecological State.....	17
3.1.2 Flora & Fauna	17
3.1.3 Aquatic Habitat.....	23
3.1.4 Terrestrial Vegetation Sensitivity Assessment	24
3.1.5 Critical Habitat	25
3.1.6 No-Go Areas.....	25
3.1.7 Potential Development Footprints	25
3.2 Risks and Potential Impacts to Biodiversity	26
3.2.1 Summary of actions, activities, or processes that require mitigation.	26
3.2.2 Potential Terrestrial Biodiversity Impacts (Direct).....	26
3.2.3 Potential Terrestrial Biodiversity Impacts (Indirect)	27
3.2.4 Potential Terrestrial Biodiversity Impacts (Cumulative)	27
3.3 Assessment of Risks and Impacts to Biodiversity	27
3.3.1 Criteria of assigning significance to potential impacts.....	27
3.3.2 Significance Rating	28

3.3.3	Assessment of Terrestrial Biodiversity Impacts	29
3.3.4	Terrestrial Biodiversity Impact Reversibility	29
3.3.5	Impacts and Risks to Irreplaceable Biodiversity Resources	29
3.3.6	Residual Risks and Uncertainties	29
3.4	Findings, Outcomes and Recommendations.....	30
3.4.1	Summary of Findings	30
3.4.2	Recommendations & Mitigation Measures	30
3.5	Site Preparation and Vegetation Clearing Plan	31
3.6	Open Space Management/Conservation Plan.....	31
3.7	Maintenance Management Plan.....	31
4	Organizational Capacity and Competency	31
5	Emergency Preparedness and Response	31
6	Stakeholder Engagement	31
7	Monitoring and Review.....	31
8	Appendices	33
8.1	Appendix A: References.....	33
8.2	Appendix B: Abbreviations & Glossary	36
8.2.1	Abbreviations.....	36
8.2.2	Glossary.....	37
8.3	Appendix C: Biodiversity Environmental Management Plan	44
8.3.1	Alien and Invasive Plan Management Plan	44
8.3.2	Fires.....	44
8.3.3	Soil Aspects.....	44
8.3.4	Infrastructural Requirements.....	45
8.3.5	Rehabilitation Plan.....	46
8.3.6	Monitoring and Reporting	47
8.3.7	Closure objectives and extent of alignment to pre-construction environment.....	48
8.4	Appendix D: General Impact Rating Scale	49
8.4.1	The Severity/ Beneficial Scale.....	49
8.4.2	Spatial and Temporal Scales.....	50
8.4.3	The Degree of Certainty and the Likelihood Scale	50
8.4.4	The Environmental Significance Scale	51
8.4.5	Absence of Data	52
8.5	Appendix E: Declaration, Specialist Profile and Registration	53
8.6	Appendix F: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity.....	69
8.7	Appendix G: Site Sensitivity Verification Report	76
8.7.1	Background.....	76
8.7.2	Activity Location and Description	76
8.7.3	Purpose of Report	77
8.7.4	Data sources and references.....	78
8.7.5	Site visit	79
8.7.6	Assumptions, Uncertainties and Gaps in Knowledge	79
8.7.7	National Environmental Screening Tool	79
8.7.8	Findings, Outcomes and Recommendations.....	81

8.7.9	Conclusions	82
-------	-------------------	----

List of Figures

Figure 1: Site locality of proposed sewer pipeline & WWTW	1
Figure 2: Site locality Aerial of proposed sewer pipeline & WWTW.	2
Figure 3: Terrestrial Biodiversity Sensitivity	8
Figure 4: Plant Species Sensitivity	8
Figure 5: Animal Species Sensitivity.....	8
Figure 6: Aquatic Sensitivity.....	8
Figure 7: National Biodiversity Assessment Vegetation Type and Conservation Status (NBA, 2018). ...	10
Figure 8: Eastern Cape Biodiversity Conservation Plan (ECBCP, 2019) – Terrestrial.....	12
Figure 9: Protected Areas.	13
Figure 10: Rivers and Wetlands.....	14
Figure 11: Vegetation of proposed sewer pipeline and WWTW.....	15
Figure 12: Remnant Sand-Fynbos elements within invaded pine area.	16
Figure 13: Secondary fynbos area within WWTW site.	16
Figure 14: Secondary Fynbos elements.	16
Figure 15: Secondary fynbos area within WWTW site.	16
Figure 16: Densely invaded area at WWTW site.	16
Figure 17: Densely invaded area at WWTW site.	16
Figure 18: Dense invaded area likely old pine plantation.	17
Figure 19: Secondary vegetation with weed elements along existing pipeline.	17
Figure 20: Current WWTW, overgrown with weeds.	17
Figure 21: Secondary vegetation with weed elements along existing pipeline.	17
Figure 22: Distribution of Flora Species of Conservation Concern (local).	18
Figure 23: Distribution of Flora Species of Conservation Concern (regional).	18
Figure 24: Distribution of Fauna Species of Conservation Concern (local).	21
Figure 25: Distribution of Fauna Species of Conservation Concern (regional).	22
Figure 26: Sensitivity of proposed sewer pipeline and WWTW.....	26
Figure 27: Site locality.....	76
Figure 28: Site locality aerial photo of proposed sewer route.	77
Figure 29: Terrestrial Biodiversity Sensitivity	80
Figure 30: Plant Species Sensitivity	80
Figure 31: Animal Species Sensitivity	80
Figure 32: Aquatic Sensitivity	80
Figure 33: Eastern Cape Biodiversity Sector Plan (2019) – site does overlap with ESA designated areas.	83
Figure 34: Protected Areas and NPAES in vicinity.....	83
Figure 35: Rivers, FEPAs & SWSA's.	84

List of Tables

Table 1: Summary of Regional Planning Biodiversity features.....	6
Table 2: Summary of Screening tool designations.....	8
Table 3: Flora Species of Special Concern	19
Table 4: Fauna Species of Special Concern (SCC).....	20
Table 5: Alien (exotic) invasive and other weed species and status.	23

Table 6: Potential Impacts to Terrestrial Biodiversity	26
Table 7 : Construction Phase Assessment (Refer to Sections 3.3.1 & 3.3.2 for methodology).	29
Table 8: Operational Phase Assessment (Refer to Sections 3.3.1 & 3.3.2 for methodology).	29
Table 9: Specific Mitigation Measures and Recommendations.....	30
Table 10: Summary of Screening tool designations.	79
Table 11: Terrestrial Biodiversity Features flagged in the National Environmental Screening Tool.	81

1 Introduction & Background

1.1 Background

Bluepebble Sustainable Solutions has been appointed by SMEC South Africa (Pty) Ltd to undertake a Basic Assessment process to ensure compliance with regulations contained in the National Environmental Management Act (NEMA Act No. 107 of 1998) and the Environmental Impact Assessment Regulations (2014), as amended, for the Woodlands Wastewater Treatment Works (WWTW) and sewer reticulation upgrade for the Koukamma Municipality, Eastern Cape province (Figure 1). Woodlands is a small settlement situated approximately 25 km to the east of Storms River along the N2 national road. As part of this environmental application process, a terrestrial biodiversity Assessment is required.

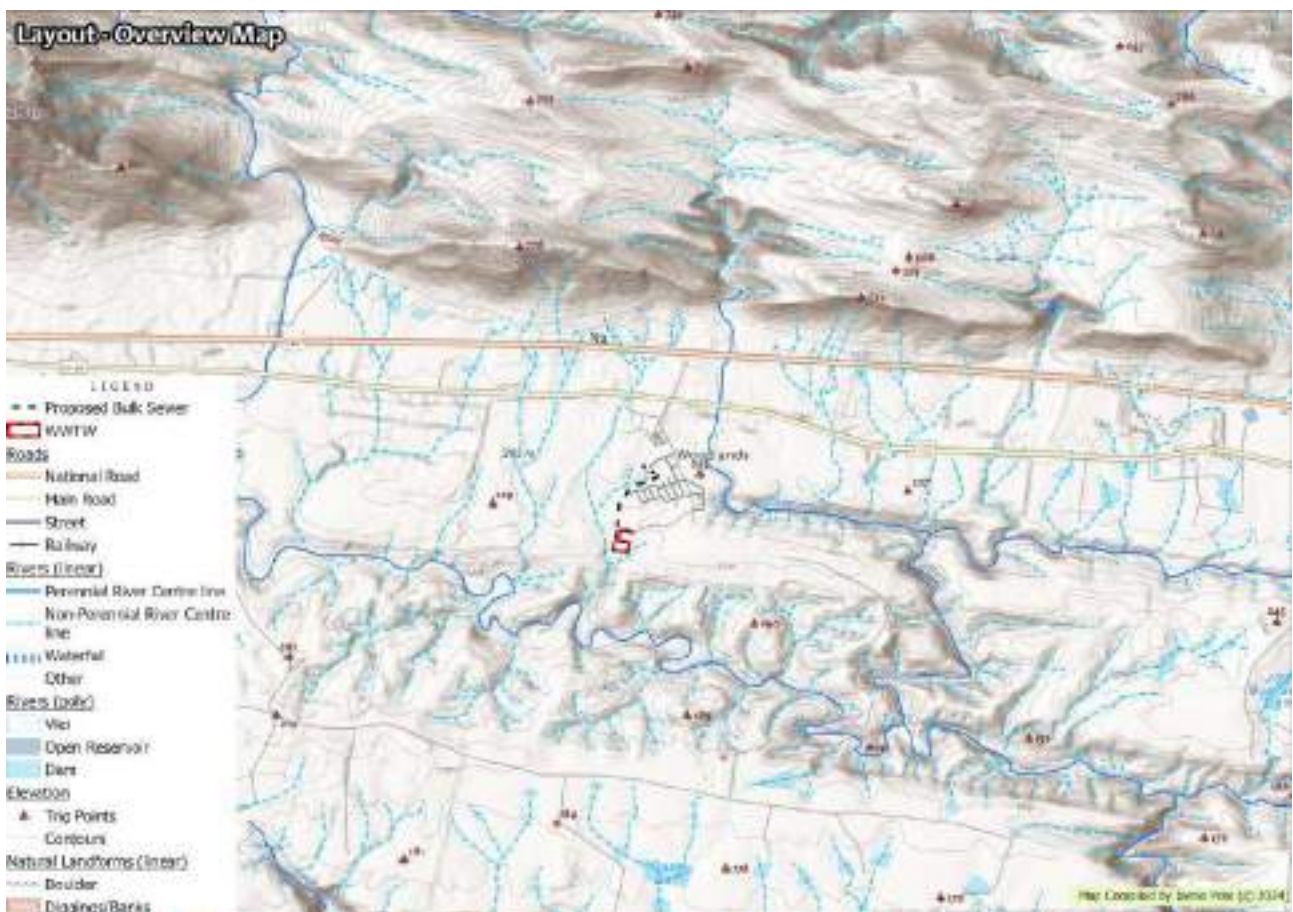


Figure 1: Site locality of proposed sewer pipeline & WWTW.

1.2 Activity Description

The Woodlands sanitation services consist of digester tanks and a 110mm diameter small bore gravity sewer reticulation system. Effluent from digesters is regularly removed by means of vacuum tankers, transported, and disposed of at the Wastewater Treatment Works (WWTW) at Woodlands Settlement. The WWTW is located 0.5km south of the southwestern boundary of the Woodlands Settlement. Effluent then undergoes an activated sludge treatment process followed by a clarification process where the solids and liquid are separated before the final effluent is discharged into a surface water course. Sludge settlement is conveyed to a pit close to the treatment works where it is then disposed of. As soon as the hole is 80% full it is then backfilled, and a new hole is formed. The WWTW is capable of handling flows up

to 400kl/d of solids free sewage. The hydraulic and treatment capacity of the existing treatment plant will be further studied during the concept and design phases.

The proposed activities for the upgrade of bulk sewers, replacing of small-bore sanitation system at Woodlands is as follows (Figure 2):

- Replace Internal Sewer Reticulation of the woodlands area.
- Design new sewer infrastructure for the proposed development.
- Realign and replace the Bulk Sewer Main.
- Refurbish the existing Waste Water Treatment Works (WWTW).

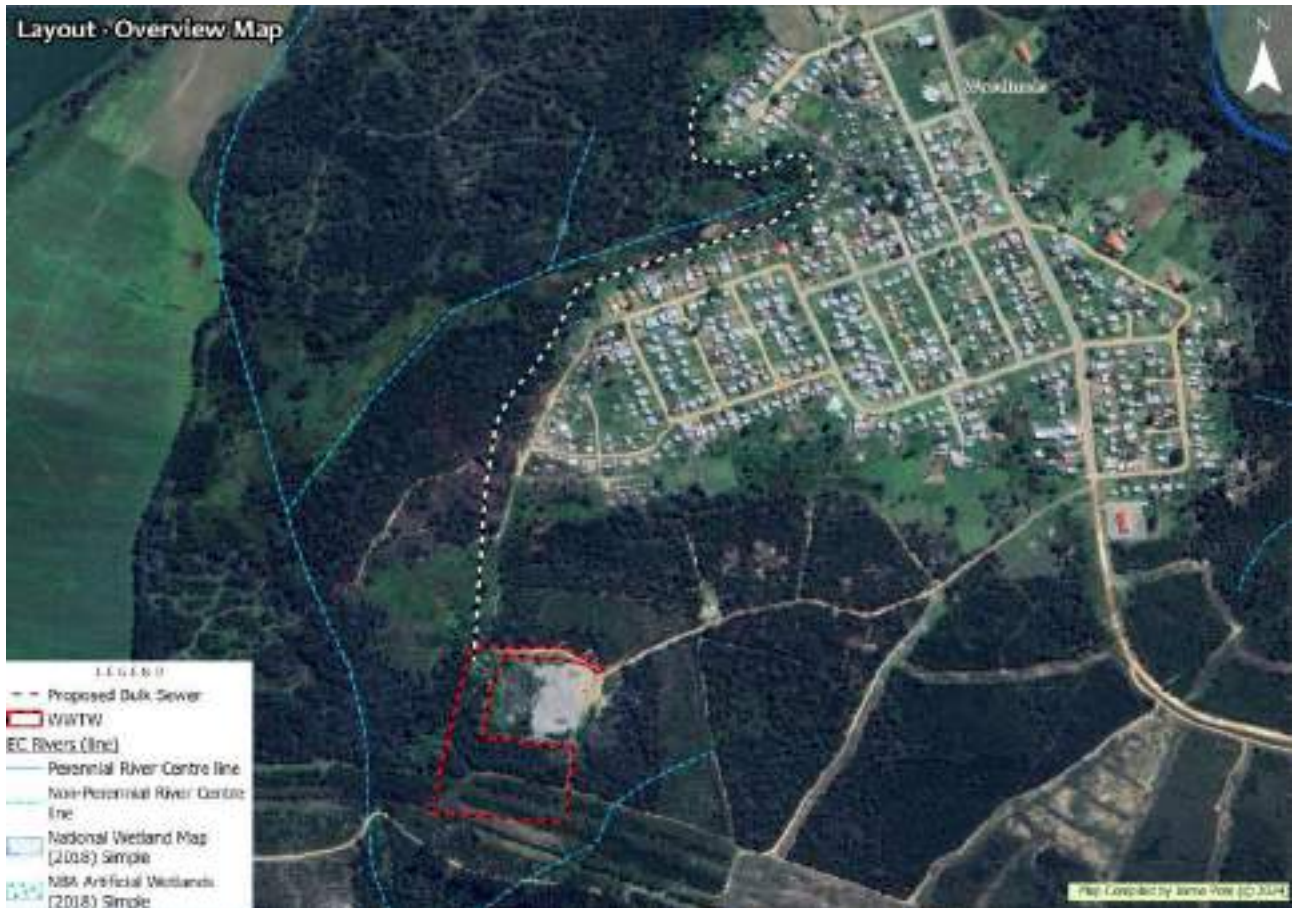


Figure 2: Site locality Aerial of proposed sewer pipeline & WWTW.

1.3 Purpose of Report

1.3.1 Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes

This report is compiled according to the requirements for a Terrestrial Biodiversity Assessment.

This report has been compiled to fulfil the requirement for a **Terrestrial Biodiversity Assessment** as per the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA (GNR 320), **as gazetted on 20 March 2020**. This report is undertaken as supporting information as part of a greater environmental application

process and is compliant in terms of the requirements in the above regulations in terms of Terrestrial Biodiversity.

In terms of the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of sections 24(5)(a) and (h) and 44 of NEMA, gazetted **on 30 October 2020**, relating to requirements relating specifically to the **Terrestrial Plant species theme**, this report includes these flora species requirements.

The principles that guide this process include protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources which are fundamental to sustainable development.

1.4 Methodology and Approach

The proposed methodology and approach are outlined below:

- Conduct a desktop study and identify potential risks relating to vegetation and flora of the site and surrounding area, for a Terrestrial Biodiversity and Plant and Animal species Compliance Statement. This will include the relevant Regional Planning and legislated frameworks, which will also be represented in a series of associated maps.
- Conduct a site verification to assess the following:
 - o Field survey of vegetation, flora and habitats present and confirmation of presence of sensitive animal and plant species.
 - o Reporting will be comprised of a Compliance Statement (for public review and comment) and a Final Report for submission. The draft and final detailed reports will address the following:
- To define the Present Ecological State (PES) of the biodiversity resources associated with the S24G Activities:
- To determine and describe the current as well as the pre-development habitats, communities and the ecological state associated with the unlawful activities.
- To conduct a faunal and floral Species of Conservation Concern (SCC) assessment, including potential for such species to occur within the unlawful activities and surroundings.
- To consider all sensitive landscapes including rocky ridges, wetlands and any other ecologically important features, if present.
- To determine the environmental impacts that the activity may have on the biodiversity of the area, and to develop mitigation and management measures to manage the current and future impacts as a result of the development activities.
- Indicate any assumptions made and gaps in available information. Assessment of all the vegetation types and habitat units within the relevant Regional Planning Frameworks.
- A species list highlighting the various species of special concern categories (endemic, threatened, Red Data species and other protected species requiring permits for destruction/relocation and invasive/exotic weeds).
- Assessment of Impacts and Mitigation Measure, as well as specific measure that may be required for alternative development plans.
- A biodiversity EMP for inclusion in the reports and EMP with specific management actions for construction and Operation.
- A map indicating buffers (if required) to accommodate Regional Planning and other requirements.

This terrestrial biodiversity assessment has been undertaken as per the requirements of the *procedures for the assessment and minimum criteria for reporting on identified environmental themes* in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation (GN 320, 20 March 2020).

1.4.1 Site visit

A site inspection was conducted on **04 April 2025**, during late summer/early autumn. The site falls within a bimodal (summer and winter) rainfall area and for the purposes of this report, a single site visit is deemed to be adequate, specifically due to the disturbed nature of the site.

1.4.2 Assumptions, Uncertainties and Gaps in Knowledge

The findings and recommendations of this report may be susceptible to the following uncertainties and limitation:

- No assessment has been made of aquatic aspects relating to any wetlands, pans, and rivers/seeps outside of the scope of a terrestrial biodiversity report. Refer to separate aquatic report.
- Any botanical surveys based upon a limited sampling time-period, may not reflect the actual species composition of the site due to seasonal variations in flowering times. Additionally, the composition of fire adapted vegetation may vary depending on level of maturity or time since last burn. As far as possible, site collected data has been supplemented with desktop and database-centred distribution data.

2 Policy

2.1 Legislation Framework

In terms of NEMA EIA Regulations (07 April 2014, as amended), the following is applicable¹:

- In terms of section 52 of NEMBA (Activity (a)(i)), the vegetation unit Eastern Coastal Shale Band Vegetation (**Endangered**) and Tsitsikamma Sandstone Fynbos (**Least Concern**) status respectively, as per National Biodiversity Assessment (2022).
- In terms of the CBA classification (ECBCP 2019), most of the sewer and the entire WWTW falls within designated Critical Biodiversity Area 1 (CBA 1) with some portions of the sewer around the dwellings within No Natural Area Remaining (NNAR).
- The proposed sewer activity is a linear activity and will likely rehabilitate to pre-construction conditions within 2 years. The WWTW will be a permanent activity.

Listing Notice 1:

Activity 12: The development of—

(xii) infrastructure or structures with a physical footprint of 100 square metres or more.

where such development occurs—

(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse: —

excluding—

(dd) where such development occurs within an urban area; or

(ee) where such development occurs within existing roads or road reserves.

The proposed activity may occur within 32m of a watercourse; hence it may be triggered.

Activity 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from—

(i) a watercourse.

(ii) ~~the seashore.~~

~~(iii) the littoral active zone, an estuary or a distance of 100 metres inland of the high water mark of the sea or an estuary, whichever distance is the greater—~~

¹ The listed activities itemized are only those with Biodiversity relevance to this report and is not a complete list.

The proposed activity may exceed the excavation of more than 5 cubic meters as it is situated in proximity to a watercourse.

Activity 27: The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—

- (i) the undertaking of a linear activity; or
- (ii) ~~maintenance purposes undertaken in accordance with a maintenance management plan.~~

The proposed pipeline is a linear activity, thus would not trigger this activity. The WWTW and furthermore is unlikely to exceed 1 Ha of indigenous vegetation. The WWTW footprint is 2.2 Ha in extent and while the footprint is densely invaded, it is likely that 1 Ha of indigenous vegetation could require clearing.

Listing Notice 2:

None are applicable.

Listing Notice 3:

12. The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

(a) Eastern Cape

- i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;
- ii. Within critical biodiversity areas identified in bioregional plans.

While the proposed activity does overlap with a designated Endangered vegetation unit, only a small portion is within the endangered unit, within an existing servitude with secondary vegetation and not likely to exceed 300m². The remainder of the pipeline and WWTW will likely require clearing of more than 300m² of indigenous vegetation, but also within significantly degraded and/or invaded vegetation.

Activity 14: The development of—

- (ii) infrastructure or structures with a physical footprint of 10 m² or more, where such development occurs—
- (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse

In the Eastern Cape –

- ii. Outside urban areas, in:
 - (ff) Critical Biodiversity Areas (CBA) or Ecosystem Service Areas (ESA) as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;

(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; or

iii. In urban areas:

~~(aa) Areas zoned for use as public open space;~~

This activity may be triggered as the proposed activity may result in a structure greater than 10m² within 32m of a watercourse, within a designated CBA as identified in a systematic conservation plan (ECBCP), and within 10 km of a protected area.

In terms of the EIA Listing Notices, listing notice 1 & 3, the activity is triggered as indicated above, thus requiring a Basic Assessment process.

Other potentially relevant legislation, which will be evaluated as required, includes the following:

- **Liability for any environmental damage, pollution, or ecological degradation:** Arising from all -related activities occurring inside or outside the area to which the permission/right/permit relates is the responsibility of the rights holder. The National Water Act and NEMA both oblige any person to take

all reasonable measures to prevent pollution or degradation from occurring, continuing, or reoccurring (polluter pays principle). Where a person/company fails to take such measures, a relevant authority may direct specific measures to be taken and, failing that, may carry out such measures and recover costs from the person responsible.

- **Public participation:** Public consultation and participation processes prior to granting licences or authorisations can be an effective way of ensuring that the range of ways in which the activities impact on the environment, social and economic conditions are addressed, and considered when the administrative discretion to grant or refuse the licence is made.
- **Constitution of Republic of South Africa (1996):** Section 24(a) of the Constitution states that everyone has the right ‘to an environment that is not harmful to their health or well-being’. Construction activities must comply with South African constitutional law by conducting their activities with due diligence and care for the rights of others.
- **Eastern Cape Nature and Environmental Conservation Ordinance 19 of 1974:** Lists Protected species, requiring permits for removal (Department of Economic Development, Environmental Affairs and Tourism).
- **Water Use Authorisations: The National Water Act (No. 36 of 1998):** Requires that provision is made both in terms of water quantity and quality for ‘the reserve’, namely, to meet the ecological requirements of freshwater systems and basic human needs of downstream communities. It is essential in preparing an EMP that any impacts on water resources be they surface water or groundwater resources, and/ or impacts on water quality or flow, are carefully assessed, and evaluated against both the reserve requirement and information on biodiversity priorities. This information will be required in applications for water use licenses or permits and/or in relation to waste disposal authorisations.
- **Conservation of Agricultural Resources Act 43 of 1993:** Lists Alien invasive species requiring removal.

2.2 Systematic Planning Frameworks

A screening of Systematic Planning Framework for the region was undertaken (summarised in Table 1), that included the following features:

- National Environmental Screening Tool
- Critically Endangered, Endangered and Vulnerable Ecosystems
- Critical Biodiversity and Ecological Support Areas
- River, Estuarine and Wetland Freshwater Ecosystem Priority Areas (FEPAs) and buffers
- Protected Areas (and buffers) and National Protected Area Expansion Strategy areas (NPAES).
- Critical Habitat for listed endemic or protected species.

Table 1: Summary of Regional Planning Biodiversity features.

FEATURE ²	DESCRIPTION	IMPLICATIONS/COMMENT
National Environmental Screening Tool (Terrestrial Biodiversity)	Very High Terrestrial Biodiversity High & Medium Plant & Animal Species sensitivities Very High Aquatic Biodiversity	ESA 2, CBA 1, SWSA, NPAES, Garden Route NP Expansion Areas (SANPARKS) & Endangered Vegetation. Several Plant & Animal Species flagged by screening tool. ESA 1 & SWSA
National Vegetation Map (NVM, 2018)	Eastern Coastal Shale Band Vegetation Tsitsikamma Sandstone Fynbos	Endangered Least Concern

² Refer to Figure 7 to Figure 10.

FEATURE ²	DESCRIPTION	IMPLICATIONS/COMMENT
Critically Endangered and Endangered Ecosystems (NBA 2018)	Eastern Coastal Shale Band Vegetation	Endangered, but transformed/secondary – refer to assessment report
Vulnerable Ecosystems (NBA)	None	N/A
Eastern Cape Biodiversity Conservation Plan (2019)	Critical Biodiversity Area 1 (CBA 1)	Indigenous vegetation is present along pipeline and WWTW footprint, but largely secondary and/or significantly degraded.
Protected Areas (SAPAD)	Garden Route NP Expansion Areas	No protected area directly affected.
NPAES	Small portion of WWTW (Access Road) falls within designated NPAES	No protected area directly affected.
Strategic Water Source Areas (SWSA)	Present	Construction of WWTW will likely improve downstream water quality.
Freshwater Ecosystem Priority Areas (FEPA's)	None	N/A
Regional Hotspots & Regions of Endemism	None	N/A
Important Bird Areas (IBA's)	None	N/A
Key Biodiversity Areas (KBA's)	None	N/A
Marine/Coastal areas	None	N/A
RAMSAR sites	None	N/A
Within 32 m of Watercourse	Portions of sewer may be within 32 m of a watercourse	Refer to Aquatic Assessment
Within 100 m of River	None	N/A
Estuary	None	N/A
Within 500 m of Wetland	Wetlands are in proximity	Refer to Aquatic Assessment
Forest	Forest pockets and forest elements are present in the vicinity.	To be assessed further in this report.
Surrounding Land Uses	Surrounding land primarily used for urban dwellings, forestry and agriculture.	Site and surrounding area is transformed, degraded and/or with secondary vegetation elements.
Critical Habitat for listed endemic/ protected species	No specific populations of threatened species were identified within the footprint and the affected footprint is largely disturbed or comprised of secondary vegetation. There are several red listed species in the surrounding area and vegetation units that are known to have limited distributions; however, none were recorded within the footprint.	

2.2.1 National Environmental Screening Tool

The DEA Screening Tool (26/11/2024) indicates the following, summarised in Table 1:

- Terrestrial Biodiversity is Very High (Figure 3).

- Plant species sensitivity is Low/Medium (Figure 4).
- Animal Species sensitivity is Medium /High (Figure 5).
- Aquatic Sensitivity is Very High (Figure 6).



Figure 3: Terrestrial Biodiversity Sensitivity



Figure 4: Plant Species Sensitivity



Figure 5: Animal Species Sensitivity



Figure 6: Aquatic Sensitivity

Table 2: Summary of Screening tool designations.

Terrestrial Sensitivity	Feature(s) in proximity
Very High	ESA 2, CBA 1, SWSA (Tsitsikamma), National Protected Area Expansion Strategy (NPAES), Garden Route NP Expansion Area (SANPARKS) & Endangered Eastern Coastal Shale Band Vegetation.
High	None
Medium	None
Low	Present
Plant Sensitivity	Feature(s) in proximity
Very High	None
High	None
Medium	<i>Ocotea bullata</i> , <i>Argyrolobium trifoliatum</i> , <i>Indigofera hispida</i> , <i>Aspalathus bowieana</i> , <i>Selago rotundifolia</i> , <i>Erica humansdorpensis</i> , <i>Erica glandulosa</i> subsp. <i>fourcadei</i> , <i>Centella longifolia</i> , <i>Marsilea schelpeana</i> , <i>Osteospermum pterigoideum</i> , <i>Pterygodium cleistogamum</i> , <i>Felicia westae</i> , Sensitive species 588, 308, 419, 448, 53, 654 and 763.
Low	Present
Animal Sensitivity	Feature(s) in proximity
Very High	None
High	<i>Neotis denhami</i> (bird)

Medium	<i>Circus maurus</i> , <i>Circus ranivorus</i> , <i>Stephanoaetus coronatus</i> , <i>Bradypterus sylvaticus</i> , <i>Eupodotis senegalensis</i> (birds), <i>Chlorotalpa duthieae</i> & Sensitive species 8 (mammals), <i>Aloeides pallida junco</i> & <i>Tsitana dicksoni</i> & <i>Aneuryphymus montanus</i> (Insects)
Low	Present
Aquatic Sensitivity	Feature(s) in proximity
Very High	ESA 1 & SWSA (Tsitsikamma)
High	None
Medium	None
Low	None

NOTE: as per point 1.5 of the Terrestrial Biodiversity Specialist Assessment and Minimum Report Content Requirements:

*'If any part of the proposed development footprint falls within an area of 'very high' sensitivity, the assessment and reporting requirements prescribed for the 'very high' sensitivity apply to the entire footprint, **excluding linear activities** for which impacts on terrestrial biodiversity are temporary and the land in the opinion of the terrestrial biodiversity specialist, based on the mitigation and remedial measures, can be returned to the current state **within two years of the completion of the construction phase**, in which case a compliance statement applies. Development footprint in the context of this protocol means the area on which the proposed development will take place and includes any area that will be disturbed.'*

Based on the above reporting protocol condition, the proposed sewer pipeline will fall into the above category, which implies that for a temporary linear activity, such as a pipeline, the screening tool designated high sensitivity should be reduced to a low sensitivity and only a compliance statement would be required.

Remnant disturbance after completion of pipeline will be nominal. Since the sewer is largely within degraded an/or significantly disturbed and invaded vegetation (including plantations), it is anticipated that the construction footprint will return to its current state within two years of completion of construction.

2.2.2 Vegetation of Southern Africa

The National Vegetation Type (NBA, 2022, Annexure A.2, Figure 7) indicated for the sewer route and WWTW is predominantly **Tsitsikamma Sandstone Fynbos (Least Concern)**, with a small portion of the sewer route crossing a band of **Eastern Coastal Shale Band Vegetation (Endangered)** as per National Vegetation Map and National Biodiversity Assessment/Red Listed Ecosystems (2022). Land cover and remnant vegetation data reflects the site is comprised of natural vegetation remnants and plantation/dense invasion.

2.2.3 National Biodiversity Assessment and Red Listed Ecosystems

The National Biodiversity Assessment and Red Listed Ecosystems NBA/RLE is the primary tool for monitoring and reporting on the state of biodiversity in South Africa and informs policies, strategic objectives, and activities for managing and conserving biodiversity more effectively. Ecosystem protection level is an indicator that tracks how well represented an ecosystem type is in the protected area network. It has been used as a headline indicator in national reporting in South Africa since 2005.

The outcome of the most recent National Biodiversity Assessment Red Listed Ecosystem Status (2022) indicate that **Tsitsikamma Sandstone Fynbos** has a Least Concern conservation status (Table 1), which indicates that more than 60 % of the unit remains, and that ecosystem functioning is not under imminent threat by loss of natural habitat. **Eastern Coastal Shale Band Vegetation** has an Endangered status,

indicating that more than 60 % of the original extent is lost, so their functioning is compromised. Only a small section of the sewer pipeline will traverse the **Eastern Coastal Shale Band Vegetation** and is within an existing pipeline servitude.



Figure 7: National Biodiversity Assessment Vegetation Type and Conservation Status (NBA, 2018).

Tsitsikamma Sandstone Fynbos (FFs 20)

VT 4 Knysna Forest (58%), VT 70 False Macchia (42%) (Acocks 1953). Wet Mountain Fynbos (33%), Mesic Mountain Fynbos (21%) (Moll & Bossi 1983). LR 64 Mountain Fynbos (54%) (Low & Rebelo 1996). BHU 71 Tsitsikamma Mountain Fynbos Complex (49%), BHU 100 Knysna Afromontane Forest (19%) (Cowling et al. 1999b, Cowling & Heijnis 2001).

Distribution: Western and Eastern Cape Provinces: Tsitsikamma Mountains from Uniondale to Cape St Francis, north of the Keurbooms River and south of Langkloof. Altitude 100–1 675 m (at the highest Peak Formosa).

Vegetation & Landscape Features: A relatively low mountain range with gentle to steep both northern and southern slopes over 140 km, with a few high peaks and moderately undulating plains. Relatively broad compared to the other coastal mountain ranges varying from 10–20 km in width. Vegetation is a medium dense, tall proteoid shrubland over a dense moderately tall, ericoid-leaved shrubland—mainly proteoid, restioid and ericoid fynbos, with fynbos thicket in wetter areas.

Geology & Soils Acidic lithosol soils derived from Ordovician sandstones of the Table Mountain Group (Cape Supergroup), plinthic catenas prominent. Land types mainly Ib, Ca and Bb.

Climate: MAP 480–1 230 mm (mean: 845 mm), fairly even throughout the year. Mean daily maximum and minimum temperatures 25.5°C and 5.8°C for February and July, respectively. Frost incidence 2–10 days per year.

Important Taxa: (T Cape thickets) Tall Shrubs: *Cliffortia serpyllifolia* (d), *Leucadendron conicum* (d), *Leucadendron eucalyptifolium* (d), *Leucadendron uliginosum* subsp. *glabratum*, *Leucospermum glabrum*, *Metalasia densa*, *Metalasia trivialis*, *Mimetes pauciflorus*, *Passerina corymbosa*, *Passerina falcifolia*, *Protea eximia*, *Protea mundii*, *Protea neriifolia*, *Pterocelastrus tricuspidatus*^T. Low Shrubs: *Erica discolor* var 'speciosa' (d), *Erica sparsa* (d), *Ursinia scariosa* subsp. *scariosa* (d), *Agathosma ovata*, *Anisodonte scabrosa*, *Aspalathus ciliaris*, *Berzelia intermedia*, *Carpacoe vaginellata*, *Erica diaphana*, *Erica glandulosa*, *Erica rosacea* subsp. *rosacea*, *Erica uberiflora*, *Euryops munitus*, *Euryops pinnatipartitus*, *Helichrysum teretifolium*, *Indigofera flabellata*, *Leucadendron salignum*, *Leucadendron spissifolium* subsp. *phillipsii*, *Leucospermum cuneiforme*, *Metalasia pulcherrima* f. *pallenscens*, *Otholobium carneum*, *Passerina pendula*, *Penaea cneorum* subsp. *gigantea*, *Phylica axillaris*, *Phylica imberbis*, *Protea cynaroides*, *Stoebe plumosa*. Herbs: *Commelina africana*, *Gazania krebsiana* subsp. *krebsiana*. Geophytic Herbs: *Geissorhiza fourcadei*, *Geissorhiza inconspicua*, *Romulea pratensis*. Graminoids: *Restio triticeus* (d), *Tetraria capillacea* (d), *Diheteropogon filifolius*, *Elegia juncea*, *Epischoenus adnatus*, *Heteropogon contortus*, *Hypodiscus synchroolepis*, *Tetraria robusta*, *Thamnochortus fruticosus*, *Thamnochortus glaber*, *Themeda triandra*, *Tristachya leucothrix*.

Endemic Taxa: Low Shrubs: *Aspalathus teres* subsp. *thodei*, *Erica trachysantha*, *E. zitzikammensis*, *Felicia tsitsikamae*, *Helichrysum outeniquense*.

Conservation: Least Concern. Target 23%. Statutorily conserved (about 40%) in the proposed Garden Route National Park (including Tsitsikamma and Soetkraal). Some 33% transformed (cultivation, pine plantations). With scattered alien *Pinus pinaster* and *Hakea sericea*. Erosion very low.

Remarks: Wetter habitats, especially in berg wind shadows east of dissected valleys, support afrotemperate forests. Most of the bigger patches of the forest are positioned on and around the shales of the Gydo Formation. The coastal strip contains a narrow shoreward band of dune fynbos communities that were not mapped, but included within this unit.

References: Bond (1978a), Cowling (1984), Bond et al. (1988), Hanekom et al. (1989).

Eastern Coastal Shale Band Vegetation (FFb 6)

VT 70 False Macchia (54%) (Acocks 1953). Mesic Grassy Fynbos (30%), Wet Mountain Fynbos (12%), Mesic Mountain Fynbos (7%), Afro-Montane Forest (4%) (Moll & Bossi 1983). LR 65 Grassy Fynbos (46%), LR 2 Afromontane Forest (34%) (Low & Rebelo 1996). BHU 100 Knysna Afromontane Forest (34%), BHU 29 Langkloof Fynbos/Renosterveld Mosaic (22%) (Cowling et al. 1999b, Cowling & Heijnis 2001).

Distribution: Western and Eastern Cape Provinces: Shale bands in the eastern Outeniqua (often also bearing forest patches), Langkloof, Tsitsikamma and Kareedouw Mountains and along the southern Cape coastal plains to around Oyster Bay with the most seaward belt reaching the coast at, for example, Clinton's Bank south of Bloukrans Pass. Altitude 0–1 100 m. See also Figure 4.78 featuring the simplified distribution of this unit.

Vegetation & Landscape Features: Shale bands form narrow 80–200 m, linear, smooth and flat landscape features and support various shrublands, ranging from thicket to renosterveld and fynbos at higher altitudes. Fynbos includes all structural types, quite often grassy in character.

Geology & Soils: Clays derived from shale of the Cedarberg Formation. Land types mainly Db, Ca, Bb, and Ib.

Climate: MAP 500–1 140 mm (mean: 815 mm), relatively even with a bimodal peak in March and August–November. Mean daily maximum and minimum temperatures 25.1°C and 7.0°C for January–February and July, respectively. Frost incidence 0–20 days per year.

Important Taxa: Tall Shrubs: *Leucadendron eucalyptifolium*, *Protea neriifolia*. Low Shrubs: *Leucadendron salignum*, *Leucospermum cuneiforme*.

Conservation: Endangered. Target 27%. Statutorily conserved (16%) in the proposed Garden Route National Park (including Tsitsikamma National Park), Koomans Bush State Reserve as well as in Lottering Forest Reserve, Plaatbos Nature Reserve, Kwaaibrand and Langebosch Forest Reserves and several other private conservation areas. Some 65% transformed, with cultivation accounting for most of the

transformation, followed by pine plantations. Alien *Pinus pinaster* and *Hakea sericea* occur as scattered. Erosion is very low.

Remark: Large portions of the shale band in this area support FOz 6 Southern Coastal Forest and these areas are mapped as such.

Reference: Bond (1981).

2.2.4 Eastern Cape Biodiversity Conservation Plan (ECBCP, 2019) – Terrestrial

The Eastern Cape Biodiversity Conservation Plan – Terrestrial (2019, Figure 8) indicates portions of the proposed sewer overlapping with designated CBA 1, with No Natural Area Remaining along the remainder around the Woodlands settlement. Since the sewer pipeline is located adjacent to an urban area having surfaced roads, road verges and developed erven, the CBA designations would be considered to be questionable as the represented vegetation units are not under threat. No CBAs or ESA's are thus likely to be affected by proposed the activity in any significant manner.

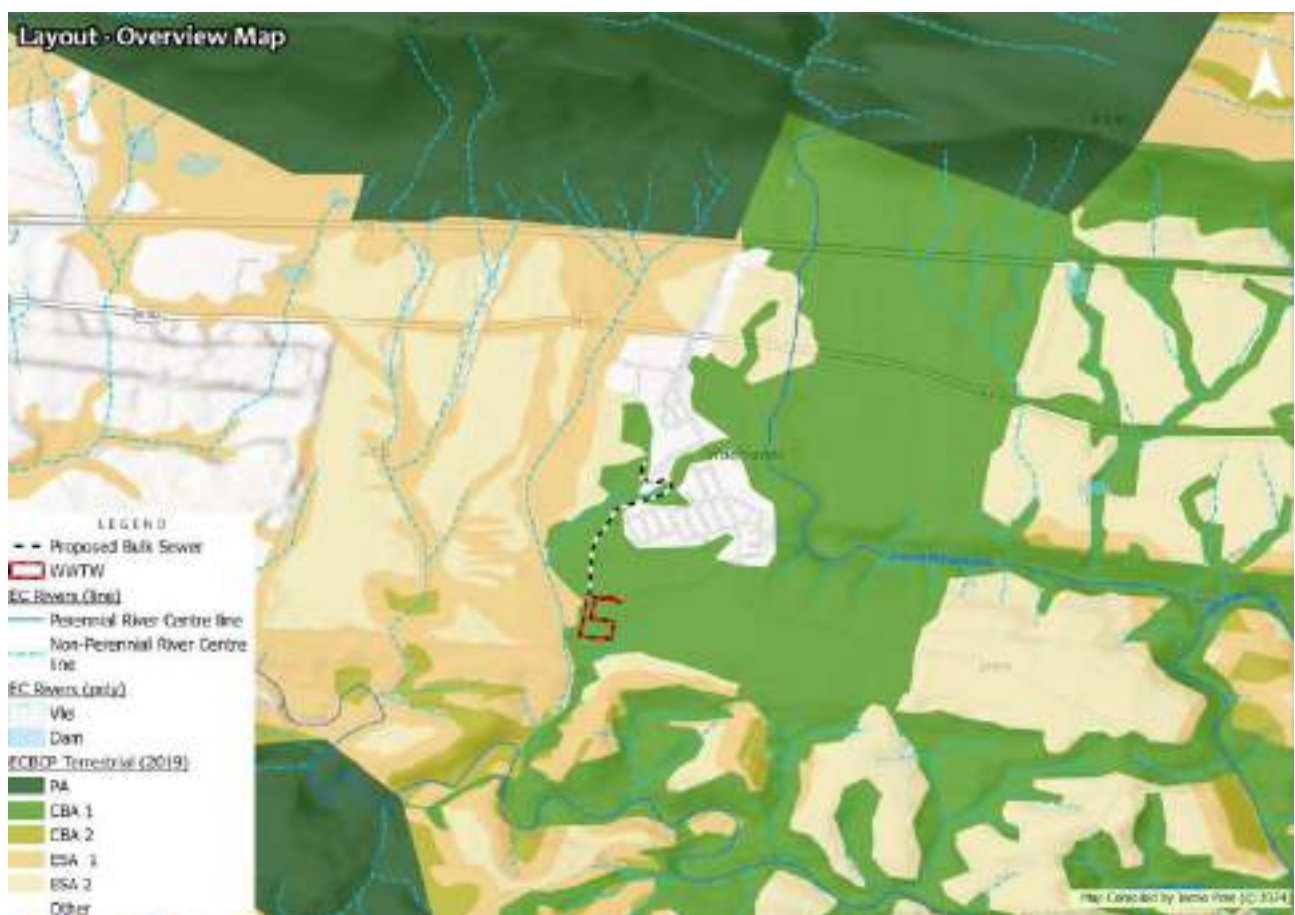


Figure 8: Eastern Cape Biodiversity Conservation Plan (ECBCP, 2019) – Terrestrial.

Linear activities having a minimal and temporary impact to landscape connectivity as a result of the sewer pipeline would be deemed nominal and acceptable. As per point 1.5 of the terrestrial biodiversity reporting protocols, should a linear activity (such as a pipeline) occur in a designated CBA or ESA, where the site will return to pre-construction state within 2 years of construction, a low terrestrial biodiversity sensitivity would apply. The WWTW will result in the loss of designated CBA 1 and will be assessed further in the report.

2.2.5 Key Biodiversity Areas

Important Bird Areas

The site is not situated within proximity of any Key Biodiversity Areas or Important Bird Areas.

2.2.6 Protected areas

The proposed sewer pipeline and WWTW does not overlap with any designated Protected Area or Important Bird Area (IBA), but a small portion of the proposed WWTW access road does overlap with designated NPAES. The site is also situated within 5 km and 10 km of portions of the Garden Route National Park (1.3 km to the north, 1.2 km to the south-west and 6.6 km to the west) and is also within a proposed SANParks Garden Route NP expansion area (Figure 9). The site also falls within the designated Garden Route Biosphere Reserve, however the minimal activity associated with the sewer installation primarily within transformed areas is not anticipated to have any direct or indirect impact. The proposed activity is also not anticipated to have any direct or indirect impact on any of the protected areas. Furthermore, the activity can be deemed critical infrastructure to support the Woodlands village, as sewage treatment is currently below acceptable standards, where untreated effluent is discharged.

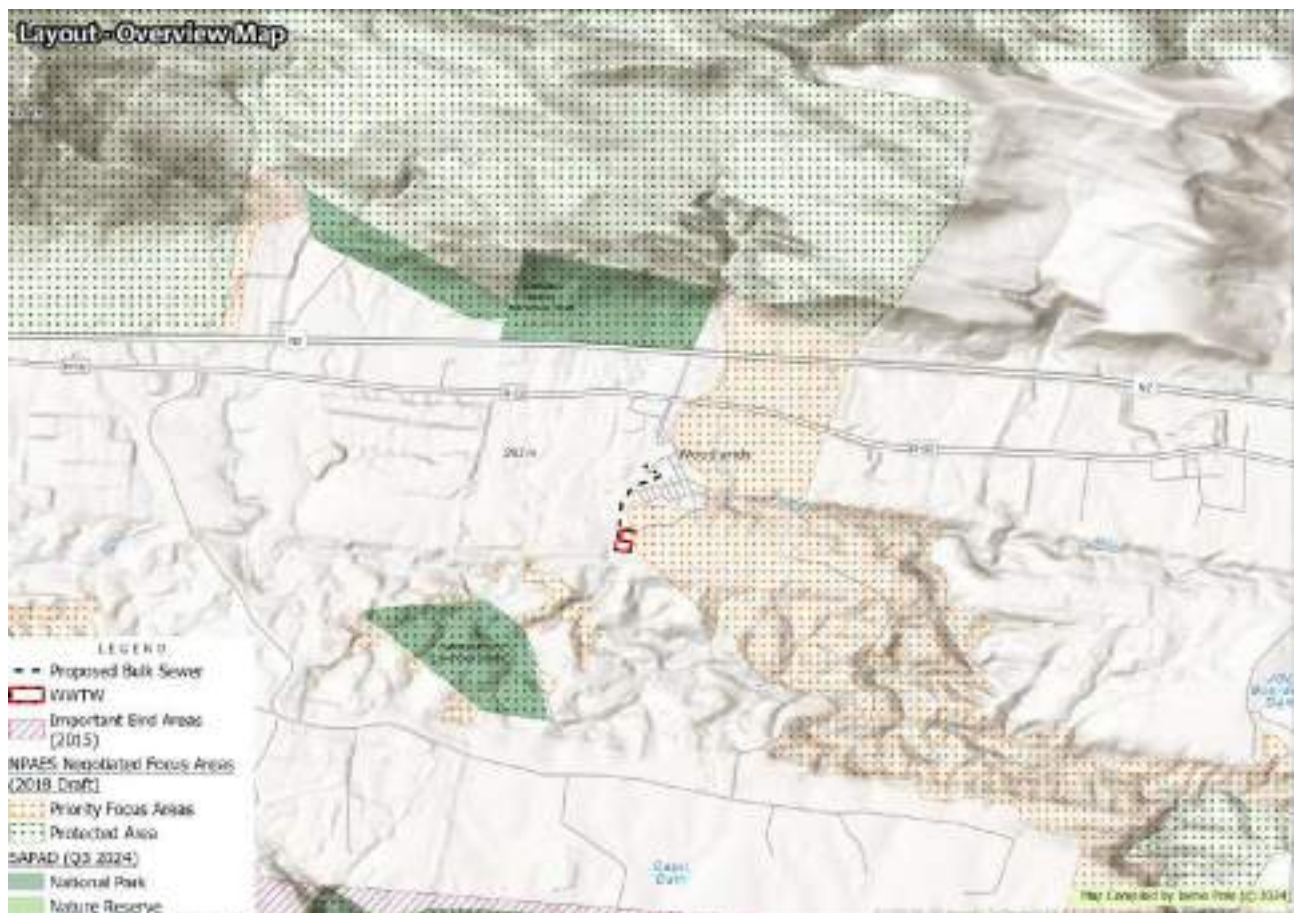


Figure 9: Protected Areas.

2.2.7 Vegetation and Ecological Processes and Corridors

Landscapes corridors are a combination of **Critical Biodiversity Areas and Ecological Support Areas** that link upland and lowland habitats, as well as linking inland mountains to the coastline (and therefore beyond municipal boundaries). Rivers and their associated riparian or riverbank habitats, including

associated catchments, provide the basis for many of these large-scale (landscape level) ecological processes.

Ecological Support Areas (ESA) are supporting zones or areas which must be safeguarded as they are needed to prevent degradation of Critical Biodiversity Areas and formal Protected Areas. Although many ESA's consist of natural veld, there are areas of land - partially or wholly transformed or degraded - that have been classified as ESA even though they are no longer in a natural state. Although these areas are heavily degraded or transformed, they still play an important role in supporting ecological processes. This is particularly the case with riparian areas, some key catchment areas, and key pieces of corridors.

2.2.8 Rivers and Wetlands

The site is located within the catchment of the Grootrivier and the sewer line is routed around and between several non-perennial watercourses of this river. Untreated sewage is currently discharged in to non-perennial watercourses due to the current WWTW infrastructure being inadequate.

Eastern Cape Biodiversity Conservation Plan (ECBCP, 2019) – Aquatic

The site is designated as aquatic Ecological Support Areas (ESA 1). However, the linear temporary activity is unlikely to have any permanent impact to terrestrial processes associated with the aquatic features. Upgrading and Improvement of the WWTW is necessary in order to improve the current sewage discharge situation and will likely result in a long-term improvement of water quality.

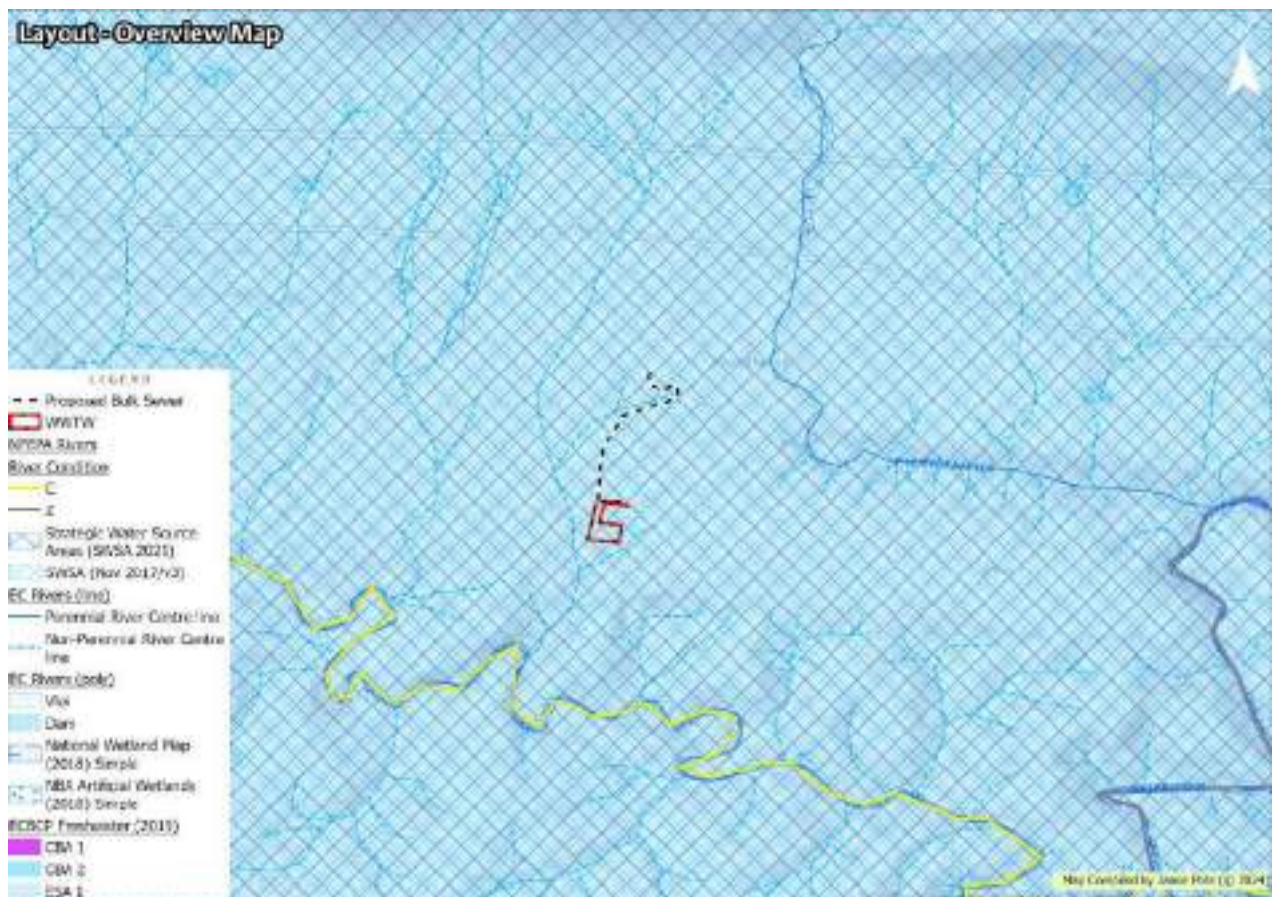


Figure 10: Rivers and Wetlands.

3 Biodiversity Risk Identification and Assessment

3.1 Baseline Biodiversity Description

The area in which the proposed pipeline and WWTW is proposed is situated near the urban settlement of Woodlands and is located within a densely invaded /remnant vegetation matrix (Figure 11 & Figure 12 to Figure 21). The surrounding area is also largely densely invaded with pine plantation in the vicinity with remnant and secondary patches of sand-fynbos vegetation. These small pockets are generally degraded and ecologically insignificant.

The habitat present is comprised predominantly of densely invaded areas (black wattle and pine) with surrounding forestry plantations with some remnant and secondary fynbos patches and/or elements where forestry plantation may have been present historically. Species composition is typical of pioneer and common elements of the represented Sand Fynbos unit and include *Passerina corymbosa*, *Erica discolor*, *Erica sparsa*, *Helichrysum teretifolium*, *Metalasia pulcherrima*, *Cliffortia serpyllifolia*, *Phyllica axillaris*, *Commelina africana*, *Gazania krebsiana*, *Geissorhiza fourcadei*, *Restio triticeus*, *Elegia juncea*, *Themeda triandra*, and *Tristachya leucothrix*. Remnant vegetation has a low species diversity and absence of key indicator species (such as Proteaceae and several Ericaceae species) is indicative of secondary and degraded nature of the habitat. No species indicative or typical of Coastal Shale Band Vegetation were recorded.



Figure 11: Vegetation of proposed sewer pipeline and WWTW.

The installation of the sewer pipeline is unlikely to have any significant impact on any indigenous vegetation as it will largely be within an existing sewer pipeline servitude and also densely invaded vegetation, hence loss of any natural vegetation will likely be negligible. The WWTW facility is also

situated within a predominantly densely invaded vegetation with some remnant and/or secondary sand fynbos elements.



Figure 12: Remnant Sand-Fynbos elements within invaded pine area.



Figure 13: Secondary fynbos area within WWTW site.



Figure 14: Secondary Fynbos elements.



Figure 15: Secondary fynbos area within WWTW site.



Figure 16: Densely invaded area at WWTW site.



Figure 17: Densely invaded area at WWTW site.



Figure 18: Dense invaded area likely old pine plantation.



Figure 19: Secondary vegetation with weed elements along existing pipeline.



Figure 20: Current WWTW, overgrown with weeds.



Figure 21: Secondary vegetation with weed elements along existing pipeline.

3.1.1 Present Ecological State

In summary, the following general observations can be noted regarding the site:

- The area in and around the pipelines & WWTW is predominantly plantations or old plantations with secondary and/or remnant and/or degraded sand-fynbos vegetation.
- Alien invasion is high.
- The southern portion of the pipelines follow an existing sewer pipeline, and the northern portion is on the edge of urban development in degraded and/or secondary sand-fynbos. The WWTW is within a densely invaded area (likely old plantations) with remnant and secondary sand-fynbos elements.
- Erosion risk is low to moderate, with slope being largely gentle.
- Overall degradation of the sewer pipeline and WWTW would be moderate to high.

3.1.2 Flora & Fauna

No endemic and range restricted species were recorded as being present. Several species are known from the surrounding area, but unlikely to be affected by the proposed activity.

Red Listed, Endemic and Protected Flora

The site falls within the general distribution range of several endemic species and other species with a highly localised distribution, some of which are Critically Endangered, Endangered, Vulnerable or Rare.



Figure 22: Distribution of Flora Species of Conservation Concern (local).



Figure 23: Distribution of Flora Species of Conservation Concern (regional).

Some of these species are only known from a single or a few populations. Several endemic species were recorded and are listed below; however, all of these are confirmed to have a wider distribution range and are not deemed to be at risk. Species (Table 3: Flora Species of Special Concern) were flagged from various database sources as occurring in the region as having an elevated status, and possibly present in the area, vegetation type or are associated with features that are present (such as host plant species). All were cross checked for distribution overlay and were actively screened for presence/absence on site. Other species may be endemic, but distribution range has been checked and are generally widespread. Respective permits will be required for removal during site clearing.

Table 3: Flora Species of Special Concern

SCIENTIFIC NAME	STATUS ³	COMMENT/PRESENCE
<i>Argyrobium trifoliatum</i>	NEST (M), En B1ab (iii,v)	Site outside of known habitat. Not recorded.
<i>Aspalathus bowieana</i>	NEST (M), En B1ab (i,ii,iii, iv, v)	Site outside of known habitat. Not recorded.
<i>Centella longifolia</i>	NEST (M), Rare	Site outside of known range. Not recorded.
<i>Erica discolor</i>	PNCO	Present, PNCO permits required.
<i>Erica glandulosa</i> subsp. <i>fourcadei</i>	NEST (M), Vu B1ab(ii,iii,iv,v), End, PNCO	Site outside of known range. Not recorded.
<i>Erica humansdorpensis</i>	NEST (M), CR B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v), PNCO	Site outside of known range. Not recorded.
<i>Erica sparsa</i>	PNCO	Present, PNCO permits required.
<i>Felicia westae</i>	NEST (M), EN B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	Known to occur in broader area. Site outside of known habitat (stream banks). Not recorded.
<i>Indigofera hispida</i>	NEST (M), NT B1b(iii)+2b(iii), End	Known to occur in broader area, but fairly widespread and not under imminent threat. Not recorded.
<i>Marsilea schelpeana</i>	NEST (M), Vu B1ab(ii,iii)+2ab(ii,iii)	Site outside of known habitat (margins of seasonal pools and water courses). Not recorded.
<i>Ocotea bullata</i>	NEST (M), En A2bd NFA,	Site outside of known habitat (high, cool, evergreen Afromontane forests). Not recorded.
<i>Osteospermum pterigoideum</i>	NEST (M), En B1ab(ii,iii,v)+2ab(ii,iii,v)	Site outside of known range. Not recorded.
<i>Podocarpus</i> spp. (Yellowwood Tree)	NFA	Site outside of known habitat (natural forest). Not recorded.
<i>Pterygodium cleistogamum</i>	NEST (M), Vu B1ab(ii,iii)	Known to occur in broader area. Not recorded.
<i>Selago rotundifolia</i>	NEST (M), Vu B1ab(ii,iii,iv,v)	Site outside of known range. Not recorded.
Sensitive species 308	NEST (M), Vu B1ab(iii,v)+2ab(iii,v)	Site outside of known habitat (coastal). Not recorded.
Sensitive species 419	NEST (M), Vu B1ab(iii,v)+2ab(iii,v)	Site outside of known range. Not recorded.
Sensitive species 448	NEST (M), Vu B1ab(i,ii,iii,iv,v)	Site outside of known habitat (coastal fynbos). Not recorded.
Sensitive species 53	NEST (M), B2ab(ii,iii,iv,v)	Known to occur in broader area. Not recorded.
Sensitive species 588	NEST (M), Vu B1ab(ii,iii,v)	Site outside of known habitat (coastal fynbos). Not recorded.
Sensitive species 654	NEST (M), Vu C2a(i)	Site outside of known range. Not recorded.
Sensitive species 763	NEST (M), Vu A2ac; C2a(i)	Site outside of known range. Not recorded.
<i>Sideroxylon inerme</i> (Milkwood Tree)	NFA	Site outside of known habitat (forest/thicket). Not recorded.
<i>Watsonia pillansii</i>	PNCO	Present, PNCO permits required.

As per Table 3 and Figure 22 & Figure 23, no Endangered or Critically Endangered flora species were confirmed to be present nor known to be present in the affected area. PNCO (Provincial Nature Conservation Ordinance) permits are likely to be required as several species protected to the provincial PNCO were recorded within the pipeline and WWTW footprints. The site is within the range of

³ PNCO - Provincial Nature Conservation Ordinance (1974); NFA - National Forests Act of (1998); ToPS - Threatened or Protected Species; IUCN: CR - Critically Endangered, En - Endangered, Vu - Vulnerable; LC - Least Concern.

yellowwood species and the timeframe to construction is not known; hence it is possible that seedlings of this species could propagate before construction and a final walkdown would be recommended as a precautionary measure before construction. No large yellowwood trees were recorded during the site visit, so the risk is deemed low.

Red Listed and Protected Fauna

As per Table 4 and Figure 24 & Figure 25, no Endangered or Critically fauna species were found to be present nor are known to be present in close proximity to the affected area nor are likely to be directly or indirectly affected significantly by the proposed activity. The habitat is well represented in the surrounding area and the limited size of the development footprint (outside of forest or intact fynbos habitat), no significant risk to these species would be anticipated if they were present.

Table 4: Fauna Species of Special Concern (SCC)

SCIENTIFIC NAME	COMMON NAME	STATUS ⁴	COMMENT/PRESENCE
Mammals			
<i>Chlorotalpa duthieae</i>	Duthie's golden mole	NEST (M), Vu	The species is known from only nine locations in southern Cape Afrotemperate Forests, clustered in two subpopulations: an eastern subpopulation in the suburban parts of Port Elizabeth (three locations); and a western subpopulation in the indigenous coastal forest belt from Wilderness to Tsitsikamma (six locations). Given that this species tolerates mild habitat alteration, is common in suburban gardens and pasturelands adjoining natural forests, it is likely to occur more widely than current records indicate, extent of occurrence is the preferred range proxy. Unlikely to be at risk from the proposed temporary activity (pipeline) and significantly disturbed area of WWTW with limited footprint with widespread more suitable habitat in the broader area. Preferred habitat (Afrotemperate Forest) is also absent. Not recorded.
Sensitive species 8	-	NEST (M), Vu	Unlikely to be affected by the proposed temporary activity (pipeline) and significantly disturbed area of WWTW with limited footprint surrounded by widespread suitable habitat unlikely to pose a risk. Not recorded.
Birds			
<i>Bradypterus sylvaticus</i>	Knysna Warbler	NEST (M), Vu	The Knysna Warbler occurs in small, severely fragmented range and small population (c. 2 500 mature individuals). Has a highly restricted and fragmented distribution, being found in four zones in the littoral of Eastern and Western Cape provinces. The northernmost zone, which once extended to the vicinity of Durban, now covers the stretch of coastal vegetation between Mbombazi Nature Reserve, south of Margate in KwaZulu-Natal, to Dwesa-Cwebe Nature Reserve in Eastern Cape. The next sub-population occurs between Tsitsikamma and Sedgelyfield, with a third sub-population persisting on the southern slopes of the Langeberg Mountains, near Swellendam. A fourth sub-population occurs on the eastern slopes of Table Mountain on the Cape Peninsula. Outside of known distribution range, although it is feasible it could be a vagrant visitor. The specific activity will not pose a risk to this species.

⁴ PNCO - Provincial Nature Conservation Ordinance (1974); ToPS – Threatened or Protected Species

SCIENTIFIC NAME	COMMON NAME	STATUS ⁴	COMMENT/PRESENCE
<i>Circus maurus</i>	Black Harrier	NEST (M), En	Widespread distribution, unlikely to be affected by the scale of project.
<i>Circus ranivorus</i>	African Marsh Harrier	NEST (M), En	Widespread distribution, unlikely to be affected by the scale of project.
<i>Eupodotis senegalensis</i>	White-Bellied Bustard	NEST (M), Vu	Widespread distribution, unlikely to be affected by the scale of project.
<i>Neotis denhami</i>	Denham's bustard	NEST (H), Vu	Widespread distribution, unlikely to be affected by the scale of project.
<i>Stephanoaetus coronatus</i>	Crowned Eagle	NEST (M), Vu	Widespread distribution, unlikely to be affected by the scale of project.
Reptiles			
None of concern flagged			
Amphibians			
None of concern flagged			
Invertebrates			
<i>Aneuryphymus montanus</i>	Yellow-winged Agile Grasshopper	NEST (M), Vu	No records from vicinity and not recorded on site. Unlikely to be present nor affected by the proposed limited footprint activity and habitat not suitable. Not recorded.
<i>Aloeides pallida junco</i>	Tsitsikamma Giant Copper	NEST (M), En	Outside of known range and habitat unlikely to be suitable. Not recorded
<i>Tsitana dicksoni</i>	Dickson's sylph	NEST (M), Rare	Outside of known range and preferred mountain habitat. Not recorded.

No fauna PNCO permits are anticipated to be required, but as a precautionary measure a faunal search and rescue is advisable before construction commences, under a general faunal relocation permit for species known to occur in the region.



Figure 24: Distribution of Fauna Species of Conservation Concern (local).



Figure 25: Distribution of Fauna Species of Conservation Concern (regional).

Alien Invasive Species

On 18 September 2020, the Minister of Environmental Affairs published the Alien and Invasive Species Regulations (“the Regulations”) which came into effect on the 18 October 2020 in a bid to curb the negative effects of IAPs. The Regulations call on landowners and sellers of land alike to assist with the conservation of our indigenous fauna and flora and to foster sustainable use of our land. Non-adherence to the Regulations by a landowner or a seller of land can result in a criminal offence punishable by a fine of up to R 5 million (R 10 million in case of a second offence) and/or a period of imprisonment of up to 10 years.

Category 1a and 1b listed invasive species must be controlled and eradicated. Category 2 plants may only be grown if a permit is obtained, and the property owner ensures that the invasive species do not spread beyond his or her property. The growing of Category 3 species is subject to various exemptions and prohibitions. Some invasive plants are categorised differently in different provinces. *For example:* the Spanish Broom plant is categorised as a category 1b (harmful) invasive plant in Eastern Cape and Western Cape, but it is a category 3 (less harmful) invasive plant in the other seven provinces.

Invasive alien plants have a significant negative impact on the environment by causing direct habitat destruction, increasing the risk and intensity of wildfires, and reducing surface and sub-surface water. Landowners are under legal obligation to control alien plants occurring on their properties. Alien Invasive Plants require removal according to the Conservation of Agricultural Resources Act 43 of 1983 (CARA) and the National Environmental Management: Biodiversity Act (10 of 2004; NEMBA): Alien and Invasive Species Lists (GN R598 and GN R599 of 2014). Alien control programs are long-term management projects and a clearing plan, which includes follow up actions for rehabilitation of the cleared area, is

essential. This will save time, money, and significant effort. Collective management and planning with neighbours allow for more cost-effective clearing and maintenance considering aliens seeds as easily dispersed across boundaries by wind or water courses. All clearing actions should be monitored and documented to keep track of which areas are due for follow-up clearing. A general rule of thumb is to first target lightly infested areas before tackling densely invaded areas and prioritize sensitive areas such as riverbanks and wetlands. Alien grasses are among the worst invaders in lowland ecosystems adjacent to farms but are often the most difficult to detect and control.

Several exotic invasive and other weed species were noted within the site and surrounding area. Proliferation of weedy and exotic species often indicate disturbance especially during or after construction. A list of species is included in Table 5. During construction it is highly likely that species currently not on site could be introduced through the construction process. A weed management programme is recommended after construction to counter the weed proliferation that would be expected after construction.

Table 5: Alien (exotic) invasive and other weed species and status.

SCIENTIFIC NAME	COMMON NAME	FAMILY	STATUS ⁵	PRESENCE
<i>Acacia mearnsii</i>	Black Wattle	Fabaceae	CARA 1b	Present, common
<i>Acacia melanoxylon</i>	Blackwood	Fabaceae	CARA 1b	Present, common
<i>Bidens pilosa</i>	Blackjack	Asteraceae	Weed	Present, uncommon
<i>Cortaderia selloana</i>	Pampas Grass	Poaceae	CARA 1b	Present, uncommon
<i>Eucalyptus spp.</i>	Eucalyptus tree	Myrtaceae	Cara 1B	Present, uncommon
<i>Hakea sericea</i>	Hakea	Proteaceae	CARA 1b	Present, uncommon
<i>Lantana camara</i>	Lantana	Verbenaceae	CARA 1b	Present, common
<i>Pennisetum clandestinum</i>	Kikuyu	Poaceae	CARA 1b	Present, common
<i>Pinus spp.</i>	Pine Tree	Pinaceae	CARA 2	Present, common
<i>Ricinus communis</i>	Castor Oil Plant		CARA 2	Present, uncommon
<i>Rubus affinis</i>	Bramble	Rosaceae	Weed	Present, common
<i>Solanum mauritianum</i>	Bugweed	Solanaceae	CARA 1b	Present, uncommon
<i>Tagetes minuta</i>	Khakibos	Asteraceae	Weed	Present, uncommon

Eradication protocol

The act required the removal of these species, being the responsibility of the landowner/contractor.

Specific eradication and management procedures must be stipulated in the EMP as to the methods to be implemented to remove and control the various alien invasive species as they tend to require species specific techniques. A management plan should be incorporated into the EMP, and a detailed action plan compiled and implemented by the ECO.

3.1.3 Aquatic Habitat

Aquatic systems do not function in isolation and in terms of ecological processes, the aquatic systems are intricately linked to the terrestrial system. In this case the riverine community that runs past the border of the site forms an integral link between upstream and downstream communities and as a corridor for various faunal especially avifaunal species.

The pipeline will be constructed in vicinity of a degraded non-perennial watercourse and wetland habitat and respective due diligence to be taken as per aquatic assessment recommendations. Any residual

⁵ CARA - Conservation of Agricultural Resources Act (1993); National List of Invasive Species in Terms Sections 70(1), 71(3) and 71A (2016).

impact is unlikely to exceed current baseline levels of disturbance due to proximity to settlement and level of invasion and degradation.

3.1.4 Terrestrial Vegetation Sensitivity Assessment

An overall vulnerability assessment of proposed pipeline and pipeline, incorporating key vegetation and ecological indicators was undertaken and includes the following key criteria:

- relative levels of *intactness* in terms of overall loss of indigenous vegetation cover.
- presence, diversity, and abundance of *species of special concern* (weighted in favour of local endemic species).
- extent of *invasion* (severity and overall ecological impact), as well as the degree to which successful rehabilitation could take place.
- overall degradation incorporating above factors.
- relative importance of the vegetation communities relative to regional conservation status - indicated as vulnerability of the area because of loss.

Intactness

Three basic classes are differentiated as follows:

- **Low:** > 75 % of original vegetation has been removed or lost; and/or no species of special concern present that are critically endangered, endangered, or endemic with highly localised distribution.
- **Moderate:** 25 - 75 % of original vegetation has been removed/lost; and or presence of species of special concern but not having high conservation status or high levels of endemism or highly localised distributions.
- **High:** < 25 % of original vegetation has been removed or lost; and or presence of species with a highly endemism and or high conservation status (endangered or critically endangered).

Intactness for the site is **Very Low**.

Alien Invasion

Three classes are differentiated as follows:

- **Low:** no or few scattered individuals.
- **Moderate:** individual clumps of invasives present but cover less than 50% of original area.
- **High:** dense, impenetrable stands of invasives present, or cover > 50 % of area with substantial loss functioning. Rehabilitation will most likely require specialised techniques over an extended period (> 5 years).

Alien invasion for the site is **Low**.

Degradation

Overall Degradation is determined from the above alien invasion and intactness scores, according to the following matrix:

INTACTNESS	INVASION		
	LOW	MODERATE	HIGH
High	Pristine	Near Pristine	Moderately Degraded
Moderate	Near Pristine	Moderately Degraded	Severely Degraded
Low	Moderately Degraded	Severely Degraded	Transformed

Degradation for the site is **High to Very High (Transformed)**

Overall Sensitivity score

Overall vulnerability (or Sensitivity) of the vegetation within the site is calculated according to the following matrix which combines degradation and overall conservation status of the vegetation units of the site.

DEGRADATION	CONSERVATION STATUS			
	LEAST THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED
Severely degraded/ Transformed	Very Low	Low	Moderate	Moderate - High
Moderately degraded	Low	Moderate	High	High
Ecologically Pristine or near Pristine	Moderate	Moderate - High	High	Very High (No-Go area)

Habitat Sensitivity

- The proposed sewer pipeline route is designated a LOW sensitivity being within a heavily invaded, secondary vegetation or highly degraded vegetation.
- The entire proposed WWTW is also designated a LOW sensitivity being within a patchy mozaic of heavily invaded, secondary vegetation or highly degraded vegetation.
- No HIGH sensitivity areas are differentiated.

3.1.5 Critical Habitat

The following Critical Habitat features have been identified within the site:

1. Criterion 1: Habitat for Critically Endangered (CR) and/or Endangered (EN) species
 - o No Endangered or Critically Endangered Flora species were recorded. Several species known from general area were screened to confirm that none are present or affected.
 - o No Endangered Mammals, Reptiles, Amphibians, or Invertebrates are likely to be affected (other than temporary displacement during construction for transient species).
2. Criterion 2: Habitat for Endemic or restricted-range species
 - o Although several range restricted flora species are potentially present in the surrounding area and vegetation types, none were recorded in proximity to the site.
3. Criterion 3: Habitat for Migratory or congregatory species
 - o No such terrestrial habitat will be directly or indirectly affected.
4. Criterion 4: Habitat for Highly threatened and/or unique ecosystems
 - o Habitat is present in the vicinity of the sewer around the WWTW, but any impact is deemed negligible, and vegetation is highly modified (invaded/secondary).
5. Criterion 5: Habitat for Key evolutionary processes
 - o No such terrestrial habitat will be directly or indirectly affected.

3.1.6 No-Go Areas

No-go areas are not identified along the sewer pipeline route.

3.1.7 Potential Development Footprints

The remainder of the site outside of the identified no-go areas above is considered to be developable.



Figure 26: Sensitivity of proposed sewer pipeline and WWTW.

3.2 Risks and Potential Impacts to Biodiversity

3.2.1 Summary of actions, activities, or processes that require mitigation.

The main impacts associated with the unauthorised activity include the following:

1. Susceptibility of some areas to erosion because of pipeline outlet disturbances. Continued surcharge of outlet water will continue to erode a pathway until it reaches the riverbanks.
2. Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.
3. Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.

3.2.2 Potential Terrestrial Biodiversity Impacts (Direct)

Table 6: Potential Impacts to Terrestrial Biodiversity

IMPACT	Nature of Impact
Alien Invasive Species	<u>Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species</u> and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not

IMPACT	Nature of Impact
	only become invasive but also prevent natural flora from becoming established.
Erosion	<u>Susceptibility of some areas to erosion</u> because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.
Ecological & Evolutionary Processes	<u>Disturbances to ecological processes</u> : Activity may result in disturbances to ecological processes.
Aquatic and Riparian processes	<u>Aquatic and Riparian processes</u> : No significant impact to any terrestrial components associated with watercourses is anticipated. Refer to separate aquatic report for specific aquatic impacts.
Faunal Habitat	<u>Loss of Faunal Habitat</u> : Activity will result in the loss of habitat for faunal species.

3.2.3 Potential Terrestrial Biodiversity Impacts (Indirect)

No significant indirect impacts are anticipated.

3.2.4 Potential Terrestrial Biodiversity Impacts (Cumulative)

No cumulative impacts are expected because of the development of the site providing recommendation and mitigation measures are adhered to, due to the limited disturbance area.

3.3 Assessment of Risks and Impacts to Biodiversity

3.3.1 Criteria of assigning significance to potential impacts

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

CRITERIA	EXPLANATION
Nature of impact	Review the type of effect that a proposed activity will have on the environment and should include "what will be affected and how?"
Extent	Indicate whether the impact will be: • (S) <i>local</i> and limited to the immediate area of development (the site). • (L) <i>limited</i> to within 5 km of the development: or • (R) whether the impact may be realized regionally, nationally or even internationally.
Duration	Review the lifetime of the impact, as being: • (V) <i>very short term</i> (0 - 1 years), • (S) <i>short term</i> (1 - 5 years), • (M) <i>medium</i> (5 - 15 years), • (L) <i>long term</i> (>15 years but where the impacts will cease after the operation of the site), or • (P) <i>permanent</i>.
Intensity	Establish whether the impact is destructive or innocuous and should be described as either: • (L) <i>low</i> (where no environmental functions and processes are affected) • (M) <i>medium</i> (where the environment continues to function but in a modified manner) or

CRITERIA	EXPLANATION
	(H) <i>high</i> (where environmental functions and processes are altered such that they temporarily or permanently cease), including loss of critical endangered ecosystem and or critically endangered species (population).
Probability	Consider the likelihood of the impact occurring and should be described as: (I) <i>improbable</i> (low likelihood) (P) <i>probable</i> (distinct possibility) (H) <i>highly probable</i> (most likely) or (D) <i>definite</i> (impact will occur regardless of prevention measures).
Status of the impact	Description as to whether the impact will be positive (a benefit), negative (a cost), or neutral.
Degree of confidence	The degree of confidence in the predictions, based on the availability of information and specialist knowledge. This should be assessed as high, medium, or low.
Significance	(VL) <i>Very Low</i>: Considered to be negligible. (L) <i>Low</i>: Where the impact will not have an influence on the decision or require to be significantly accommodated in the project design (M) <i>Medium</i>: Where it could have an influence on the environment which will require modification of the project design or alternative mitigation. (H) <i>High</i>: Where it could have a 'no-go' implication for the project unless mitigation or re-design is practically achievable. (VH) <i>Very High</i>: Confirmed No-Go area, no mitigation feasible, redesign and avoidance are required, where activity will have a significant permanent and irreversible impact on a critically endangered ecosystem or species population.

3.3.2 Significance Rating

INTENSITY		DURATION				
		PERMANENT	LONG TERM	MEDIUM TERM	SHORT TERM	VERY SHORT TERM
HIGH INTENSITY						
EXTENT	National	Very High	Very High	High	High	Medium
	Regional	Very High ⁶	High	High	High	Medium
	Local	High	High	Medium	Medium	Medium
	Site specific	Medium	Medium	Medium	Medium	Medium
MEDIUM INTENSITY						
EXTENT	National	High	High	High	Medium	Medium
	Regional	High	High	High	Medium	Medium
	Local	Medium	Medium	Medium	Medium	Medium
	Site specific	Medium	Medium	Medium	Medium	Low
LOW INTENSITY						
EXTENT	National	Medium	Medium	Medium	Medium	Medium
	Regional	Medium	Medium	Medium	Medium	Low
	Local	Medium	Medium	Medium	Low	Very Low
	Site specific	Low	Low	Low	Very Low	Very Low

⁶ Considered a regional impact if activity will result in significant permanent and irreversible loss to a critically endangered species population or ecosystem (vegetation type)

3.3.3 Assessment of Terrestrial Biodiversity Impacts

Operations can result in a range of negative impacts on terrestrial ecosystems if not effectively managed. Table 6 describes impacts that may potentially occur in the site (as per DEDEAT guidelines) as well indicating the relevant EMP section. The predicted significance of these during the construction phase are summarised in Table 7 and during the operational phase are summarised in Table 8.

Table 7 : Construction Phase Assessment (Refer to Sections 3.3.1 & 3.3.2 for methodology).

Nature of impact	Extent	Duration	Intensity	Probability	Status of the impact	Degree of confidence	Significance (before)	Significance (after)
Vegetation	S	S	L	D	-ve	H	L	L
Flora Species	S	S	L	P	-ve	M	L	L
Alien Invasive Species	S	M	L	H	-ve	H	L	L
Erosion	S	M	L	P	-ve	M	L	L
Ecological Processes	S	S	L	P	-ve	H	L	L
Aquatic & Riparian Processes	S	V	L	P	-ve	M	L	L
Faunal Habitat	S	V	L	D	-ve	H	L	L
Faunal Processes	S	V	L	P	-ve	H	L	L
Faunal Species	S	V	L	P	-ve	M	L	L

Table 8: Operational Phase Assessment (Refer to Sections 3.3.1 & 3.3.2 for methodology).

Nature of impact	Extent	Duration	Intensity	Probability	Status of the impact	Degree of confidence	Significance (before)	Significance (after)
Vegetation	S	S	L	D	-ve	H	L	L
Flora Species	S	S	L	P	-ve	M	L	L
Alien Invasive Species	S	M	L	H	-ve	H	L	L
Erosion	S	M	L	P	-ve	M	L	L
Ecological Processes	S	S	L	P	-ve	H	L	L
Aquatic & Riparian Processes	S	V	L	P	-ve	M	L	L
Faunal Habitat	S	V	L	D	-ve	H	L	L
Faunal Processes	S	V	L	P	-ve	H	L	L
Faunal Species	S	V	L	P	-ve	M	L	L

All impacts are assessed to be of low significance before and after mitigation (i.e. insignificant) with the implementation of the mitigation measures.

3.3.4 Terrestrial Biodiversity Impact Reversibility

In general, most impacts will have a high reversibility in the affected habitat, as well as transformed or degraded areas, except where hardening of surfaces or removal of topsoil may occur.

3.3.5 Impacts and Risks to Irreplaceable Biodiversity Resources

Risks to Irreplaceable Biodiversity Resources is low to very low.

3.3.6 Residual Risks and Uncertainties

No residual risks or uncertainties are anticipated.

3.4 Findings, Outcomes and Recommendations

3.4.1 Summary of Findings

- The vegetation on site is generally highly modified the sewer pipeline and WWTW is within an existing pipeline servitude or within heavily invaded/secondary or degraded vegetation.
- No Sensitive plant or Animal species identified as per the National Environmental Screening Tool were found to be present or likely to be present or would be affected by the proposed activity.
- Although areas are designated CBA 1, these designations are incorrect as the site is significantly transformed and adjacent to a settlement where essential services are necessary.
- The site is largely considered to have a LOW Sensitivity due to the disturbed and transformed nature.
- No HIGH sensitivity areas are identified.
- No No-go areas are identified within the site footprint.
- No significant direct, indirect or cumulative impacts are anticipated.

3.4.2 Recommendations & Mitigation Measures

- The proposed activity is unlikely to pose any risk to natural ecological processes, vegetarian or plant and animal species of conservation concern above current baseline levels.
- The proposed activity is deemed to be within acceptable terrestrial biodiversity risk and impact limits.

Table 9 lists specific mitigation measures that must be implemented and adhered to. These must be considered to be conditions of authorisation.

Table 9: Specific Mitigation Measures and Recommendations

IMPACT	MITIGATION MEASURES
Vegetation	• No clearing outside of footprint to take place. • Surrounding intact Humansdorp Shale Renosterveld is to be conserved and not harmed during the construction process unnecessarily.
Flora Species	• A flora search and rescue is <u>likely</u> to be required and protected flora were found to be present.
Alien Invasive Species	• A suitable weed management strategy to be implemented along the pipeline after completion of construction.
Erosion	• Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted. • If natural vegetation re-establishment does not occur, a suitable grass must be applied. Possible grasses include <i>Cynodon dactylon</i>, <i>Eragrostis curvula</i> & <i>Digitaria eriantha</i>.
Aquatic and Riparian processes	• Adequate measures to be implemented for erosion and stormwater management.
Faunal Processes	• The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. • Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity.
Faunal Species	• A faunal search and rescue recommended before construction commences. • No animals are to be harmed or killed during the course of operations. • Workers are NOT allowed to snare any faunal species.

3.5 Site Preparation and Vegetation Clearing Plan

Flora relocation is likely to be required before commencement, and permits will be required.

As a precautionary measure a faunal relocation before construction is advisable.

3.6 Open Space Management/Conservation Plan

None are applicable for this project.

3.7 Maintenance Management Plan

Ongoing maintenance is likely to be required in the long-term, which could include re-excavation of portions of the pipelines and associated WWTW infrastructure for maintenance/replacement of defective components and leak repair. All measures of this report, including the EMP, should be adhered to for any maintenance requirements. Any excavated areas must be stabilised and rehabilitated as per the measures indicated in this report.

4 Organizational Capacity and Competency

Successful Implementation will be in part be dependent on the organisational capacity and competency of the applicant and any implementing agents. The following aspects are likely to pose risk to the successful mitigation of the project:

- Budget constraints – budget allocated for environmental management tends to be inadequate for construction projects.
- Organisational Structure – implementing agents may or may not have adequate capacity and competency to ensure appropriate and adequate environmental management.

5 Emergency Preparedness and Response

Emergency Preparedness Plan must be included in the EMP and should address specific measures relating to the following emergency risks:

- Fire management and response.
- Spill management and incident response.
- Waste management and incident response.
- Response to emergency site shutdown, including labour and protest actions.

6 Stakeholder Engagement

Possible Stakeholders relating to Biodiversity could include the following key groups:

- Neighbouring Property Owners
- Local Regional and National Conservation Authorities

No Stakeholder Engagement was conducted specifically by the Specialist. Stakeholder Engagement will be undertaken by the EAP as part of the environmental application public participatory process. Any comments raised relating to Biodiversity will be addressed by the specialist in the final report.

7 Monitoring and Review

Key monitoring activities should include the following:

1. Pre-construction
 - a) Ensure flora permits are in place timeously (PNCO only) – allow at least 1 or 2 months before commencement.
 - b) Environmental Awareness and training (EAT) – Ensure all labour are informed and plant operators are aware of risks, issues, do's and don'ts and no-go areas.
2. Bush clearing
 - a) Ensure working plant has no oil or hydraulic leaks
 - b) Check delineated footprints area not exceeded.
3. Construction
 - a) Regular checks on trenches for trapped animals and possible drowning risks
 - b) Regular checks of fences for snares
4. Rehabilitation
 - a) Check quality of topsoil and weed free.
 - b) Check for weed regrowth and manage timeously (before seed is set)
5. Operation monitoring
 - a) Weed management on ongoing basis.
 - b) Erosion to be addressed on ongoing basis

8 Appendices

8.1 Appendix A: References

General Reference Sources

- Acocks, J. P. H. 1988. *Veld Types of South Africa*. Memoirs of the Botanical Survey of South Africa, No 57. Botanical Research Institute, Department of Agriculture and Water Supply, South Africa.
- Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland. 2014. Edited by Michael F. Bates, William R. Branch, Aaron M. Bauer, Marius Burger, Johan Marais, Graham J. Alexander & Marienne S. de Villiers. SANBI, Pretoria.
- Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J. & Marienne S. de Villiers. (Eds). 2014. *Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland*. SANBI, Pretoria.
- Berliner D. & Desmet P. 2007. *Eastern Cape Biodiversity Conservation Plan: Technical Report*. Department of Water Affairs and Forestry Project No 2005-012, Pretoria. 1 August 2007
- Bromilow, C. 2001. *Problem Plants of South Africa*. A Guide to the Identification and Control of More than 300 Invasive Plants and Other Weeds. Briza Publications. Pp 258
- Child M.F., Roxburgh L., Do Linh San E., Raimondo D., Davies-Mostert H.T. 2016. *The Red List of Mammals of South Africa, Swaziland and Lesotho*. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.
- Council for Scientific and Industrial Research. NFEPA river FEPAs 2011 [vector geospatial dataset] 2011. Available from the Biodiversity GIS website, downloaded on 20 July 2020.
- Council for Scientific and Industrial Research. NFEPA rivers 2011 [vector geospatial dataset] 2011. Available from the Biodiversity GIS website, downloaded on 20 July 2020.
- Council for Scientific and Industrial Research. NFEPA wetland clusters 2011 [vector geospatial dataset] 2011. Available from the Biodiversity GIS website, downloaded on 20 July 2020.
- Council for Scientific and Industrial Research. NFEPA wetlands vegetation 2011 [vector geospatial dataset] 2011. Available from the Biodiversity GIS website, downloaded on 20 July 2020.
- Cowling, R.M., Richardson, D.M. & Pierce, S.M. 1997. *Vegetation of Southern Africa*. Cambridge University Press.
- Esler, K.J., Milton, S.J. & Dean, W.R.J. 2006. *Karoo Veld: Ecology and Management*. Briza Publications.
- Fitzpatrick Institute of African Ornithology (2024). MammalMAP Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=MammalMAP> on 2024-01-27.
- Fitzpatrick Institute of African Ornithology (2024). OrchidMAP Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=OrchidMAP> on 2024-01-27.
- Fitzpatrick Institute of African Ornithology (2024). PHOWN Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=PHOWN> on 2024-01-27.
- FitzPatrick Institute of African Ornithology (2024). ScorpionMAP Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=ScorpionMAP> on 2024-01-27.
- Fitzpatrick Institute of African Ornithology (2024). SpiderMAP Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=SpiderMAP> on 2024-01-27.
- Fuggle, R. F. & Rabie, M. A. 2003. *Environmental Management in South Africa*. Juta & Co, Johannesburg.
- Germishuizen, G. & Meyer, N.L. (eds). 2003. *Plants of southern Africa: An annotated checklist*. Strelitzia, 14. Pretoria: National Botanical Institute.
- Golding, J. (Ed.) 2002. *Southern African Plant Red Data Lists*. Southern African Botanical Diversity Network Report No 14.

- Henderson, L. 2001. *Alien Weeds and Invasive Plants*. Plant Protection Research Institute Handbook No 12. Agricultural Research Council. Pp 300.
- Hilton-Taylor, C. 1996. *Red Data List of Southern African Plants*. National Botanical Institute.
- Hockey PAR, Dean WRJ and Ryan PG 2005. *Roberts - Birds of southern Africa*, VIIth ed. The Trustees of the John Voelcker Bird Book Fund, Cape Town.
- International Finance Corporation. 2012. *Performance Standards on Environmental and Social Sustainability*.
- Köpke, D. 1988. *The Climate of the Eastern Cape*. In: Bruton, M. N., and Gess, F. W. (Eds). *Towards and Environmental Plan for the Eastern Cape*. Conference proceedings from Rhodes University. Grocott and Sherry, Grahamstown.
- Low, A.B. & Rebelo, A.G. 1998. *Vegetation of South Africa, Lesotho and Swaziland*. Pretoria: Department of Environmental Affairs and Tourism.
- Marnewick MD, Retief EF, Theron NT, Wright DR, Anderson TA. 2015. *Important Bird and Biodiversity Areas of South Africa*. Johannesburg: BirdLife South Africa.
- Mecenero, S., Ball, J.B., Edge, D.A., Hamer, M.L., Hening, G.A., Krüger, M., Pringle, R.L., Terblanche, R.F. & Williams, M.C. (Eds). 2013. *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red List and atlas*. Safronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town.
- Minter LR, Burger M, Harrison JA, Braack HH, Bishop PJ & Kloepfer D (Eds). 2004. *Atlas and Red Data book of the frogs of South Africa, Lesotho and Swaziland*. SI/MAB Series no. 9. Smithsonian Institution, Washington, D.C.
- Minter LR, Burger M, Harrison JA, Braack HH, Bishop PJ & Kloepfer D (eds). 2004. *Atlas and Red Data book of the frogs of South Africa, Lesotho and Swaziland*. SI/MAB Series no. 9. Smithsonian Institution, Washington, D.C.
- Mucina, L. & Rutherford, M.C. (Eds). 2006. *The vegetation of South Africa, Lesotho and Swaziland*, in Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- Myers, N., Mittermeir, R.A., Mittermeir, C.G., De Fonseca, G.A.B. & Kent, J. 2000. *Biodiversity hotspots for conservation priorities*. Nature, 403: 853–858.
- Nel, J., Colvin, C., Le Maitre, D., Smith, J., Haines, I. 2013. *Defining South Africa's Water Source Areas*. WWF South Africa & Council for Scientific & Industrial Research (CSIR).
- Nel, J.L., Murray, K.M., Maherry, A.M., Petersen, C.P., Roux, D.J., Driver, A., Hill, L., van Deventer, H., Funke, N., Swart, E.R., Smith-Ado, L.B., Mbona, N., Downsborough, L. & Nienaber, S. 2011. *Technical Report for the National Freshwater Ecosystem Priority Areas project*. Report to the Water Research Commission, WRC Report No. 1801/2/11. ISBN 978-1-4312-0149-5.
- Pienaar, K. 2000. *The South African What Flower is That?* Struik Publishers (Pty) Ltd. Cape Town.
- Powrie, L.W. 2013. A database of biodiversity taxon names in South Africa for copy-and-paste into reports or documents. South African National Biodiversity Institute, Cape Town. Obtained from SANBI on 20 July 2020.
- Powrie, L.W. 2013. A list of South African biodiversity terms and common names for spell checking. South African National Biodiversity Institute, Cape Town. Downloaded from www.sanbi.org on 20 July 2020.
- Powrie, L.W. 2013. A list of South African botanical names for spell checking. South African National Biodiversity Institute, Cape Town. Downloaded from www.sanbi.org 18 July 2020.
- Powrie, L.W. 2013. A list of South African physical feature names for spell checking. South African National Biodiversity Institute, Cape Town. Downloaded from www.sanbi.org on 20 July 2020.
- Powrie, L.W. 2013. A list of South African zoological and other (including fungi and lichen) names for spell checking. South African National Biodiversity Institute, Cape Town. Downloaded from www.sanbi.org on 20 July 2020.
- Rouget, M., Reyers, B., Jonas, Z., Desmet, P., Driver, A., Maze, K., Egoh, B. & Cowling, R.M. 2004. *South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 1: Terrestrial Component*. Pretoria: South African National Biodiversity Institute.

- Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. & Slingsby, J.A. (Eds.). 2019. *South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm*. South African National Biodiversity Institute, Pretoria. <http://hdl.handle.net/20.>
- South African National Biodiversity Institute (SANBI). 2019. *National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report*. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria. pp. 1–214.
- Stirton, C. H. 1987. *Plant Invaders: Beautiful, but Dangerous*. The Department of Nature and Environmental Conservation of the Cape Province Administration. Galvin and Sales, Cape Town.
- Taylor, M.R., Peacock, F., and Wanless, R.M. 2015. *Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland*.
- Taylor, P.B., Navarro, R.A., Wren-Sargent, M., Harrison, J.A. & Kieswetter, S.L. 1999. *Coordinated waterbird Counts in South Africa, 1992-1997*. Avian Demography Unit, Cape Town.
- Turpie, J.K., Wilson, G. & Van Niekerk, L. 2012. *National Biodiversity Assessment 2011: National Estuary Biodiversity Plan for South Africa*. Anchor Environmental Consulting, Cape Town. Report produced for the Council for Scientific and Industrial Research and the South African National Biodiversity Institute.
- UN Natural Value Initiative. 2009. *The Ecosystem Services Benchmark*, 2009.
- Van Niekerk, L., Adams, J.B., Lamberth, S.J., MacKay, C.F., Taljaard, S., Turpie, J.K., Weerts S.P. & Raimondo, D.C., 2019 (eds). *South African National Biodiversity Assessment 2018: Technical Report. Volume 3: Estuarine Realm*. CSIR report number CSIR/SPLA/EM/EXP/2019/0062/A. South African National Biodiversity Institute, Pretoria. Report Number: SANBI/NAT/NBA2018/2019/Vol3/A. <http://hdl.handle.net/20.500.12143/6373>
- Van Wyk, A.E. & Smith, G.F. 2001. *Regions of Floristic Endemism: A Review with Emphasis on Succulents*, Umdaus Press.
- Weather Bureau. 1988. *Climate of South Africa – Climate statistics up to 1984 (WB40)*. Government Printer, Pretoria.
- Young, D.J., Harrison, J.A, Navarro, R.A., Anderson, M.A., & Colahan, B.D. (Eds). 2003. *Big birds on farms: Mazda CAR Report 1993-2001*. Avian Demography Unit: Cape Town.

Web Databases

- Animal Demographic Unit: <http://vmus.adu.org.za>
- Conservation International: <http://www.biodiversityhotspots.org>
- Global Biodiversity Information Facility (GBIF): <http://gbif.org>
- International Union for Conservation of Nature (IUCN) Redlist: <http://iucnredlist.org>
- Millennium Ecosystem Assessment (MEA). 2005: <https://www.millenniumassessment.org>
- Plants of Southern Africa: <http://newposa.sanbi.org>
- South African National Biodiversity Institute (SANBI) Redlist: <http://redlist.sanbi.org>
- South African Bird Atlas Project: <http://sabap2.birdmap.africa>
- United Nations Environment Programme (UNEP), *A to Z Areas of Biodiversity Importance*: <http://www.biodiversitya-z.org>
- United Nations Environment Programme (UNEP), *World Database on Protected Areas, Protected Planet*: <http://www.protectedplanet.net>
- World Resources Institute (WRI): <https://www.wri.org>

8.2 Appendix B: Abbreviations & Glossary

8.2.1 Abbreviations

CARA	Conservation of Agricultural Resources Act, Act 43 of 1983
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs (<i>now DFFE, see below</i>)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DFFE	The Department of Environmental Affairs was renamed the <u>Department of Forestry, Fisheries & the Environment</u> (DFFE) in April 2021, incorporating the forestry and fisheries functions from the previous Department of Agriculture, Forestry and Fisheries.
DEMC	Desired Ecological Management Class
DWS	Department of Water Affairs and Sanitation
DWAF	Department of Water Affairs and Forestry (former department name)
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMC	Ecological Management Class
EMP	Environmental Management Plan
EMPr	Environmental Management Programme report
ER	Environmental Representative
ESS	Ecosystem Services
IAP's	Interested and Affected Parties
IEM	Integrated Environmental Management
LM	Local Municipality
masl	meters above sea level
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act, Act 107 of 1998
NFA	National Forests Act
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NFA	National Forest Act, Act 84 of 1998
PEMC	Present Ecological Management Class
PES	Present Ecological State
PNCO	Provincial Nature and Environment Conservation Ordinance (No. 19 of 1974).
RDL	Red Data List
RHS	Right Hand Side
RoD	Record of Decision
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SoER	State of the Environment Report
SSC	Species of Special Concern
ToPS	Threatened or Protected Species
ToR	Terms of Reference
+ve	Positive
-ve	Negative

8.2.2 Glossary

Alien Invasive Species (AIS)	An alien species whose introduction and/or spread threaten biological diversity (Convention on Biological Diversity). Note: “Alien invasive species” is considered to be equivalent to “invasive alien species”. An alien species which becomes established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity (IUCN).
Best Environmental Practice	The application of the most appropriate combination of environmental control measures and strategies (Stockholm Convention).
Best Management Practice	Established techniques or methodologies that, through experience and research, have proven to lead to a desired result (BBOP).
Biodiversity	Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.
Biodiversity Offset	Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure and ecosystem function and people’s use and cultural values associated with biodiversity (BBOP).
Bioremediation	The use of organisms such as plants or microorganisms to aid in removing hazardous substances from an area. Any process that uses microorganisms, fungi, green plants, or their enzymes to return the natural environment altered by contaminants to its original condition.
Boundary	Landscape patches have a boundary between them which can be defined or fuzzy (Sanderson and Harris, 2000). The zone composed of the edges of adjacent ecosystems is the boundary.
Catchment	In relation to a watercourse or watercourses or part of a watercourse, means the area from which any rainfall will drain into the watercourse or watercourses or part of a watercourse, through surface flow to a common point or common points.
Connectivity	The measure of how connected or spatially continuous a corridor, network, or matrix is. For example, a forested landscape (the matrix) with fewer gaps in forest cover (open patches) will have higher connectivity.
Corridors	Have important functions as strips of a landscape differing from adjacent land on both sides. Habitat, ecosystems or undeveloped areas that physically connect habitat patches. Smaller, intervening patches of surviving habitat can also serve as “steppingstones” that link fragmented ecosystems by ensuring that certain ecological processes are maintained within and between groups of habitat fragments.
Critically Endangered (CR)	A category on the IUCN Red List of Threatened Species which indicates a taxon is considered to be facing an extremely high risk of extinction in the wild (IUCN).
Cultural Ecosystem Services	The non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including, e.g. knowledge systems, social relations, and aesthetic values (Millennium Ecosystem Assessment).
Cumulative Impacts	The total impact arising from the project (under the control of the developer), other activities (that may be under the control of others, including other developers, local communities, government) and other background pressures

	and trends which may be unregulated. The project's impact is therefore one part of the total cumulative impact on the environment. The analysis of a project's incremental impacts combined with the effects of other projects can often give a more accurate understanding of the likely results of the project's presence than just considering its impacts in isolation (BBOP).
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat(IUCN).
Degraded Habitat/Land	Land that has been impacted upon by human activities (including introduction of invasive alien plants, light to moderate overgrazing, accelerated soil erosion, dumping of waste), but still retains a degree of its original structure and species composition (although some species loss would have occurred) and where ecological processes still occur (albeit in an altered way). Degraded land is capable of being restored to a near-natural state with appropriate ecological management.
Disturbance	An event that significantly alters the pattern of variation in the structure or function of a system, while fragmentation is the breaking up of a habitat, ecosystem, or land-use type into smaller parcels. Disturbance is generally considered a natural process.
Ecological Function	How each of the elements in the landscape interacts based on its life cycle events [Producers, Consumers, Decomposers Transformers]. Includes the capacity of natural processes and components to provide goods and services that satisfy human needs, either directly or indirectly.
Ecological Pattern	The contents and internal order of the landscape, or its spatial (and temporal) components. May be homogenous or heterogenous. Result from the ecological processes that produce them.
Ecological Process	Includes <i>Physical processes</i> [Climate (precipitation, insolation), hydrology, geomorphology]; <i>Biological processes</i> [Photosynthesis, respiration, reproduction]; <i>Ecological processes</i> [Competition, predator-prey interactions, environmental gradients, life histories]
Ecological Processes	Ecological processes typically only function well where natural vegetation remains, and where the remaining vegetation is well-connected with other nearby patches of natural vegetation. Loss and fragmentation of natural habitat severely threatens the integrity of ecological processes. Where basic processes are intact, ecosystems are likely to recover more easily from disturbances or inappropriate actions if the actions themselves are not permanent. Conversely, the more interference there has been with basic processes, the greater the severity (and longevity) of effects. Natural processes are complex and interdependent, and it is not possible to predict all the consequences of loss of biodiversity or ecosystem integrity. When a region's natural or historic level of diversity and integrity is maintained, higher levels of system productivity are supported in the long run and the overall effects of disturbances may be dampened.
Ecological Structure	The composition, or configuration, and the proportion of different patches across the landscape. Relates to species diversity, the greater the diversity, the more complex the structure. A description of the organisms and physical features of environment including nutrients and climatic conditions.
Ecosystem	All the organisms of a habitat, such as a lake or forest, together with the physical environment in which they live. A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Ecosystem Services	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. Supporting Ecosystem services are those that are necessary for the maintenance of all other ecosystem services. Some examples include biomass production, production of atmospheric oxygen, soil formation and retention, nutrient cycling, water cycling, and provisioning of habitat.
Ecosystem Status	Ecosystem status of terrestrial ecosystems is based on the degree of habitat loss that has occurred in each ecosystem, relative to two thresholds: one for maintaining healthy ecosystem functioning, and one for conserving the majority of species associated with the ecosystem. As natural habitat is lost in an ecosystem, its functioning is increasingly compromised, leading eventually to the collapse of the ecosystem and to loss of species associated with that ecosystem (Millennium Ecosystem Assessment).
Ecotone	The transitional zone between two communities. Ecotones can arise naturally, such as a lakeshore, or can be human created, such as a cleared agricultural field from a forest. The ecotonal community retains characteristics of each bordering community and often contains species not found in the adjacent communities. Classic examples of ecotones include fencerows; forest to marshlands transitions; forest to grassland transitions; or land-water interfaces such as riparian zones in forests. Characteristics of ecotones include vegetational sharpness, physiognomic change, and occurrence of a spatial community mosaic, many exotic species, ecotonal species, spatial mass effect, and species richness higher or lower than either side of the ecotone.
Edge	The portion of an ecosystem near its perimeter, where influences of the adjacent patches can cause an environmental difference between the interior of the patch and its edge. This edge effect includes a distinctive species composition or abundance in the outer part of the landscape patch. For example, when a landscape is a mosaic of perceptibly different types, such as a forest adjacent to a grassland, the edge is the location where the two types adjoin. In a continuous landscape, such as a forest giving way to open woodland, the exact edge location is fuzzy and is sometimes determined by a local gradient exceeding a threshold, as an example, the point where the tree cover falls below thirty-five percent.
Emergent Tree	Trees that grow above the top of the canopy
Endangered (En)	<u>Endangered terrestrial ecosystems</u> have lost significant amounts (more than 60 % lost) of their original natural habitat, so their functioning is compromised. A taxon (species) is Endangered when the best available evidence indicates that it meets any of the criteria for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild (IUCN).
Endemic	A plant or animal species, or a vegetation type, which is naturally restricted to a defined region or limited geographical area. Many endemic species have widespread distributions and are common and thus are not considered to be under any threat. They are however noted to be unique to a region, which can include South Africa, a specific province or a bioregion, vegetation type, or a localised area. In cases where it is highly localised or known only from a few or a few localities, and is under threat, it may be red listed either in terms of the South Africa Threatened Species Programme, NEMBA Threatened or Protected Species (ToPS) or the IUCN Red List of Threatened Species.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Estuary	a partially or fully enclosed body of water - (a) which is open to the sea permanently or periodically; and

	(b) within which the sea water can be diluted, to an extent that is measurable, with fresh water drained from land.
Evolutionary Processes	The process by which genetic changes have taken place and continue to take place in populations of plants and animals over successive generations in response to environmental changes. Evolutionary Processes includes the mechanisms that produce the biodiversity of life and include Mutation and Migration (Gene Flow), Genetic Drift, Natural Selection, Common Descent, Speciation, Sexual Selection, and Biogeography. Disruptions to evolutionary processes can prevent ecosystems and species from adapting to environmental change over time. Significant fragmentation is considered to be an important disrupter of evolutionary processes. Series of actions which enable new species to evolve in response to changing Biodiversity is maintained by ecological processes at the micro-scale (such as in pollination and nutrient cycling via microbial action) through to the mega-scale (natural events e.g. fire, flood; migration of species along river valleys or coastal areas, quality and quantity of water feeding rivers and estuaries; marine sand movement and the seasonal mountain-to-coast migration of birds that pollinate plants).
Exotic	Non-indigenous; introduced from elsewhere, may also be a weed or alien <i>invasive</i> species. Exotic species may be invasive or non-invasive.
Fragmentation (Habitat Fragmentation)	The ‘breaking apart’ of continuous habitat into distinct pieces. Causes land transformation, an important current process in landscapes as more and more development occurs.
Habitat	The home of a plant or animal species. Generally, those features of an area inhabited by animal or plant which are essential to its survival.
Habitat Banking	A market where credits from actions with beneficial biodiversity outcomes can be purchased to offset the debit from environmental damage. Credits can be produced in advance of, and without ex-ante links to, the debits they compensate for, and stored over time (IEEP).
IFC PS6	International Finance Corporation Performance Standard 6 – A standard guiding biodiversity conservation and sustainable management of living natural resources for projects financed by the International Finance Corporation (IFC)
Indicator	Information based on measured data used to represent an attribute, characteristic, or property of a system.
Indicator species	A species whose status provides information on the overall condition of the ecosystem and of other species in that ecosystem. They reflect the quality and changes in environmental conditions as well as aspects of community composition.
Indigenous	Native; occurring naturally in a defined area.
Indigenous Species (Native species)	A species that has been observed in the form of a naturally occurring and self-sustaining population in historical times (<i>Bern Convention 1979</i>). A species or lower taxon living within its natural range (past or present) including the area which it can reach and occupy <u>using its natural dispersal systems</u> (<i>modified after the Convention on Biological Diversity</i>)
Indirect Impact	Impacts triggered in response to the presence of a project, rather than being directly caused by the project’s own operations (BBOP)
Instream habitat	Includes the physical structure of a watercourse and the associated vegetation in relation to the bed of the watercourse;
Intact Habitat / Vegetation	Land that has not been significantly impacted upon by man’s activities. These are ecosystems that are in a near-pristine condition in terms of structure, species composition and functioning of ecological processes.
Intrinsic Value	The inherent worth of something, independent of its value to anyone or anything else.

Keystone Species	Species whose influence on ecosystem function and diversity are disproportionate to their numerical abundance. Although all species interact, the interactions of some species are more profound and far-reaching than others, such that their elimination from an ecosystem often triggers cascades of direct and indirect changes on more than a single trophic level, leading eventually to losses of habitats and extirpation of other species in the food web.
Landscape	An area of land that contains a mosaic of ecosystems, including human-dominated ecosystems (Millennium Ecosystem Assessment).
Landscape Approach	Dealing with large-scale processes in an integrated and multidisciplinary manner, combining natural resources management with environmental and livelihood considerations (FAO).
Landscape connectivity	The degree to which the landscape facilitates or impedes movement among resource patches.
Least threatened / Least Concern (LC)	These <u>ecosystems</u> have lost only a small proportion (more than 80 % remains) of their original natural habitat and are largely intact (although they may be degraded to varying degrees, for example by invasive alien species, overgrazing, or overharvesting from the wild). A <u>taxon (species)</u> is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category (IUCN).
Matrix	The “background ecological system” of a landscape with a high degree of connectivity.
Natural Forest (Indigenous Forest)	The definition of “natural forest” in the National Forests Act of 1998 (NFA) Section 2(1)(xx) is as follows: ‘A natural forest means a group of indigenous trees. • whose crowns are largely contiguous. • or which have been declared by the Minister to be a natural forest under section 7(2)? This definition should be read in conjunction with Section 2(1)(x) which states that ‘Forest’ includes: • A natural forest, a woodland, and a plantation • The forest-produce in it; and • The ecosystems which it makes up. The legal definition must be supported by a technical definition, as demonstrated by a court case in the Umzimkulu magisterial district, relating to the illegal felling of Yellowwood (<i>Podocarpus latifolius</i>) and other species in the Gonqogonqo forest. From scientific definitions (also see Appendix B) we can define natural forest as: • A generally multi-layered vegetation unit • Dominated by trees that are largely evergreen or semi-deciduous. • The combined tree strata have overlapping crowns, and crown cover is >75% • Grasses in the herbaceous stratum (if present) are generally rare. • Fire does not normally play a major role in forest function and dynamics except at the fringes. • The species of all plant growth forms must be typical of natural forest (check for indicator species) • The forest must be one of the national forest types
Near Threatened (NT)	A <u>taxon (species)</u> is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable

	now, but is close to qualifying for or is likely to qualify for a threatened category in the near future (IUCN).
Patch	A term fundamental to landscape ecology, is defined as a relatively homogeneous area that differs from its surroundings. Patches are the basic unit of the landscape that change and fluctuate, a process called patch dynamics. Patches have a definite shape and spatial configuration and can be described compositionally by internal variables such as number of trees, number of tree species, height of trees, or other similar measurements.
Protected Area	A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
Range restricted species	Species with a geographically restricted area of distribution. Note: Within the IFC PS6, restricted range refers to a limited <u>extent of occurrence</u> (EOO): For terrestrial vertebrates and plants, restricted-range species are defined as those species that have an EOO less than 50,000 square kilometres (km²).
Refugia	A location which supports an isolated or relict population of a once more widespread species. This isolation can be due to climatic changes, geography, or human activities such as deforestation and overhunting.
Rehabilitation	Measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and/ or minimised. Rehabilitation emphasizes the reparation of ecosystem processes, productivity and services, whereas the goals of restoration also include the re-establishment of the pre-existing biotic integrity in terms of species composition and community structure (BBOP).
Resilience	The capacity of a natural system to recover from disturbance (OECD).
Restoration	The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. An ecosystem has recovered when it contains sufficient biotic and abiotic resources to continue its development without further assistance or subsidy. It would sustain itself structurally and functionally, demonstrate resilience to normal ranges of environmental stress and disturbance, and interact with contiguous ecosystems in terms of biotic and abiotic flows and cultural interactions (IFC).
Riparian	Pertaining to, situated on or associated with the banks of a watercourse, usually a river or stream.
Riparian Habitat	Includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.
River Corridors	River corridors perform several ecological functions such as modulating stream flow, storing water, removing harmful materials from water, and providing habitat for aquatic and terrestrial plants and animals. These corridors also have vegetation and soil characteristics distinctly different from surrounding uplands and support higher levels of species diversity, species densities, and rates of biological productivity than most other landscape elements. Rivers provide for migration and exchange between inland and coastal biotas.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED).
Terrestrial	Occurring on, or inhabiting, land.
Threatened Species	Umbrella term for any species categorised as Critically Endangered, Endangered or Vulnerable by the IUCN Red List of Threatened Species (IUCN). Any species that

	is likely to become extinct within the foreseeable future throughout all or part of its range and whose survival is unlikely if the factors causing numerical decline or habitat degradation continue to operate (EU).
Traditional Ecological Knowledge	Knowledge, innovations and practices of indigenous and local communities around the world. Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is transmitted orally from generation to generation. It tends to be collectively owned and takes the form of stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, and agricultural practices, including the development of plant species and animal breeds. Traditional knowledge is mainly of a practical nature, particularly in such fields as agriculture, fisheries, health, horticulture, and forestry (CBD).
Transformation	In ecology, transformation refers to adverse changes to biodiversity, typically habitats or ecosystems, through processes such as cultivation, forestry, drainage of wetlands, urban development or invasion by alien plants or animals. Transformation results in habitat fragmentation – the breaking up of a continuous habitat, ecosystem, or land-use type into smaller fragments.
Transformed Habitat/Land	Land that has been significantly impacted upon as a result of human interferences/disturbances (such as cultivation, urban development, mining, landscaping, severe overgrazing), and where the original structure, species composition and functioning of ecological processes have been irreversibly altered. Transformed habitats are not capable of being restored to their original states.
Tributary	A small stream or river flowing into a larger one.
Untransformed Habitat/Land	Land that has not been significantly impacted upon by man's activities. These are ecosystems that are in a near-pristine condition in terms of structure, species composition and functioning of ecological processes.
Vulnerable (Vu)	<u>Vulnerable terrestrial ecosystems</u> have lost some (more than 60 % remains) of their original natural habitat and their functioning will be compromised if they continue to lose natural habitat. A <u>taxon (species)</u> is Vulnerable when the best available evidence indicates that it meets any of the criteria for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild (IUCN).
Watercourse	Natural or man-made channel through or along which water may flow. A river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows. and a reference to a watercourse includes, where relevant, its bed and banks;
Weed	An indigenous or non-indigenous plant that grows and reproduces aggressively, usually a ruderal pioneer of disturbed areas. Weeds may be unwanted because they are unsightly, or they limit the growth of other plants by blocking light or using up nutrients from the soil. They can also harbour and spread plant pathogens. Weeds are generally known to proliferate through the production of large quantities of seed.
Wetlands	A collective term used to describe lands that are sometimes or always covered by shallow water or have saturated soils, and where plants adapted for life in wet conditions usually grow.

8.3 Appendix C: Biodiversity Environmental Management Plan

Specific measures relating to management of Biodiversity Impacts that must be included in the project Environmental Management Programme (EMPr). This Environmental Management Plan (EMP) contains guidelines, operating procedures and rehabilitation control requirements, which will be binding on the holder of the environmental authorisation after approval of the EMP. The impacts identified and listed in 3.3 will be managed / controlled as set out under mitigating measures (3.3) and as detailed in this section for the more significant impacts during the operational phase.

8.3.1 Alien and Invasive Plant Management Plan

The following mitigation measures have been identified in order to ensure that the introduction and spread of alien invasive vegetation is minimised:

- Alien species must be removed from the site as per the National Environmental Management: Biodiversity Act (No. 10 of 2004) requirements.
- A suitable weed management strategy must be implemented in the construction phase and carried through the operational phase.
- Weeds and alien species must be cleared by hand before the rehabilitation phase of the areas. Removal of alien plants are to be done according to the Working for Water Guidelines.
- The Contractor is responsible for the removal of alien species within all areas disturbed during construction activities. Disturbed areas include (but are not limited to) access roads, construction camps, site areas and temporary storage areas.
- In consultation with relevant authorities, the Engineer may order the removal of alien plants (when necessary). Areas within the confines of the site are to be included.
- All alien plant material (including brushwood and seeds) should be removed from site and disposed of at a registered waste disposal site. Should brushwood be utilised for soil stabilization or mulching, it must be seed free.
- After clearing is completed, an appropriate cover crop may be required, should natural re-establishment of grasses not take place in a timely manner.

8.3.2 Fires

- The Contractor must ensure that an emergency preparedness plan is in place in order to fight accidental fires or veld fires, should they occur. The adjacent landowners/users/managers should also be informed or otherwise involved.
- Any contractors must take precautions when working with welding or grinding equipment near potential sources of combustion. Such precautions include having a suitable, tested and approved fire extinguisher immediately at hand and the use of welding curtains.

8.3.3 Soil Aspects

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

8.3.4 Infrastructural Requirements

Topsoil

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

Stormwater and Erosion Control

- Stormwater Management Plans must be developed for the site and should include the following:
 - o The management of stormwater during construction.
 - o The installation of stormwater and erosion control infrastructure.
 - o The management of infrastructure after completion of construction.
- Temporary drainage works may be required to prevent stormwater to prevent silt laden surface water from draining into river systems in proximity to the site. Stormwater must be prevented from entering or running off site.
- To ensure that site is not subjected to excessive erosion and capable of drainage runoff with minimum risk of scour, their slopes should be profiled at a maximum 1:3 gradient.
- Diversion channels should be constructed ahead of the open cuts, and above emplacement areas and stockpiles to intercept clean runoff and divert it around disturbed areas into the natural drainage system downstream of the site.
- Rehabilitation is necessary to control erosion and sedimentation of all eroded areas (where works will take place).
- Existing vegetation must be retained as far as possible to minimise erosion problems.
- Visual inspections will be done on a regular basis with regard to the stability of water control structure, erosion and siltation.
- Sediment-laden runoff from cleared areas must be prevented from entering rivers and streams.
- No river or surface water may be affected by silt emanating from the site.

Site Office / Camp Sites

- Any site office / camp and/or laydown areas to be located in a transformed / previously disturbed area.

Operating Procedures in the Site

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

- Cognisance is to be taken of the potential for endangered species occurring in the area. It is considered unlikely, however, that these species will be affected by the proposed activity, or the access road.

Excavations

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

- Topsoil shall be handled as described in this EMP.
- Excavations shall take place only within the approved demarcated site.
- The construction site will not be left in any way to deteriorate into an unacceptable state.
- The area shall be fertilised, if necessary, to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally occurring flora.

Rehabilitation of Processing and Excavation Areas

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

8.3.5 Rehabilitation Plan

Rehabilitation Objective

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

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

Topsoil and Subsoil Replacement

Topsoil and subsoil will be stripped and stockpiled separately and only used in rehabilitation work towards the end of the operation. Stripped topsoil will be spread over the re-profiled areas to an adequate depth to encourage plant regrowth. The vegetative cover will be stripped with the thin topsoil layer to provide organic matter to the relayed material and to ensure that the seed store contained in the topsoil is not diminished. Reseeding may be required should the stockpiles stand for

too long and be considered barren from a seed bank point of view. Stockpiles should ideally be stored for no longer than a year. The topsoil and overburden will be keyed into the reprofiled surfaces to ensure that they are not eroded or washed away. The topsoiled surface will be left fairly rough to enhance seedling establishment, reduce water runoff and increase infiltration.

Revegetation

All prepared surfaces will be seeded with suitable grass species to provide an initial ground cover and stabilize the soil surface. The following grass seed that is commonly available and suitable.

Botanical name	Common name	Approx seed mixture /Ha
<i>Cynodon dactylon</i>	Kweek	12 kg/ Ha
<i>Eragrostis curvula</i>	Weeping Love Grass	6 kg/ Ha
<i>Eragrostis tef</i>	Teff	2 kg/ Ha
<i>Digitaria eriantha</i>	Smuts Grass	4 kg/ Ha
Other indigenous veld grasses can be added to the seed mix		± 4 kg/Ha

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

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

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

Drainage and Erosion Control

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

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

Visual Impacts Amelioration

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

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

8.3.6 Monitoring and Reporting

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

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

8.3.7 Closure objectives and extent of alignment to pre-construction environment

Closure Objectives

The closure of the site will involve removal of all debris and rehabilitation of areas disturbed during the construction phase of the project. This will comprise the scarification of compacted areas, reshaping of areas, topsoiling and rehabilitating all prepared surfaces.

8.4 Appendix D: General Impact Rating Scale

To ensure a direct comparison between various specialist studies, six standard rating scales are defined and used to assess and quantify the identified impacts. This is necessary since impacts have several parameters that need to be assessed.

These scales are:

1. The Severity/ Benefit Scale, which assesses the importance of the impact from a purely technical perspective.
2. The Spatial Impact Scale, which assesses the extent or magnitude of the impact (the area that will be affected by the impact).
3. The Temporal Impact Scale, which assesses how long the impact will be felt. Some impacts are of a short duration, whereas others are permanent.
4. The Degree of Certainty Scale, which provides a measure of how confident the author feels about their prediction.
5. The Likelihood Scale, which provides an indication of the risk or chance of an impact taking place.
6. The Environmental Significance Scale, which assesses the importance of the impact in the overall context of the affected system or party.

To ensure integration of social and ecological impacts, to facilitate specialist assessment of impact significance, and to reduce reliance on value judgments, the severity of the impact within the scientific field in which it takes place (e.g. vegetation, fauna etc.) was assessed first. Thereafter, each impact was assessed within the context of time and space, and the probability of the impact occurring was quantified using the degree of certainty scale.

The impact was then assessed in the context of the whole environment to establish the “environmental significance” of the impact to the flora and vegetation.

The scales are described in detail below.

8.4.1 The Severity/ Beneficial Scale

The *severity scale* was used to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on an affected system (for ecological impacts) or an affected party. This methodology attempts to remove any value judgments from the assessment, although it relies on the professional judgment of the specialist.

NEGATIVE IMPACT	POSITIVE IMPACT
<u>Very severe</u> An irreversible and permanent change to the affected system(s) which cannot be mitigated. For example, change in topography resulting from a quarry.	<u>Very Beneficiary</u> A permanent and very substantial benefit to the affected system(s) with no alternative to achieve this benefit.
<u>Severe</u> Long-term impacts on the affected system(s) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.	<u>Beneficial</u> A long-term impact and substantial benefit to the affected system(s). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
<u>Moderately severe</u> Medium- to long-term impact on the affected system(s) that could be mitigated.	<u>Moderately beneficial</u> A medium- to long-term impact of real benefit to the affected system(s) Other ways of optimising are equally difficult, expensive and time

NEGATIVE IMPACT	POSITIVE IMPACT
	consuming (or a combination of these), as achieving them in this way.
<u>Slight</u> Medium- to short term impacts on the affected system(s) Mitigation is very easy, cheap, less time consuming or not necessary.	<u>Slightly beneficial</u> A short- to medium-term impact and negligible benefit to the affected system(s) Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.
<u>No effect</u> The system(s) is not affected by the proposed development.	<u>Do not know/Cannot know</u> In certain cases, it may not be possible to determine the severity of the impact.

The severity of impacts can be evaluated with and without mitigation order to demonstrate how serious the impact is when nothing is done about it. For beneficial impacts, optimisation means anything that can enhance the benefits. However, mitigation or optimisation must be practical, technically feasible and economically viable.

8.4.2 Spatial and Temporal Scales

Two additional factors were considered when assessing the impacts, namely the relationship of the impact to Spatial and Temporal Scales.

The *spatial scale* (shown in italics) defines the impact at the following scales.

SPATIAL SCALE	EXPLANATION
Localised	at a localised scale (i.e. few hectares in extent). The specific area to which this scale refers is defined for the impact to which it refers.
Study Area	the site, some effects to surrounding area (~10 km)
District	the site, some effects to wider surrounding area (~100 km)
Regional	the site, some effects to surrounding area (+250 km)
National	Impacts will affect at a country level
International	Impacts extend beyond country boundary

The *temporal scale* (shown in italics) defines the impact at the following scales.

TEMPORAL SCALE	EXPLANATION
Short Term	Less than 5 years. Many construction phase impacts will be of a short duration
Medium Term	Between 5 and 20 years
Long Term	Between 20 and 40 years, and from a human perspective essentially permanent.
Permanent	Over 40 years and resulting in a permanent and lasting change.

8.4.3 The Degree of Certainty and the Likelihood Scale

It is also for each specialist to state the degree of certainty, or the confidence attached to their prediction of significance. For this reason, a 'degree of certainty' scale (shown in bold) must be used.

DEGREE	DESCRIPTION
Definite:	More than 90% sure of fact. To use this one will need to substantial supportive data.
Probable:	Between 70% and 90% sure of fact.
Possible:	Between 40% and 70% sure of fact.
Unsure:	Less than 40% sure of fact.

The risk or likelihood (shown in normal font) of impacts being manifested differs. There is no doubt that some impacts would occur, but certain other (usually secondary data) impacts are not as likely and may or may not result. Although these impacts maybe severe, the likelihood of them occurring may affect their overall significance and must therefore be considered. It is therefore necessary for the author to state his estimate of the likelihood of an impact occurring, using the following likelihood scale:

DEGREE	DESCRIPTION
Very unlikely	The chance of these impacts occurring is extremely slim, e.g. natural forces destroying a dam wall.
Unlikely	The risk of these impacts occurring is slight.
May occur	The risk of these impacts is more likely, although it is not definite.
Very Likely	Slight chance that this impact will not occur.
Definite	There is no chance that this impact will not occur.

8.4.4 The Environmental Significance Scale

The environmental significance scale is an attempt to evaluate the significance of an impact, the severity or benefit of which has already been assessed. This evaluation needs to be assessed in the relevant context, as an impact can either be ecological or social, or both. Since the severity of impacts with and without mitigation will already have been assessed, significance was only evaluated after mitigation. In many cases, this mitigation will take place, as it has been incorporated into project design. A six-point significance scale is applied as follows:

SIGNIFICANCE	DESCRIPTION
Very High (6)	Impacts considered to have a major and permanent change to natural environment and are rate as VERY HIGH, usually resulting to severe or very severe/ beneficial to highly beneficial effects.
High (5)	Long term change and are rated as HIGH resulting to severe or moderately severe effects/ beneficial to moderately beneficial.
Moderate (4)	Medium to long-term effects. Impacts are rated as MODERATE with moderately severe or moderately beneficial effects.
Low (3)	Medium to short term effects. Impacts are rated as MODERATE resulting in moderately severe or moderately beneficial effects.
Insignificant (2)	Short term effects are present. Impacts are rated as SLIGHT resulting in SLIGHTLY BENEFICIAL effects. Residual effects are present but are of no consequence.
No Significance (1)	No primary or secondary effects, resulting in NO SIGNIFICANT impact.
Do not Know (0)	Not possible to determine the significance of impacts

8.4.5 Absence of Data

In certain instances, an assessment must be produced in the absence of all the relevant and necessary data, due to paucity or lack of scientific information on the study area. It is more important to identify all the likely environmental impacts than to precisely evaluate the more obvious impacts. It is important to be on the conservative side in reporting likely environmental impacts. Because assessing impacts with a lack of data is more dependent on scientific judgment, the rating on the certainty scale cannot be too high. It is for these reasons that a degree of certainty scale has been provided, as well as the categories DON'T KNOW or CAN'T KNOW.

8.5 Appendix E: Declaration, Specialist Profile and Registration

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST IN TERMS OF REGULATIONS 12 AND 13 OF THE AMENDMENTS TO THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 AS AMENDED.

File Reference Number:

NEAS Reference Number:

Date Received:

(For official use only)

Application for environmental authorization in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amendments to the Environmental Impact Assessment Regulations, 2014. This form is valid as of 6 January 2021.

PROJECT TITLE

UPGRADE OF A WASTEWATER TREATMENT WORKS AND INSTALLATION OF SMALL-BORE SEWAGE RETICULATION SYSTEM IN WOODLANDS, KOUKAMMA LOCAL MUNICIPALITY, SARAH BAARTMAN DISTRICT MUNICIPALITY, EASTERN CAPE

SPECIALIST 1

Contact person:

Postal address:

Postal code:

Telephone:

E-mail:

Professional affiliation(s) (if any)

Mr Jamie Pote

Mr Jamie Pote

Postnet Suite 57, Private Bag X13130, Humewood

6013

Cell:

Fax:

jamiepote@live.co.za

SACNASP (115233), IA/Asa (5045)

Project Consultant:

Contact person:

Postal address:

Postal code:

Telephone:

E-mail:

BLUEPEBBLE CC

Joclyn Marshall

18 Plum Tree Trading Post, 52 Main Service Road, Sedgefield

6573

Cell:

Fax:

067 314 4069

joclyn@bluepebble.co.za

0832563159

The SPECIALIST

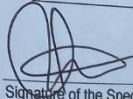
I, Mr Jamie Pote, declare that –

General declaration:

- I act as the independent Specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the assessments for which I am a specialist, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in regulation 8 of the regulations when preparing the application and the Specialist report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority 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 the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- I will keep a register of all interested and affected parties that participated in a public participation process; and
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- all the particulars furnished by me in this form are true and correct;
- will perform all other obligations as expected from a Specialist in terms of the Regulations; and
- I realise that a false declaration is an offence and is punishable in terms of section 24F of the Act.

of Vested Interest (delete whichever is not applicable)
I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Amendments to Environmental Impact Assessment Regulations, 2014 as amended.

- I have a vested interest in the proposed activity proceeding, such vested interest being:



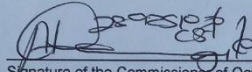
Signature of the Specialist:

N/A

Name of company:

26/07/2025

Date:



Signature of the Commissioner of Oaths:

2025-07-26

Date:

Constable

Designation:

Official stamp (below).



¹ Curriculum Vitae (CV) attached

Annexure 1

CV

Page 4 of 4



Jamie Pote

SENIOR ECOLOGIST AND ENVIRONMENTAL
SCIENTIST

CONTACT

-  (+27) 76 888 8890
-  jamiépote@live.co.za
-  Port Elizabeth, South Africa
-  [linkedin.com](https://www.linkedin.com/in/jamiépote)
-  JamiePote
-  [Bluesky-SA](#)

EDUCATION

- Bachelor of Science
Rhodes University
2002 (Botany & Environmental Science)
- Bachelor of Science (Honours)
Rhodes University
2002 (Botany)
- Professional Natural Scientist
SACNASP
2016

SERVICES

- Terrestrial Biodiversity/Ecological Assessments
- Environmental & Ecological Risk Assessments
- Bioremediation, Restoration & Rehabilitation Plans
- Environmental Management Plans & Programmes
- GIS Mapping & Analysis & Web maps
- Alien Invasive Management (Terrestrial)
- Environmental Auditing & Monitoring (ECO)
- Flora Search & Rescue & Relocation
- Independent Environmental & Ecological review
- Permit and License applications
- Environmental & Mining Applications

ABOUT ME

16 years broad professional experience in Biodiversity, Ecological and Vegetation Assessments on over 220 projects in southern, western and central Africa. Senior Environmental Consultant and EAP on over 50 projects in the mining, infrastructure, housing and agricultural sectors. Environmental monitoring and auditing on over 50 civil infrastructure and construction projects. Have managed all aspects of projects from inception through to implementation. GIS mapping and analytics.

EXPERIENCE AND CLIENTS

Key Sectors

- Wind, Solar Energy Facilities
- Infrastructure and Housing
- Agriculture and Forestry
- Mining and Industrial

Key Projects

- Over 220 independent Biodiversity/Ecological Assessments throughout southern, western and central Africa.
- Mining applications and construction auditing on over 40 projects and more than 300 gravel borrow pits for the Eastern Cape Department of Roads and Public Works, Department of Transport and the South African National Roads Agency (SANRAL) throughout the Eastern Cape.
- South-End Precinct Mixed Use Development for Mandela Bay Development Agency - Environmental application, Ecological assessments and Construction monitoring.
- Coega Development Corporation IDZ projects - Ecological assessments, Flora search & rescue and Construction monitoring.
- Environmental applications, construction monitoring and auditing for a wide range of projects, including infrastructure and housing for various clients including the Department of Transport and SANRAL.
- Various agricultural expansion and infrastructure projects.
- Various wind and solar energy and associated infrastructure projects.
- Numerous infrastructure projects including electrical, water and roads.
- Various Environmental Management and Rehabilitation Plans.

SACNASP
South African Council for Natural Scientific Professions

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

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

Effective: **20 July 2016** Expires: **31 March 2026**




Chairperson


Chief Executive Officer

To verify this certificate scan this code: 

Mr Jamie Pote (BSc (Hons) PR, Sci. Nat.)

PROJECT EXPERIENCE

PERFORMANCE STANDARD BIODIVERSITY AND CRITICAL HABITAT ASSESSMENTS (IFC PS6)

- DBSA Environmental & Social Safeguards Standards 9: Biodiversity Conservation and Sustainable Management Assessment: The Ilitha Fibre Project, Ethekeini 2021
- Critical Habitat & Biodiversity Assessment - Roggeveld Wind Energy Project 2020
- Biodiversity Assessment for Kalukundi Copper/Cobalt Mine, Democratic Republic of Congo 2008

TERRESTRIAL BIODIVERSITY ASSESSMENTS AND COMPLIANCE STATEMENTS

- Terrestrial Biodiversity Assessment (Addo BSD Offices) 2021
- Terrestrial Biodiversity Assessment (Blaauwater Farms) 2021
- Terrestrial Biodiversity Assessment (Buffelshoek Farm, Loele) 2021
- Terrestrial Biodiversity & Aquatic Assessment & Review (Falcon Ridge Dam) 2021
- Terrestrial Biodiversity Assessment (Gubenxa Valley Deciduous Forest) 2021
- Terrestrial Biodiversity Assessment (Little Chelsea Mixed-use) 2021
- Terrestrial Biodiversity Compliance Statement (Maldenhead Farm) 2021
- Terrestrial Biodiversity Review, Mulilo Total Hydra Storage Project Grid Interconnection 2021
- Terrestrial Biodiversity Compliance Statement (Lahlangubo River Bridge) 2021
- Terrestrial Biodiversity Assessment (Mbashe access roads - 3 sites) 2021
- Terrestrial Biodiversity Assessment (Burlington Farm Citrus Development, Cookhouse) 2020
- Terrestrial Biodiversity Compliance Statement: CHDM Cluster 9 Phase 3D Pipeline 2020
- Terrestrial Biodiversity Review, Mulilo Total Hydra Storage Project BESS 2020
- Terrestrial Biodiversity Assessment (Mbashe housing projects, Dutywa & Willowvale) 2020
- Terrestrial Biodiversity Assessment (Helpmekaar Dam, Tarkastad) 2020
- Terrestrial Biodiversity Assessment (Herbertsdale pipeline, Mossel Bay) 2020
- Terrestrial Biodiversity Assessment (Keurbooms Erf 155, Keurboomstrand) 2020
- Terrestrial Biodiversity Assessment (Lowmar Hydroelectric Project, Cradock) 2020
- Terrestrial Biodiversity Assessment (Mossel Bay Gas Power Plant) 2020
- Terrestrial Biodiversity Assessment (Erf 1820, Mthatha) 2020
- Terrestrial Biodiversity Assessment (Newlyn Manganese Terminal, Coega SEZ) 2020
- Terrestrial Biodiversity Assessment Thornhill Phase 2 Sanitation Link 2020

ENERGY PROJECTS (WIND FARM AND PHOTOVOLTAIC INFRASTRUCTURE)

- Preliminary Biodiversity Screening for Chrisdelina Ranch Agricultural Project, Kizenga District 2020
- Preliminary Biodiversity Screening and GIS mapping for Balekani Photovoltaic Solar Project 2020
- Preliminary Biodiversity Screening and GIS mapping for Sihoye Photovoltaic Solar Project 2020
- Preliminary Biodiversity Screening and GIS mapping Mpaka Photovoltaic Solar Project 2020
- Preliminary Biodiversity Screening and GIS mapping for Chivvelwa Hydroelectric project 2020
- Ecological Assessment for Vermaak Boerdery Hydro Turbine (Cookhouse), Eastern Cape 2020
- Ecological Assessment for Windcurrent Wind Farm, Eastern Cape 2012
- Ecological Assessment for Universal Windfarm, NMB 2011
- Ecological Assessment for Inca Energy Windfarm, Northern Cape 2011
- Ecological Assessment for Broadlands Photovoltaic Farm, Eastern Cape 2011
- Botanical Assessment for Electrawinds Windfarm Coega, NMB 2010
- Botanical Assessment and Open Space Management Plan for Mainstream WEF Phase 2, Eastern Cape 2010

SPECIALISED ECOLOGICAL REPORTS AND REVIEWS

- Rebels Vlei Riparian delineation 2021

24/03/2021

1 | Page

Mr Jamie Pote (BSc (Hons) PR, Sci. Nat.)

• Buck Kraal Dam Rehabilitation Plan Review	2020
• Rehabilitation Plan for Hitgeheim Farm (Farm 960), Sunland, Eastern Cape	2017
• Green Star Rating Ecological Assessment for SANRAL office, Bay West City, NMBM	2015
• Section 24G Assessment and Rehabilitation Plan for Bingo Farm, Eastern Cape	2014
• Mapping and Ecological services for Congo Agriculture, Republic of Congo	2013
• Rehabilitation Plan for Nieu Bethesda, Eastern Cape	2011
• Mapping of pipeline for Kenton Water Board, Eastern Cape	2010
• Rehabilitation Plan for N2 Upgrade - Coega to Colchester, NMB	2010
• Representative for landowner group for Seaview burial Park, NMB	2010
• Botanical Sensitivity Analysis for LSDF, Greenbushes-Hunters Retreat, NMB	2008
• Forestry Rehabilitation Assessment Report for Amahlathi Forest Rehabilitation, Eastern Cape	2007
• Botanical & Riparian Assessment for Orange River Weirs-Boegoeberg, Douglas Dam and Sendelingsdrif, Northern Cape	2006
• Botanical Assessment for State of the Environment Report for Chris Hani District Municipality SoER, Eastern Cape	2003

ROAD AND RAILWAY INFRASTRUCTURE PROJECTS

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

MINING PROJECTS

• Ecological Assessment for Bochum Borrow Pits, Limpopo	2013
• Ecological Assessment and Mining and Rehabilitation Plan for Greater Soutpansberg Mining Project, Limpopo (3 proposed Mines)	2013
• Ecological Assessment for Thulwe Road Borrow Pits, Limpopo	2013
• Ecological Assessment and Mining and Rehabilitation Plan for Baghana Mining, Ghana	2010
• Botanical Assessment for Zwartbosch Quarry, Eastern Cape	2008
• Botanical description & map production for Quarry - Rudman Quarry, Eastern Cape	2008
• Botanical Basic Assessment, Rehab Plan & Maps for Borrow Pit - Rocklands/Patensie, Eastern Cape	2008
• Botanical Assessment & Maps for Sandman Sand Gravel Mine, Eastern Cape	2008
• Botanical Assessment & GIS maps for Shamwari Borrow Pit, Eastern Cape	2008
• Detailed Botanical Assessment, EMP and Rehab Plan for Kalukundi Copper/Cobalt Mine, Democratic Republic of Congo	2008
• Botanical Assessment, Rehab Plan & Maps for Borrow Pit Humansdorp/Oyster Bay, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Cala, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Camdeboo, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Somerset East, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Nkonkobe, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Ndlambe, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Blue Crane Route, Eastern Cape	2008

Mr Jamie Pote (BSc (Hons) PR, Sci. Nat.)

• Botanical Assessment, EMP and Rehabilitation Plan for AWRM - Cathcart, Eastern Cape	2008
• Botanical Assessment, GIS maps and Rehab Plan for Mthatha Prospecting, Eastern Cape	2008
• Regional Botanical Map for mining prospecting permit, Welkom	2008
• Botanical Assessment for Scoping Report and Detailed Botanical Assessment and Rehab Plan for Elitheni Coal Mine, Eastern Cape	2007
• Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Oyster Bay, Eastern Cape	2007
• Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Bathurst/CHT, Eastern Cape	2007
• Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Jeffreys Bay, Eastern Cape	2007
• Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Storms River/Kareedouw, Eastern Cape	2007
• Biophysical Assessment for Humansdorp Quarry, Eastern Cape	2006
• Botanical Assessment, Rehab Plan & Maps for Quarry-Cathcart & Somerset East, Eastern Cape	2006
• Botanical Assessment, Rehab Plan & Maps for Quarry - Despatch Quarry, NMB	2006
• GIS Mapping & Botanical Assessment and Rehab Plan for Quarry - JBay Crushers, Eastern Cape	2006
• Botanical Assessment, EMP and Rehabilitation Plan for Polokwane Silicon Smelter, Limpopo	2006
• Application for Mining Permit for Bruce Howarth Quarry, Eastern Cape	2006

POWERLINE INFRASTRUCTURE PROJECTS

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

PIPELINE INFRASTRUCTURE PROJECTS

• Terrestrial Biodiversity Assessment for Thornhill Phase 2 Sanitation Link, Ndlambe, Eastern Cape	2020
• Botanical Assessment for Ngqamakhwe Regional Water Supply Scheme (Phase 3)	2018
• Ecological Assessment for Butterworth Emergency Bulk Water Supply Scheme	2017
• Ecological Assessment for Karringmelkspruit Emergency Bulk Water Supply (Lady Grey)	2017
• Ecological Assessment for Wanhoop-Willowmore Bulk Water Supply, Eastern Cape	2016
• Ecological Assessment for Steytleville Bulk Water Supply, Eastern Cape (Phase 4)	2013
• Ecological Assessment for Steytleville Bulk Water Supply, Eastern Cape (Phase 5)	2013
• Detailed Ecological Assessment for Suikerbos Pipeline, Gauteng	2012
• Basic Botanical Assessment for Wanhoop farm pipeline, Eastern Cape	2010
• Basic Botanical Assessment for Chatty Sewer, NMB	2010
• Species of Special Concern Mapping for Seaview Pipeline, NMB	2009
• Species of Special Concern Mapping for Chelsea Bulk Water Pipeline, NMB	2009
• Map Production for Russell Rd Stormwater, NMB	2008
• Basic Botanical Assessment for Albany Pipeline, Eastern Cape	2008
• Environmental Risk Assessment for Elands River pipeline, Eastern Cape	2007

Mr Jamie Pote (BSc (Hons) PR, Sci. Nat.)

• Detailed Botanical Assessment for Motherwell Pipeline, NMB	2007
• Detailed Botanical Assessment, GIS maps for Erasmuskloof Pipeline, Eastern Cape	2007
• Botanical & Floristic Report for Hankey pipeline, Eastern Cape	2006
• Detailed Botanical Assessment for Port Alfred water pipeline, Eastern Cape	2004

GENERAL INFRASTRUCTURE DEVELOPMENT PROJECTS

• Ecological Assessment for Amalinda crossing, BCM, Eastern Cape	2019
• Ecological Assessment for Cookhouse Bridge rehabilitation and temporary deviation, Eastern Cape	2019
• Ecological Assessment for Nelson Mandela University Access Road, NMB	2019
• Botanical Assessment for Zachtvlei Dam (Lady Grey), Eastern Cape	2017
• Botanical Assessment for Gcebula River bridge (Peddie), Eastern Cape	2017
• Botanical Assessment for Kouga Dam wall upgrade, Eastern Cape	2013
• Botanical Assessment for Jansenville Cemetery, Eastern Cape	2009
• Botanical Assessment for Radar Mast construction for South African Weather Service – BCM & NMB	2008
• Botanical Assessment and GIS mapping for golf course realignment for East London Golf Course, BCM, Eastern Cape	2007
• Botanical Assessment for PE Airport Extension, NMB	2006
• Botanical Assessment for Kidd's Beach Desalination Plant, BCM, Eastern Cape	2006

HOUSING DEVELOPMENT PROJECTS

• Terrestrial Biodiversity Assessment for Erf 1820 Mthatha, KSDM, Eastern Cape	2020
• Ecological Assessment for Erf 599 Walmer Mixed Use Development, Nelson Mandela Bay	2019
• Ecological Assessment Portion 21-23 and 41 of Farm 807, Gonubie, Buffalo City	2019
• Ecological Assessment for Emerald Sky Housing Project, BCMM	2019
• Ecological Assessment for Erf 14, Kabega, Port Elizabeth	2017
• Ecological Assessment for Fairwest Rental Housing, Port Elizabeth	2017
• Ecological Assessment for Hankey Housing, Kouga District Municipality	2015
• Ecological Assessment for Lebowakgoma Housing, Limpopo	2013
• Ecological Assessment for Giyani Development, Limpopo	2013
• Ecological Assessment for Palmietfontein Development, Limpopo	2013
• Ecological Assessment for Seshego Development, Limpopo	2013
• Botanical Assessment for Sheerness Road, BCM, Eastern Cape	2013
• Ecological Assessment for Ethembeni Housing, NMB	2012
• Ecological Assessment for Pelana Housing, Limpopo	2012
• Flora Search and Rescue Plan for Kwanobuhle Housing, Western Cape	2011
• Botanical Assessment for The Craggs 288/03, Western Cape	2010
• Ecological Assessment Revision Report for Fairview Housing, NMB	2010
• Botanical Assessment, EMP and Open Space Management Plan for Hornlee Housing Development, Western Cape	2010
• Botanical Assessment for Little Ladywood, Western Cape	2010
• Botanical Assessment and Open Space Management Plan for Motherwell NU31, NMB	2010
• Botanical Assessment and Open Space Management Plan for Plett 443/07, Western Cape	2010
• Botanical Assessment for Willow Tree Farm, NMB	2010
• Botanical Assessment for Kouga RDP Housing, Eastern Cape	2009
• Botanical Assessment for Fairview Erf 1226 (Wonderwonings), NMB	2009
• Species List Compilation for Zeekoerivier Humansdorp, Eastern Cape	2009
• Botanical Assessment for Woodlands Golf Estate (Farm 858), BCM, Eastern Cape	2009

Mr. Jamie Pote (BSc (Hons) PR. Sci. Nat.)

• Botanical Assessment for Plettenberg Bay - 438/4, Western Cape	2009
• Vegetation Assessment for Kwanokuthula RDP housing project, Western Cape	2008
• Site screening assessment for Greenbushes Site screening, NMB	2008
• Botanical Assessment for Fairfax development, Eastern Cape	2008
• Botanical Assessment for Plettenberg Bay Brakkloof 50&51, Western Cape	2008
• Botanical Assessment, GIS mapping for Theescombe Erf 325, NMB	2008
• Site Screening for Mount Road, NMB	2008
• Botanical Assessment for Greenbushes Farm 40 Swinburne 404, NMB	2008
• Botanical Assessment for Greenbushes 130, NMB	2008
• Botanical Assessment for Greenbushes Kuyga no. 10, NMB	2008
• Botanical Assessment for Plettenberg Bay - 438/24, Western Cape	2007
• Botanical Assessment for Plettenberg Bay - Olive Hills 438/7, Western Cape	2007
• Botanical Assessment for Gonubie Portion 809/9, BCM, Eastern Cape	2006
• Botanical Assessment for Glengarriff Farm 723, BCM, Eastern Cape	2006
• Botanical Assessment for Gonubie Portion 809/10, BCM, Eastern Cape	2006
• Botanical Assessment for Gonubie Portion 809/4 & 5, BCM, Eastern Cape	2006
• Botanical Assessment for Plettenberg bay - Ladywood 438/1&3, Western Cape	2006
• Botanical Assessment and Rehab Plan for Winterstrand Desalination Plant, BCM	2006
• Botanical Assessment for Bosch Hoogte, NMB	2006
• Botanical Assessment for Plettenberg bay Farm 444/38, Western Cape	2006
• Botanical Assessment for Plettenberg Bay - 444/27, Western Cape	2006
• Botanical Assessment for Leisure Homes, BCM, Eastern Cape	2006
• Botanical Basic Assessment for Trailees Wetland Assessment, Eastern Cape	2005
• Botanical Assessment and Rehab Plan for Arlington Racecourse - PE, NMB	2005
• Botanical Assessment for Smart Stone, NMB	2005
• Botanical Assessment for Peninsular Farm (Port Alfred), Eastern Cape	2005
• Botanical Assessment for Mount Pleasant - Bathurst, Eastern Cape	2005
• Botanical Assessment and RoD amendments for Colchester Erven 1617 & 1618 (Riverside), NMB	2005
• Basic Botanical Assessment for Parsonsvele 3/4, Eastern Cape	2005
• Botanical Assessment for Bridgemead - Malabar PE, NMB	2004

AGRICULTURAL PROJECTS

• Ecological Assessment for Vermaak Boerdery Hydro Turbine (Cookhouse) 2020	2020
• Thornhill Eggland Specialist Ecological Assessment	2020
• Ecological Assessment for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape	2015
• Ecological Assessment for Citrus expansion on farm 960, Patensie (AIN du Preez Boerdery)	2014
• Ecological Assessment for Doornkraal Pivot (Hankey), Eastern Cape	2014
• Ecological Assessment for Tzaneen Chicken Farm, Limpopo	2013
• Botanical Assessment and Open Space Management Plan for Kudukloof, NMB	2010
• Botanical Assessment and Open Space Management Plan for Landros Veeplaats, NMB	2010
• Botanical Assessment and Flora Relocation Plan for Wildemans Plaas, NMB	2006

GOLF ESTATE AND RESORT DEVELOPMENT PROJECTS

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

Mr Jamie Pote (BSc (Hons) PR, Sci. Nat.)

MIXED USE DEVELOPMENT PROJECTS

• Ecological Assessment for South-End Precinct Mixed Use Development, Nelson Mandela Bay	2018
• Botanical Assessment, EMP and Open Space Management Plan for Bay West City, NMB	2010
• Botanical Assessment, GIS maps, Open Space and Rehab Plans for Fairview Erf 1082, NMB	2009
• Botanical Assessment and GIS maps for Utopia Estate PE, NMB	2008
• Botanical Assessment and GIS mapping for Madiba Bay Leisure Park, NMB	2007
• Botanical Assessment and GIS mapping for Madiba Bay Leisure Park, NMB	2007
• Botanical Basic Assessment for Cuyler Manor (Farm 320), Uitenhage, NMB	2007

BUSINESS AND INDUSTRIAL DEVELOPMENT PROJECTS

• Ecological Assessment for Parsonsview Erf 984 & 1134 Parsonsview, NMB	2020
• Mthatha Retails and Service Center	2020
• Ecological Assessment for Walmer Erf 11667 - Bidfood Warehousing Development, NMB	2020
• Ecological Assessment for Portion 87 of the Farm Little Chelsea No 10, NMB	2020
• Ecological Assessment for Bay West City ENGEN Service Station, NMB	2015
• Ecological Assessment for Green Star grading for SANRAL, NMB	2014
• Ecological Assessment for OTGC Tank Farm, NMB	2012
• Botanical Assessment and Open Space Management Plan for Petro SA Refinery, Coega IDZ, NMB	2010
• Botanical Assessment for Bluewater Bay Erf 805, NMB	2009
• Ecological Assessment for Bay West City, NMB	2007
• Botanical Assessment for Kenton Petrol Station, Eastern Cape	2005
• Botanical Assessment and RoD amendments for Colchester Petrol Station, NMB	2005

ECO-ESTATE DEVELOPMENT PROJECTS

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

FLORA AND FAUNA RELOCATION PLANS, PERMITS AND IMPLEMENTATION

• Flora Search and Rescue for Nelson Mandela University Phase 2 & 3 Residences, Eastern Cape	2020
--	------

24/03/2021

6 | Page

Mr Jamie Pote (BSc (Hons) PR, Sci. Nat.)

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

ENVIRONMENTAL MANAGEMENT PLANS

• Final Environmental Management Programme (EMPr) and Maintenance Management Plan for South End Precinct Mixed Use Zone, Nelson Mandela Bay Municipality	2020
• Final Environmental Management Programme (EMPr) for Coega Land-Based Aquaculture Development Zone (ADZ), Coega Industrial Development Zone (IDZ), Nelson Mandela Bay Municipality	2019
• Basic Botanical Assessment for Kromensee EMP (Jeffries Bay), Eastern Cape	2010
• Wetland Management Plan for NMB Portnet, NMB	2010
• Baseline Botanical Study, Vegetation mapping and EMP for Local Nature Reserve for Plettenberg Bay Lookout LNA, Western Cape	2009
• Biodiversity & Ecological Processes for Bathurst-Commonage, Eastern Cape	2006
• EMP for Kromensee EMP (Jeffries Bay), Eastern Cape	2006
• Floral Survey for Mbotyi Conservation Assessment, Eastern Cape	2005
• Identifying and Assessment on Aquatic Weeds for Pumba Private Game Reserve, Eastern Cape	2005

BASIC ASSESSMENT APPLICATION PROJECTS (DEDEAT)

• Basic Assessment Application for Parsonsvei Erf 984 & 1134 Parsonsvei	2020
• Construction of Deviation and Rehabilitation of Bridge along DRO2481 road	2020
• Basic Assessment Application for Vermaak Boerdery Hydro Turbine (Cookhouse)	2020
• Basic Assessment Application for Walmer Erf 11667 Bidfood Warehousing Development	2020
• Basic Assessment Application for Portion 87 of the Farm Little Chelsea No 10	2020
• Basic Assessment Application for Nelson Mandela University Access Road, NMB	2019
• Basic Assessment, WULA and Borrow Pit/Quarry Mining Application, Clarkebury Rd, Idutywa	2019
• Basic Assessment Application for Erf 599 Walmer Mixed Use Development, Nelson Mandela Bay	2019
• Basic Assessment Application for Cookhouse Bridge rehabilitation and temporary deviation	2019
• Basic Assessment Application for Erf 14 Kabega, NMBM	2017
• Basic Assessment Application for Hankey Housing, Kouga District Municipality	2017
• Basic Assessment Application for Fairwest Rental Housing, Nelson Mandela Bay	2017
• Basic Assessment Application for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape	2015

24/03/2021

7 | Page

Mr Jamie Pote (BSc (Hons) PR, Sci. Nat.)

- Basic Assessment Application for Hankey Housing, Kouga District Municipality 2015
- Basic Assessment Application for Citrus expansion on farm 960, Patensie (AIN du Preez Boerdery) 2014
- Basic Assessment Application for South-End Precinct Mixed Use Development, Nelson Mandela Bay 2018

MINING PERMIT/ENVIRONMENTAL MANAGEMENT PROGRAMME APPLICATIONS (DMR)

- Mining BAR/EMP's for Blue Crane Route & Camdeboo LM 12 Borrow Pits – (DoT) 2019
- Mining BAR/EMP's for Elundini LM 6 Borrow Pits (DoT)
- Mining BAR/EMP's for Baviaans LM 6 Borrow Pits (DoT)
- Mining BAR/EMP's for Kouga & Koukamma LM 12 Borrow Pits (DoT)
- Mining BAR/EMP's for Sakhisizwe & Engcobo LM 12 Borrow Pits (DoT)
- Mining BAR/EMP's for Senqu LM 12 Borrow Pits (DoT)
- Mining BAR/EMP's for 24 Borrow Pits in 6 districts within the Eastern Cape – (SANRAL) 2018
- Mining BAR/EMP's for Ingquza Hill LM Borrow Pits – (SANRAL) 2017
- Mining BAR/EMP's for Baviaans LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Senqu LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Inkwanca (Enoch Mgijima) LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Sakhisizwe/Engcobo LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Raymond Mahlaba LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Camdeboo LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Elundini LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Emalahleni/Intsika Yethu LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Nkonkobe LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Mbhashe LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Mbitzane LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Senqu LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Elundini LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Emalahleni LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Emalahleni LM Borrow Pits – (DRPW) 2016
- Mining BAR/EMP's for Ikwezi/Baviaans LM Borrow Pits – (DRPW) 2016
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (Tarkastad) (DRPW) 2015
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - Intsika Yethu and Emalahleni (DRPW) 2015
- Mining BAR/EMP's for Joe Gqabi DM Borrow Pits - Senqu (DRPW) 2015
- Mining BAR/EMP's for Makana/Ndlambe LM Borrow Pits - Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Amahlathi LM Borrow Pits - Amatole (DRPW) 2015
- Mining BAR/EMP's for Mbashe/Mqume LM Borrow Pits - Amatole (DRPW) 2015
- Mining BAR/EMP's for Sundays River Valley LM Borrow Pits - Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Kouga LM Borrow Pits - Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR02581 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08041, DR08247, DR08248 & DR08504 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08599, DR08601 & DR08570 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08235, DR08551 & DR08038 (DRPW) 2014
- Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08092, DR08093 & DR08649 (DRPW) 2014
- Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08090, DR08412, DR08425, DR08129, DR08109, DR08106, DR08104 & DR08099 - Matatiele (DRPW) 2014

24/03/2021

8 | Page

Mr Jamie Pote (BSc (Hons) PR, Sci. Nat.)

ENVIRONMENTAL COMPLIANCE AUDITING

- Environmental Compliance Audit (Habata Boerdery) 2021
- Environmental Compliance Audit (Sontule Farm) 2021

ENVIRONMENTAL MANAGEMENT, AUDITING, COMPLIANCE AND MONITORING PROJECTS

- Environmental Auditing Services Pre-construction and Construction (Rocky Coast Farm) 2021
- Environmental Auditing Services (Middledrift Breeder Facility) 2021
- Coega Aquaculture Development Zone Environmental Compliance and Monitoring for Construction (24 Months) 2020
- Construction of NMU West End Student Residences Phases 1 & 3 Environmental Control Office (30 Months) 2020
- Environmental Auditing and construction monitoring for construction of Phase 1 River Park (South End Precinct) 2020
- Waste Management License audit for Bedford Recycling project 2020
- Auditing for Construction of Fairwest Village Housing Project 2019
- Auditing for Construction of Utopia Estate monthly auditing 2019
- ECO for DRPW IRM Road Maintenance projects, Baviaans LM 2019
- ECO for DRPW IRM Road Maintenance projects, Senqu LM 2019
- ECO for DRPW IRM Road Maintenance projects, Kouga/Koukamma LM 2019
- ECO for DRPW IRM Road Maintenance projects, Sakhsizwe/Engcobo LM 2019
- ECO for DRPW IRM Road Maintenance projects, Elundini LM 2019
- ECO for DRPW IRM Road Maintenance projects, Emalahleni/Intsika Yethu LM 2019
- ECO for Construction of Fairwest Village Housing Project 2019
- ECO for Construction of Utopia Estate Mixed Use Project 2019
- ECO for Construction of NMU West End Student Residences Phases 1 & 3 2019
- ECO for Construction of Eco-Pullets pullet rearing facility, Paterson 2018
- ECO for DRPW IRM Road Maintenance projects, Raymond Mahlaba LM 2018
- ECO for DRPW IRM Road Maintenance projects, Inkwanca (Enoch Mgijima) LM 2018
- ECO for Citrus expansion on Farm 960, Patensie (AIN du Preez Boerdery) 2017
- ECO for Citrus expansion on Hitgeheim Farm (Farm 960), Sunland, Eastern Cape 2017
- DEO for improvement of national route R67 section 5 from Whittlesea (km 0.00) to Swart Kei river (km 15.40) – Murray & Roberts 2017
- ECO for SANRAL RRP Road Maintenance projects, Mbizana LM 2017
- ECO and Botanical Specialist for the special maintenance of national route R61 Section 2 from Elinus Farm (km 42.2) to N10 (km 85.0) (SANRAL) 2016
- Environmental Control Officer (ECO): Construction of NSRI Slipway - Port Elizabeth Harbour 2016
- ECO for SANRAL RRP Road Maintenance projects, Mbashe LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Nkonkobe LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Mbizana LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Senqu LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Elundini LM 2016
- ECO and Environmental Management for closure of Bushmans River Landfill site 2016
- ECO for DRPW IRM Road Maintenance projects, Amahlathi Municipality 2015
- ECO for DRPW IRM Road Maintenance projects, Makana/Ndlambe Municipality 2015
- ECO for DRPW IRM Road Maintenance projects, Mbashe/Mqume Municipality 2015
- ECO for DRPW IRM Road Maintenance projects, Port St Johns, Mbizana, Ingquza Hill LM's 2015
- ECO for Riversbend Citrus Farm, NMB 2014
- ECO for Alfred Nzo DM Road resurfacing - DR08071, DR08649, DR08092, DR08418, DR08452, DR08015, DR08085, DR08639 & DR08073, Eastern Cape - MSBA 2014

Mr Jamie Pote (BSc (Hons) PR. Sci. Nat.)

• ECO Audits for Koukamma Flood Damage Road Repairs – Hatch Goba	2014
• EMP and ECO for Utopia Estate, NMB	2013
• Final EMP submission for Seaview Garden Estate, NMB	2012
• ECO audits for NMB Road surfacing, NMB (multiple contacts)	2011
• EMP submission and ECO for Seaview Garden Estate, NMB	2010
• ECO for Mainstream Windfarm wind monitoring mast installation, Eastern Cape	2010
• EMP and ECO for Sinati Golf Estate EMP, BCM, Eastern Cape	2009
• Flora Relocation Plan and Permit application for Wildemans Plaas, NMB	2006

ENVIRONMENTAL SCREENING PROJECTS

• Somerset East Stormwater Environmental Screening Report	2021
• Woodlands Diary Road Upgrade Environmental Screening Report, Kouga LM	2021
• Risk Assessment and Screening for proposed Heatherbank access road, NMB	2020
• Environmental Screening Report for Proposed Life Hospital parking expansion, NMB	2019
• Environmental Screening Report for Erf 984 & 1134 development, Parsonsvei, NMB	2019
• Environmental Screening Report for proposed Khayaletu School, Buffalo City	2018
• Environmental Screening Report for Proposed Housing Development of Erf 8700, Kabega Park, NMB	2017
• Environmental Screening Report for Proposed Housing Development of Erf 14, Kabega Park, NMB	2017
• Environmental Screening Report for Proposed Fairwest Social Housing project, Fairview, NMB	2016
• Environmental Screening Report for Development of Little Chelsea No 25, NMB	2016
• Terrestrial Vegetation Risk Assessment for proposed Skietnek Citrus Farm development (Kirkwood)	2015
• Preliminary Environmental Risk Assessment: NSRI Slipway Port Elizabeth	2015
• Environmental Screening Report for Proposed Development of a Dwelling on Erf 899, Theescombe	2015
• Environmental Screening Report for Proposed Development on Erf 559, Walmer, Port Elizabeth	2015
• Environmental Screening Report for Proposed Housing Scheme Development of Erf 8709, Wells Estate	2015
• Environmental Screening Report for Development of Portion 10 of Little Chelsea No 87, NMB	2015

SECTION 24G APPLICATIONS

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

CONFERENCES AND PUBLICATIONS

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

*Mr Jamie Pote (BSc (Hons) PR, Sci. Nat.)***OTHER RESEARCH EXPERIENCE**

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

8.6 Appendix F: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity

SCOPE

The protocol (*Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation (GN 320, 20 March 2020)*) provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities requiring environmental authorisation.

The protocol (*Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of sections 24(5)(a) and (h) and 44 of NEMA, gazetted on 30 October 2020*), provides the criteria for the assessment and reporting of impacts on plant and animal species for activities requiring environmental authorisation.

These protocols replace the requirements of Appendix 6 of the Environmental Impact Assessment Regulation⁷.

The assessment and minimum reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (<https://screening.environment.gov.za/screeningtool>). The requirements for terrestrial biodiversity are for landscapes or sites which support various levels of biodiversity. The relevant terrestrial biodiversity data in the screening tool has been provided by the South African National Biodiversity Institute⁸.

SITE SENSITIVITY VERIFICATION AND MINIMUM REPORT CONTENT REQUIREMENTS

Prior to commencing with a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool must be confirmed by undertaking a site sensitivity verification.

2.1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.

2.2. The site sensitivity verification must be undertaken through the use of:

- (a) a desk top analysis, using satellite imagery,
- (b) a preliminary on-site inspection; and
- (c) any other available and relevant information.

2.3. The outcome of the site sensitivity verification must be recorded in the form of a report that:

- (a) confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.;
- (b) contains a motivation and evidence (e.g., photographs) of either the verified or different use of the land and environmental sensitivity; and
- (c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

⁷ The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act 107 of 1998).

⁸ The biodiversity dataset has been provided by the South African National Biodiversity Institute (for details of the dataset, click on the options button to the right of the various biodiversity layers on the screening tool).

TERRESTRIAL BIODIVERSITY SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
1	<u>General Information</u>	-
1.1	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified on the screening tool as being "very high sensitivity" for terrestrial biodiversity, must submit a <u>Terrestrial Biodiversity Specialist Assessment</u> .	✓
1.2	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being ' low sensitivity ' for terrestrial biodiversity, must submit a <u>Terrestrial Biodiversity Compliance Statement</u> .	✓
1.3	However, where the information gathered from the site sensitivity verification differs from the designation of ' very high ' terrestrial biodiversity sensitivity on the screening tool and it is found to be of a ' low ' sensitivity, then a <u>Terrestrial Biodiversity Compliance Statement</u> must be submitted.	✓
1.4	Similarly, where the information gathered from the site sensitivity verification differs from that identified as having a ' low ' terrestrial biodiversity sensitivity on the screening tool, a <u>Terrestrial Biodiversity Specialist Assessment</u> must be conducted.	✓
1.5	If any part of the proposed development footprint falls within an area of ' very high ' sensitivity, the assessment and reporting requirements prescribed for the ' very high ' sensitivity apply to the entire footprint, excluding linear activities for which impacts on terrestrial biodiversity are temporary and the land in the opinion of the terrestrial biodiversity specialist, based on the mitigation and remedial measures, <u>can be returned to the current state within two years of the completion of the construction phase</u> , in which case a <u>compliance statement applies</u> . Development footprint in the context of this protocol means the area on which the proposed development will take place and includes any area that will be disturbed.	✓
	VERY HIGH SENSITIVITY RATING for terrestrial biodiversity features	
3.1.13	a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified <u>as having a 'low' terrestrial biodiversity sensitivity and that were not considered appropriate</u> ,	✓
	LOW SENSITIVITY RATING – for terrestrial biodiversity features	
4	<u>Terrestrial Biodiversity Compliance Statement</u>	✓
4.1	The compliance statement <u>must be prepared by a specialist registered with the SACNASP and having expertise in the field of ecological sciences</u> .	✓
4.2	The compliance statement must:	
4.2.1	<u>be applicable to the preferred site and proposed development footprint;</u>	✓
4.2.2	<u>confirm that the site is of 'low' sensitivity for terrestrial biodiversity; and</u>	✓
4.2.3	<u>indicate whether or not the proposed development will have any impact on the biodiversity feature.</u>	✓
4.3	The <u>compliance statement must contain, as a minimum</u> , the following information:	
4.3.1	the <u>contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;</u>	✓
4.3.2	a <u>signed statement of independence</u> by the specialist;	✓
4.3.3	a <u>statement on the duration, date and season</u> of the site inspection and the relevance of the season to the outcome of the assessment;	✓
4.3.4	a <u>baseline profile description</u> of biodiversity and ecosystems of the site;	✓
4.3.5	the <u>methodology used to verify the sensitivities</u> of the terrestrial biodiversity features on the site, including equipment and modeling used, where relevant;	✓
4.3.6	in the case of a linear activity, <u>confirmation from the terrestrial biodiversity specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;</u>	✓
4.3.7	where required, <u>proposed impact management outcomes or any monitoring requirements</u> for inclusion in the EMPr;	✓
4.3.8	a <u>description of the assumptions made and any uncertainties or gaps in knowledge or data; and</u>	✓

4.3.9	any <u>conditions to which this statement is subjected.</u>	EAP
4.4	A <u>signed copy of the compliance statement must be appended to the Basic Assessment Report</u> or Environmental Impact Assessment Report.	EAP

ANIMAL SPECIES SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
1	<u>General Information</u>	
1.1	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of “very high” or “high” sensitivity for <u>terrestrial animal species</u> must submit a Terrestrial Animal Species Specialist Assessment Report .	✓
1.2	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of “medium sensitivity” for <u>terrestrial animal species</u> must submit either a Terrestrial Animal Species Specialist Assessment Report or a Terrestrial Animal Species Compliance Statement , depending on the outcome of a site inspection undertaken in accordance with paragraph 4.	✓
1.3	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of “low” sensitivity for <u>terrestrial animal species</u> must submit a Terrestrial Animal Species Compliance Statement .	✓
1.4	Where the information gathered from the site sensitivity verification differs from the screening tool designation of “very high” or “high”, for terrestrial animal species sensitivity and it is found to be of a “low” sensitivity, then a Terrestrial Animal Species Compliance Statement must be submitted.	✓
1.5	Where the information gathered from the site sensitivity verification differs from the screening tool designation of “low” terrestrial animal species sensitivity and it is found to be of a “very high” or “high” terrestrial animal species sensitivity, a Terrestrial Animal Species Specialist Assessment must be conducted.	✓
1.6	If any part of the development falls within an area of confirmed “very high” or “high” sensitivity, the assessment and reporting requirements prescribed for the “very high” or “high” sensitivity, apply to the entire development footprint. Development footprint in the context of this protocol means, the area on which the proposed development will take place and includes the area that will be disturbed or impacted.	✓
1.7	The Terrestrial Animal Species Specialist Assessment and the Terrestrial Animal Species Compliance Statement must be undertaken within the <i>study area</i> .	✓
1.8	Where the nature of the activity is not expected to have an impact on species of conservation concern (SCC) beyond the boundary of the preferred site, the study area means the proposed development footprint within the preferred site.	✓
1.9	Where the nature of the activity is expected to have an impact on SCC beyond the boundary of the preferred site, the <i>project areas of influence</i> (PAOI) must be determined by the specialist in accordance with <i>Species Environmental Assessment Guideline</i> ⁹ , and the study area must include the PAOI, as determined.	✓
	VERY HIGH AND HIGH SENSITIVITY RATING for terrestrial animal species	
2	<u>Terrestrial Animal Species Specialist Assessment</u>	
	<u>VERY HIGH SENSITIVITY RATING</u>	✓
	1. Critical habitat for range-restricted species ¹⁰ of conservation concern, that have a global range of less than 10 km ² .	

⁹ Available at <https://bgis.sanbi.org/>¹⁰ Species with a geographically restricted area of distribution.

	2. SCC listed on the IUCN Red List of Threatened Species¹¹ or on South Africa's National Red List website¹² as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare. 3. Species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle. 4. The number of mature individuals that ranks the site among the largest 10 aggregations known for the species. These areas are irreplaceable for SCC.	
	HIGH SENSITIVITY RATING 1. Confirmed habitat for SCC. 2. SCC, listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare. These areas are unsuitable for development due to a very likely impact on SCC.	✓
2.2.12	identify any <u>alternative development footprints</u> within the preferred site which would be of "low" or "medium" sensitivity as identified by the screening tool and verified through the site sensitivity verification.	✓
2.3	The findings of the assessment must be written up in a Terrestrial Animal Species Specialist Assessment Report .	✓
3	Terrestrial Animal Species Specialist Assessment Report	
3.1.13	a <u>motivation must be provided</u> if there were any development footprints identified as per paragraph 2.2.12 above that were identified as having "low" or "medium" terrestrial animal species sensitivity and were not considered appropriate.	✓
4	MEDIUM SENSITIVITY SPECIES OF CONSERVATION CONCERN CONFIRMATION	
	MEDIUM SENSITIVITY RATING – for terrestrial animal species: 1. <u>Suspected habitat for SCC based either on historical records (prior to 2002) or being a natural area included in a habitat suitability model for this species¹³.</u> 2. SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	✓
4.6	Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Animal Species Specialist Assessment must be submitted in accordance with the requirements specified for "very high" and "high" sensitivity in this protocol.	✓
4.7	Similarly, where <u>no SCC are found on site during the site inspection</u> or the presence is confirmed to be unlikely, a Terrestrial Animal Species Compliance Statement must be submitted.	✓
5	LOW SENSITIVITY RATING – for terrestrial animal species	
	Terrestrial Animal Species Compliance Statement 1. Areas where no natural habitat remains. 2. Natural areas where there is no suspected occurrence of SCC.	✓
5.1	The compliance statement <u>must be prepared by a SACNASP registered specialist</u> under one of the two fields of practice (Zoological Science or Ecological Science).	✓
5.2	The compliance statement must:	✓
5.2.1	be <u>applicable to the study area</u> ;	✓
5.2.2	<u>confirm that the study area, is of "low" sensitivity for terrestrial animal species; and</u>	✓

¹¹ <https://www.iucnredlist.org/>

¹² This category includes the categories Extremely Rare, Critically Rare and Rare

¹³ The methodology by which habitat suitability models have been developed are explained within the Species Environmental Assessment Guideline.

5.2.3	indicate <u>whether or not the proposed development will have any impact</u> on SCC.	✓
5.3	The compliance statement ¹⁴ must contain, as a minimum, the following information:	✓
5.3.1	<u>contact details and relevant experience as well as the SACNASP registration</u> number of the specialist preparing the compliance statement including a curriculum vitae;	✓
5.3.2	a signed <u>statement of independence</u> by the specialist;	✓
5.3.3	a statement on the <u>duration, date and season</u> of the site inspection and the relevance of the season to the outcome of the assessment;	✓
5.3.4	a description of the <u>methodology</u> used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;	✓
5.3.5	the mean density of observations/ number of samples sites per unit area ¹⁵ .	✓
5.3.6	where required, <u>proposed impact management actions</u> and outcomes or any monitoring requirements for inclusion in the EMPr;	✓
5.3.7	a <u>description of the assumptions made and any uncertainties or gaps</u> in knowledge or data; and	✓
5.3.8	any <u>conditions</u> to which the compliance statement is subjected.	✓
6	A signed copy of the Terrestrial Animal Species Compliance Statement must be appended to the Basic Assessment Report or the Environmental Impact Assessment Report.	✓

PLANT SPECIES SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
1	<u>General Information</u>	
1.1	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of “very high” or “high” sensitivity for <u>terrestrial plant species</u> must submit a Terrestrial Plant Species Specialist Assessment Report .	✓
1.2	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of “medium sensitivity” for <u>terrestrial plant species</u> must submit either a Terrestrial Plant Species Specialist Assessment Report or a Terrestrial Plant Species Compliance Statement , depending on the outcome of a site inspection undertaken in accordance with paragraph 4.	✓
1.3	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of “low” sensitivity for <u>terrestrial plant species</u> must submit a Terrestrial Plant Species Compliance Statement .	✓
1.4	Where the information gathered from the site sensitivity verification differs from the screening tool designation of “very high” or “high”, for terrestrial plant species sensitivity and it is found to be of a “low” sensitivity, then a Terrestrial Plant Species Compliance Statement must be submitted.	✓
1.5	Where the information gathered from the site sensitivity verification differs from the screening tool designation of “low” terrestrial plant species sensitivity and it is found to be of a “very high” or “high” terrestrial plant species sensitivity, a Terrestrial Plant Species Specialist Assessment must be conducted.	✓
1.6	If any part of the development falls within an area of confirmed “very high” or “high” sensitivity, the assessment and reporting requirements prescribed for the “very high” or “high” sensitivity, apply to the entire development footprint. Development footprint in the context of this protocol means, the area on which the proposed development will take place and includes the area that will be	✓

¹⁴ An example of a what is contained in a Compliance Statement for Animal Species Impact Assessment can be found in the Species Environmental Impact Assessment Guideline

	disturbed or impacted.	
1.7	The Terrestrial Plant Species Specialist Assessment and the Terrestrial Plant Species Compliance Statement must be undertaken within the <i>study area</i> .	✓
1.8	Where the nature of the activity is not expected to have an impact on species of conservation concern (SCC) beyond the boundary of the preferred site, the study area means the proposed development footprint within the preferred site.	✓
1.9	Where the nature of the activity is expected to have an impact on SCC beyond the boundary of the preferred site, the <i>project areas of influence</i> (PAOI) must be determined by the specialist in accordance with <i>Species Environmental Assessment Guideline</i> ¹⁵ , and the study area must include the PAOI, as determined.	✓
	VERY HIGH AND HIGH SENSITIVITY RATING for terrestrial plant species	
2	Terrestrial Plant Species Specialist Assessment	
	<u>VERY HIGH SENSITIVITY RATING</u> 1. Critical habitat for range-restricted species¹⁶ of conservation concern, that have a global range of less than 10 km². 2. SCC listed on the IUCN Red List of Threatened Species¹⁷ or on South Africa's National Red List website¹⁸ as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare. 3. Species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle. 4. The number of mature individuals that ranks the site among the largest 10 aggregations known for the species. These areas are irreplaceable for SCC. <u>HIGH SENSITIVITY RATING</u> 1. Confirmed habitat for SCC. 2. SCC, listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare. These areas are unsuitable for development due to a very likely impact on SCC.	✓
2.3.12	identify any <u>alternative development footprints</u> within the preferred site which would be of "low" or "medium" sensitivity as identified by the screening tool and verified through the site sensitivity verification.	✓
2.4	The findings of the assessment must be written up in a Terrestrial Plant Species Specialist Assessment Report .	✓
3	Terrestrial Plant Species Specialist Assessment Report	✓
3.1.13	a <u>motivation must be provided</u> if there were any development footprints identified as per paragraph 2.3.12 above that were identified as having "low" or "medium" terrestrial plant species sensitivity and were not considered appropriate.	✓
4	MEDIUM SENSITIVITY SPECIES OF CONSERVATION CONCERN CONFIRMATION	
	MEDIUM SENSITIVITY RATING – for terrestrial plant species:	
	1. <u>Suspected habitat for SCC</u> based either on there being records for this species collected in the past, prior to 2002, or <u>being a natural area included in a habitat suitability model</u>¹⁹.	✓

¹⁵ Available at <https://bgis.sanbi.org/>

¹⁶ Species with a geographically restricted area of distribution.

¹⁷ <https://www.iucnredlist.org/>

¹⁸ This category includes the categories Extremely Rare, Critically Rare and Rare

¹⁹ The methodology by which habitat suitability models have been developed are explained within the Species Environmental Assessment Guideline.

	2. SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	
4.6	Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Plant Species Specialist Assessment must be submitted in accordance with the requirements specified for “very high” and “high” sensitivity in this protocol.	✓
4.7	Similarly, where no SCC are found on site during the site inspection or the presence is confirmed to be unlikely, a Terrestrial Plant Species Compliance Statement must be submitted.	✓
5	LOW SENSITIVITY RATING – for terrestrial plant species	
	Terrestrial Plant Species Compliance Statement	✓
	1. Areas where no natural habitat remains. 2. Natural areas where there is no suspected occurrence of SCC.	
5.1	The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Botanical Science or Ecological Science).	✓
5.2	The compliance statement must:	✓
5.2.1	be applicable to the study area;	✓
5.2.2	confirm that the study area, is of “low” sensitivity for terrestrial plant species; and	✓
5.2.3	indicate whether or not the proposed development will have any impact on SCC.	✓
5.3	The compliance statement ²⁰ must contain, as a minimum, the following information:	✓
5.3.1	contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae;	✓
5.3.2	a signed statement of independence by the specialist;	✓
5.3.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
5.3.4	a description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;	✓
5.3.5	where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;	✓
5.3.6	a description of the assumptions made and any uncertainties or gaps in knowledge or data;	✓
5.3.7	the mean density of observations/ number of samples sites per unit area ²¹ ; and	✓
5.3.8	any conditions to which the compliance statement is subjected.	✓
6	A signed copy of the Terrestrial Plant Species Compliance Statement must be appended to the Basic Assessment Report or the Environmental Impact Assessment Report.	✓

²⁰ An example of a what is contained in a Compliance Statement for Plant Species Impact Assessment can be found in the Species Environmental Impact Assessment Guideline

²¹ Refer to the Species Environmental Assessment Guideline

The proposed activities for the upgrade of bulk sewers, replacing of small-bore sanitation system at Woodlands is as follows (Figure 28):

- Replace Internal Sewer Reticulation of the woodlands area.
- Design new sewer infrastructure for the proposed development.
- Realign and replace the Bulk Sewer Main.
- Refurbish the existing Waste Water Treatment Works (WWTW).

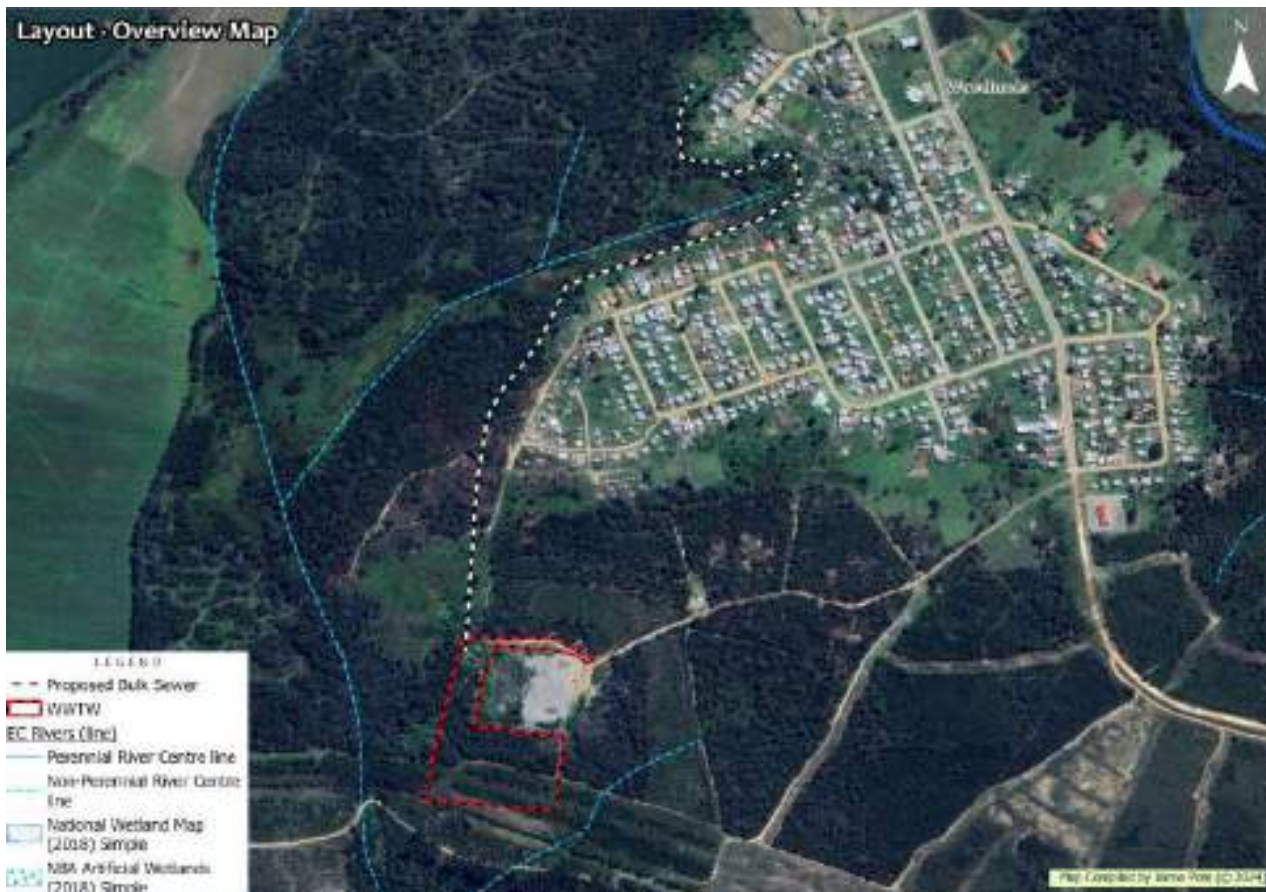


Figure 28: Site locality aerial photo of proposed sewer route.

8.7.3 Purpose of Report

The “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of sections 24 (5) (a) and (h) and 44 of the Act, when applying for Environmental Authorisation”, as published on 20 March, 2020 in National Gazette, No. 43110 in terms of NEMA (Act 107 of 1998) sections 24(5)(a), (h) and 44, lists protocols and minimum report requirements for environmental impacts on terrestrial biodiversity and provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities requiring environmental authorisation. The assessment and minimum reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the National web based Environmental Screening Tool. Prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration, identified by the screening tool, must be confirmed by undertaking a **site sensitivity verification**, which must include the following.

1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.
2. The site sensitivity verification must be undertaken through the use of:
 - a. a desk top analysis, using satellite imagery.

8.7 Appendix G: Site Sensitivity Verification Report

8.7.1 Background

Bluepebble Sustainable Solutions has been appointed by SMEC South Africa (Pty) Ltd to undertake a Basic Assessment process to ensure compliance with regulations contained in the National Environmental Management Act (NEMA Act No. 107 of 1998) and the Environmental Impact Assessment Regulations (2014), as amended, for the Woodlands Wastewater Treatment Works (WWTW) and sewer reticulation upgrade for the Koukamma Municipality, Eastern Cape province (Figure 27). Woodlands is a small settlement situated approximately 25 km to the east of Storms River along the N2 national road. As part of this environmental application process, a terrestrial biodiversity Assessment is required.



Figure 27: Site locality.

8.7.2 Activity Location and Description

The Woodlands sanitation services consist of digester tanks and a 110mm diameter small bore gravity sewer reticulation system. Effluent from digesters is regularly removed by means of vacuum tankers, transported, and disposed of at the Wastewater Treatment Works (WWTW) at Woodlands Settlement. The WWTW is located 0.5km south of the southwestern boundary of the Woodlands Settlement. Effluent then undergoes an activated sludge treatment process followed by a clarification process where the solids and liquid are separated before the final effluent is discharged into a surface water course. Sludge settlement is conveyed to a pit close to the treatment works where it is then disposed of. As soon as the hole is 80% full it is then backfilled, and a new hole is formed. The WWTW is capable of handling flows up to 400kl/d of solids free sewage. The hydraulic and treatment capacity of the existing treatment plant will be further studied during the concept and design phases.

- b. a preliminary on-site inspection; and
 - c. any other available and relevant information.
3. The outcome of the site sensitivity verification must be recorded in the form of a report that:
- a. confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool.
 - b. contains a motivation and evidence of either the verified or different use of the land and environmental sensitivity; and
 - c. is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

The National Web Based Screening Tool was used to generate the potential environmental sensitivity of the site which has then been compared to various online and other databases and information sources in order to verify and confirm the validity of the screening tool findings. This was further supported with on-site observations and analysis of most recent aerial photography.

This terrestrial biodiversity site verification has been undertaken as per the requirements of the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation (GN 320, 20 March 2020).

8.7.4 Data sources and references

Data sources that were utilised for this report include the following:

- National (DFFE) Web Based Screening Tool – to generate the sites potential environmental sensitivity.
- National Vegetation Map 2018 (NVM, 2018), Mucina & Rutherford (2006) and National Biodiversity Assessment (NBA, 2019) – description of vegetation types, species (including endemic) and vegetation unit conservation status.
- National and Regional Legislation including Provincial Nature Conservation Ordinance (P.N.C.O). NEM:BA Threatened or Protected Species (ToPS).
- Botanical Database of Southern Africa (BODATSA) and New Plants of Southern Africa (POSA) – lists of plant species and potential species of concern found in the general area (SANBI.)
- International Union for Conservation of Nature (IUCN) - Red List of Threatened Species.
- Animal Demography Unit Virtual Museum (VM) – potential faunal species.
- Global Biodiversity Information Facility (GBIF) – potential faunal species.
- Southern African Bird Atlas Project 2 (SABAP2) – for bird species records.
- National Red Books and Lists - mammals, reptiles, frogs, dragonflies & butterflies.
- National Freshwater Ecosystem Priority Areas assessment (NFEPA, 2011) - important catchments.
- National Protected Areas Expansion Strategy (NPAES, 2018) and South Africa Protected Area database (2020) – protected area information.
- SANBI BGIS – All other biodiversity GIS datasets.
- Eastern Cape Biodiversity Conservation Plan.
- The Garden Route Biodiversity Sector Plan for the Kouga Municipality (2010).
- Aerial Imagery – Google Earth, ESRI, Chief Surveyor General (<http://csg.dla.gov.za>).
- Cadastral and other topographical country data - Chief Surveyor General (<http://csg.dla.gov.za>).
- Other sources include peer-reviewed journals, regional and local assessments, and studies in the general location of the project and its area of influence, landscape prioritization schemes (Key Biodiversity Areas), systematic conservation planning assessments and plans (as above), and any pertinent masters and doctoral theses, among others.

8.7.5 Site visit

A site inspection was conducted on **04 April 2025**, during spring. The site falls within a summer rainfall area and for the purposes of this report, a single site visit is deemed to be adequate, specifically due to the disturbed nature of the site.

8.7.6 Assumptions, Uncertainties and Gaps in Knowledge

The findings and recommendations of this report may be susceptible to the following uncertainties and limitation:

- No assessment has been made of aquatic aspects relating to any wetlands, pans and rivers/seeps and/or estuaries outside of the scope of a terrestrial biodiversity report and have been undertaken by an aquatic specialist.
- Any biodiversity surveys based upon a limited sampling time-period, may not reflect the actual species composition of the site due to seasonal variations in flowering times.
- As far as possible, site collected data has been supplemented with desktop and database-centred distribution data as well as previous studies undertaken in the area.

8.7.7 National Environmental Screening Tool

The DEA Screening Tool indicates the following, summarised in Table 1:

- Terrestrial Biodiversity is Very High (Figure 29).
- Plant species sensitivity is Low/Moderate (Figure 30).
- Animal Species sensitivity is Moderate/High (Figure 31).
- Aquatic Sensitivity is Very High (Figure 32).

Table 10: Summary of Screening tool designations.

Terrestrial Sensitivity	Feature(s) in proximity
Very High	ESA 2, CBA 1, SWSA (Tsitsikamma), National Protected Area Expansion Strategy (NPAES), Garden Route NP Expansion Areas (SANPARKS) & Endangered Eastern Coastal Shale Band Vegetation.
High	None
Medium	None
Low	Present
Plant Sensitivity	Feature(s) in proximity
Very High	None
High	None
Medium	<i>Ocotea bullata</i> , <i>Argyrolobium trifoliatum</i> , <i>Indigofera hispida</i> , <i>Aspalathus bowieana</i> , <i>Selago rotundifolia</i> , <i>Erica humansdorpensis</i> , <i>Erica glandulosa</i> subsp. <i>fourcadei</i> , <i>Centella longifolia</i> , <i>Marsilea schelpeana</i> , <i>Felicia westae</i> , <i>Osteospermum pterigoideum</i> , <i>Pterygodium cleistogamum</i> , Sensitive species 588, 308, 419, 448, 53, 654 and 763.
Low	Present
Animal Sensitivity	Feature(s) in proximity
Very High	None
High	<i>Neotis denhami</i> (bird)
Medium	<i>Circus maurus</i> , <i>Circus ranivorus</i> , <i>Stephanoaetus coronatus</i> , <i>Bradypterus sylvaticus</i> , <i>Eupodotis senegalensis</i> (birds), <i>Chlorotalpa duthieae</i> & Sensitive species 8 (mammals), <i>Aloeides pallida juno</i> & <i>Tsitana dicksoni</i> & <i>Aneuryphymus montanus</i> (Insects)

Low	Present
Aquatic Sensitivity	Feature(s) in proximity
Very High	ESA 1 & SWSA (Tsitsikamma)
High	None
Medium	None
Low	None



Figure 29: Terrestrial Biodiversity Sensitivity



Figure 30: Plant Species Sensitivity



Figure 31: Animal Species Sensitivity



Figure 32: Aquatic Sensitivity

NOTE: as per point 1.5 of the Terrestrial Biodiversity Specialist Assessment and Minimum Report Content Requirements:

*'If any part of the proposed development footprint falls within an area of 'very high' sensitivity, the assessment and reporting requirements prescribed for the 'very high' sensitivity apply to the entire footprint, **excluding linear activities** for which impacts on terrestrial biodiversity are temporary and the land in the opinion of the terrestrial biodiversity specialist, based on the mitigation and remedial measures, can be returned to the current state **within two years of the completion of the construction phase**, in which case a compliance statement applies. Development footprint in the context of this protocol means the area on which the proposed development will take place and includes any area that will be disturbed.'*

Based on the above reporting protocol condition, the proposed sewer pipeline portion will fall into the above category, which implies that for a temporary linear activity, such as a pipeline, the screening tool designated high sensitivity should be reduced to a low sensitivity and only a compliance statement would be required. Remnant disturbance after completion of pipeline will be nominal and the route will likely revegetate to a functional natural state on completion of construction.

The site assessment has physically screened for the presence of species as listed in the National Environmental Screening Tool, as well as other possible species or sensitivities that are not identified in the screening tool. Not all features are directly affected, but being in proximity, the risks associated with the activity will be investigated further and addressed in the report. The following is deduced from the DFFE National Environmental Screening Tool:

- The terrestrial biodiversity theme is VERY HIGH due to portions of the sewer pipeline and WWTW falling within designated CBA 1 area and well as a short portion of the pipeline traversing an Endangered vegetation unit. This portion of the pipeline falls within an existing pipeline servitude with high levels of alien invasion and as per the point above, will rehabilitate to previous state on completion of construction, The Very High sensitivity designation is disputed as the entire area within and surrounding the proposed sewer pipeline route, is densely invaded and near a settlement and the main represented vegetation unit is not under threat, hence the CBA designation is invalid. A specialist sensitivity of low is thus allocated.
- Several flora (plant) species regarded as being of concern are flagged as potentially being present (MEDIUM sensitivity) and are assessed further in the report, however none were found to be present during the site visit and are furthermore due to the degraded and invaded nature of the site, it is not deemed to be suitable habitat for any species population. The Medium sensitivity designation is thus disputed as the entire area within and surrounding the proposed pipeline route and WWTW and a specialist sensitivity of low is allocated.
- Several fauna (animal) species regarded as being of concern are flagged as potentially being present (MEDIUM sensitivity) and are assessed further in the report. Due to the limited size of the site and transformed nature of the surrounding landscape, the site would not be deemed to be viable for any species population. The Medium sensitivity designation is thus disputed as the entire area within and surrounding the proposed sewer pipeline and WWTW, is situated within degraded and densely invaded habitat and a specialist sensitivity of low is allocated.
- The aquatic sensitivity is Very High due to falling within designated Aquatic ESA and FEPA sub-catchment. While outside of the scope of this terrestrial assessment. Refer to Aquatic Assessment.
- The impacts are assessed further in the relevant report sections in the accompanying report.

8.7.8 Findings, Outcomes and Recommendations

Terrestrial Biodiversity

Site verification of the Terrestrial Biodiversity sensitivities is summarised in Table 11 and depicted in Figure 33.

Table 11: Terrestrial Biodiversity Features flagged in the National Environmental Screening Tool.

Feature		COMMENT
Ecological Support Area	ESA 2	None
Critical Biodiversity Area	CBA 1	Dispute – The site is not within a vegetation unit that is under imminent threat hence a CBA 1 designation is not applicable to meeting conservation targets.
Strategic Water Source Area	SWSA	Dispute – The activity is unlikely to negatively affect downstream water sources.
National Protected Area Expansion Strategy	NPAES	Dispute – The site is adjacent to a settlement, is for a critical service (waste water treatment), including residents that are potentially employees of the national park and surrounding area and would hence not be suitable for protected area expansion.
Garden Route National Park Expansion Area		Dispute - The site is adjacent to a settlement, is for a critical service (waste water treatment), including

Feature		COMMENT
		residents that are potentially employees of the national park and surrounding area and would hence not be suitable for protected area expansion.
Eastern Coastal Shale Band Vegetation	Endangered	Dispute – most of the sewer pipeline within this section falls within an existing heavily degraded sewer reserve

The SSVR thus disputes the flagged Very High terrestrial biodiversity designation, and the specialist designates a low sensitivity. The sewer pipeline is also a linear, temporary activity and any disturbance will likely return to pre-construction state within a 2-year period. The area of the WWTW would not be required to meet conservation targets as the vegetation unit is not under threat.

Plant Species (Flora)

National Environmental Screening Tool flagged several flora species. Almost the entire proposed sewer pipeline and WWTW is situated within heavily degraded and invaded habitat where minimal natural vegetation remains.

The SSVR thus disputes the flagged flora ('plant') species of conservation concern and medium plant species designations, and a specialist sensitivity of low is allocated.

Animal Species (Fauna)

National Environmental Screening Tool flagged several fauna species. Almost the entire proposed sewer pipeline and WWTW is situated within heavily degraded and invaded habitat where minimal natural vegetation for faunal species of conservation concern habitat remains.

The SSVR thus disputes the flagged fauna ('animal') species of conservation concern and medium plant species designations, and a specialist sensitivity of low is allocated.

Aquatic

Watercourses are present in the broader area but is outside of this terrestrial assessment. Since the pipeline route and WWTW will avoid aquatic habitat, it is expected the sensitivity will be low. Refer to Aquatic Assessment report. No impact of consequence is expected to any terrestrial features associated with the aquatic habitat.

8.7.9 Conclusions

The site verification thus confirms that while the sewer pipeline and WWTW does fall within a designated CBA area, it is not deemed to be very high sensitivity being in proximity to a settlement and within heavily degraded and invaded habitat. The heavily degraded and invaded nature of the habitat is also unlikely to provide suitable habitat for any flagged fauna species of conservation concern and no flagged plant species of conservation concern were recorded nor are likely to occur in close proximity.



Figure 33: Eastern Cape Biodiversity Sector Plan (2019) – site does overlap with ESA designated areas.

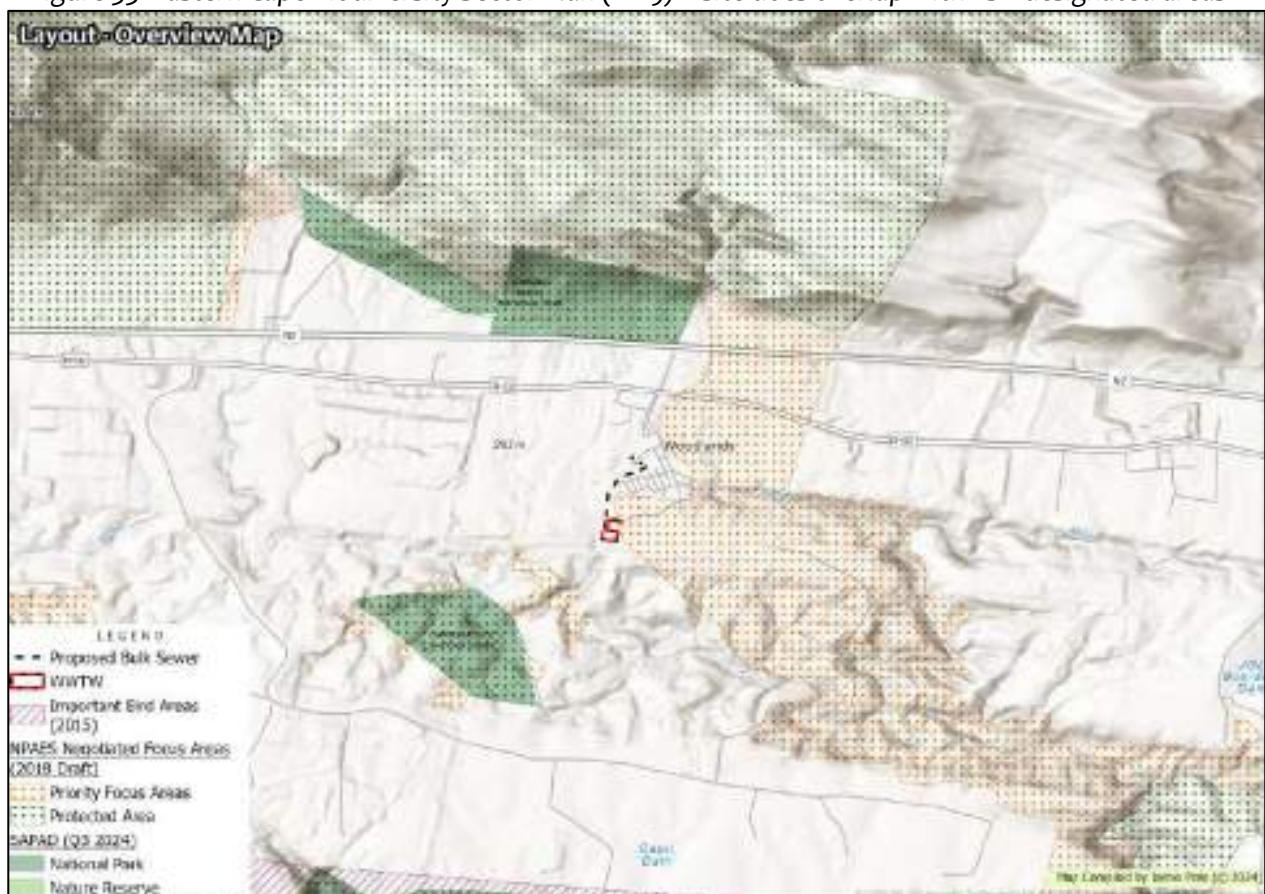


Figure 34: Protected Areas and NPAES in vicinity.

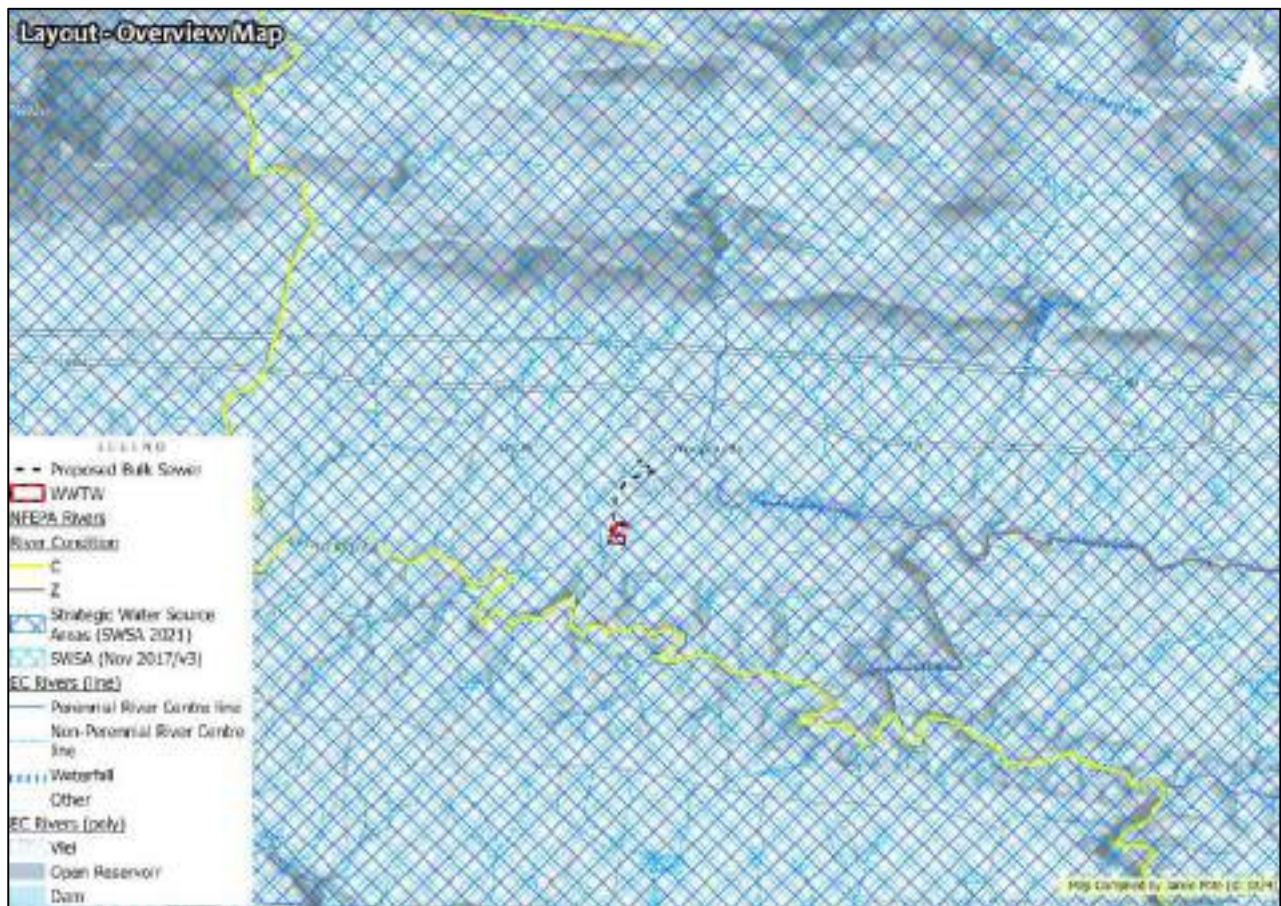


Figure 35: Rivers, FEPAs & SWSA's.

PAGE INTENTIONALLY LEFT BLANK

END