Eco Route
ENVIRONMENTAL CONSULTANCY
REGISTRATION NO. 1998/031976/23

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APPENDIX J: Draft BAR - IMPACT ASSESSMENT

PROPOSED MEDIUM TO HIGH DENSITY RESIDENTIAL DEVELOPMENT ON RE / ERF 2074, MARINE WAY, BITOU LOCAL MUNICIPALITY, WESTERN CAPE

An Environmental Authorisation Process for activities which are listed in terms of the 2014 Environmental Impact Assessment (EIA) Regulations (as amended) published in terms of National Environmental Management Act (Act 107 of 1998) (NEMA) is required for the proposed high-density residential development:

Activity No(s):	Basic Assessment Activity as set out in	Description
27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.	RE/2074 is approximately 6.25 ha in extent. More than 1 ha indigenous vegetation will be required to be cleared for the proposed residential development.
67	Phased activities for all activities— listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices, where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold	Development of the residential units will be developed in phases.
Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3	Describe the portion of the proposed development to which the applicable listed activity relates.
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. i. Western Cape ii. Within critical biodiversity areas identified in bioregional plans.	RE/2074 is approximately 6.25 ha in extent. More than 1 ha indigenous vegetation will be required to be cleared for the proposed residential development. Mapped vegetation on the property is South Outeniqua Sandstone Fynbos which has a conservation status of least concern in terms of the 2022 updated list of threatened ecosystems. The Western Cape Biodiversity Spatial Plan (WCBSP; 2017) excludes the majority of Erf 2074 from the conservation planning areas; the southern most section of the site is mapped as a terrestrial Critical Biodiversity Area 1 (CBA1); Ecological Support Areas 1 and 2 (ESA1 and ESA2) are mapped along the west-south-western boundary of Erf 2074.
26	Phased activities for all activities—	Development of the residential units will be developed in 3 or 4 phases to allow the

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	i. listed in this Notice and as it applies to a specific geographical area, which commenced on or after the effective date of this Notice; or ii. similarly listed in [in] any of the previous NEMA notices, and as it applies to a specific geographical area, which commenced on or after the effective date of such previous NEMA Notices— where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold;	development to respond to changing market demands. It is proposed that site development plans be submitted to the local authority for each phase. The current development proposal has been designed for the maximum number of units that can be achieved taking into account access and parking requirements, existing structures, site characteristics, as well as infrastructure development parameters of the zoning Scheme. The development proposal will be assessed; recommendations will inform the final SDP/s developed for the site.

This section presents a description of baseline conditions and the direct, indirect and cumulative impacts that have been identified including impacts relating to the choice of site/activity/technology alternatives.
This section verifies site sensitivities identified in the DFFE screening tool report generated for the site.
Mitigation measures that may eliminate or reduce the identified impacts are recommended.
The Impact Identification and Assessment Methodology is provided in Section B.
The main impacts associated with the proposed activity includes the following:

- Loss of indigenous vegetation
- Loss of habitats and disturbance to fauna
- Alien invasive vegetation
- Fire Risk
- Susceptibility of some areas to erosion
- Increased runoff from increased hard surfaces
- Positive impact on socio-economic conditions as a result of employment opportunities
- Positive impact on socio-economic conditions as a result of housing provisions

PLANNING AND DESIGN

The proposed development of a medium to high residential development on Erf 2074 requires a number of approvals to be in place prior to the start of construction. Two plans have been proposed for this development. Alternative layout 1 had a density of 250 units / 5 ha and is not considered further. Alternative Layout 2 (228 units) is assessed; recommendations and mitigations on this layout will inform alternative layout 3.

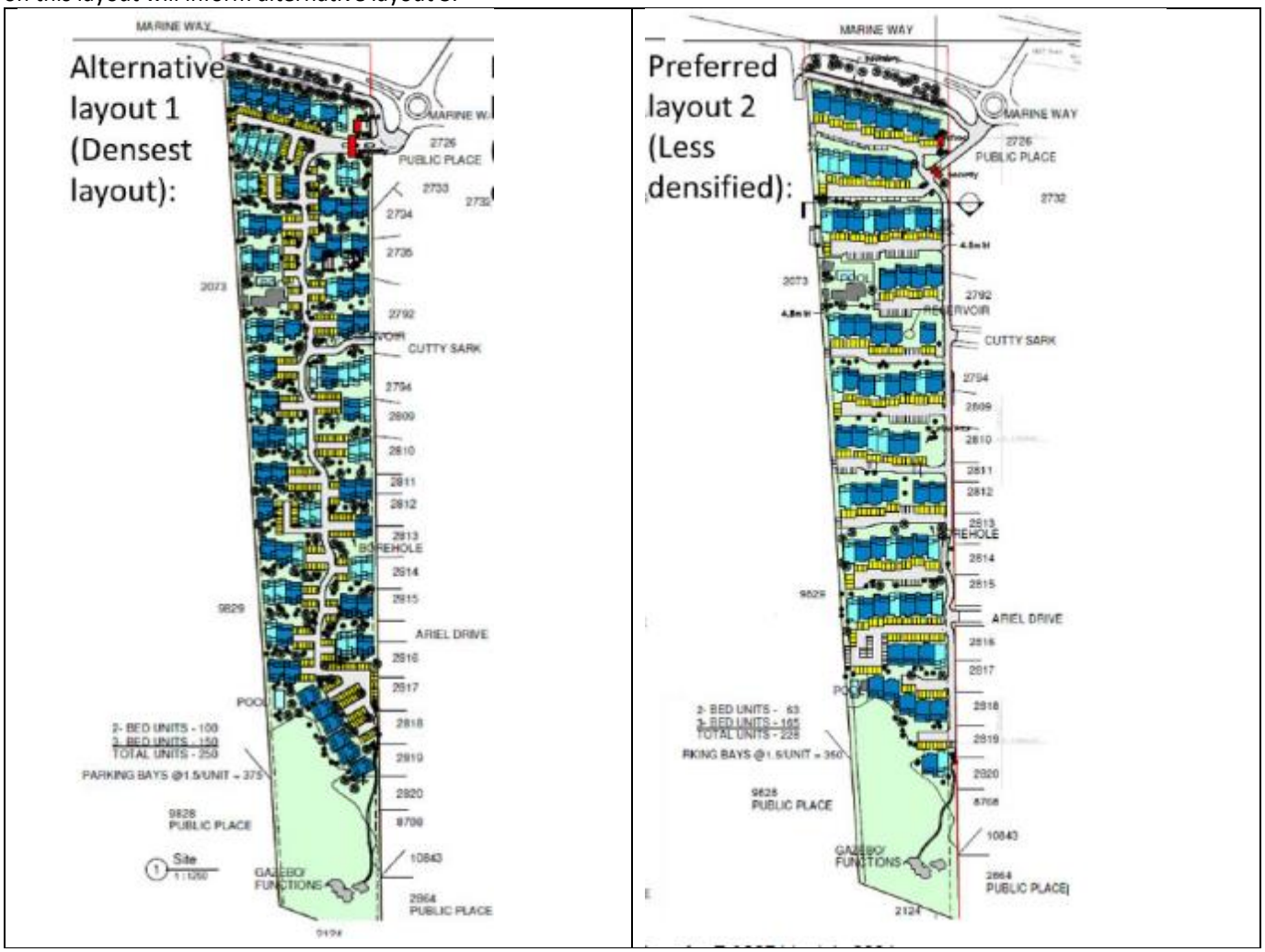


Figure 1: Alternative Layout 1 (left); considered too dense and not considered further; alternative layout 2 (right); assessed with mitigation measures which include changes to the layout to reduce anticipated impact

Commencement of construction prior to receiving required approvals can result in project delays. Many approvals will have conditions, and all preconstruction conditions must be in place prior to the start of construction to avoid project delays. Required approval for site layouts, development plans and engineering drawings must be in place prior to the start of construction.

Correct environmental management planning and budget allocation must be carried out during the planning phase to ensure required mitigation measures are put in place.

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	Planning and Design
Aspect	Planning and design
Nature of Impact	**Direct – Project delays and economic consequences**
Description of impact	Commencement prior to required approvals in place can lead to delays in project and economic loss

Impact Rating

Impact Status	**Negative Impact**		**Negligible**	
	Without mitigation		With mitigation	
Spatial	Local	3	Activity	
Duration	Short	3	Short	
Frequency	Seldom	3	Rarely	
Intensity	Low – medium	2	Low	

Severity	Medium	8	Low	
Consequence	Medium	11	Low	
Probability	Probable	4	Expected	
Impact Significance	**Medium**	**15**	**Negligible**	
Mitigation	Likely - Impact can be avoided with mitigation which has proven results.			
Confidence	High			
Reversibility	Possible			

Nature of impact	**Direct**
Description of impact	**Fauna, Flora, Water, Soil - Poor environmental management planning and / or lack of budget for environmental management will result in unmitigated impacts.**
Impact Rating	As per impact ratings for construction and operational impact
Mitigation Measures	Planning – Planning Team • Ensure an Environmental Management File is put in place to contain all documents / report which pertain to the relevant conditions of the planning, construction and operational phases (e.g. EA, permits, waste disposal certificates etc.) • Ensure all approvals in place • Ensure all preconstruction requirements are in place prior to construction • Ensure layouts, designs and accompanying engineering drawing approved • All preconstruction requirements included as conditions of the Environmental Authorisation (if attained) to be met. • All preconstruction requirements included as conditions in any other license, authorisation, approval etc. required for the site to be met. • Method statements for construction phase are to be compiled by the project team and be aligned to mitigation measures and conditions of the Environmental Authorisation (if attained) • Construction team should include a suitably qualified Environmental site officer to assist with daily environmental management on site and compliance with the CEMP and conditions of the EA (if attained) • Appoint a suitably qualified external environmental control officer to ensure environmental management requirements are met by carrying out monthly external audits. • Suitable budget to be assigned to environmental management requirements for construction and operational phase • Operational management plans are to be aligned to mitigation measures and conditions of the Environmental Authorisation (if attained) • Integrate environmental management requirements into a management system for the project

HERITAGE

In 2005 a Heritage Impact Assessment was carried out by Dr Lita Webley, 2005 for the previous proposed development of 36 houses and 60 town house units. There is a well-established stone house located on the northern section of the site. Stone tools were discovered on the site; one in the central section of the site and one in the southern section. Flaked stone tools were reported to be more concentrated on the escarpment overlooking the Piesang river than elsewhere on the property, however this may have been due to greater visibility in the fynbos area. No archaeological site were discovered; however, its possible sites may be buried.

The original house is older than 60 years and therefore subject to the provisions of the National Heritage Resources Act (Act 25 of 1999) (NHRA). A Notice of Intent to Develop (NID) was submitted in 2006 for a development that will change character of site exceeding 5000m2 and rezoning of a site exceeding 1ha in terms of Section 38 (1) of the National Heritage Resources Act (Act No. 25 of 1999). The original house is proposed not to be demolished but rather preserve the original farmhouse and use it as a communal facility on the planned development.

A palaeontological assessment will be carried out and relevant measures put in place.

Figure 2: stone tool near southern end (Webley, 2005)
34° 3' 11"S ; 23° 21' 37.7"E

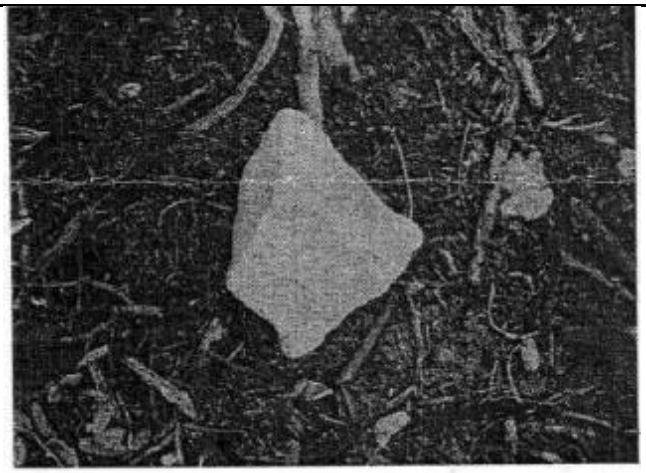


Figure 3: badly weathered stone tools under pine tree - centre of site
34° 03' 21,2"S ; 23° 21' 39.1"E

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Planning, Construction and Operational Phase**
Aspect	**Site clearing; construction activities; operations**
Nature of impact:	**Direct –**
Description of imapct.	**Loss of palaeontological/ archaeological resources / disturbance to heritage** can occur during construction phase. Care must be taken during site clearing and archaeological sites should be reported to SAHRA and WC Heritage.

Impact Rating

Impact Status	**Negative**		**Positive**	
	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Very short	1	Very short	1
Frequency	Infrequent	2	Seldom	3
Intensity	High	5	Medium	3
Severity	Low	8	Low	7
Consequence	Low	9	Low	8
Probability	Probable	4	Slight	2
Impact Significance	**Medium**	**13**	**Low**	**10**
Mitigation	Possible – impacts can be prevented with mitigation during construction phase.			
Confidence	High			
Reversibility	Permanent impact (Loss of any artefacts)			

Mitigation Measures

Planning – Planning Team

- Incorporate heritage buildings into planned development.
- Carry out palaeontological assessment and put in place relevant measures.

Planning – Construction Team

- Construction managers/foremen should be informed before construction starts on the possible types of archaeological sites they may encounter and the procedures to follow when they find sites.

Construction – Construction and Planning Team

- ESO to supervise site clearing
- If resources are unearthed during construction, the find brought to the immediate attention of the developer and all work is to be stopped immediately and reported by the ECO accompanied by photographs and coordinates. This must be sent to WC Heritage as soon as possible to inspect the findings. Any recommendations followed from such an investigation must be carried out.
- Any discovered artefacts shall not be removed under any circumstances without consent from the WC Heritage Authority.
- Sites may include:
    - Dense accumulations of marine shell – evidence of prehistoric shell midden
    - Concentrations of shell associated with pieces of bone, pottery and stone artefacts
    - Concentrations of fossilized bone
    - Concentrations of blue and white china, pieces of irons, coins etc.
    - Human remains including burials

Operational – Operational and Planning Team

- Operational Phase – follow procedure if any artefacts discovered by residents in operational phase

Activity	No go alternative		
Nature of impact:	Baseline conditions will likely remain the same – negligible impacts on heritage.		
	Impact Status	**Negligible**	
	Spatial	Activity	1
	Duration	Very short	1
	Frequency	Rarely	1
	Intensity	Low	1
	Severity	Negligible	3
	Consequence	Negligible	4
	Probability	Slim	1
	Impact Significance	Negligible	**5**

TERRESTRIAL BIODIVERSITY

The Department of Forestry, Fisheries, and the Environment (DFFE) screening tool report for the development footprint has identified the terrestrial biodiversity theme as having a Very High sensitivity

The climate of Plettenberg Bay is warm and temperate. The rainfall pattern is seasonal; however it is typical for rain to occur in the driest months of the year. Two seasonal rainfall peaks during the spring and winter. The mean annual temperature is 18˚C. The proposed development is approximately 9km away from the Garden Route National Park and highly unlikely to negatively affect corridor connectivity and the buffer area.

South Outeniqua Sandstone (FFs 19) is the mapped vegetation type on Erf 2074 (NatVeg Map, 2019) and has a conservation status of least threatened (NEMBA list of threatened ecosystems, 2022). Approximately 67% of the original area of South Outeniqua Sandstone (historically ca. 157 123 ha) of the vegetation type is still intact, with 32.2% formally conserved.

In terms of the Western Cape Biodiversity Spatial Plan (WC BSP) the southernmost section of the site is falls within a terrestrial critical biodiversity area (CBA1).

> Definition: Areas in a natural condition. Required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.
>
> Objective: Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.

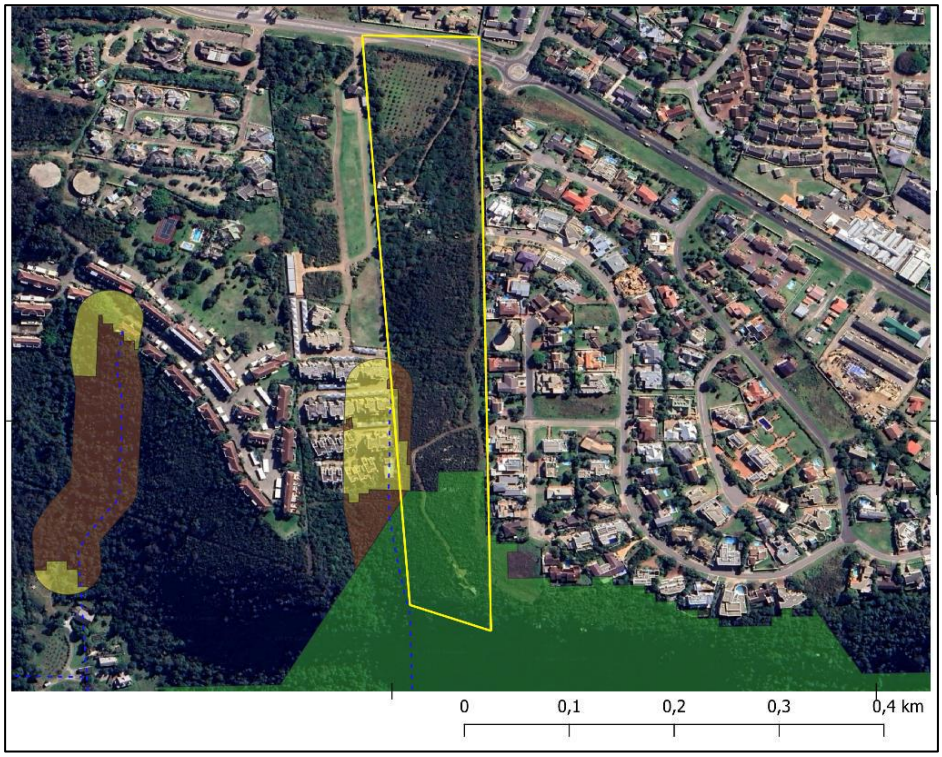


Figure 4: CBA1 (WC BSP) shown in green

The site is one of only a few natural spaces in an urban area and likely serves as a refuge for many animal and plant species. Historically the entire site was likely an open-canopy vegetation type – which is consistent with the South Outeniqua Sandstone Fynbos that is mapped here. The northern section of the site has been historically transformed, starting with a few buildings and road in the 1930s'and then clearing and agricultural activities and establishment of alien vegetation over the years.

The north-western section of the site does not represent sensitive vegetation, nor are any SCCs likely to be found in highly invaded areas.
The sensitivity of the terrestrial biodiversity of the site is low for the northern half of Erf 2074 (i.e., sections not classified as "fynbos" or "valley fynbos-thicket"), and Very High for the southern half (the sections classified as "fynbos" or "valley fynbos-thicket").

A revised vegetation map has been compiled.

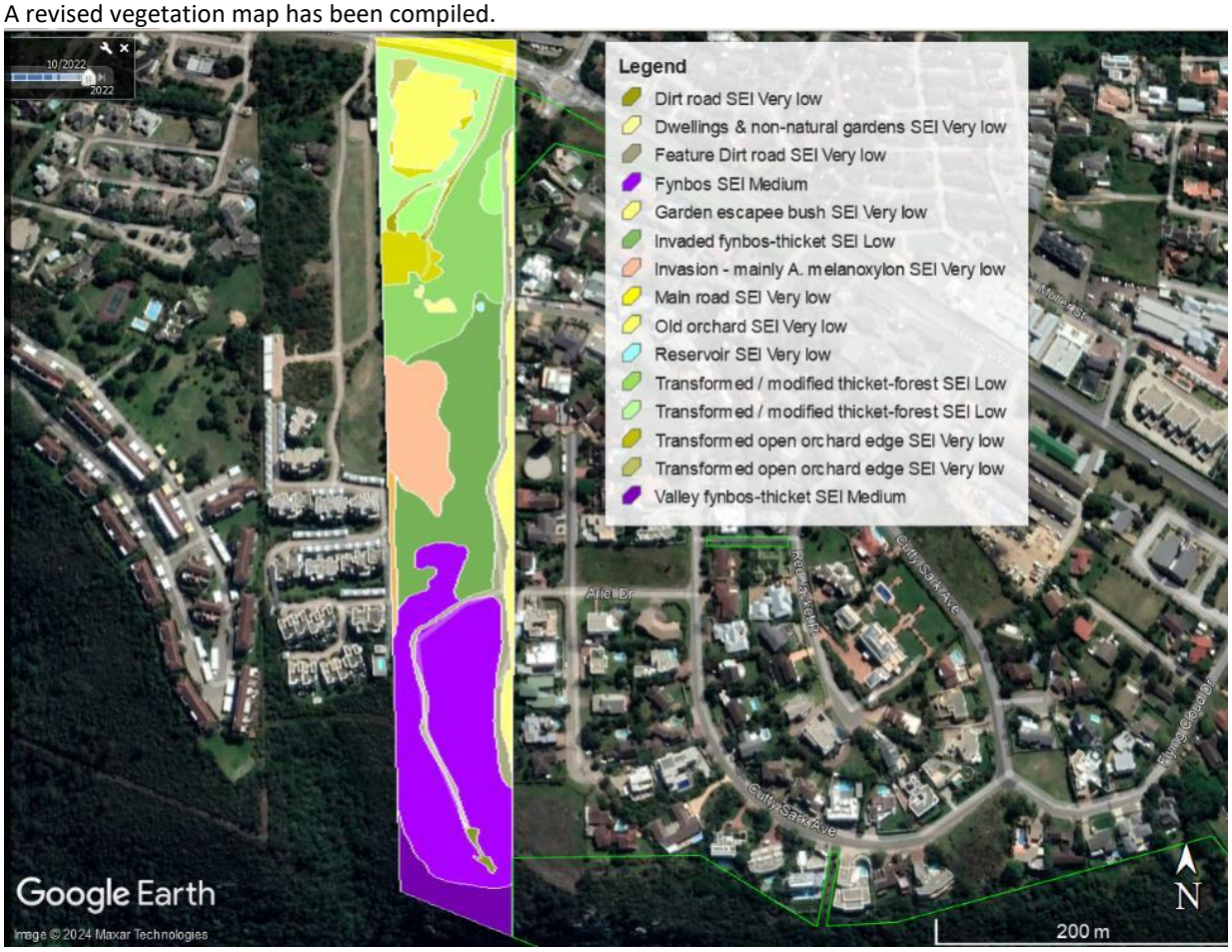
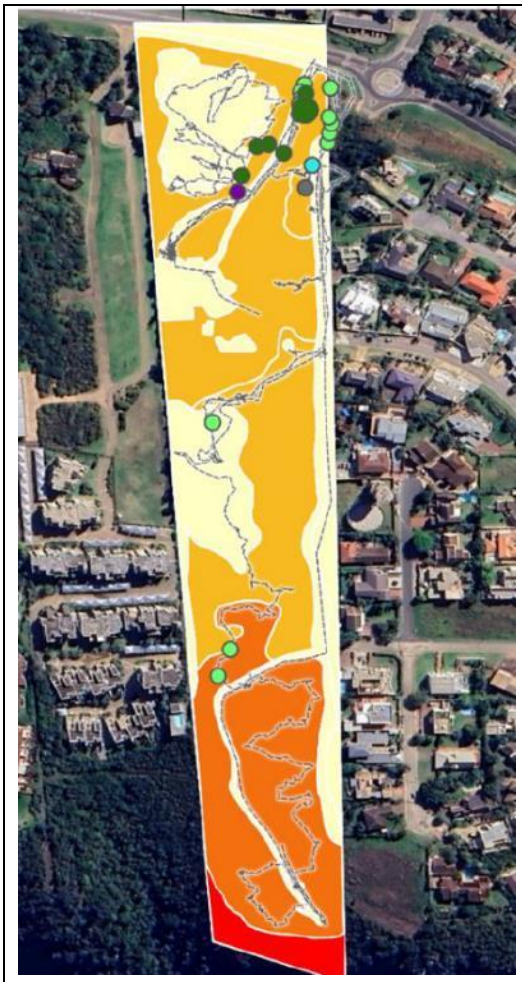


Figure 5: Vegetation units as mapped by terrestrial flora specialist with sensitive area indicated in purple (shape files provided by confluent, 2024)

The original triggers for the terrestrial biodiversity theme sensitivity provided in the Screening tool report evaluated for the northern and southern halves of Erf 2074 respectively. Grey entries represent reasons that do not apply to the site, and green entries do apply to the site.

Sensitivity layer	Northern Half of Erf 2074	Southern half of Erf 2074
Critical Biodiversity Areas (CBAs)	None mapped	The southernmost section consists of fynbos and steep valley and part of a terrestrial CBA 1 area.
Ecological Support Areas (ESAs)	A thin section of ESA 1 & 2 is mapped along the western boundary of the site, but this is on a transformed lawn that borders an established, permanent, residential development.	.
SAN Parks Buffer Areas	The buffer is 10km wide, and the site is almost 10km away from the Garden Route National Park. The northern half of the site is highly modified and has limited connectivity to the surrounding landscape & habitats.	The buffer is 10km wide, and the site is almost 10km away from the Garden Route National Park. However, the southern half of the site is connected to the larger natural valley below, which is a functional ecological corridor.
Freshwater Ecosystem Catchments (terrestrial)	The only water resource here is the artificial reservoir. Erf 2074 does not have areas that directly add to FEPA.	The Piesang River is south of Erf 2074 in the valley. Erf 2074 does not have areas that directly add to FEPA.

The overall Site Ecological Importance is low and very low in the central and northern portions, medium in the southern portion and high at the most southern section.



Spp. observations

- *Afrocarpus falcatus*
- *Podocarpus latifolius*
- *P. latifolius* (Large)
- *Sideroxylon inerme inerme*
- *Protea cynaroides*
- *Protea cf. laurifolia* (Possibly a hybrid)

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Site Ecological Importance (SEI)

- High
- Medium
- Low
- Very low

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Site Ecological Importance	Recommendation for activities based on the mitigation hierarchy
Very High	Avoidance mitigation – no destructive development activities should be considered. Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

Figure 6: SEI: Most of the development footprint will be in low / very low SEI; a small development footprint will be located in the Medium SEI; no new roads in south – recommend to retain existing road as a footpath (adapted from confluent, 2024)

The total area of Erf 2074 is approximately 6.25 ha. PAOI calculations for the property show that at least three quarters (75%) of the Erf will be transformed, and approximately 1 hectare will remain as a natural space and will connect to the High SEI area in the south and the Piesang Valley. None of the alternative options will have any effect on the High SEI area.

The project area of influence can be reduced by retaining the road as a footpath; reducing the development footprint in the CBA and not allowing for further tracks / roads to be developed in the southern area. The gazebo development footprint must be planned on the existing disturbed footprint. No vehicles are permitted in the southern area; only foot traffic.
The steeper (less than 1:4) southern section falling within CBA / representative of intact fynbos is not recommended to be developed. An approximate 1200m2 section identified in the NE section of the mapped CBA is recommended to be developed rather than the adjacent steeper western area with exception of the existing road. The northern and central sections of the site are recommended for a medium - high density residential development.
The final SDP/s will result in a loss of approximately 5900m2 fynbos with 1200m2 fynbos occurring in the NE section of mapped CBA. The remaining southern areas (1.5ha) will be designated as no-go areas.

Figure 7: Existing road recommended to be retained as a footpath

Figure 8: Most southern development footprints recommended to be removed from CBA with exception of planned development on flatter NE section of CBA (approximately 1200m2) and existing road and gazebo area on existing footprint.

Existing negative environmental impacts on erf 2074:

- The majority of the northern half of the Erf is very modified and transformed.
- The fynbos section in the southern half of Erf 2074 is senescent and requires a fire. However, this is unlikely to occur given the close proximity of existing houses and developments.
- The property is surrounded by housing developments to the east, west and north of the Erf.
- Although the valley to the south still represents a functional corridor, there are developments & transformed landscapes that surround the drainage line. The majority of the valley is forest habitat and not representative of a fynbos corridor.

Activity	**Medium to high residential development**

Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Planning and Construction Phase**
Aspect	**Construction activities – site clearing, earthworks, excavations, lay down areas**
Nature of impact:	**Direct impact on terrestrial biodiversity**
Description of impact	**Construction activities can result in disturbances outside the development footprint areas and p*ermanent Loss of Biodiversity in South Outeniqua Sandstone Fynbos (LT)***

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation (including recommendations for layout 3)	
Spatial	Site	2	Activity	1
Duration	Short to medium	2	Short	2
Frequency	Regular	4	Seldom	3
Intensity	Medium	3	Low	1
Severity	Medium	9	Medium	6
Consequence	Medium	11	Medium	7
Probability	Probable	4	Plausible	3
Impact Significance	**Medium**	**15**	**Low**	**10**
Mitigation	Possible – impacts can be minimised with mitigation during planning and construction phase.			
Confidence	High			
Reversibility	Any disturbances to fynbos outside the development footprint areas will be difficult to reverse.			

Mitigation Measures

Planning – Design Team

- Reduce project area of influence can be reduced by retaining the road as a footpath; removing buildings from the CBA and not allowing for further tracks / roads to be developed in the southern area. Only 1200m2 development permitted in area mapped as CBA (WCBSP) due to flatter gradient as opposed to developing on adjacent steeper gradient not mapped as CBA.
- The gazebo development footprint must be planned to use the existing disturbed footprint.
- No vehicles are permitted in the southern area; only foot traffic

Planning – Construction Team

- Careful planning is required - A turning and parking area for construction and delivery vehicles may only take place in areas that are already cleared or part of the permanent disturbance footprint of the development plan; this must be indicated on the contractors site plan prior to start of construction.
- Schedule vegetation clearance during the winter in order to minimize impact on plant life cycles & pollination
- Maximum disturbance envelope of 2m along the edges where it intersects fynbos vegetation; areas outside direct area of influence to be designated as no go areas and signage placed to indicate such areas to contractors.

Construction activities – Construction Team

- Method statements for construction of the gazebo area must be compiled by the construction team and approved by the ECO prior to construction.
- All construction activities must remain with development footprint.
- The disturbance footprint of proposed developments should be clearly defined and demarcated to prevent unnecessary damage to the surrounding environment - have a maximum disturbance envelope of 2m along the edges where it intersects fynbos vegetation
- Movement of workers must be limited to areas under construction. Access to natural area in the south is not permitted; these must be designated as no-go areas during construction.
- Mitigation measures to mitigate impacts on flora, fauna, alien invasives, soil and aquatic systems to be implemented.

Phase	**Planning and Operational Phase**
Aspect	**Increased activity within CBA**
Nature of impact:	**Direct**
Description of impact	**impact on terrestrial biodiversity - development within CBA**

Impact rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation (including recommendations for layout 3)	
Spatial	Site	2	Activity	1
Duration	Long	6	Short to medium	3
Frequency	Continuously	6	Seldom	3
Intensity	Medium - Low	2	Low	1
Severity	High	14	Low	5

Consequence	Medium High	16	Low	7
Probability	Expected	5	Plausible	3
Impact Significance	**High**	**21**	**Low**	**10**
Mitigation	Possible – layout change			
Confidence	High			
Reversibility	Possible to reduce impacts and maintain natural vegetation, biodiversity and habitats in the south			

Mitigation Measures	**Planning – Planning and Design Team** • The southern portion of the site is mapped as a CBA1 area within the WCBSP, indicating a management objective of maintaining a natural or near-natural state, with no further loss of habitat, and only low-impact, biodiversity-sensitive land uses considered appropriate. Development should be reduced in the southern section of the site mapped as a CBA (WC BSP); this area contains the most pristine vegetation and habitats on the site and connects to the southern valley. The proposed residential development should be concentrated in the central / northern section of the Erf with only minimal development permitted in 1200m2 of NE section of CBA due to gentler gradient. • Permeable pavers may be used on existing southern road, but must be retained as a footpath; no driving permitted in southern section; only foot traffic **Operations – Operational Team** • Put in place all required operational phase mitigation measures
Activity	**No go alternative**
Nature of impact	Direct
Description of impact:	Baseline conditions will likely remain the same – modified ecosystems in the north and intact ecosystems in the south. Continued spread of alien trees. Existing incomplete development footprint within sensitive CBA1.

Impact rating

Impact Status	**Negative**	
Spatial	Activity	1
Duration	Short to medium	3
Frequency	Infrequent	2
Intensity	Low	1
Severity	Medium	6
Consequence	Low	7
Probability	Plausible	3
Impact Significance	**Low**	**10**

INDIGENOUS VEGETATION AND FLORA SPECIES OF CONSERVATIONAL CONCERN

Historically the entire site was likely an open-canopy vegetation type which is consistent with the South Outeniqua Sandstone Fynbos mapped on the site. The north-western section of the site has been transformed and does not represent sensitive vegetation, nor are any flora SCCs likely to be found in areas with high level of alien invasive trees.

Three species of protected trees have been identified on the site:

- *Afrocarpus falcatus* (The Outeniqua yellowwood)
- *Podocarpus latifolius* (The real yellowwood tree)
- *Sideroxylon inerme inerme* (Milkwood tree)

One possible flora SCC (*Lampranthus cf. pauciflorus*; endangered (EN) was observed during the terrestrial assessment on the steep rocky outcrops along the south of the site, extending into the valley and outside of the development footprint. Two Protea bushes were identified on the site; king protea (Protea cynaroides); possible hybrid / cultivar of the grey-leaf protea (*P. cf. laurifolia*).

The northern section of the site has been confirmed to have a Low botanical theme sensitivity; permits will however be required to trim, remove, or alter the protected trees if necessary. The **southern section** of the site (i.e. fynbos and valley fynbos-thicket) has been confirmed to have a **high plant species sensitivity**.

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Planning and Construction Phase**
Aspect	**Site clearing and construction activities**
Nature of impact:	**Direct – Loss of vegetation**
Description of impact	Loss of flora species of special concern, important plant populations and other indigenous vegetation during site clearing and construction activities.

Impact Rating

Impact Status	Negative		Negative	
	Without mitigation		With mitigation (including recommendations for layout 3)	
Spatial	Activity	1	Activity	1
Duration	Permanent	6	Permanent	6
Frequency	Infrequent	2	Rare	1
Intensity	Low	1	Low	1
Severity	Medium	9	Medium	8
Consequence	Medium	10	Medium	9
Probability	Plausible	3	Slim	1
Impact Significance	**Medium**	**13**	**Low**	**10**
Mitigation	Possible – impacts can be managed with mitigation during construction phase.			
Confidence	High			
Reversibility	Any disturbances to fynbos outside the development footprint areas will be difficult to reverse.			

Mitigation Measures

Planning – Design Team

- Development should be reduced in the southern section of the site which contains the most pristine vegetation on the site. Only 1200m2 development recommended in mapped CBA (WCBSP) due to flatter gradient as opposed to steeper areas immediately west, not within CBA but which connects to CBA.

Planning – Construction Team

- Conserve identified SCC and protected trees by marking them off during construction and incorporating the vegetation into landscaping on the site.
- Any permits for sensitive flora species of conservational concern to be in place prior to construction. Allow 3 months for this process.
- Search and rescue of flora SCC (succulents and geophytes) must take place on site prior to start of construction. This vegetation must be transplanted (where possible) or seeded in suitable ecosystems identified close to the site (southern CBA section)
- Identify a suitable specialist to assist with a suitable method to remove, store and / or transplant identified flora species of special concern
- Identify area on site which will not be disturbed by construction activities for establishment of an on-site indigenous plant nursery on site and are to store removed topsoil / vegetation
- Rescued plants must all be placed in suitable containers / bags
- These must then to be transported with care to a nursery that should preferably be set up on the site in an existing disturbed area. Alternatively, arrangements with a suitable nursery / available receptor site should be made to keep and care for removed plants during the construction phase of the project.
- The rescued plants must be planted back with the aid of botanists and / or horticultural specialists within the 2m disturbance footprint around the permanent disturbance footprints.
- In areas in the fynbos where alien clearing results in bare patches that could use some aid to enhance their recovery. This will promote the regeneration of natural fynbos abound the developments and reduce the possibility of negative edge effects on the site.

Construction– Construction Team

- Materials used during construction must be sourced and transported responsibly to minimise the risk new invasive plants.
- Staff, if suspected may be checked when they leave to ensure no plants have been poached from the natural surrounding environment. Staff should also be told that plants may not be collected outside of the search and rescue operation.
- Any additional SCC and plants with a high survival likelihood that are observed during construction within a development footprint must be rescued (soil in-tact) and added to the rescued plants in the indigenous nursery.
- Record of permits for removal / transplanting of sensitive species of conservational concern / protected trees to be kept on record in EM file for audit purposes.
- Site clearing to be done in phased manner. No blanket clearing of vegetation is permitted.
- Areas within the development footprint, that can be used for the duration of the construction phase, must be selected for stockpiling of indigenous material including logs and rocks that can be used in landscaping.
- The site ESO to oversee topsoil and indigenous vegetation clearing and storage. Topsoil and indigenous vegetation removed must be stockpiled together for use in rehabilitation and landscaping on the site.
- Gathering of firewood / plants in adjacent areas is not permitted.
- Contractual fines to be imposed on any employee who is found attempting to remove indigenous flora.

Post construction – Construction team

- Revegetation of bare soil following construction is an essential part of concluding the construction phase
- Undertake revegetation of the disturbance envelope outside of the permanent disturbance footprint.

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Construction sites must be cleared of all waste material, rubble, and debris associated with the construction phase at regular intervals during, and at the conclusion of the construction phase.
Site preparation – remove all non-native weeds from the site of revegetation to reduce competition with native plant species.
Plant during the cooler, wetter months to reduce transplant shock and ensure moisture availability. This would ideally be during winter (June, July). Space plants according to their natural distribution & spacing, which will be visible in the surrounding remaining natural vegetation on the site. So not add any additional organic matter to the soil, as some fynbos species are sensitive to nutrient stress in a way most typical garden species are not.
Post planting care - Regularly water & monitor the newly planted fynbos, particularly during the establishment phase. Apply a thin layer of mulch to conserve moisture and suppress weeds. Continue removing any invasive species that may reappear.
If more plants are required for successful coverage of disturbed areas, augmentation with sourced plants can be done.
Species selection – Choose a mix of pioneer species and slower-growing species to ensure quick coverage and long-term sustainability. Some species that could be considered include: Helichrysum petiolare, H. odoratissimum, H, cymosum, Metalasia muricata, M. pungens, Osteospermum moniliferum, Searsia chirindensis, Senecio crenatus, Agathosma ovata, Chironia baccifera, Restio eleocharis, Passerina corymbosa, etc. Base additional species selection first on important species listed for South Outeniqua Sandstone Fynbos (Refer to Appendix G – Specialist reports), and then only on availability from local nurseries.
Adaptive management – Be prepared to adapt strategies based on monitoring results and environmental conditions.

</td></tr>
<tr><td>Phase</td><td>Planning and Operational Phase</td></tr>
<tr><td>Aspect</td><td>Management of habitats and plant species; landscaping activities</td></tr>
<tr><td>Nature of impact</td><td>Direct / Indirect - Negative Edge Effects on Habitats and Plant Species -</td></tr>
<tr><td>Description of impact</td><td>The fynbos remaining after construction in the southern half of the site will be negatively affected by landscaping and gardens in the residential development due to negative edge effects that result from these planted areas. Landscaping services often discard garden waste and slash into open spaces and could also result in cutting natural vegetation back further than defined in the PAOI. This may be the result of inappropriate control (cutting / herbicide use) in natural vegetation resulting from poor planning for alien clearing. Hard surfaces on the development will also affect rainwater runoff into the fynbos area, causing changes to microclimates and niches.

The edge effects resulting from landscaping choices could potentially have a permanent medium negative impact on remaining natural spaces on Erf 2074. The application of the mitigation measures proposed will result in the reduction of the impact to low negative for all layout 1 (very dense, not considered further), layout 2 (assessed) and concept layout 3 (layout 2 redesigned with relevant mitigation measures in place).</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><td>Impact Status</td><td>Negative</td><td></td><td>Negative</td><td></td></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation (including recommendations for change in layout 2)</td><td></td></tr>
<tr><td>Spatial</td><td>Activity</td><td>2</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Short to medium</td><td>2</td><td>Very short</td><td>1</td></tr>
<tr><td>Frequency</td><td>Seldom</td><td>3</td><td>Infrequent</td><td>2</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>3</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Medium High</td><td>8</td><td>Low</td><td>4</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>10</td><td>Low</td><td>5</td></tr>
<tr><td>Probability</td><td>Expected</td><td>5</td><td>Plausible</td><td>3</td></tr>
<tr><td>Impact Significance</td><td>Medium</td><td>15</td><td>Low</td><td>8</td></tr>
<tr><td>Mitigation</td><td colspan="4">Possible</td></tr>
<tr><td>Confidence</td><td colspan="4">High</td></tr>
<tr><td>Reversibility</td><td colspan="4">Difficult</td></tr>
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</td></tr>
<tr><td>Mitigation Measures</td><td>
Post construction – Construction Team

The rehabilitation of the 2m disturbance footprint with topsoil and plants rescued on the site must occur as soon as possible after the conclusion of construction.
The rescued plants must be planted back with the aid of botanists and / or horticultural specialists within the 2m disturbance footprint around the permanent disturbance footprints.

Planning - Design Team

The southern boundary of Erf 2074 should preferably remain unfenced - Should a fence be planned along the southern edge of Erf 2074 (as opposed to just along the southern boundary of the proposed development) this fence (and potential associated fire breaks – consult the Southern Cape Fire Protection Association) will present additional management impact which is currently addressed in this report.
Development should therefore be avoided as far as possible in the southern CBA section of the site which contains the most pristine vegetation on the site. Only existing road, gazebo developed on existing development footprint and 1200m2 area identified in NE section of CBA due to flatter area is recommended in the southern area.

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<tr><td></td><td>Planning and Operations – Design and Operational Team
Existing road in the south recommended to be used as a footpath only for residents; no other footpaths / roads permitted to be created in southern section.
The existing development footprint of unfinished building recommend to be converted to a lookout point for residents.
No fires permitted in this area.
No removal of indigenous vegetation in the southern no-go area;
If gardens need to be considered, they can be designed to be water wise (avoid erosion) and friendly to wildlife and the greater natural habitat. Fynbos Life in Cape Town is an inspirational indigenous landscaping project with very useful tips allowing a garden to add biodiversity value, instead of detract value.
Gardens & the built environment should be planned with rainfall, slope/aspect, wind direction, & microclimates in mind. Gardens could be planned to capture rainfall & slow water loss. Create a grey-water wetland if there is a need for water filtration & absorption of extra nutrients.
No garden waste may be dumped in any remaining natural area and must be disposed of in a responsible manner.
Make sure not to plant NEMBA listed invasive plants (e.g., kikuyu grass, Cenchrus clandestinus) in your garden. Better grasses to plant in areas that are erosion prone or in lawns include kweek (Cynodon dactylon), Eragrostis capensis, Kangaroo grass (Themeda triandra), Rats tail grass (Sporobolus africanus), and buffalo grass (Stenotaphrum secundatum)
Select locally indigenous plants for gardens, making use of as many of the rescued plant species as possible. Avoid plants that are hybrids and cultivars (Refer to Terrestrial biodiversity and Plant species Assessment in Appendix G)
Plant during the rainy season (early winter May/June) and add a 10cm thick layer of wood chip to keep in moisture.
Reduce or replace lawns with water-wise groundcovers or enlarging shrub beds.
Add local edible and aromatic plants to avoid water & nutrient intensive vegetable gardens.
Ensure soft landscaping is used as opposed to hard landscaping
Soft landscaping refers to natural spaces around constructed buildings that contain plants. The plants used are often trees, shrubs, and herbs that perform valuable ecosystem functions and services. Soft landscapes support biodiversity if local indigenous species are planted, or better yet, if the natural vegetation is left to recover and grow with minimal to no planting of man-made gardens. Grasses and shrubs are as effective at converting Carbon dioxide as are trees. Keeping fynbos & Strandveld vegetation allows groundwater attenuation and minimisation of erosion risk
Hard landscaping are spaces around buildings that have been transformed into impermeable surfaces, such as pavements, and concrete driveways. Hard landscapes have negative impacts on the natural environment. Hard landscaping results in the absorption and reflection of heat, which makes them hotter than the surrounding natural areas. Furthermore, they speed up the flow of rainwater. No plants can really grow on these surfaces making groundwater attenuation problematic
Clearly delineate maintenance zones and employ low-impact maintenance techniques
Schedule major maintenance activities to avoid critical periods such as flowering, seed dispersal, and pollination periods (for most species this is during spring between September to November).
Minimize soil disturbance and compaction, such as using hand tools instead of heavy machinery. Use specialized equipment designed to reduce environmental footprint, like lightweight mowers or trimmers.
When chemical treatments are necessary, use targeted applications that minimize exposure to non-target species.
Stabilize disturbed soils promptly with native vegetation or erosion control materials. Erosion control measures should be in place.

Vegetation clearing along road verges should be kept to a minimum, and avoided in areas where it poses no risk to vehicles. Where essential, vegetation along the road verges should only be cleared up to a maximum width of 1m on either side of the road.
Cut vegetation should not be consolidated (gathered into piles) and left next to the side of the road where clearing took place. Instead, the cut vegetation should either be removed from site, or disposed of in a scattered/spread-out manner within the immediate surrounding of where it was cut, so as not to smother other plants or create concentrated fuel loads for fire.
</td></tr>
<tr><td>Activity</td><td>No go alternative</td></tr>
<tr><td>Nature of impact:</td><td>Direct</td></tr>
<tr><td>Description of impact:</td><td>Baseline conditions will likely remain the same – modified ecosystems in the north and intact fynbos in the south with development footprint of unfinished building and access road. Minimal disturbance to fynbos in the south as a result of existing activities.</td></tr>
<tr><td>Impact Rating</td><td>
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<tr><th>Impact Status</th><th colspan="2">Negative</th></tr>
<tr><td>Spatial</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Very short</td><td>1</td></tr>
<tr><td>Frequency</td><td>Infrequent</td><td>2</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Low</td><td>4</td></tr>
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	Consequence	Low	5	
	Probability	Plausible	3	
	Impact Significance	**Low**	**8**	

FAUNA HABITATS AND FAUNA SPECIES

The Department of Forestry, Fisheries and the Environment (DFFE) Screening Tool shows a HIGH and MEDIUM sensitivity for the terrestrial animal species theme across Erf 2074

Habitat types identified on the property includes a small, old agricultural field (olive grove); dense vegetation (trees/shrubs) in the north around the houses; modified fynbos with some Pine and Black Wattle (*Acacia mearnsii*) invasions in the middle of the property; heavily invaded areas of Blackwood (*A. melanoxylon*) in the middle of the property; and natural fynbos in the south. There are no mapped watercourses or waterbodies on the property, only a drainage line is present along the south-western boundary.

A total of 27 bird species was identified during site visits; the likelihood of occurrence of potential SCC was found to be low for all avian species due to limited or no suitable habitat remaining on the site, with exception of *Campethera notata* (Knysna Woodpecker) which is assigned a medium likelihood of occurrence due to suitable habitat (i.e. gardens) occurring in the north of the property surrounding the houses and old agricultural fields.

Mammals record on site include a Cape Grey Mongoose, suspected caracal, evidence of Cape Porcupine. The likelihood of potential mammal SCC was found to be low for all mammal species, due to limited / no suitable habitat and / or limited food sources, with exception of *Amblysomus corriae* (Fynbos Golden Mole) which is assigned a medium likelihood of occurrence due to potential suitable habitat occurring in the north of the property; the area is however fragmented, but the precautionary principle is applied to this SCC.

A dung beetle was found on the property but different to the SCC; butterfly activity was note north of the site around the agricultural field and houses. No butterfly SCC was observed or sampled, however some plants of the genus Aspalathus (*Aspalathus alopecurus*) were found; this is not specifically known to be a larval host for the butterfly SCC, but it is in the same genus of plants utilized by the Red Copper butterfly (Aloeides thyra orientis) and the suspected genus for lesser-known breeding habits of the Knysna Pale Copper butterfly (*Aloeides pallida littoralis*).

No amphibians were found on the property. The likelihood of potential amphibian SCC was found to be low. The artificial garden pond may be inhabited by Clicking Stream Frogs (*Strongylopus grayii*) and Raucous Toads (*Sclerophrys capensis)*

No reptile SCC were highlighted for the property by the DFFE screening tool and other online platforms. Puff Adder (*Bitis arietans*), Red-lipped Herald (*Crotaphopeltis hotamboeia*), Spotted Bush Snake (*Philothamnus semivariegatus*), Common Egg-eater (*Dasypeltis scabra*), Night Adder (*Causus rhombeatus*), Natal Green Snake (*Philothamnus natalensis)* have been reportedly observed on the property.

The fynbos south of site has a low likelihood of providing suitable habitat for *Aloeides thyra orientis* (Red Copper Butterfly) (SCC); the host plant was not observed, and soil in the fynbos area is not sandy as preferred by the SCC. Closest observation is Brenton on Sea. Larval host plants of *Aloeides pallida littoralis* (Knysna Pale Copper) were observed in the south; Closest observation is Brenton on Sea. The species is assigned a medium low occurrence on the property.

List of SCC with indication of likelihood of occurrence

Sensitivity	Resource	Classification	Scientific name	Common name	Red list status*	Suitable habitat	Likelihood of occurrence
High	DFFE Screening tool report	Avifauna	*Circus ranivorus*	Marsh Harrier	Endangered	Low	Low
High	DFFE Screening tool report	Avifauna	*Stephanoaetus coronatus*	Crowned Eagle	Vulnerable	No	Low
High	DFFE Screening tool report	Avifauna	*Bradypterus sylvaticus*	Knysna Warbler	Vulnerable	No	Low
	South African Bird Atlas Project (SABAP2)	Avifauna	*Tyto capensis*	African Grass Owl	Vulnerable	No	Low
	South African Bird Atlas Project (SABAP2)	Avifauna	*Buteo trizonatus*	Forest Buzzard	Least Concern (Regional), Near Threatened (Global)	Possible	Low

	South African Bird Atlas Project (SABAP2)	**Avifauna**	***Campethera notata***	**Knysna Woodpecker**	**Near Threatened (Regional), Near Threatened (Global)**	**Possible**	**Medium** -
Small amount of suitable habitat in the north of the property around the houses and the fringes of the agricultural fields. This area is quite disturbed in terms of human activity and noise, but this dense vegetation and tall trees may be marginally suitable habitat, The SCC is known to occur in gardens							
	South African Bird Atlas Project (SABAP2)	Avifauna	*Grus paradisea*	Blue Crane	Near Threatened TOPS: Protected (2023 DRAFT) CITES: Appendix II	No	Low
Medium	DFFE Screening tool report	Mammal	*Chlorotalpa duthieae*	Duthie's Golden Mole	Vulnerable	No	Low
Medium	DFFE Screening tool report	Mammal	*Sensitive species 8*	-	Vulnerable	No	Low
	Virtual Museum platform	Mammal	*Panthera pardus*	Leopard	Vulnerable	Yes	Low
	iNaturalist	**Mammal**	***Amblysomus corriae***	**Fynbos Golden Mole**		**Possible**	**Medium**
Suspected suitable habitat in north where soils are less compact and rocky. This area has been disturbed by cultivation (agricultural field/olive grove) and infrastructure (houses, roads), but SCC is known to thrive in gardens and cultivated lands and therefore can adapt and tolerate such habitat modification. The habitat is largely disconnected from surrounding suitable areas, with urban development on all surrounding properties, and the south of the site having shallow, rocky, compact soils unsuitable for the SCC.							
	Virtual Museum platform	Mammal	*Leptailurus serval*	Serval	Near Threatened TOPS: Protected (2023 DRAFT) CITES: Appendix II	No	No
Medium	DFFE Screening tool report	Invertebrate	*Aloeides thyra orientis*	Red Copper Butterfly	Endangered	**Possible**	**Medium / Low**
Possible habitat given the open patches of ground in the fynbos habitat towards the south of the property. However, the soil in this fynbos area is very compact and rocky, not sandy as is preferred by SCC (nor is the vegetation mapped as Knysna Sand Fynbos where SCC is known to occur), and the host plant species was not observed on site. Closest observations of this SCC are in Brenton on Sea, Knysna, a distance not traversable by the subspecies							
Medium	DFFE Screening tool report	Invertebrate	*Sarophorus punctatus*	-	Endangered	No	Low
Medium	DFFE Screening tool report	Invertebrate	*Aneuryphymus montanus*	Yellow-winged Agile Grasshopper	Vulnerable	No	Low
	Virtual Museum platform	Invertebrate	*Aloeides pallida littoralis*	Knysna Pale Copper Butterfly	Near Threatened	**Possible**	**Medium - Low**
Property has coastal fynbos and flat terrain as preferred by SCC. Larval host plants in the correct genus were observed on the property in the fynbos area in the south. However, the closest observations of this SCC are close to Brenton on Sea, a distance not traversable by the subspecies. However, the precautionary principle is applied due to suspected habitat on site and the SCC is given a medium-low likelihood of occurrence.							
Medium	DFFE Screening tool report	Amphibian	*Afrixalus knysnae*	Knysna Leaf-folding Frog	Endangered	No	Low

The property contains marginally suitable habitat characteristics for the Knysna Woodpecker (*Campethera notata*), Knysna Pale Copper Butterfly (*Aloeides pallida littoralis*), and the golden mole (Amblysomus corriae) SCC. Despite suitable habitat on site being relatively small and disconnected from other suitable areas in the surrounding landscape, the precautionary principle is applied, and it is deemed likely that the SCC occur on the property despite these limitations. - The likely occurrence is supported by their ability to adapt to semiurban/modified environments (i.e. Knysna Woodpecker seen in gardens; Fynbos Golden Moles occur in agricultural fields/gardens) and the high likelihood to evade disturbance by dogs on site. The property also represents some of the last natural remaining fynbos fragments and natural space in an otherwise developed urban area, thereby providing a refuge for most animal species, and likely also the SCC.

A **MEDIUM sensitivity rating** is applied to the property for the **Terrestrial Animal Species** Theme.

Strong consideration should be given to limiting the developmental footprint on southern CBA area. This section is mapped as a CBA1 area within the WCBSP indicating a management objective of maintaining a natural or near-natural state, with no further loss of habitat, and only low-impact, biodiversity-sensitive land uses considered appropriate.
Currently, dogs roam the entire property and cause disturbance to wildlife (chasing and catching animals) and reducing their reproductive success (e.g. eating Guineafowl eggs). This can have major negative impacts on the abundance and diversity of wildlife making use of the property and in some cases reduces their survival.

The **south of the property** has the most natural habitat (fynbos), greatest connectivity to adjacent natural/semi-natural areas along the Piesang River valley and access to water in the drainage line along the south-western boundary. This fynbos area in the

southern section of the property is considered to have a **high site ecological importance (SEI)** and considered to have a **medium likelihood** occurrence of Knysna Pale Copper Butterfly (*Aloeides pallida littoralis*) (NT).

The old agricultural field is considered to have a low site ecological importance (SEI) and a medium likelihood occurrence of Knysna Woodpecker (*Campethera notata*) (NT) and Fynbos Golden Mole (*Amblysomus corriae*) (NT)

All the other identified habitats / areas on the site are considered to have a very low site ecological importance (SEI) and Fynbos Golden Mole (*Amblysomus corriae*) (NT)) is considered to have a medium likelihood of occurrence around dwellings, gardens and lawn areas due to its adaptability to modified areas.

Guidelines for interpreting SEI ratings in terms of development (SANBI, 2020):
VERY LOW SEI - activities of medium to high impact are acceptable and restoration may not be required, but minimisation mitigation is necessary.
LOW SEI - medium to high impact development activities are allowed but must be minimised and followed by appropriate restoration
High SEI - areas should be avoided where possible, but minimization mitigation measures may be acceptable when the development: 1) limits the amount of habitat impacted, and 2) associated activities are limited and are of low impact.

The land use suggested by alternative layouts 1 and 2 options is high impact and unsuitable for the HIGH SEI area of the property. To limit the amount of habitat impacted, the final SDP developed for the units is recommended to place the development footprint outside gradients steeper than 1:4 and to only permit limited development in the mapped CBA ; the proposed concept layouts show that approximately 7750m2 of the mapped fynbos area will be lost to the development and 12457**m2** fynbos within mapped CBA will be retained.

To ensure associated activities are limited and of low impact, it is recommended that only the identified flatter area in the NE section of the mapped CBA be developed (approximately 1200m2), as opposed to the steeper adjacent area not included in the mapped CBA; the existing road in the southern section is recommended to be used as a footpath, and the existing development footprint be used for the development of the proposed look out / gazebo area. This section of the property is likely to be utilised by many animal species in the surrounding areas and it is strongly recommended that the southern boundaries of the property not be fenced in order to maximize connectivity within the surrounding landscape and allow animals to continue using this natural space. With the proposed recommendation, approximately 5900m2 fynbos will be lost and 15 000m2 (1.5ha) fynbos retained with approximately 1.4 ha within CBA.

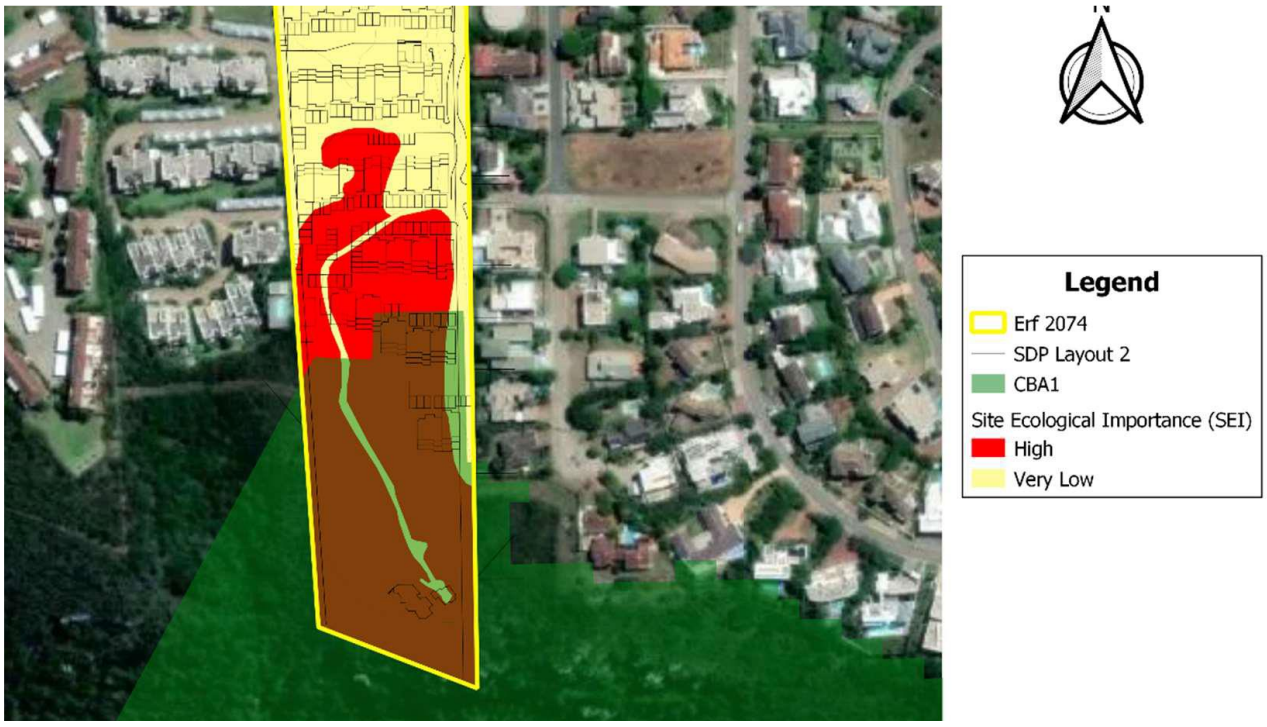

Figure 9: SEI for Erf 2074, Alternative Layout 2 with the inclusion of the CBA1 boundary

It is imperative that mitigation measures are strictly adhered to and that all measures are taken to reduce the developmental footprint wherever possible to minimize negative impacts on the faunal community and reduce the loss of critical habitats.

Current impacts:

- AIS resulting in Habitat transformation from its natural state resulting in altered fire regimes (increased frequency and intensity), loss of suitable habitat, reduction in food resources
- Disturbances by domestic dogs

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Planning and construction Phase**
Aspect	**Layout and Planning, Construction**
Nature of impact:	**Direct**
Description of impact	**Loss of high SEI Faunal Habitat - it important to limit the loss of natural ecosystems, which benefits all SCC and biodiversity more widely.**

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation (including recommendations for layout 3)	
Spatial	Site	2	Site	2
Duration	Short to medium	3	Very short	1
Frequency	Seldom	3	Seldom	3
Intensity	Low to medium	2	Low	1
Severity	Medium	8	Low	5
Consequence	Medium	10	Low	7
Probability	Probable	4	Plausible	3
Impact Significance	**Medium**	**14**	**Low**	**10**
Mitigation	Possible – impacts can be minimised with mitigation during construction phase.			
Confidence	High			
Reversibility	Permanent impact (Loss of SCC, habitat)			

Mitigation Measures

Planning

- Reduce development in the southern portion of the site is mapped as a CBA1 area within the WCBSP, and where gradients are steeper than 1:4
- The existing road to be used to access the existing gazebo/ function space rather than adding a new road; retain existing road as footpath and permit no driving in southern CBA area.
- Fence northern boundary; do not fence southern section to allow connectivity to the natural habitat and drainage line in the south.

Phase	**Construction Phase - The construction phase will have the highest impacts on fauna species due to increased moving vehicles, noise and habitat destruction associated with these activities.**
Aspect	**Construction Activities**
Nature of impact:	**Direct -** Loss of habitat for fauna within the footprint of the proposed development
Description of impact	Loss of Faunal Habitat: Activity may result in the loss of habitat for faunal species, which could result in disturbance and displacement of faunal species. Loss of faunal SSC due to construction activities: Activities associated with bush clearing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Local	3	Activity	1
Duration	Medium	3	Very short	1
Frequency	Seldom	3	Infrequent	2
Intensity	Medium High	4	Low to medium	2
Severity	Medium High	10	Low	5
Consequence	Medium High	13	Low	6
Probability	Probable	4	Probable	4
Impact Significance	**Medium High**	**15**	**Low**	**10**
Mitigation	Possible – impacts can be minimised with mitigation during construction phase.			
Confidence	High			
Reversibility	Permanent impact (Loss of SCC, habitat)			

Mitigation Measures

Planning – Planning and construction team

- Transplanting should follow best practice guidelines and on-going monitoring and maintenance (i.e. watering, temporary shading, etc.) of each transplanted plant needs to occur to ensure the best chances of survival. The new location of each plant needs to be marked (GPS point and a physical marker next to the plant) to allow the plant to be revisited for monitoring and maintenance purposes, which can cease once a Botanical Specialist considers the plant well established within its new environment.
- No further development is permitted to take place in the core of the green fynbos space in the south of the property with the exception of an upgrade of the existing gazebo with the same footprint (no expansion). The existing road is to be used as is or formalised using grass blocks and retained as a footpath

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Existing road and gazebo footprint in the south to be cordoned off to ensure footprint remains as small as possible. A clear method statement for construction methods in the south required prior to start of construction.
The southern extent of the footprint of the development needs to be assessed by a Botanical Specialist for the presence of butterfly larval host plants: Aspalathus spp. (especially A. acuminata, A. laricifolia and A. cymbiformis), Chrysanthemoides incana, C. monilifera, Indigofera erecta, Lebeckia plukenetiana, Osteospermum polygaloides, Thesium spp, Zygophyllum spp.)
If located, a botanical specialist needs to oversee the transplanting of these species from the development footprint into an appropriate natural environment (outside the development footprint) closest to where the plant was originally found. By limiting the distance that the plant is moved from its original location, impacts on associated faunal communities and changes to its growing conditions (microclimate, soil texture, soil moisture) are reduced.

Planning – Construction Team

Prior to construction, the disturbance footprint of the development should be clearly defined and demarcated to prevent unnecessary additional damage to the surrounding environment:
Construction netting or fencing must be used to clearly indicate construction areas.
Access roads must be clearly marked so there is no confusion as to where the tracks are or how wide the road is.
Clear signs for “no-go” areas for vehicles and personnel should be placed strategically on the site and along access roads. No-go areas are anywhere outside of the direct area of influence of the construction phase and especially in the green space area in the south of the site.
A turning area for construction vehicles should be demarcated within the existing footprint of proposed hard surfaces like roads or houses.

Construction - Construction Team

Movement of workers must be limited to areas under construction. Access to surrounding areas is not permitted; these must be designated as no-go areas during construction.

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<tr><td>Aspect</td><td>Construction Activities - Noise</td></tr>
<tr><td>Nature of impact:</td><td>Direct – noise impacts on fauna</td></tr>
<tr><td>Description of impact</td><td>The faunal assessment revealed that the old agricultural field is possible breeding space for Knysna Woodpecker; Noise may have effects on other animals as well, as mitigated by this impact. Construction related noise can disturb breeding birds in the vicinity which can prevent them from selecting or returning to a site to breed on the property.
Construction related noise can result in SCC and other fauna abandoning nests, eggs, or chicks if breeding has already begun when construction commences. Noise may displace fauna which is detrimental to their wellbeing in a space with few refuges such as this landscape.</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><td>Impact Status</td><td>Negative</td><td></td><td>Negligible</td><td></td></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation</td><td></td></tr>
<tr><td>Spatial</td><td>Activity</td><td>1</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Short</td><td>2</td><td>Very short</td><td>1</td></tr>
<tr><td>Frequency</td><td>Seldom</td><td>3</td><td>Rarely</td><td>1</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Low</td><td>6</td><td>Negligible</td><td>3</td></tr>
<tr><td>Consequence</td><td>Low</td><td>7</td><td>Negligible</td><td>4</td></tr>
<tr><td>Probability</td><td>Plausible</td><td>3</td><td>Slim</td><td>1</td></tr>
<tr><td>Impact Significance</td><td>Low</td><td>10</td><td>Negligible</td><td>5</td></tr>
<tr><td>Mitigation</td><td colspan="4">Possible – impacts can be minimised with mitigation during construction phase.</td></tr>
<tr><td>Confidence</td><td colspan="4">High</td></tr>
<tr><td>Reversibility</td><td colspan="4">Permanent impact (Loss of SCC, habitat)</td></tr>
</table>
</td></tr>
<tr><td>Mitigation Measures</td><td>
Planning – Construction and Planning Team

A walk through and search should be conducted to ensure that any birds are not nesting in vegetation prior to clearing of aliens and construction. If a nest with eggs is encountered, construction must be halted and a wildlife rehabilitation facility contacted.
During laying season for Knysna Woodpecker (August to November) a dedicated search for the SCC must be conducted by a Faunal Specialist in the agricultural fields and non-natural gardens habitat to check if the species is present.
If a Knysna Woodpecker nest is found, no construction should take place in the dwelling and non-natural garden and old agricultural field habitat for 6 weeks hence (time for incubation and development of the nestling before it can relocate) and in October (peak laying month to account for other Knysna Woodpeckers that may not have nested in a place that is as conspicuous as those found).

</td></tr>
<tr><td>Aspect</td><td>Construction Activities – Management of materials</td></tr>
<tr><td>Nature of impact:</td><td>Direct</td></tr>
</table>

<table>
<tr><td>Description of impact</td><td>The management of materials and staff on the site must be managed properly to prevent negative impacts on fauna and the surrounding environment.
1. Loss of habitat or harm to fauna outside of designated construction areas.
2. Litter and pollution of natural environment.
3. Potential health and safety hazards (for staff and fauna) on the site and in the surrounding environment.</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><td>Impact Status</td><td>Negative</td><td></td><td>Negative</td><td></td></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation</td><td></td></tr>
<tr><td>Spatial</td><td>Site</td><td>2</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Short</td><td>2</td><td>Very short</td><td>1</td></tr>
<tr><td>Frequency</td><td>Seldom</td><td>3</td><td>Rarely</td><td>1</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Low</td><td>6</td><td>Negligible</td><td>3</td></tr>
<tr><td>Consequence</td><td>Low</td><td>8</td><td>Negligible</td><td>4</td></tr>
<tr><td>Probability</td><td>Plausible</td><td>3</td><td>Plausible</td><td>3</td></tr>
<tr><td>Impact Significance</td><td>Medium</td><td>11</td><td>Low</td><td>7</td></tr>
<tr><td>Mitigation</td><td colspan="4">Possible – impacts can be minimised with mitigation during construction phase.</td></tr>
<tr><td>Confidence</td><td colspan="4">High</td></tr>
<tr><td>Reversibility</td><td colspan="4">Permanent impact (Loss of SCC, habitat)</td></tr>
</table>
</td></tr>
<tr><td>Mitigation Measures</td><td>Planning and Construction – Construction Team
• All new staff must be briefed about the layout of the construction site and must be made aware of the no-go areas as the surrounding environment is sensitive and must not be disturbed.
• Staff must be made aware what all SCC looks like and to report all fauna occurring on site to the site ECO who will report to external ECO.
• Weekly toolbox talks should be held, during which the ECO should remind all staff of construction phase mitigation measures
• Put in place vegetation mitigation measures
• Put in place waste management mitigation measures
• Put in place soil management and dust control measures</td></tr>
<tr><td>Aspect</td><td>Construction Activities</td></tr>
<tr><td>Nature of impact:</td><td>Direct - Harm/Death of fauna</td></tr>
<tr><td>Description of impact</td><td>Fauna may occur on site and be killed or seriously harmed during construction related activities. Cryptic and ground-dwelling species, like the Fynbos Golden Mole (Amblysomus corriae) SCC, are difficult to detect and limited in their mobility rendering them vulnerable to earthmoving and construction activities. It is suspected that the golden mole SCC could depend on the old agricultural field habitat (designated as low SEI) for its subterranean lifestyle. This SCC is highly adaptable to modified environments but impacts on individuals and the population must be kept to a minimum during construction.
1. Loss of threatened species.
2. Loss of genetic diversity from remaining fauna populations.
3. General loss of biodiversity.</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><td>Impact Status</td><td>Negative</td><td></td><td>Negligible</td><td></td></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation</td><td></td></tr>
<tr><td>Spatial</td><td>Activity</td><td>1</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Permanent</td><td>6</td><td>Permanent</td><td>6</td></tr>
<tr><td>Frequency</td><td>Seldom</td><td>3</td><td>Rarely</td><td>1</td></tr>
<tr><td>Intensity</td><td>High</td><td>5</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>High</td><td>14</td><td>Low</td><td>8</td></tr>
<tr><td>Consequence</td><td>Medium High</td><td>15</td><td>Low</td><td>9</td></tr>
<tr><td>Probability</td><td>Probable</td><td>4</td><td>Slim</td><td>1</td></tr>
<tr><td>Impact Significance</td><td>Medium High</td><td>15</td><td>Low</td><td>10</td></tr>
<tr><td>Mitigation</td><td colspan="4">Possible – impacts can be prevented with mitigation during construction phase.</td></tr>
<tr><td>Confidence</td><td colspan="4">High</td></tr>
<tr><td>Reversibility</td><td colspan="4">Permanent impact (Loss of SCC, habitat) - Impact requires in situ mitigation and receptor mitigation to prevent impact</td></tr>
</table>
</td></tr>
<tr><td>Mitigation Measures</td><td>Planning – Planning and construction Team
• Any permits for sensitive fauna species of conservational concern to be in place prior to construction. Allow 3 months for this process.
• Site walkovers to be conducted by fauna search and rescue team prior to commencement of construction;
• Permits required for fauna search and rescue (i.e., tortoises) must be obtained before any construction commences. Some animal species that potentially occur in the project area are protected under CITES and the PNCO. Although the status of these species is not necessarily equivalent to that of SCC, a permit is required for their removal where appropriate. For example, tortoises are listed on Schedule 2 of the PNCO and will, therefore, require permits for their removal during the construction phase of the project.</td></tr>
</table>

- Threatened species should be removed to similar habitat within proximity of the project area by a suitably qualified person where appropriate. Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise.

Planning – construction Team

- Construction should happen in phases, such that construction related activities are confined to one area at a time on the property and can be monitored for faunal impacts appropriately.
- Suggested order for phases of construction should prioritize constructing access roads to completion before focusing on dwellings
- After the footprint of the development has been clearly demarcated a faunal specialist should do a walk-through to search for bird nests and eggs.
- A permit is required for activities that disturb protected bird species, particularly during the breeding season. Sites with eggs or chicks are considered to be protected sites.
- After grubbing has been completed, a Faunal Specialist should do a second walk-through to look for signs of fauna with limited mobility and escape potential (i.e. tortoise, chameleon, etc.) with particular attention given to the Fynbos Golden Mole SCC.
- Should signs of fauna with limited mobility or an SCC be found within the demarcated area, a search and rescue operation should be undertaken to relocate fauna to a suitable location on the property (See Box. 1 for guidelines
- on animal encounters).
- No construction may commence until the Faunal Specialist is satisfied that all fauna with limited mobility and/or SCC have been successfully removed from the demarcated footprint area.

Construction - Construction Team

- Keep records of fauna search and rescue permits and reports.
- Faunal search and rescue to be conducted before construction commences, however, experience has shown that there could still be some mortalities as these animals may move onto site once construction is underway. A search should be on call for such circumstances. Before construction commences for any new earthworks at the start of new phase, an ECO should do a walk-through of the demarcated area and access roads that will be used to look fauna for with limited mobility. These animals should be removed from the demarcated area to an adjacent location, and where appropriate a Faunal Specialist contacted for assistance or guidance.
- It is important that clearing activities are kept to the minimum and take place in a phased manner; this allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas.
- At any point during the day (during construction), if an animal with limited mobility is observed on site, this should be reported to the ECO and construction temporarily halted.
- Construction can commence once the ECO is satisfied that all such fauna is removed from the construction area.
- No animals are to be harmed or killed during construction activities.
- All open excavations must be securely fenced or barricaded. Excavations must be checked daily for trapped fauna. Trapped animals are to be rescued and released.
- Establish strict speeding regulations during construction phase. All personnel and visitors to abide to speeding regulations. The recommended speed is 20 km/hour on sites of this kind. Signs should be put up along the roads to remind people of speed limits, as well as warnings to look out for small animals on the roads.
- Contractual fines to be imposed on any employee who is found attempting to harm fauna in surrounding areas.
- If any animals are seen on site, a photo or a video should be taken if possible (to assists in identification) and all fauna encountered on site should be reported to the ECO immediately. This is particularly important when:
- An animal is harmed or compromised in any way during construction.
- Ground-dwelling animals their nests or eggs are unearthed during earthworks (e.g. moles,
- tortoise eggs, terrapins/frogs estivating).
- Any animal with limited mobility is found on site (e.g. tortoises, moles, chameleons).
- Any potentially dangerous animal is encountered. This includes any potentially venomous animal (e.g. snakes, scorpions) or any medium-large animal that has become cornered in an enclosed area such that it cannot escape (e.g. porcupines, monkeys, baboons, antelope). It is critical in the case of snakes/ scorpions o get pictures/videos to aid in identification and appropriate treatment of anyone needing medical assistance.
- Any animal that shows a reluctance to escape or move away from the construction site thereby increasing its exposure to harm or increasing the risk of injuring people on site.
- For any injured animals or animals to be removed from site (domestic or wild):
- The ECO should provide guidance or assistance to get all animals to safety, treating any injured animals, and issuing instructions on when to continue with construction (once they are satisfied that all animals have been removed from site) or put additional mitigation measures in place to protect animals on the site from harm.

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A local SPCA or animal welfare society can collect and treat most animals and should be the first point of call for assistance. If they cannot directly assist, they will revert and notify the relevant authorities/vets.
For any assistance with snake removals/relocations, identifications, or bite treatment contact the African Snakebite Institute. The contact details of a suitably qualified snake handler are provided at the following link: https://snakeremoval.co.za/plettenberg-bay. Also available are the following emergency contacts:

<table>
<tr><th>SNAKEBITE EMERGENCIES:</th><th>GET THE FREE APP:</th></tr>
<tr><td>Poisons Information Helpline +27 861 555 777
Dr Jenna Taylor +27 83 631 4816
Dr Christoff Bell +27 73 174 0199
Johan Marais +27 82 494 2039
Jason Seale +27 82 781 8498
Arno Naude +27 83 739 9303
Dr PJC Buys +26 481 127 5109 (Namibia)</td><td>(Scan this code with your phone's camera.)</td></tr>
</table>
</td></tr>
<tr><td>Phase</td><td>Planning and Operational Phase</td></tr>
<tr><td>Aspect</td><td>Operational and maintenance activities;</td></tr>
<tr><td>Nature of impact:</td><td>Direct – Loss of fynbos habitat for fauna during maintenance activities.</td></tr>
<tr><td>Description of impact</td><td>The development on the site will alter the disturbance regime through changes in fire regimes and vegetation clearing associated with the maintenance and operation of housing and road infrastructure. For the most part, disturbances and habitat loss/alterations will be restricted to the immediate surroundings of the roads and dwellings but some largescale disturbances may alter the property's habitat as a whole.If the management adopts ecologically friendly approaches in the long-term, the development can have many positive (rather than only negative) outcomes for the environment. For example, the removal of the alien plants on site and the active control thereof reduces a significant existing threat to the fynbos habitat on site and in the surrounding environment i.e. increase in natural habitat, reducing the risk of fires (reduced frequency and intensity). The owner of the property will need to develop an alien invasive management and eradication plan, as well as a fire management plan.

Consequences of impact:
1. A general loss of habitat for plants and fauna by vegetation clearing around dwellings and roads. The mismanagement of materials during routine maintenance of infrastructure can also cause habitat loss (i.e. stockpiling/long term storage of materials on site rather than removing from site).
2. Changes in habitat structure through changes in fire regimes on the property i.e. suppressing fire over a prolonged period can lead to species poor senescent fynbos habitat in the green space in the south of the property.
3. Uncontrolled alien plants can completely invade and transform natural habitats leading to a loss in associated biodiversity. Alien plants also increase fire frequency and intensity, which negatively impacts biodiversity either directly through hotter more frequent fires, or indirectly though changes in habitat (vegetation) structure.</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><th>Impact Status</th><th>Negative</th><th></th><th>Negative</th><th></th></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation</td><td></td></tr>
<tr><td>Spatial</td><td>Site</td><td>2</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Very short</td><td>1</td><td>Very short</td><td>1</td></tr>
<tr><td>Frequency</td><td>Seldom</td><td>2</td><td>Infrequent</td><td>2</td></tr>
<tr><td>Intensity</td><td>Low to medium</td><td>2</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Low</td><td>5</td><td>Low</td><td>4</td></tr>
<tr><td>Consequence</td><td>Low</td><td>7</td><td>Low</td><td>5</td></tr>
<tr><td>Probability</td><td>Probable</td><td>4</td><td>Plausible</td><td>3</td></tr>
<tr><td>Impact Significance</td><td>Medium</td><td>11</td><td>Low</td><td>8</td></tr>
<tr><td>Mitigation</td><td>Likely</td><td colspan="3"></td></tr>
<tr><td>Confidence</td><td>High</td><td colspan="3"></td></tr>
<tr><td>Reversibility</td><td>Possible</td><td colspan="3"></td></tr>
</table>
</td></tr>
<tr><td>Mitigation Measures</td><td>Planning – Planning Team

Only minimal development should take place in southern section where intact habitats and refuge for fauna occurs.
Approximately 1200m2 NE section of CBA recommended due to flatter gradient
Existing road recommended to be used as a footpath only for residents; no other footpaths / roads permitted to be created in southern section.
The existing development footprint of unfinished building recommend to be converted to a lookout point for residents.

Operations– Operational Team

Put in place waste management, fire management, landscaping and AIS mitigation measures

</td></tr>
<tr><td>Aspect</td><td>Operational activities – visual and noise</td></tr>
<tr><td>Nature of impact:</td><td>Direct</td></tr>
<tr><td>Description of impact</td><td>The development on the site will alter the disturbance regime of the largely undeveloped area on the property through changes in noise and artificial lighting levels. For the most part, these disturbances will be restricted to the immediate surroundings of the road (i.e. traffic noise) and residential units (i.e. people talking/shouting, music). However, this can</td></tr>
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<tr><td></td><td>have a significant impact on biodiversity and alter the way fauna use the landscape (i.e. the creation of a landscape of fear resulting in animals avoiding certain habitats/areas around human disturbances; insects attracted to lights decreases their survival, negatively impacts on the ecosystem services they provide, and has negative knock-on consequences for their associated predators).
Consequences of impact:
1. The creation of a landscape of fear for fauna where areas of the property are avoided due to excessive anthropogenic activity, predominantly noise.
2. Light pollution, acts as an attractant to many insects and associated predators, putting all at risk.</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><th>Impact Status</th><th>Negative</th><th></th><th>Negative</th><th></th></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation</td><td></td></tr>
<tr><td>Spatial</td><td>Site</td><td>2</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Very short</td><td>1</td><td>Very short</td><td>1</td></tr>
<tr><td>Frequency</td><td>Seldom</td><td>2</td><td>Infrequent</td><td>2</td></tr>
<tr><td>Intensity</td><td>Low to medium</td><td>2</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Low</td><td>5</td><td>Low</td><td>4</td></tr>
<tr><td>Consequence</td><td>Low</td><td>7</td><td>Low</td><td>5</td></tr>
<tr><td>Probability</td><td>Probable</td><td>4</td><td>Plausible</td><td>3</td></tr>
<tr><td>Impact Significance</td><td>Medium</td><td>11</td><td>Low</td><td>8</td></tr>
<tr><td>Mitigation</td><td>Likely</td><td colspan="3"></td></tr>
<tr><td>Confidence</td><td>High</td><td colspan="3"></td></tr>
<tr><td>Reversibility</td><td>Possible</td><td colspan="3"></td></tr>
</table>
</td></tr>
<tr><td>Mitigation Measures</td><td>• Put in place visual and noise management mitigation measures</td></tr>
<tr><td>Aspect</td><td>Operational activities</td></tr>
<tr><td>Nature of impact:</td><td>Direct - Human-wildlife conflict</td></tr>
<tr><td>Description of impact</td><td>Some wild animals are attracted to human developments, usually due to the presence of a resource that has become available within the footprint of the development. If any animal becomes habituated or loses their fear of humans, they risk becoming pests and problem animals (sometimes even posing a risk to humans) and often require control, in severe cases resulting in their harm or death. Keeping pets on the premises can also increase the potential for human-wildlife conflict as pets can fight or kill animals (i.e. cats are known to be devastating for indigenous wildlife, especially birds, small mammals and reptiles), or be attractive to some animals as prey (i.e. leopards are known to take domestic cats and dogs occasionally). This is especially important for this site since the Fynbos Golden Mole SCC and the Knysna Woodpecker SCC can adapt to human modified environments such as gardens and may suffer negative impacts because of pets. Pets also run the risk of being harmed by wildlife (i.e. snake bites) which can lead to owners wanting to control or harm the natural fauna of the area.
Consequences of impact:
1. Intentional harm or death of problem or pest animals due to their negative effects on the people (or pets) living on the property.
2. Unintentional harm or death of animals due to them consuming waste/food products which are bad for their health.
3. Pets causing death/harm to indigenous wildlife especially Knysna woodpecker and Golden Mole SCC.
4. Changes in natural foraging and movement patterns of fauna across habitats within the landscape due to the presence of a favourable resource (usually food) near the development. This can have knock-on effects for the ecosystem services they provide and their associated predators.</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><th>Impact Status</th><th>Negative</th><th></th><th>Negligible</th><th></th></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation</td><td></td></tr>
<tr><td>Spatial</td><td>Activity</td><td>1</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Short</td><td>2</td><td>Very short</td><td>1</td></tr>
<tr><td>Frequency</td><td>Seldom</td><td>3</td><td>Rarely</td><td>1</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Low</td><td>6</td><td>Negligible</td><td>3</td></tr>
<tr><td>Consequence</td><td>Low</td><td>7</td><td>Negligible</td><td>4</td></tr>
<tr><td>Probability</td><td>Plausible</td><td>3</td><td>Slim</td><td>1</td></tr>
<tr><td>Impact Significance</td><td>Low</td><td>10</td><td>Negligible</td><td>5</td></tr>
<tr><td>Mitigation</td><td>Likely</td><td colspan="3"></td></tr>
<tr><td>Confidence</td><td>High</td><td colspan="3"></td></tr>
<tr><td>Reversibility</td><td>Possible</td><td colspan="3"></td></tr>
</table>
</td></tr>
<tr><td>Mitigation Measures</td><td>Planning and Operations – Planning and Operational Team
• No feeding of wildlife is permitted, and no disposal/discarding of any food waste (bones, scraps, fruit pips/cores) within the surrounding environment is allowed.
• Put in place waste management mitigation measures to prevent attraction of wildlife to food waste areas
• No insect zappers should be allowed on site,
• No of insecticides around infrastructure.
• If pets permitted</td></tr>
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Residents on the property should be limited in their ability to keep pets (i.e. how many pets and what types of pets). It is highly recommended that no outdoor cats be allowed on the property as they are known to actively hunt small animals and can have detrimental effects on the wildlife of an area.
Dogs are to be kept in fenced areas around the property to prevent conflicts.
All dog walking in the green fynbos space is strictly prohibited and clearly visible signage should convey this to residents.
Residents on the property should be encouraged to keep their pets within enclosed areas around the houses. Dogs outside enclosed areas must be on leads at all times to prevent chasing of wild fauna in the area.

</td></tr>
<tr><td>Aspect</td><td>Operational activities</td></tr>
<tr><td>Nature of impact:</td><td>Direct - Harm/Death to wildlife due to collisions with vehicles.</td></tr>
<tr><td>Description of impact</td><td>All fauna run the risk of being seriously harmed or killed due to collisions with vehicles on road infrastructure. The Endangered Wildlife Trust (EWT) has a programme aimed at tracking the impacts of roadkill and monitoring the effectiveness of various mitigation measures (https://ewt.org.za/what-we-do/saving-species/wildlife-and-transport/), illustrating the severity of this impact on fauna. Roadkill can be particularly detrimental to populations of threatened species within an area and to animals with limited mobility which are at a higher risk of injury or death due to their limited ability to escape moving vehicles.
Consequences of impact:
1. Death/Harm to any animal species (small insects to larger mammals) as a result of collisions with vehicles, particularly animals with limited mobility.
2. Decline in population size of local fauna populations, particularly that of threatened species (i.e. listed as vulnerable or endangered, etc.).</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><td>Impact Status</td><td>Negative</td><td></td><td>Negative</td><td></td></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation</td><td></td></tr>
<tr><td>Spatial</td><td>Activity</td><td>1</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Permanent</td><td>6</td><td>Permanent</td><td>6</td></tr>
<tr><td>Frequency</td><td>Infrequent</td><td>2</td><td>Rarely</td><td>1</td></tr>
<tr><td>Intensity</td><td>High</td><td>5</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>High</td><td>13</td><td>Medium</td><td>7</td></tr>
<tr><td>Consequence</td><td>Medium High</td><td>14</td><td>Low</td><td>8</td></tr>
<tr><td>Probability</td><td>Probable</td><td>4</td><td>Slight</td><td>2</td></tr>
<tr><td>Impact Significance</td><td>Medium High</td><td>18</td><td>Low</td><td>10</td></tr>
<tr><td>Mitigation</td><td colspan="4">Likely</td></tr>
<tr><td>Confidence</td><td colspan="4">High</td></tr>
<tr><td>Reversibility</td><td colspan="4">Possible</td></tr>
</table>
</td></tr>
<tr><td>Mitigation Measures</td><td>Planning and Operations – Planning and Operational Team

Limit driving at night in the fynbos area in the south of the property. Some animals are blinded by the lights of a car, which reduces their ability to escape from collisions.
The strict enforcement of speed limits along all roads on the property. This speed limit should be reduced to 30km/h in areas where road-side visibility is reduced (i.e. due to dense vegetation).
Speedbumps or other speed reducing techniques can be incorporated into the road design to assist in keeping speeds to a minimum.
In areas where there is dense vegetation along the road verges, consideration should be given to clearing a narrow road margin (i.e. maximum of 1m on each side of road). This can assist in preventing roadkill by improving the driver's ability to see an animal before it appears on the road and have adequate response time (through the implementation of a speed limit) to avoid collisions. Vegetation clearing for this purpose needs to be balanced with the amount of habitat lost due to this activity.

</td></tr>
<tr><td>Aspect</td><td>Operational activities</td></tr>
<tr><td>Nature of impact:</td><td>Direct - Reduction of habitat connectivity to the greater landscape</td></tr>
<tr><td>Description of impact</td><td>Habitat connectivity is integral to the maintenance of healthy populations of fauna to and for the wellbeing of individuals. The southern section is connected to a large area and fragmentation in this area should be avoided. The fewer artificial barriers put in place, the better. However, this need is balanced equally with concern for security of residents on the property.
Consequences of impact: Reduction of gene flow ; Increased inter and intraspecific competition</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><td>Impact Status</td><td>Negative</td><td></td><td>Negligible</td><td></td></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation</td><td></td></tr>
<tr><td>Spatial</td><td>Local</td><td>3</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Long term</td><td>5</td><td>Very short</td><td>1</td></tr>
<tr><td>Frequency</td><td>Often</td><td>5</td><td>Rarely</td><td>1</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>3</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Very high</td><td>13</td><td>Negligible</td><td>3</td></tr>
<tr><td>Consequence</td><td>High</td><td>16</td><td>Negligible</td><td>4</td></tr>
<tr><td>Probability</td><td>Probable</td><td>4</td><td>Slim</td><td>1</td></tr>
</table>
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</table>

	Impact Significance	**Medium High**	**20**	Negligible	5
	Mitigation	Likely			
	Confidence	High			
	Reversibility	Possible			

Mitigation Measures	**Planning and Operations – Planning and Operational Team** • It is strongly recommended that the southern boundaries of the property not be fenced. This southern area is unlikely to pose a significant security threat to residents as the property borders a steep slope/cliff acting as a natural barrier for criminals. • Palisade fencing is best used for the rest of the site as this offers some permeability for smaller wildlife, requires little maintenance, and is not as susceptible to damage by fire as other fencing options
Activity	**No go alternative**
Nature of impact:	Direct
Description of impact:	Baseline conditions will likely remain the same – modified ecosystems in the north, medium to high invasion of alien trees in some sections, and intact fynbos in the south.

Impact rating

Impact Status	**Negative**	
Spatial	Site	2
Duration	Very short	1
Frequency	Seldom	3
Intensity	Low	1
Severity	Medium	5
Consequence	Medium	7
Probability	Plausible	3
Impact Significance	**Low**	**10**

ALIEN INVASIVE SPECIES

Some sections of the site (central section) are heavily invaded with alien tress. Some of the fynbos on the site contains thicket elements and is invaded by wattles (*Acacia cyclops*, *A. mearnsii*, *A. melanoxylon*, *A. saligna*), pines (*Pinus radiata*), cotoneaster (*Cotoneaster glaucophyllus*), and purpletop vervains (*Verbena bonariensis*). The most serious invasion on the site is Blackwood wattles (A. melanoxylon).
Some alien species not occurring on the site may be introduced during construction phase.
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). The property should implement the removal of alien plants in accordance with an alien management plan, best practices guidelines and legal requirements. Particular attention should be given to the dense stands of Blackwood (A. melanoxylon) in the middle of the property, in addition to the Pine and Black Wattle (A. mearnsii) observed throughout the site. This will prevent the loss/transformation of natural fynbos habitat, greatly reduce the risk of fires (frequency and intensity) causing damage to infrastructure and changing habitat structure and promote indigenous biodiversity of the area. These benefits extend beyond the property boundaries and can have cumulative benefits for the surrounding area (reduced fire risks, reduced spreading of alien plants) and biodiversity in general that benefit from indigenous habitat. Large tracts of alien invasive trees will be cleared; Correct AIS management can result in a decrease in alien invasives on the site

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Planning and Construction Phase**
Aspect	**Site clearing; construction activities**
Nature of impact:	**Direct**
Description of impact	Increase in alien invasive vegetation can displace indigenous vegetation and increase fire risk. Decrease in alien vegetation can increase indigenous vegetation and reduce the fire risk.

Impact Rating

Impact Status	**Negative**		**Positive**	
	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Short to medium	3	Short to medium	2
Frequency	Seldom	3	Infrequent	2
Intensity	Low	1	Low	1
Severity	Low	7	Low	5
Consequence	Low	8	Low	6
Probability	Probable	4	Probable	4
Impact Significance	**Medium**	**12**	**Low**	**10**
Mitigation	Possible – impacts can be managed with mitigation during construction phase.			
Confidence	High			
Reversibility	Possible - Impact is reversible with interventions			

<table>
<tr><td>Mitigation Measures</td><td>

ESO must be familiar with AIS currently on site and potential AIS that could be introduced
ESO to oversee:

Area on site to be designated for storage of removed alien trees
All removed alien trees must either be removed from site and disposed of at a registered waste disposal facility. Alternatively, the plant material can be mulched using a woodchipper on site. Any seed-bearing material is to be disposed of at a registered landfill.

Materials used during construction must be sourced and transported responsibly to minimise the risk new invasive plants
Ongoing hand removal of alien invasive plants must be done throughout construction phase as soon as the plant is detected.- Alien plant removal must not take place September / October since the SCC may rely on these for nesting. A walk through and search should be conducted to ensure that any birds are not nesting in vegetation prior to clearing of aliens. is encountered, construction must be halted and a wildlife rehabilitation facility contacted.

During rehabilitation, ensure topsoil is weed free.
During construction and rehabilitation check for weed regrowth and manage timeously (before seed is set)
Keep records of removal and disposal method

</td></tr>
<tr><td>Phase</td><td>Planning and Operational Phase</td></tr>
<tr><td>Aspect</td><td>Operational activities; landscaping</td></tr>
<tr><td>Nature of impact:</td><td>Direct</td></tr>
<tr><td>Description of impact:</td><td>Increase / decrease alien invasive vegetation; poor planning for alien clearing (herbicide use / dumping slash material); disturbance of fauna SCC</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><th>Impact Status</th><th>Negative</th><th></th><th>Positive</th><th></th></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation</td><td></td></tr>
<tr><td>Spatial</td><td>Site</td><td>2</td><td>Site</td><td>2</td></tr>
<tr><td>Duration</td><td>Medium to long</td><td>5</td><td>Medium to long</td><td>5</td></tr>
<tr><td>Frequency</td><td>Infrequent</td><td>2</td><td>Infrequent</td><td>2</td></tr>
<tr><td>Intensity</td><td>Low to medium</td><td>2</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Medium</td><td>9</td><td>Low</td><td>4</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>11</td><td>Low</td><td>5</td></tr>
<tr><td>Probability</td><td>Plausible</td><td>3</td><td>Plausible</td><td>3</td></tr>
<tr><td>Impact Significance</td><td>Medium</td><td>14</td><td>Low</td><td>8</td></tr>
<tr><td>Mitigation</td><td colspan="4">Possible</td></tr>
<tr><td>Confidence</td><td colspan="4">High</td></tr>
<tr><td>Reversibility</td><td colspan="4">Possible</td></tr>
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<tr><td>Mitigation Measures</td><td>

An alien management and control plan needs to be in place for the remaining open space on Erf 2074. This is a requirement by law.
Operational management to include ongoing removal of alien invasive trees from the property; fynbos in the south recommended to be managed naturally and kept free of alien trees and weeds.
In areas in the fynbos where alien clearing results in bare patches that could use some aid to enhance their recovery. This will promote the regeneration of natural fynbos abound the developments and reduce the possibility of negative edge effects on the site.
Landscaping with indigenous vegetation only
Duties of operational landscaping to include ensuring the ongoing removal of alien invasive trees and weeds on the property - Alien plant removal must not take place September / October since the fauna SCC may rely on these for nesting. A walk through and search should be conducted to ensure that any birds are not nesting in vegetation prior to clearing of aliens
When chemical treatments are necessary, use targeted applications that minimize exposure to non-target species.
Where alien invasive plants are removed at the root; suitable indigenous vegetation recommended to be planted to hold the soil.

</td></tr>
<tr><td>Activity</td><td>No go alternative</td></tr>
<tr><td>Nature of impact:</td><td>Direct</td></tr>
<tr><td>Description of impact:</td><td>Baseline conditions will likely remain the same – modified ecosystems in the north, medium to high invasion of alien trees in some sections, and intact fynbos in the south.</td></tr>
<tr><td>Imapct rating</td><td>
<table>
<tr><th>Impact Status</th><th>Negative</th><th></th></tr>
<tr><td>Spatial</td><td>Site</td><td>2</td></tr>
<tr><td>Duration</td><td>Medium to long</td><td>5</td></tr>
<tr><td>Frequency</td><td>Infrequent</td><td>2</td></tr>
<tr><td>Intensity</td><td>Low to medium</td><td>2</td></tr>
<tr><td>Severity</td><td>Medium</td><td>9</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>11</td></tr>
<tr><td>Probability</td><td>Plausible</td><td>3</td></tr>
<tr><td>Impact Significance</td><td>Low</td><td>8</td></tr>
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FIRE RISK

With the occurrence of the high number of alien vegetation on the site and natural fynbos in the south, the site is considered to have a high fire risk; measures must be put in place to prevent unplanned fires and control planned fires (fynbos requires burning every 7 to 15 years). With no management of the South Outeniqua Sandstone Fynbos in the south, it will start to present a fire risk, and will result in long-term biodiversity loss. Due to fire boosting requirements, it is proposed that a separate fire water reticulation be provided.

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Planning, Construction and Operational Phase**
Aspect	**Fire Risk - *Effect of Management on Habitats & Plant Species***
Nature of impact:	**Direct**
Description of impact	**Damage to surrounding vegetation and fauna and infrastructure due to fires**

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Local	3	Site	2
Duration	Very short	1	Very Short	1
Frequency	Rarely	1	Rarely	1
Intensity	Very High	6	Medium	3
Severity	Medium	8	Medium	5
Consequence	Medium	11	Medium	7
Probability	Probable	4	Plausible	3
Impact Significance	Medium	15	Low	10
Mitigation	Possible			
Confidence	High			
Reversibility	Possible			

Mitigation Measures

Planning, Construction and Operations – Planning, Construction and Operational Team

- Due to the fire risk inherent for any fire driven ecosystem (fynbos), it is important that this application be reviewed by the Southern Cape Fire Protection Association (SCFPA) so they can provide comments on the development layout, and management recommendations from a fire risk reduction perspective.
- The current gravel road on Erf 2074 may be utilised as a fire access road in the event of a wildfire. Fire breaks may not be necessary along fence-lines that are not directly adjacent to dwellings - Consult with the SCFPA for recommendations relating to the necessity of fire breaks.
- A fire prevention, response and management plan must be designed for the site for both construction and operational phase.
- Fire-proof hedges (Esler et al., 2014) can be made with indigenous species to reduce fire risk around the built environment. Some of the species that could be planted for this purpose include Osteospermum moniliferum (Bietou), *Diospyros dichrophylla, Searsia glauca*, *Pterocelastrus tricuspidatus* (Candlewood), *Ekebergia capensis* (Cape Ash), *Grewia occidentalis* (Crossberry), *Carissa bispinosa*, and *Euclea racemosa* (Gwarrie).
- The proposed development will be situated within Fynbos vegetation which is fire prone and could experience burning in the largely open green space in the south. Measures must be taken to secure infrastructure such as the maintenance of fire breaks around houses forming part of the development that share a boundary with the fynbos area as well as the gazebo/ function venue in the south of the site in the green space.
- Fire Management plan recommendations:
    - Mechanical clearing
    - Selectively thin areas where the veld is old, or where invasive species are becoming more dominant.
    - The thinning and cutting of vegetation will mimic an aspect of the effect of fire.
    - Utilisation of biomass cleared (excluding that of cleared invasive or alien plants):
    - Shred or chip cut fynbos. This can be used for paths, or as mulch in areas where aliens have been cleared. Distribute chipped material evenly and thinly to avoid fire hazards.
    - Use small-scale biochar kilns to convert biomass into biochar (these kilns can easily be made at a low cost should these not be available ready-made).
    - The ash and carbon can be spread back over the fynbos of Erf 2074 to improve soil health, and hopefully mimic the effect of fire.
    - Biochar production can be done with minimal smoke and emissions.
    - The burning of biomass does not always need to be complete, as fynbos fires are often cooler, and therefore not all biomass should be converted to ash.
- Fire preparedness and response
    - Job specific training to be provided to individuals responsible for dealing with fire management.
    - If a fire is detected it must be attended to immediately;
    - Adequate fire-fighting measures must be available and readily accessible on site.
    - No open fires permitted on construction site.

	• During operational phase fires may only be permitted in designated areas equipped with fire safety features; no designated fire areas permitted in southern fynbos area. • No cigarette butts or burning substances are permitted to be released into the environment. All cigarette butts to be extinguished first and then disposed of in a waste receptacle (sand buckets) provided. • Implement alien invasive vegetation mitigation measures and fire management plan. • Separate fire water reticulation to be provided. • Health and safety obligations as required by applicable National regulations and municipal bylaws to be implemented • Ensure all emergency numbers are in place and visible at all times • Ensure security guard and key personnel has all emergency numbers on hand at all times
Activity	**No go alternative**
Nature of impact:	Direct
Description of impact	Baseline conditions will likely remain the same – alien invasive trees on site; fynbos in the south – high risk fire area
Imapct Rating	

Impact Status	**Negative**	
Spatial	Local	3
Duration	Very short	1
Frequency	Rarely	1
Intensity	High	5
Severity	Low	7
Consequence	Medium	10
Probability	Plausible	3
Impact Significance	**Medium**	**13**

Housing developments – habitat degradation

With the occurrence of the high number of alien vegetation on the site and natural fynbos in the south, the site is considered to have a high fire risk; measures must be put in place to prevent unplanned fires and control planned fires (fynbos requires burning every 7 to 15 years). With no management of the South Outeniqua Sandstone Fynbos in the south, it will start to present a fire risk, and will result in long-term biodiversity loss. Due to fire boosting requirements, it is proposed that a separate fire water reticulation be provided.

Activity	Medium to high residential developments
Phase	Planning
Aspect	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Nature of impact:	Cumulative
Description of impact	The surrounding environment around Erf 2074 is already very developed, and cumulative impacts are already significant in this area. Multiple housing developments have led to an incremental loss and degradation of habitats, which could over time lead to a negative shift in the conservation status of South Outeniqua Sandstone Fynbos. Habitat degradation also leads to a loss of biodiversity in the long term. Where some species are lost from the landscape, while other populations of plants could face reduced genetic diversity, making them more susceptible to pests etc. Edge effects with minimal control means that more areas become invaded, and permanently altered so that pollination networks and edaphic modification become permanent features of the landscape. Cumulative impacts can push ecosystems beyond ecological thresholds, leading to sudden and irreversible changes in plant communities. These sudden irreversible changes can be very difficult to predict, especially when an assessment is localised, being focussed on a single development alone.
Impact Rating	

Impact Status	**Negative**		**Negative**	
	Without mitigation			
Spatial	Local	3		
Duration	Permanent	6		
Frequency	Infrequent	2		
Intensity	Very High	6		
Severity	High	14		
Consequence	High	17		
Probability	Probable	4		
Impact Significance	High	22		
Mitigation	Difficult – this cumulative impact and management of edge effects, biodiversity and AIS clearing would need to addressed jointly by the local municipality and various landowners along the southern CBA / Piesang river Valley area			
Confidence	High			
Reversibility	Difficult			

Activity	**No go alternative -**
Nature of impact:	Cumulative
Description of impact:	The surrounding environment around Erf 2074 is already very developed; high cumulative impact has already occurred on the biodiversity in this area.

Impact rating			
	Impact Status	**Negative**	
	Spatial	Local	3
	Duration	Permanent	6
	Frequency	Infrequent	2
	Intensity	Very High	6
	Severity	High	14
	Consequence	High	17
	Probability	Probable	4
	Impact Significance	High	22

SOIL, GEOLOGY, TOPOGRAPHY

The site is a narrow strip of land measuring approximately 650 m in length from Marine Drive in the north to the southern boundary, and between 80 - 120 meters in breadth. The site is situated between contour levels of 105m – 140m; the site is moderately flat in the central section, a gentle slope to the north and a steep slope (12% - 40%) in the south. The highest part the site (140 MASL) is in the central section; the lowest part in the south (105MASL).

North of the watershed the site slope is initially from east to west, then turning to a northerly/north easterly direction, with the lowest point at the north east corner. The average slope of this area is approximately 8 percent.

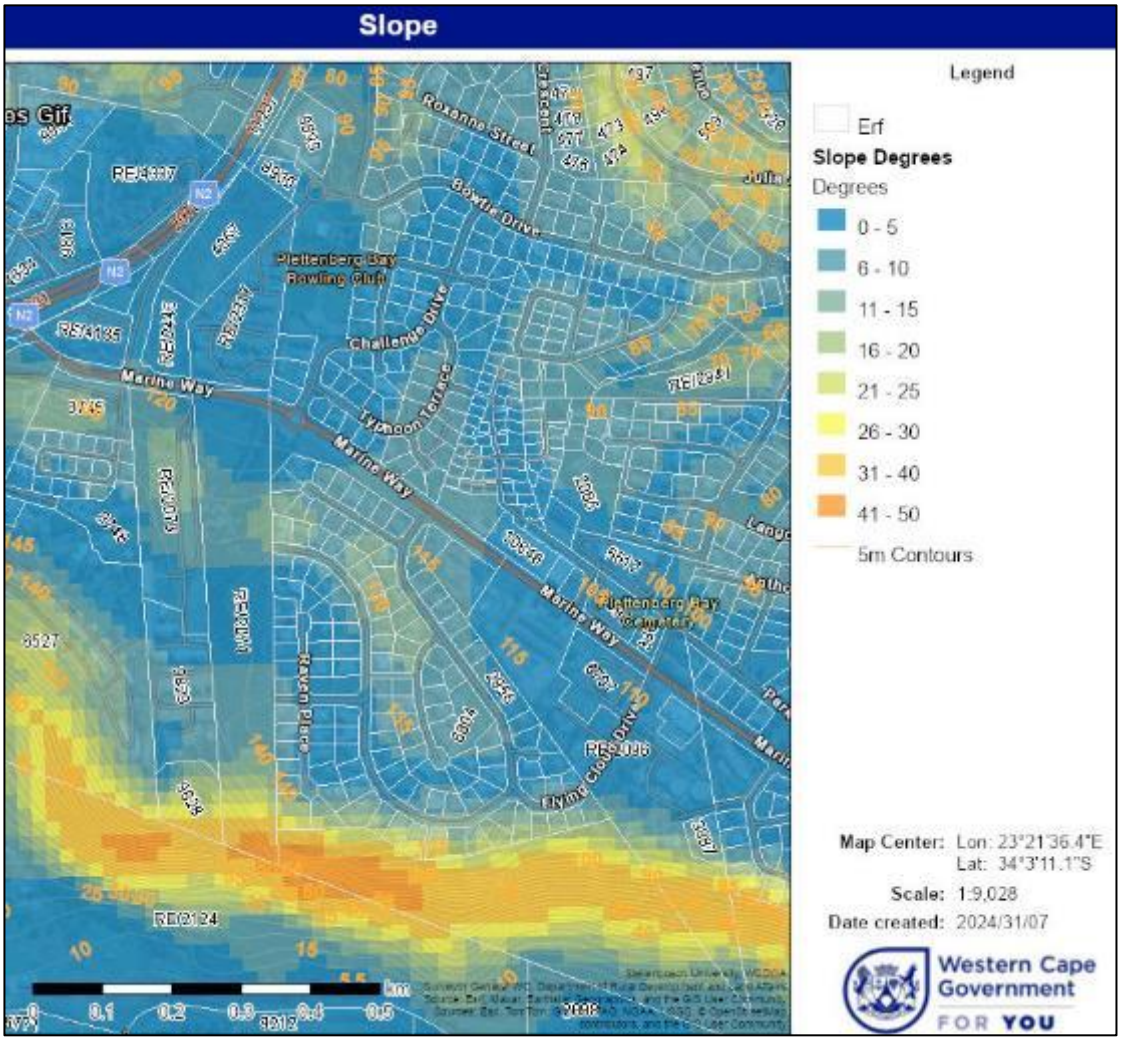

Figure 10: Slope of site showing steep area in the south

The central section, south of the watershed the site slope is predominantly from east to west, turning slightly to south west, with the lowest point of the developable area in the south west. The average slope of this area is approximately 6 percent.

The southern end of the site steepens severely. In this area approximately 1 hectare will be undevelopable due to extreme slope.

The site is mostly sandstone with relatively nutrient poor sandy soil. The very south of the soil is described as grey regic sands; these occur on the stepper sections of the site. The origin of the geology and soil in this area is from aeolian (i.e., windblown) origin that is from the Quaternary (Paton, 2023). The topsoil on the site had a sandy texture, and clay content in the soil is likely very low throughout the soil profile. Soil erodibility on the site is considered high (SA Atlas of Climatology and Agrohydrology, Schulze, 2009).

Geology classification of site (Council for Geoscience):

Northern section mapped as KIRKWOOD FORMATION (Kkw); Lithology described as *Variegated (reddish-brown and greenish) silty mudstone and sandstone, subordinate grey shale and sandstone.*

Southern section: NARDOUW SUBGROUP (S-Dn); Lithology described as white, coarse-grained to fine-grained, thick-bedded pebbly quartz arenite, thin bedded feldspathic and ferruginous sandstone, very subordinate shale and siltstone.

Soil Types (Soil types and descriptions for the Western Cape; DAFF):

Majority of site is mapped as a CA soil type, class "soils with a strong texture contrast and described as "*soils with a marked clay accumulation, strongly structured and a non-reddish colour. In addition, one or more of vertic, melanic and plinthic soils may be present; depth ranges from between 450 mmm to 750mm. Clay content is less than 15%*."

Southern section: EA soil type; class "Soils with limited pedological development" and described as "Soils with minimal development, usually shallow on hard or weathering rock, with or without intermittent diverse soils. Lime rare or absent in the landscape; depth rangers from between 450 mmm to 750mm. Clay content is less than 15%."

Broad Soils Classification (ENPAT)

Northern section: Soil Type: Prismacutanic and/or pedocutanic diagnostic horizons dominant, B horizons mainly not red; Geology: Mainly conglomerate, sandstone, siltstone and mudstone of the Enon Formation, Uitenhage Group.

Central Section: Soil Type: Plinthic catena: undifferentiated, upland duplex and/or margalitic soils common; Geology: Mainly quartzitic sandstone of the Table Mountain Group, Cape Supergroup.

Southern Section: Soil Type: Grey regic sands and other soils; Geology: Aeolian sand and marine terrace gravel and sand, partly calcareous.

The mapped units of broad soil classification correspond to mapped Land Types (Agricultural Research Council):

Northern section: Land Type: Db28; Description: B horizons not red; Class: PRISMACUTANIC AND/OR PEDOCUTANIC DIAGNOSTIC HORIZONS DOMINANT

Central Section: Land Type: Ca46; Description: Undifferentiated; Class: PLINTHIC CATENA: UPLAND DUPLEX AND/OR MARGALITIC SOILS COMMON

Southern Section: Land Type: Hb11; Description: Regic sands and other soils; Class: GREY REGIC SANDS

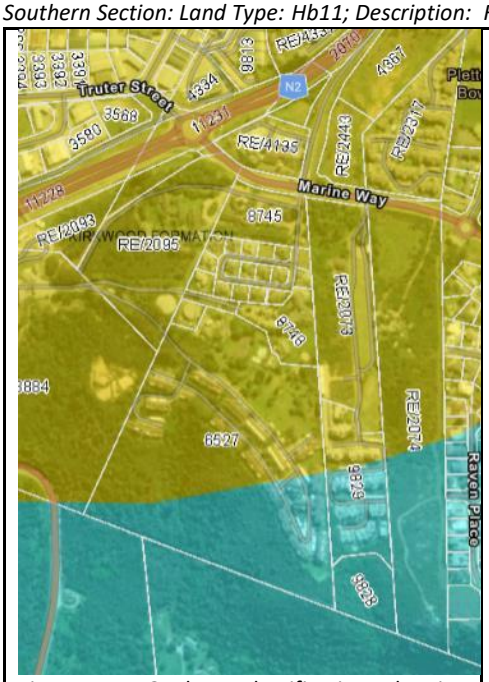

Figure 11: Geology classification showing Kirkwood formation in northern section (yellow); Nardouw subgroup in southern section (blue).

Figure 12: CA soil type (purple); EA soil type (yellow)

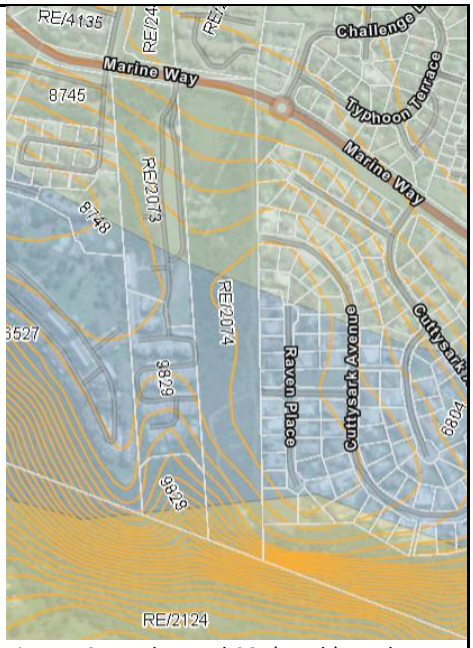

Figure 13: Landtype Db28; (north) Land Type: Ca46 (central); Land Type: Hb11 (south); mapped regic sand corresponds to steeper southern areas

Removal of vegetation (which has a binding action on underlying soils) could lead destabilization of sandy sediment leading to erosion. Exposed soils leads to erosion by wind and water. Foundations established for the development of the residential blocks and other buildings on sight will lead to compaction (densification) of the soil. Care must be taken to prevent wind erosion / dust generation, ensure correct stripping and stockpiling methods and ensure appropriate storm management measures are in place.

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Planning, Construction, Operational Phase**
Aspect	**Removal of vegetation, excavation activities, general construction activities, bare soil, stockpiling, stormwater management, vehicle entrainment, general maintenance activities**
Nature of impact:	**Direct - Loss of soil; damage to soil structure, dust generation, impacts on flora and fauna**
Description of impact	**Loss of topsoil, dust generation and damage to vegetation and fauna habitats due to poor soil management practices.**

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation (including recommendations for layout 3)	
Spatial	Site	2	Activity	1
Duration	Short to medium	3	Short	2
Frequency	Regular	4	Infrequent	2
Intensity	Low to medium	2	Low	1
Severity	Medium	9	Low	5
Consequence	Medium	11	Low	6
Probability	Expected	5	Probable	4

	Impact Significance	**Medium High**	**16**	**Low**		**10**
	Mitigation	Possible – impacts can be managed during construction phase.				
	Confidence	High				
	Reversibility	Possible / Difficult - damage to soil structure difficult to reverse / possible to manage erosion and stockpiles				

Mitigation Measures

Planning – Planning team

- Development on areas with 1:4 gradient or steeper is not recommended.
- Design the proposed development site to follow natural contour lines as far as possible.
- Ensure the site is appropriately levelled to fit in with current topography levels of adjacent developments.

Construction and Operational

Construction and maintenance activities – Construction and operational (as required) Team

- Prepare method statement to indicate how soil will be managed during site clearing and must include these mitigation measure:
  - Site clearing to be done in phased manner. No blanket clearing of vegetation is permitted to avoid large areas of unconsolidated soils;
  - Topsoil should be cleared in a phased manner Topsoil includes 150 to 250 mm of soil and needs to be stripped separately. Topsoil from vegetation on the site in new excavation areas must be stripped to a maximum depth of 30cm, or in cases where the bedrock is shallower than this, then the entire soil layer is to be removed. Topsoil is to be kept in designated piles of maximum 1 m in height, to prevent anaerobic conditions from smothering seeds and rendering them inviable and must be suitably covered with shade cloth (or another breathable material with a fine mesh) to prevent any additional invasive species seeds from falling in and establishing in the soil.
  - Designated areas for storage of topsoil and subsoil to be on level areas - Designated area/s for storage of topsoil to be selected in conjunction with ESO and ECO; area/s selected should be an area which will not be disturbed from construction activities for duration of construction period. This must be done to avoid double handling of topsoil stockpiles. Stockpile subsoils separately in designated and demarcated area; used as fill material for levelling.
  - Topsoil cleared to be placed on designated area; the topsoil will be invaluable during rehabilitation otherwise the project will need to buy in topsoil / mulch / plants for landscaping.
  - Excavated material generated on site to be used as fill material for site levelling.
  - Do not create multiple tracks
- Prepare method statement to indicate how dust will be prevented during construction and include the following
  - Cover all fine building materials with shade cloth to prevent dust
  - Topsoil and subsoil stockpiles are not to be higher than 1.5 m.
  - Topsoil and subsoil stockpiles should be covered, wetted or otherwise stabilised:
  - Cover subsoils with shade cloth; Cover topsoil with shade cloth / vegetate if it will be kept for longer for 3 months.
  - Exposed areas should be wetted during windy / dry conditions
  - Ensure appropriate storm water control mechanisms are implemented.
  - Ongoing rehabilitation throughout construction with stored topsoil and vegetation

Activity	**No go alternative**
Nature of impact:	Direct
Description of impact	Baseline conditions will likely remain the same – minimal soil erosion as a result of existing activities.

Impact Rating

Impact Status	**Negative**	
Spatial	Site	2
Duration	Very short	1
Frequency	Seldom	3
Intensity	Low	1
Severity	Medium	5
Consequence	Medium	7
Probability	Plausible	3
Impact Significance	**Low**	**10**

AQUATIC SYSTEMS

The rainfall intensity in the area is classified as High and the inherent erosion potential of soils as Very High, erosion of soils and stormwater management are factors which must be considered when developing in this area. The site falls within quaternary catchment K60G in the catchment of the Piesang River. The Piesang River is in the valley bottom below the cliffs approximately 250 m south of the property The river is mapped as the Estuarine Functional Zone (EFZ) at this point. This flows in an easterly direction for approximately 1.8 km until it exits to the sea at the river mouth.

The property is located on a watershed with approximately half of the property draining to the north and the other half draining to the south. The northern drainage would indirectly drain to the Keurbooms River via stormwater in urban areas, while the southern drainage would drain more directly to the Piesang River. According to the National Freshwater Ecosystem Priority Atlas (NFEPA; Nel et al., 2011) the two sub-

quaternary reaches (SQR 9200 and 9188) are classified as Freshwater Ecosystem Priority Areas (FEPAs). FEPAs are designated areas within freshwater ecosystems that hold high ecological significance and biodiversity. Protecting and managing these areas is crucial for maintaining freshwater biodiversity and ecosystem health.

There is a defined NWA watercourse in the valley bottom (Erven 9828 and 9829), west of RE/2074. This stream is a trickle flow with a densely vegetated riparian zone of indigenous plants. The existing vegetation provides an ideal buffer to this stream as well as excellent habitat for wildlife which would utilise it as a refuge from busier areas of the site. Dominant trees along the stream are Boekenhout (*Rapanea melanophloeos*), Candlewood (*Pterocelastrus tricuspidatus*), WIld Mulberry (*Trimeria grandifolia*), Cape Sumach (*Colpoon compressum*) and Currant rhus (*Searsia tormentosa*). No other watercourses have been identified on RE/2074. The recommended buffer for the adjacent drainage line is 48 m. For the most part this buffer is aligned with the southwestern boundary of RE/2074, but a small area intrudes into the property boundary near the corner of the property. The mapped ESA1 is aligned with the stream on the neighbouring property, but the WCBSP version of this stream has it in the incorrect location. The stream is mapped on the slope and the resulting ESA1 around it extends more substantially into RE/2074 than it would if it were correctly aligned. The ESA creates a buffer of approximately 32 m around the drainage line, and even with the riparian buffer of 48 m determined in this assessment it barely intrudes into RE/2074.

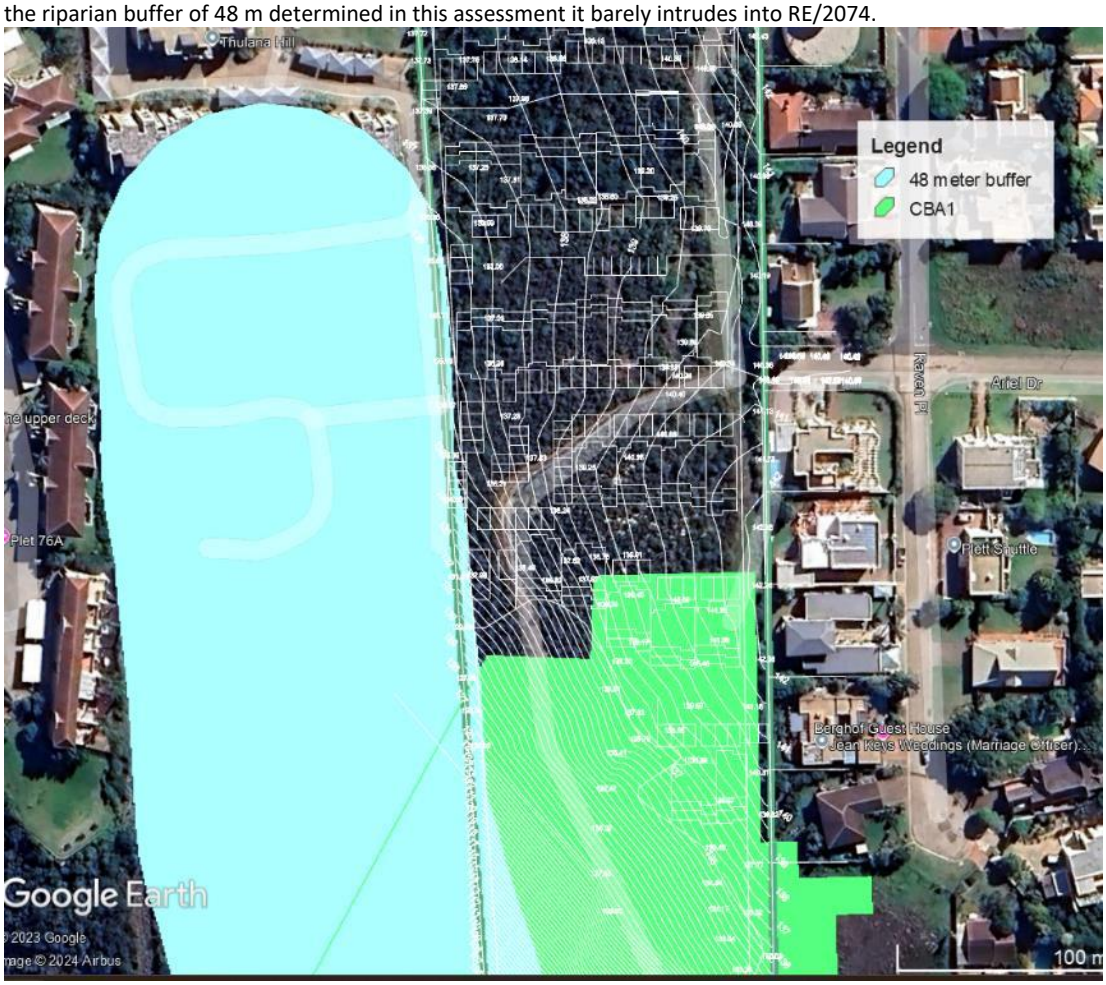

Figure 14: Southern section of development showing 48 meter buffer of western drainage line and CBA

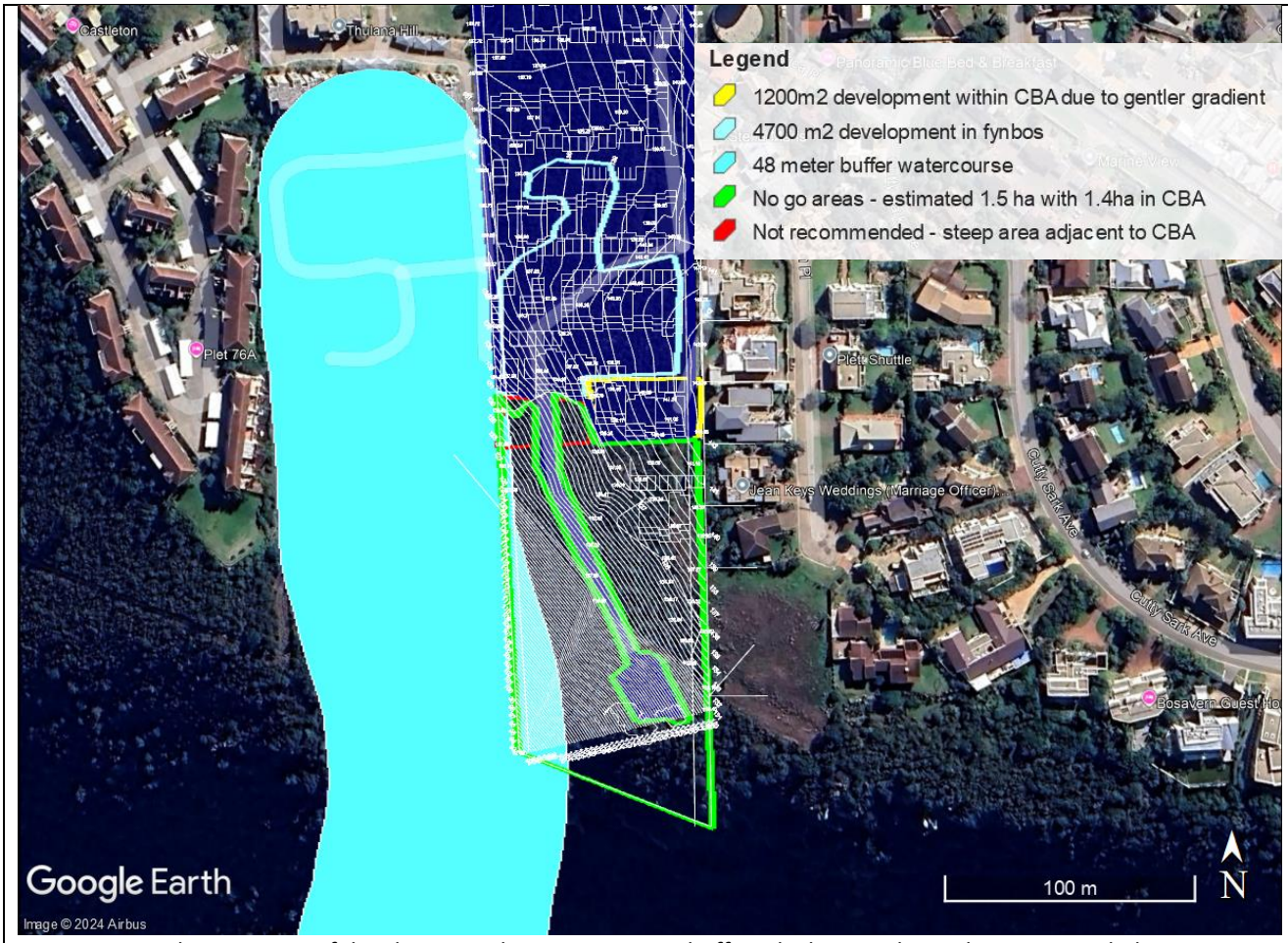

Figure 15: Southern section of development showing 48 meter buffer which coincides with recommended steeper no-go area

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Planning, Construction and Operational Phase**
Aspect	**Site clearing; construction activities, increased hard surfaces**
Nature of impact:	**Direct - Impacts on aquatic system**
Description of impact	Any potential impacts to the drainage line on the neighbouring property or the Piesang River can be effectively managed to minimise the Project Area Of Influence (PAOI).

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Site	2	Site	2
Duration	Short to medium	3	Very short	1
Frequency	Seldom	3	Seldom	3
Intensity	Medium	3	Low	1
Severity	Medium	9	Low	4
Consequence	Medium	11	Low	6
Probability	Probable	4	Plausible	3
Impact Significance	**Medium**	**15**	**Low**	**9**
Mitigation	Possible – impacts can be minimised with mitigation during construction phase.			
Confidence	High			
Reversibility	Permanent impact (Loss of SCC, habitat)			

Mitigation Measures

Planning Phase

Planning – Planning Team

- Buffer of 48 meters from adjacent drainage line; exclude development in buffered area

Construction and Operations – Construction and Operational Teams

- Prevent pollution of freshwater ecosystems by the proper disposal of construction waste, sewage, and hazardous materials (NFEPA; Nel et al., 2011).
- Put in place stormwater management mitigation measures
- Put in place soil erosion mitigation measures
- Put in place waste management measures

Nature of impact:	Baseline conditions will likely remain the same – negligible impact on aquatic systems as a result of existing activities		
Impact Rating	**Impact Status**	**Negligible**	
	Spatial	Activity	1
	Duration	Very short	1
	Frequency	Rarely	1
	Intensity	Low	1
	Severity	Negligible	3
	Consequence	Negligible	4
	Probability	Slim	1
	Impact Significance	Negligible	**5**

STORMWATER MANAGEMENT

The following is extracted from the Civil Engineering Report, Version 1, July 2024, prepared by Poise Consulting Engineers; the stormwater management section was updated based on 1: 100 stormwater management requirements and recommendations in the aquatic compliance statement and presents the mitigation for stormwater impacts.

Pre-Development: The site has a long narrow aspect with average north to south length and east to west width approximately 640 meters and 93 meters. A watershed ridge crosses the site approximately 270 meters south of the north east corner. Approximately 66% of the area of the site to be developed, lies to the north of the watershed. This area currently drains to the stormwater drainage system of Marine Drive. The remaining 34% lies to the south of the water shed. Approximately 90% of this area drains over the western boundary to the drainage system of the adjacent Thulana Hills Sectional Title development on Erf 9829. The Thulana Hills drainage system discharges at the south western corner of Erf 9829 to a natural watercourse which leads to the Piesang Valley River. The remaining 10% drains in a south westerly direction down the steep slope across Erf 9828 to ultimately discharge to the Piesang Valley River.

Post Development: In the developed condition stormwater runoff from roofs will be partially discharged to road and parking surfaces and partially to landscaped garden areas. The discharge to the road surfaces will be routed to permeable paved areas. The discharge to landscaped garden areas will be partially routed to road surfaces and partially to grass lined swales.
The swales and permeable paving areas will be designed to detain the runoff the pre=development flow rates.
In the Northern Catchment an underground piped system will collect the runoff from the swales and permeable paved areas and convey it to the discharge position at the north-eastern corner of the site, where it will be connected to the existing Municipal stormwater system in Marine Drive.
In the Southern Catchment an underground piped system will collect the runoff from the permeable paved areas and convey it to the swales positioned along the western boundary. From the swales the discharge will be released on surface in a manner engineered to simulate the existing spread of surface flow across the full area of discharge. Therefore, the detained runoff will be distributed on surface without concentration.

Sustainable Drainage Systems (SUDS): The City of Cape Town norms for SUDS are adopted for projects located in the Western Cape: The detention criteria is that stormwater be detained to reduce the post-development runoff rates to not exceed the pre-development rates for the 1 in 10 year and 1 in 50-year return storm intervals. However, in the case of the southern catchment due to the sensitivity of the discharge release area, detention will be provided to reduce the post-development runoff rates to not exceed the pre-development rates for the 1 in 10 year and 1 in 100-year return storm intervals.
The target reductions of total suspended solids (TSS) and total phosphates (TP) are 80% and 45% respectively. The reduction of the post-development runoff to the pre-development rates and the targeting of the required SUDS TSS and TP reductions will be achieved by the detention of post development runoff in the swales and permeable paving to be provided.
The swales and permeable paving areas indicated on Drawing 24G64 S01 are preliminary. Finalization of permeable paving and swale details will be undertaken in the Detailed Design Phase

Stormwater Modelling: The runoff and retention calculations have been done utilising the CBA Hydrograph Generation Reservoir Routing program of Chris Brooker and Associates.
The average annual precipitation is 650mm.
Pre-development:
In calculating the run-off coefficient C the following factors were used, adapted from SADM Table 3.7:

- Slope CS 0.08
- Permeability CP 0.16
- Vegetation CV 0.11

Using adjustment factors of 0.73 and 0.89 and 1.0 (Table 3.8 adapted for mild slope and semi-permeable conditions) for the 10, 50, and 100 year Return Interval (RI) storms respectively, the following run-off coefficients were obtained:

- 1:10 RI 0.25
- 1:50 RI 0.31
- 1:100 RI 0.35

Northern Catchment: Area: Area 3.201 ha.

The generated Pre-Development runoff rates are:

1: 10 Year RI 0,12 m3/s

1: 50 Year RI 0,15m3/s

Southern Catchment: Area: Area 1.643 ha.

The generated Pre-Development runoff rates are:

1: 10 Year RI 0,08 m3/s

1: 100 Year RI 0,22 m3/s

Post-development: Detailed modelling and finalization of permeable paving and swale areas will be undertaken in the Detailed Design Phase. Preliminary modeling has been undertaken on the basis of the following: The post development runoff factors are calculated adopting 100% for roof and road areas and 30% for unsurfaced landscaped areas.

Northern Catchment:

Roof and Road Area 21400 m2

Swale and Landscaped Area 10610 m2

Total Area 32010 m2

Runoff Factor Cd: 0.77

Area Permeable Paving: 2500m2 Area Swales: 270m2

The generated Post-Development runoff rates and detention volumes are:

1: 10 Year RI 0,112 m3/s Detention Volume 314m3

1: 100 Year RI 0,148 m3/2 Detention Volume 554m3

Southern Catchment:

Roof and Road Area 12260 m2

Swale and Landscaped Area 4170 m2 8

Total Area 16430 m2

Runoff Factor Cd: 0.83

Area Permeable Paving: 1500m2 Area Swales: 530m2

The generated Post-Development runoff rates are:

1: 10 Year RI 0,078 Detention Volume 134m3

1: 100 Year RI 0,205 Detention Volume 276m3

STORMWATER MANAGEMENT DURING CONSTRUCTION

Permanent detention channel swales which are specified on the western and northern boundaries of the site will be constructed on commencement of construction. Elsewhere along the southern, western and northern boundaries of the site a grass lined stormwater containment berm will be constructed. The detention channel swales and berms will contain all concentrated and silt contaminated stormwater flow from running off to the underlying property during the construction period. The desilting maintenance of these facilities will be undertaken on a regular basis.

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Planning, Construction and Operational Phase**
Aspect	**Stormwater management measures**
Nature of impact:	**Direct / indirect**
Description of impact	**Soil erosion; impact on aquatic systems**

Impact Rating

Impact Status	**Negative**		**Negligible**	
	Without mitigation		With mitigation (revised SWMP)	
Spatial	Local	3	Activity	Activity
Duration	Very short	1	Very short	Very short
Frequency	Infrequent	2	Rarely	Rarely
Intensity	Medium High	4	Low	Low
Severity	Medium	7	Negligible	Negligible
Consequence	Medium	10	Negligible	Negligible
Probability	Expected	5	Slim	Slim
Impact Significance	**Medium**	**15**	Negligible	Negligible
Mitigation	Possible			
Confidence	High			
Reversibility	Possible			

Mitigation Measures

Planning – Planning Team

- Detailed modelling and finalization of permeable paving and swale areas to be undertaken in the Detailed Design Phase.
- Finalization of stormwater management designs including rainwater tanks, ponds, permeable paving, swale details to be carried out in the Detailed Design Phase.

<table>
<tr><td></td><td>

Concentrate higher density development on the northern section of the property's watershed where stormwater runoff can be diverted towards existing stormwater drains with low risk of erosion or major impacts to any watercourse; Minimise development on the southern section of the watershed as management of stormwater will be challenging in this area.
The stormwater on site is to be managed for the 1: 100-year stormwater events. Implement SUDS-type stormwater management systems to encourage water infiltration, improve quality of runoff, and minimise runoff velocities throughout the proposed development.
The swales and permeable paving areas will be designed to detain the runoff the pre-development flow rates.
In the Northern Catchment an underground piped system will collect the runoff from the swales and permeable paved areas and convey it to the discharge position at the north-eastern corner of the site, where it will be connected to the existing Municipal stormwater system in Marine Drive.
In the Southern Catchment an underground piped system will collect the runoff from the permeable paved areas and convey it to the swales positioned along the western boundary. From the swales the discharge will be released on surface in a manner engineered to simulate the existing spread of surface flow across the full area of discharge. Therefore, the detained runoff will be distributed on surface without concentration.

Construction and Operational phase – Construction / operational teams

Permanent detention channel swales which are specified on the western and northern boundaries of the site to be constructed on commencement of construction. Elsewhere along the southern, western and northern boundaries of the site a grass lined stormwater containment berm will be constructed.
The detention channel swales and berms will contain all concentrated and silt contaminated stormwater flow from running off to the underlying property during the construction period. The desilting maintenance of these facilities to be undertaken on a regular basis.
Minimizing impervious surfaces and implementing green infrastructure for stormwater management to reduce habitat disturbance and water pollution;

The stormwater pond must be lined with suitable groundcover and indigenous vegetation to manage erosion and stormwater absorption
Some of the parking bays are proposed to be paved with permeable "green" pavers; this will lessen the degree of soil compaction in these areas, improve stormwater absorption and soften the amount of hard surfacing within the development.
All open ground areas must be vegetated with suitable groundcover and indigenous vegetation to manage erosion and stormwater absorption. Make use of vegetated strips instead of concrete wherever possible.
Ensure sustained vegetation cover to protect soil from erosion; Any bare areas should be mulched, and indigenous vegetation planted; plant indigenous vegetation where alien invasive plants removed to hold soil.

Rainwater tanks to be installed to allow catchment of stormwater from roof structures;
Any construction of stormwater outlets, pipes or associated infrastructure directing stormwater into the drainage line on the neighbouring property will require an impact assessment and a Water Use Authorisation in terms of the National Water Act.
Do not discharge any stormwater directly off the edge of the cliff due to high velocity flow creating erosion where it lands.
Stormwater management measures for the southern section to be implemented to ensure no erosion / increased runoff will occur; implement suitably sized stormwater management pond / attenuation dams, vegetated swales and dispersion methods. Volumes required to mitigate post development runoff have been calculated by the appointed civil engineer and dictate the sizing.

</td></tr>
<tr><td>Activity</td><td>No go alternative</td></tr>
<tr><td>Nature of impact:</td><td>Baseline conditions will likely remain the same – negligible impact on aquatic systems as a result of existing activities.
<table>
<tr><th>Impact Status</th><th colspan="2">Negligible</th></tr>
<tr><td>Spatial</td><td>Activity</td><td>Activity</td></tr>
<tr><td>Duration</td><td>Very short</td><td>Very short</td></tr>
<tr><td>Frequency</td><td>Rarely</td><td>Rarely</td></tr>
<tr><td>Intensity</td><td>Low</td><td>Low</td></tr>
<tr><td>Severity</td><td>Negligible</td><td>Negligible</td></tr>
<tr><td>Consequence</td><td>Negligible</td><td>Negligible</td></tr>
<tr><td>Probability</td><td>Slim</td><td>Slim</td></tr>
<tr><td>Impact Significance</td><td>Negligible</td><td>Negligible</td></tr>
</table>
</td></tr>
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Social impacts – NOISE and visual

The proposed development is situated in an area that has been identified as a "strategic Development Area" with the potential for medium density (3 to 4 storey) residential development. This development will be residential, and it will fit into surrounding land uses (low and high residential developments).

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Construction Phase**

Aspect	**Noise impact**
Nature of impact:	**Direct**
Description of impact	**Noise impacts on residents in the area** The surrounding area is characterised by typical residential activities which generate noise i.e. vehicles, residents. The ambient level of noise in the area is low. Sources of noise during construction phase include construction personnel, vehicles and machinery used for clearing of vegetation, levelling, excavation, concrete etc. The noise generated is likely to be experienced by those in the immediate vicinity of the construction activity (residential areas to the east and west). The proposed development will be developed in phases. Construction timeframes have not been confirmed but based on experience it is estimated to be between 24 - 36 months per phase. The residential accommodation development will generate noise typical of residential activities and add to the ambient noise level of the area.

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Site Specific	2	Activity Specific	1
Duration	Very Short term	1	Very Short term	1
Frequency	Often	5	Often	5
Intensity	Low – medium	2	Low	1
Severity	Medium	8	Medium	7
Consequence	Medium	10	Low	8
Probability	Plausible	3	Slight	2
Impact Significance	Medium	13	Low	10
Mitigation	Possible			
Confidence	High			
Reversibility	Possible			

Phase	**Operational Phase**
Aspect	**Noise generation**
Nature of impact:	Direct – noise impacts on surrounding residents
Description of impact	Operational phase will result in noise generation activities typical of surrounding landuses.

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Very short	1	Very short	1
Frequency	Infrequent	2	Infrequent	2
Intensity	Low	1	Low	1
Severity	Low	4	Low	4
Consequence	Low	5	Low	5
Probability	Plausible	3	Plausible	3
Impact Significance	**Low**	**8**	**Low**	**8**
Mitigation	Likely			
Confidence	High			
Reversibility	Possible			

Phase	**Planning and Construction Phase**
Aspect	**Construction site**
Nature of impact:	**Direct – Visual impact on receptors**
Description of impact	The construction site and related activities will be visible to surrounding residential areas (north, east, west) and receptors on Marine Way. Construction activities are not likely to be visible to receptors in the south. The proposed development will be developed in phases. Construction timeframes have not been confirmed but based on experience it is estimated to be between 24 - 36 months per phase.

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Site	2	Site	2
Duration	Medium - Long term	5	Medium - Long term	5
Frequency	Rarely	1	Rarely	1
Intensity	Low	1	Low	1
Severity	Medium	7	Medium	7
Consequence	Medium	9	Medium	9
Probability	Slight	2	Slim	1
Impact Significance	Medium	11	Low	10
Mitigation	Possible			
Confidence	High			
Reversibility	Permanent impact (Loss of SCC, habitat)			

<table>
<tr><td>Phase</td><td>Planning and Operational Phase</td></tr>
<tr><td>Aspect</td><td>Medium – high residential area</td></tr>
<tr><td>Nature of impact:</td><td>Direct / cumulative – Visual impact on receptors (biodiversity, surrounding residential areas)</td></tr>
<tr><td>Description of impact</td><td>This development will be residential, and it will be designed to be aesthetically appealing and fit into surrounding land uses (low and high residential developments). This visual impact may therefore become negligible in the short – medium term as local residents become accustomed to the new development in the area.
Light pollution is of global concern given that our night skies are getting lighter due to urban development and that many animals are specifically adapted to dark night skies for navigation, foraging and behavioural aspects (i.e. sleep, hunting). Many insects are attracted to or disorientated by artificial lights, leading to aggregations at such point sources. This interferes with their natural behaviour (i.e. feeding), associated ecosystem services they provide (e.g. pollination) and often has fatal consequences for individuals unable to escape the ‘light trap’. There is also the cumulative impact of attracting predators to light sources (e.g. birds, frogs,small mammals) and exposing them to risks in these areas as well.</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><td>Impact Status</td><td>Negative</td><td></td><td>Negative</td><td></td></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation</td><td></td></tr>
<tr><td>Spatial</td><td>Site</td><td>2</td><td>Site</td><td>2</td></tr>
<tr><td>Duration</td><td>Very short</td><td>1</td><td>Very short</td><td>1</td></tr>
<tr><td>Frequency</td><td>Infrequent</td><td>2</td><td>Infrequent</td><td>2</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Low</td><td>4</td><td>Low</td><td>4</td></tr>
<tr><td>Consequence</td><td>Low</td><td>6</td><td>Low</td><td>6</td></tr>
<tr><td>Probability</td><td>Plausible</td><td>3</td><td>Slim</td><td>2</td></tr>
<tr><td>Impact Significance</td><td>Low</td><td>9</td><td>Low</td><td>8</td></tr>
<tr><td>Mitigation</td><td colspan="4">Likely</td></tr>
<tr><td>Confidence</td><td colspan="4">High</td></tr>
<tr><td>Reversibility</td><td colspan="4">Possible</td></tr>
</table>
</td></tr>
<tr><td>Mitigation Measures</td><td>Planning – Planning Team
• Any four storey buildings that could be accommodated (taking parking requirements into account) on site are to be planned on the northern and North - western sections (adjacent to road / Thulana) and not on the east (quieter adjacent residential area) and environmentally sensitive southern sections.

Construction – Construction Team
• Construction should take place during daylight hours - the site can be adequately monitored for fauna during work hours, and the use of artificial lighting at night will be prevented.
• Access during construction phase is only permitted from Marine drive, not from the cutty sark area.
• No loud music to be allowed on site.
• All vehicles and machinery must be kept in good working condition.
• Working hours and deliveries / collections to be restricted to day time hours (i.e. 8 am to 5pm)
• No construction work to take place after hours or on Sundays or on public holidays.
• Ensure good housekeeping measures on site; put in place all construction mitigation measures to reduce visual impacts
• A complaints register should be kept to document complaints and the corrective action taken.

Planning and Operations - Planning and Operational Teams
• Keep artificial lighting along roads and around infrastructure to a minimum and consider lighting colour, brightness and design options with minimal impact on biodiversity.
• Wherever possible in the designing phase consider ‘no lighting’ options to encourage dark areas and reduce light pollution, especially close to the southern part of the site, closer to natural fynbos. No lighting options should only be considered where this does not threaten safety and security of residents (no applicable to the southern end of the site which is bounded by the river. Where this is not possible, the impacts of lighting can be reduced through the selection of the colour/brightness (select yellow, dim lights which are less attractive to insects than bright white or blue lights) and design elements (lights facing down towards the ground rather than facing up towards the sky).
• Light pollution must be reduced and avoided wherever possible during the operational phase of the project. White LED lights have the worst negative effects for the environment, therefore dimmer lights with more natural warm light colours must be used. This must be outlined to residents.
• Permanent lighting along roads must be avoided but should be balanced with maintaining nighttime visibility in higher traffic areas to decrease the incidence of roadkill
• To reduce levels of noise and visual disturbance, plantings of indigenous trees and tall shrubs should be introduced to the interface between the development and the fynbos area (if fire breaks are not recommended by fire protection agencies, in which case these plantings would be within the fynbos alongside the fire break). Fire-proof indigenous hedge species are suggested.

Operations – Operational Team</td></tr>
</table>

	• Ensure municipal bylaws applicable to noise in residential areas are included in "house rules" distributed to owners / residents • Any maintenance work carried out on site during the life of operation complies to construction phase mitigation measures. • Landscaped and open space areas will assist to absorb noise impacts and reduce visual impacts. • Noise should be minimised on the site and loud sirens/alarms must not be permitted unless there is an emergency. If security is a concern, then a silent alarm system should be implemented i.e. motion detection cameras
Activity	**No go alternative**
Description of impact:	Baseline conditions will likely remain the same – negligible visual or noise impacts; residents
Impact Rating	**Impact Status** | **Negligible**

WASTE POLLUTION AND HAZARDOUS MATERIALS

General waste generated during construction phase will include excavated material that will not be reused for level / fill material, building rubble, alien invasive material containing seed that cannot be used for mulch and general waste items such as metals, plastics, paper, tins. Waste streams need to be estimated and correctly managed on site (storage), in transit and offsite (licensed waste sites / recycling operations). Hazardous waste generated during construction phase includes sewage, any fuel / oil / chemical spillages. Hazardous materials used during construction phase need to be correctly managed.
Care must be taken to ensure hazardous materials are contained at all times to prevent pollution to the underlying soil and polluted stormwater runoff.

The residential development will consist of approximately 228 units (165 x 4 bed units; 63x3 bed units) and will therefore accommodate approximately 840 people on the site.

The following is extracted from the Civil Engineering Report, Version 1, July 2024, prepared by Poise Consulting Engineers
Removal:
The solid waste from the development will be collected by the Bitou refuse removal trucks from a waste storage area which will be provided at the main access to the site. Arrangement will be made by the Development Body Corporate for the transport of refuse from the individual units to the storage area. At the storage area the refuse will be stored in bins for the weekly Bitou collection.
Quantity:
Based on the South African middle income average of 0.74 kilograms per person day, and an average of 3 people per unit, an average of 2.4 kilograms per unit is adopted. An estimated total weekly quantity for the 228 units will be 547 kg / 0.6 ton.

The following is extracted from the Bitou LM IDP 2024 – 2025:
WASTE REMOVAL The municipality is transporting waste to Mossel Bay, and this is costing taxpayer's a lot of money. This phenomenon of transporting waste to Mossel Bay will not change because there is no landfilling site in Bitou. The municipality must investigate alternative ways of dealing with waste like recycling recyclable waste and transport that which is non-recyclable. Communities are using every open space as dumpsites that soar the mushrooming of illegal dumpsite all over the Bitou Area. In some instances, contractors will dump building rubble in other areas instead of taking their waste to designated waste sites. Communities need education around illegal dumping and the municipality should increase the number of waste skips. The law enforcement officials should arrest, repossess, and fine people who use wheelie bins for transporting other things than waste. The municipality should convert some of the existing illegal dumpsites into green spaces, play parks, jungle gyms or food gardens.

Waste Minimisation
• Investigate and increase collection at the source through commercial contracts, business initiatives, entrepreneurs, waste pickers, and SMME's.
• Unrestricted but regulated access to certain waste streams.
• Recycling reusable building materials and making the same available to the community in consultation with Ward Cllrs.
• Decentralised and Centralised waste drop-off facilities
• Bring drop-off facilities closer to the people – objective to reduce fuel costs, maintenance of fleet due to kilometres travelled – current wet fuel budget R3,7 million

Investigations to reduce, reuse and recycle waste generated during the construction and operational phases of the development are recommended.

Activity	**Medium to high residential development**		
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***		
Phase	**Planning and Construction Phase**		
Aspect	**General waste**		
Nature of impact:	**Direct**		
Description of impact	**Incorrect waste management can result in pollution of soil; polluted runoff, aquatic systems, fauna and flora**		
Impact Rating	**Impact Status**	**Negative**	**Negative**
		Without mitigation	With mitigation

Spatial	Site	2	Activity	2
Duration	Short to medium	3	Very short	1
Frequency	Regular	4	Infrequent	2
Intensity	Low to medium	2	Low	1
Severity	Medium	9	Low	4
Consequence	Medium	11	Low	5
Probability	Probable	4	Probable	4
Impact Significance	**Medium**	**15**	**Low**	**9**
Mitigation	Possible – impacts can be minimised with mitigation during construction phase.			
Confidence	High			
Reversibility	Reversible			

Mitigation Measures

Construction Phase – Planning and Construction Teams

- Determine waste streams and quantities to ensure provision of adequate waste management facilities on site; Investigate disposal / reuse/ recycling services.
- Include details of waste stream and preferred management option in general waste method statement.
- Receptacles (covered, labelled) to be provided for smaller general waste items generate on site. If waste will be recycled, provide separately labelled receptacle as required per waste stream. All waste is to be collected in designated bins with lids that can be secured or stored in a secure area when construction is not taking place (evenings, weekends, holidays, etc.) to prevent interference by animals.
- All waste should be stored in a double-container fashion, in such a way that it does not serve as an attractant to wildlife attempting to access the secure location (i.e. all waste products put into closed/sealed rubbish bags/containers and then placed within larger sealed containers/bins).
- All food waste or general waste should be kept in a secure location (i.e. a lockup cage or sealed outside room) which is not accessible to any wildlife.
- All waste, particularly food waste, should be regularly removed from the property and disposed of appropriately to prevent the scent of old products increasing the attractiveness to the disposal area and surrounding development for wildlife / if it is composted on site it must be done using combination of anaerobic and aerobic process within sealed room / container.
- General Waste receptacles should be emptied on a regular basis.
- Any small items or building materials which can be carried away by medium-large animals (i.e. baboons) should be safely stored in containers or locked away in a designated area to prevent interference from animals, causing possible harm to them and preventing them from removing such items from site.
- Excavated material from site levelling will as far as possible be used on-site as fill material. Excess excavated material that cannot be used in this way will be exported from the site and reused as fill at other construction activities elsewhere in Bitou LM or disposed of at an appropriately licensed waste disposal facility. Construction waste (e.g. packaging material, unused concrete) not reused / recycled must be disposed of at an appropriately licensed waste disposal facility.
- Area for storage of rubble not for reuse to be designated and demarcated.
- Alien invasive material with seeds to be placed in bags and sealed for disposal at registered waste site. Waste that is not reused / recycled must be disposed of at an appropriately registered and licensed waste disposal facility.
- Ensure good housekeeping of the site (i.e. no litter) at all times.
- No burning of waste.
- No dumping or burial of waste
- No littering, waste dumping or burning is allowed on the site or in the surrounding environment.
- All waste is to be transported to a registered waste disposal / recycling facility off site - Record of disposal / recycling kept.

Phase	**Planning and Construction Phase**
Aspect	**Hazardous materials**
Nature of impact:	**Direct**
Description of impact	**Incorrect waste management can result in pollution of soil; polluted runoff, aquatic systems, fauna and flora**

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Very short	1	Very short	1
Frequency	Seldom	3	Infrequent	2
Intensity	Medium	3	Low	1
Severity	Medium	7	Low	4
Consequence	Medium	8	Low	6
Probability	Probable	4	Probable	4
Impact Significance	**Medium**	**12**	**Low**	**10**
Mitigation	Possible – impacts can be managed during construction phase.			
Confidence	High			
Reversibility	Possible			

<table>
<tr><td>Mitigation Measures</td><td>Construction Phase – Planning and Construction Teams
• Prepare method statement indicating what hazardous substance (fuel, oil, sewage etc) will be on site and how they will be managed.
• Any fuel and other hazardous substances to be stored on site in bunded area equipped with roof under lock and key with appropriate signage
• If generators are refuelled on site, they must be placed on trays, which rest on clean sand and once construction is complete this must be removed from the site and disposed of at an appropriately registered waste disposal facility.
• Drip trays required to be placed under all equipment using fuels /oils.
• Complete spill kits with accompanying storage container required to be on site equipped with hazardous bin for placement of spills cleaned up using absorbents
• Hazardous bins required for storage of any hazardous waste materials.
• Wash station to be provided for cleaning of hazardous paint / building materials
• Do not leave machinery / vehicles running unnecessarily. Service machines and vehicles regularly to prevent unnecessary fumes and leaks.
• Records of any hazardous waste disposal to be kept

Concrete, cement, plastering, and painting:
a. Mixing areas be clearly defined on the site and must be surrounded by an impermeable material (i.e. create a temporary coffer dam with sandbags and thick plastic sheeting) to prevent any runoff and absorption into the surrounding soils.
b. The designated mixing areas should be limited to areas that will become future hard surfaces on the site. No concrete and cement mixing is allowed in areas outside of the proposed hardened surfaces of the camping block.
c. No concrete and cement mixing is allowed in areas outside the site development plans (SDPs).
d. Cleaning of cement, plastering & paint equipment must be done into a designated, bunded, & lined slurry sump or container to avoid contaminating the environment.</td></tr>
<tr><td>Phase</td><td>Operational Phase</td></tr>
<tr><td>Aspect</td><td>Waste management (general and hazardous)</td></tr>
<tr><td>Nature of impact:</td><td>Cumulative</td></tr>
<tr><td>Description of impact</td><td>Increasing disposal at landfill and few recycling options in Bitou LM</td></tr>
<tr><td>Impact rating</td><td>
<table>
<tr><th>Impact Status</th><th colspan="2">Negative</th><th colspan="2">Negative</th></tr>
<tr><td></td><td colspan="2">Without mitigation</td><td colspan="2">With mitigation (recycling / reuse options)</td></tr>
<tr><td>Spatial</td><td>Municipal</td><td>4</td><td>Municipal</td><td>4</td></tr>
<tr><td>Duration</td><td>Short</td><td>2</td><td>Short</td><td>2</td></tr>
<tr><td>Frequency</td><td>Regular</td><td>4</td><td>Regular</td><td>4</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>3</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Medium</td><td>9</td><td>Medium</td><td>7</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>13</td><td>Medium</td><td>11</td></tr>
<tr><td>Probability</td><td>Probable</td><td>4</td><td>Plausible</td><td>3</td></tr>
<tr><td>Impact Significance</td><td>Medium - High</td><td>17</td><td>Medium</td><td>14</td></tr>
<tr><td>Mitigation</td><td colspan="4">Difficult – few recycling options available in Bitou LM / recycling will likely not be implemented</td></tr>
<tr><td>Confidence</td><td colspan="4">High</td></tr>
<tr><td>Reversibility</td><td colspan="4">Possible – Few recycling options available/ cumulative impact at landfill remains until recycling is feasible</td></tr>
</table>
</td></tr>
<tr><td>Mitigation Measures</td><td>Planning and Operational Teams
• Determine waste streams and quantities to ensure provision of adequate waste management facilities on site; Investigate disposal / reuse/ recycling services.
• Include details of waste stream and preferred management option in waste management plan.
• Receptacles (covered, labelled) to be provided for smaller general waste items generate on site. If waste will be recycled, provide separately labelled receptacle as required per waste stream. All waste is to be collected in designated bins with lids that can be secured or stored in a secure area to prevent interference by animals.
• All waste should be stored in a double-container fashion, in such a way that it does not serve as an attractant to wildlife attempting to access the secure location (i.e. all waste products put into closed/sealed rubbish bags/containers and then placed within larger sealed containers/bins).
• All food waste or general waste should be kept in a secure location (i.e. a lockup cage or sealed outside room) which is not accessible to any wildlife.
• All waste, particularly food waste, should be regularly removed from the property and disposed of appropriately to prevent the scent of old products increasing the attractiveness to the disposal area and surrounding development for wildlife / if it is composted on site, it must be done using combination of anaerobic and aerobic process within sealed room / container.
• General Waste receptacles should be emptied on a regular basis.
• Any small items or building materials which can be carried away by medium-large animals (i.e. baboons) should be safely stored in containers or locked away in a designated area to prevent interference from animals, causing possible harm to them and preventing them from removing such items from site.</td></tr>
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Provide adequate number of waste management facilities required for number of units. Waste areas must be made rodent and scavenger proof
Recycling and reuse is encouraged to prevent excessive landfill disposal. Ongoing investigations into recycling options encouraged throughout operational phase.
On site composting is recommended for green waste; compost can be used in landscaping.
Provide waste management area for general and hazardous waste bins. Ensure the waste storage areas are designed in line with the refuse storage chamber design guidelines; the design should include, inter alia, suitably bunded area, non-permeable flooring, provision of a water tap for easy cleaning, suitable access to waste service providers, lockable doors, adequate ventilation, adequate roofing.
Ensure weekly waste collection services are in place
Ensure the site is litter free for the life of the operation and suitable waste receptacles are provided in landscaped areas which are correctly maintained and emptied regularly
During routine maintenance of infrastructure on the property, adequate management of materials should be implemented to reduce any unnecessary habitat loss. For example, all new building materials should be stored in areas within the disturbance footprint of the developments as far as possible to reduce additional damage to the natural (undisturbed) surroundings. Any old/removed building materials or rubble should be removed from site as soon as possible during maintenance activities and disposed of appropriately off-site. This will reduce the amount of additional space (natural surrounding habitat) lost or damaged for unnecessary storage of materials

</td></tr>
<tr><td>Activity</td><td>No go alternative</td></tr>
<tr><td>Nature of impact:</td><td>Direct / cumulative</td></tr>
<tr><td>Description of impact</td><td>Baseline conditions will likely remain the same – waste generated by low density residential disposed at landfill; some litter / dumping by vagrants continue</td></tr>
<tr><td>Impact Rating</td><td>
<table>
<tr><th>Impact Status</th><th>Negative</th><th></th></tr>
<tr><td>Spatial</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Very short</td><td>1</td></tr>
<tr><td>Frequency</td><td>Infrequent</td><td>2</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Low</td><td>4</td></tr>
<tr><td>Consequence</td><td>Low</td><td>5</td></tr>
<tr><td>Probability</td><td>Plausible</td><td>3</td></tr>
<tr><td>Impact Significance</td><td>Low</td><td>8</td></tr>
</table>
</td></tr>
</table>

SOCIAL - CHANGE IN LAND USE – AGRICULTURAL TO RESIDENTIAL II

Plettenberg Bay is known traditionally as a holiday town and summer playground of wealthy tourists; however, the town has started to mature in recent years into a more diverse and multi-faceted town. The town has seen a sharp rise in demand for permanent homes in recent years (Urban-Econ, 2019). According to the Bitou LM IDP 2024 – 2025, in 2022 the population totalled 65 240 individuals in 2022 and is expected to reach 80 628 by 2027. The largest population growth projection was recorded in the working age population (15 -64 years) which grew at an annual average rate of 3.0 per cent (2011 – 2022); Some houses have back yard dwellings; these backyards are there are a result of growing families and growing population. There has been talks of GAP housing between Shell Garage and Santini Village; The tender for Shell Ultra housing development planned on Erf 4367 has been advertised for middle-income units. According to a residential Market Assessment done in 2019 by Urban-Econ, the average income for households in Biotu is R11056 per household. This report highlighted the extreme lack of middle-income housing options in Plettenberg Bay. The town is split between suburbs offering properties above R 2 million and properties below R 200 000 with very few properties occupying the middle ground. This has resulted in high rates of rental in the middle-income brackets. In the coming years, it is critical that the housing shortage in this market is addressed to ensure the efficient functioning of the Plettenberg Bay economy. Without increased options it is unlikely that the town will be able to maintain its current trajectory. The Constitution stipulates that every citizen has the right to access to adequate housing and that the state must take reasonable legislative and other measures within its available resources to achieve the progressive realisation of this right. Access to housing also includes access to services such as potable water, basic sanitation, safe energy sources and refuse removal services, to ensure that households enjoy a decent standard of living.

Erf 2074 has been in the ownership of the current owners since 1981. The property is zoned for "Agricultural I" in terms of the Bitou Zoning Scheme By-Law. The land is not currently actively farmed; however, remnants of agricultural activities (protea orchard, olive grove) are evident. An old farmhouse and outbuildings on the northern section of the property currently provide low density residential housing accommodation. The majority of the site is open and accessible by vagrants; Alien invasive vegetation on the central / northern sections of the property, and fynbos vegetation in the south, puts the land at fire risk.

The Bitou Spatial Development Framework has identified the property for development and specifically earmarked the site as a priority development area for medium-density residential development (3-4 storeys).

The developer wants to rezone the property to "General Residential II" which permits flats, group housing and townhouses as primary rights. The developer aims to provide high quality yet affordable housing. The identified development area is approximately 5 ha. The initial concept proposed 250 units; however, this was considered to be too dense (50 units / ha). The plan was updated to the proposed 228 units (net density of 46.5 units / ha) with each unit being approximately 100-130m2 in size and developed in (76) blocks of 3-storeys. Alternative concept

2 has been designed for the maximum number of units that can be achieved taking into account access and parking requirements, existing structures, site characteristics, as well as infrastructure development parameters of the zoning Scheme. The development proposes communal open space which will include roads, infrastructure, parks and other amenities and the protection of the southern section.

The provision of residential units in line with the long-term development vision of the town and contributes to the need of housing stock, job creation and economic growth. According to the Planning Report the density is motivated to be in line with the average density currently permitted in the area.

The southern section of the site connects the Piesang River and is identified to have high conservational value; the central and northern sections of the site have been transformed and the area is adjacent to a low and high residential development; this section is considered to be of low conservational area and suitable for residential housing.
To the north (Santini village), the density is approximately 44 units / hectare; the residential area to the west (Thulana) has a density of approximately 33 units per ha; the residential area directly east (cutty sark) has a density of approximately 12 units per hectare. A development which is too dense could result in conflicts between residents (i.e. parking, storage, privacy); The proposed density was reduced from 50 units per ha to 46.5 units per ha.

Relevant comment from IAP:
The proposal of 230 units will change the nature of the established area known as 'Cutty Sark' by the locals, as its a low traffic area where people allow their children to walk and ride bicycles, walk the dogs etc. Kindly give my objection to a high-density development where there is inadequate sewerage, water and electricity capacity already, plus is an established low traffic area.

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Planning, operational**
Aspect	**Medium to high density housing**
Impact:	**Economic – rates / sales from units**
Nature of impact	**Direct / cumulative**
Description of impact	228 residential units will result in a positive economic impact through sales of the units and the rates received by the Bitou LM during operational phase. The change in land use to provide additional houses to the middle-income market is a positive impact.

Impact Rating

Impact Status	**Positive**		**Positive**	
	Without mitigation		With mitigation	
Spatial	Municipal	4	Municipal	4
Duration	Medium to long	5	Medium to long	5
Frequency	Seldom	3	Seldom	3
Intensity	Low to medium	2	Low	1
Severity	Medium High	10	Medium	9
Consequence	Medium High	14	Medium High	13
Probability	Probable	4	Probable	4
Impact Significance	**Medium High**	**18**	**Medium High**	**17**
Mitigation	Not applicable			
Confidence	High			
Reversibility	Not applicable			

Impact	**Density - social conflict**
Nature of impact	**Indirect**
Description of impact	Planning must ensure that long term social conflict is avoided, and social wellness is ensured by ensuring sufficient space is allocated per unit and for the required open space areas, bulk services and roads. Open spaces are recommended to be managed as per mitigation measures outlined in the EMPr.

Impact Status	**Negative**		**Positive**	
	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Medium to long	5	Medium to long	5
Frequency	Seldom	3	Seldom	3
Intensity	Low	1	Low	1
Severity	Medium	9	Medium High	9
Consequence	Medium	10	Medium	10
Probability	Plausible	3	Expected	5
Impact Significance	**Medium**	**13**	**Medium**	**15**
Mitigation / Management	Possible – potential social conflict impacts can be addressed during planning phase.			
Confidence	High			
Reversibility	Difficult if development is not economically viable at a decreased density			

<table>
<tr><td>Impact</td><td>Provision of housing for middle income families</td></tr>
<tr><td>Nature of impact</td><td>Direct</td></tr>
<tr><td>Description</td><td>The provision of residential units in line with the long-term development vision of the town is considered a positive impact.</td></tr>
<tr><td></td><td>
<table>
<tr><th>Impact Status</th><th>Positive</th><th></th><th>Positive</th><th></th></tr>
<tr><td></td><td>Without mitigation</td><td></td><td>With mitigation</td><td></td></tr>
<tr><td>Spatial</td><td>Municipal</td><td>4</td><td>Municipal</td><td>4</td></tr>
<tr><td>Duration</td><td>Medium to long</td><td>5</td><td>Medium to long</td><td>5</td></tr>
<tr><td>Frequency</td><td>Rarely</td><td>1</td><td>Rarely</td><td>1</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Low</td><td>7</td><td>Low</td><td>7</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>11</td><td>Medium</td><td>11</td></tr>
<tr><td>Probability</td><td>Probable</td><td>4</td><td>Expected</td><td>5</td></tr>
<tr><td>Impact Significance</td><td>Medium</td><td>15</td><td>Medium High</td><td>16</td></tr>
<tr><td>Management</td><td colspan="4">Possible</td></tr>
<tr><td>Confidence</td><td colspan="4">High</td></tr>
<tr><td>Reversibility</td><td colspan="4">Not applicable</td></tr>
</table>
</td></tr>
<tr><td>Mitigation Measures</td><td>Planning Team:
Planning must ensure that long term social conflict is avoided, and social wellness is ensured by ensuring sufficient space is allocated per unit and for the required open space areas, bulk services and roads. A maximum density of 228 units proposed at 100 – 130m2 per unit is recommended.
Any four storey buildings that could be accommodated to be placed in northern, central and western areas (BLM Restructuring Zone) away from quieter eastern residential areas and sensitive southern fynbos area. 2/3 storey buildings to be planned for east (quieter adjacent residential area) and environmentally sensitive southern sections.</td></tr>
<tr><td>Activity</td><td>No go alternative</td></tr>
<tr><td>Impact</td><td>Direct – Provision of residential accommodation (Low density) on agricultural zone area</td></tr>
<tr><td>Nature of impact</td><td>Direct</td></tr>
<tr><td>Description of impact</td><td>Currently, low residential housing exists on the property. Without the proposed development, low density residential accommodation will continue to be provided.
Tenants currently on the property have commented on the proposed development:
I am one of the residents on the property Fynbosrant and would like to be included in the communications or any shared information regarding the development of the property. I’d like to know the plans in order to be prepared on my end in regards to the when the development begins and for the welfare of my family (how much time we have to relocate etc)</td></tr>
<tr><td>Impact rating</td><td>
<table>
<tr><th>Impact Status</th><th>Positive</th><th></th></tr>
<tr><td>Spatial</td><td>Activity</td><td>1</td></tr>
<tr><td>Duration</td><td>Short to medium</td><td>3</td></tr>
<tr><td>Frequency</td><td>Rarely</td><td>1</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Low</td><td>5</td></tr>
<tr><td>Consequence</td><td>Low</td><td>6</td></tr>
<tr><td>Probability</td><td>Plausible</td><td>3</td></tr>
<tr><td>Impact Significance</td><td>Low</td><td>10</td></tr>
</table>
</td></tr>
<tr><td>Impact</td><td>Residential units will not be developed</td></tr>
<tr><td>Nature of impact</td><td>Direct – No provision of housing (medium high density)</td></tr>
<tr><td>Description of impact</td><td>Currently, low residential housing exists on the property. Without the proposed development, an estimated 230 residential houses will not be developed on the site.</td></tr>
<tr><td>Impact rating</td><td>
<table>
<tr><th>Impact Status</th><th>Negative</th><th></th></tr>
<tr><td>Spatial</td><td>Local</td><td>3</td></tr>
<tr><td>Duration</td><td>Long term</td><td>5</td></tr>
<tr><td>Frequency</td><td>Seldom</td><td>3</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td></tr>
<tr><td>Severity</td><td>Medium</td><td>9</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>12</td></tr>
<tr><td>Probability</td><td>Probable</td><td>4</td></tr>
<tr><td>Impact Significance</td><td>Medium High</td><td>16</td></tr>
</table>
</td></tr>
</table>

SOCIAL – EMPLOYMENT CREATION AND SKILLS DEVELOPMENT

The site is situated within ward 2 of the Bitou LM. According to the Bitou LM IDP 2024 – 2025, in 2022 the population of Bitou LM totalled 65 240 individuals in 2022 and is expected to reach 80 628 by 2027. The average income for households in Biotu is R11056 per household. There is generally a low level of educational attainment with only 30% of the adult population having a matric and or higher education qualification (residential Market Assessment, 2019, Urban-Econ). The IDP estimates that in 2022, 62.5% of Bitou's population lived below the UBPL (Upper Bound Poverty Line) set at R1 227 per person per month (in April 2019 prices) *There is a general decline in employment opportunities and there is a rise in unemployment.* Basic education and skills development are needed in order for the unemployed population to attain jobs in order to improve the livelihoods of the population.

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Planning Phase, Construction Phase; Operational Phase**
Aspect	**Development of residential housing and associated infrastructures**
Imapct	**Employment creation and skills development**
Nature of impact:	**Direct / Indirect**
Description of impact	*The proposed development will contribute to the creation of direct employment opportunities and skills development through the creation of construction jobs for local contractors and labourers and suppliers of required services. Indirect employment could be created through the use of various materials required for the construction phase. A few permanent positions are likely to be created during operational phase.*

Impact Rating

Impact Status	**Positive**		**Positive**	
	Without mitigation		With mitigation	
Spatial	Municipal	4	Municipal	4
Duration	Short to medium	3	Short to medium	3
Frequency	Infrequent	2	Seldom	3
Intensity	Low	1	Low	1
Severity	Low	6	Low	7
Consequence	Medium	10	Medium	11
Probability	Probable	4	Expected	5
Impact Significance	**Medium**	**14**	**Medium High**	**16**
Mitigation	Possible			
Confidence	High			
Reversibility	Possible			

Mitigation Measures

Planning team

- Use local labour.
- Use local suppliers of required materials and services where possible.
- Advertise locally making use of local resources for this purpose.
- Use reputable agencies / avenue (i.e. Department of Labour) to screen staff employed.

Construction Team

- Use local labour.
- Use local suppliers of required materials and services where possible.
- Weekly toolbox talks to be held to upskill labour force

Activity	**No go alternative**
Nature of impact:	Baseline conditions will likely remain the same – no additional employment

Impact Rating

Impact Status	**Negligible**

SOCIAL – CRIMINAL ACTIVITIES

Crime is a major challenge in the Bitou Municipality. Poor lighting and alien vegetation on the property can lead to use of the site for criminals. The development of residential accommodation on Erf 2074 is expected to reduce opportunities for criminals; access control will be put in place at the main entrance in the north. Criminal activities can increase in the area during construction phase; measures must be put in place to ensure safety and security during construction and operational phases.

Activity	**Medium to high residential development**
Layout	***Concept Layouts 1 and 2 and final SDP (developed based on recommendations)***
Phase	**Construction Phase**
Aspect	**Criminal activities**
Nature of impact:	**Direct**
Description of impact	Increased crime during construction phase.

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Site	2	Activity	1
Duration	Very short	1	Very short	1
Frequency	Seldom	3	Infrequent	2
Intensity	Low to medium	2	Low	1
Severity	Medium	6	Low	4
Consequence	Medium	8	Low	5
Probability	Plausible	3	Plausible	3
Impact Significance	**Medium**	**11**	**Low**	**8**
Mitigation	Possible			
Confidence	High			
Reversibility	Possible / Difficult			

Mitigation Measures

- There must be strict access control to and from the site.
- A security guard should be stationed on site for the duration of the construction phase and guard the site 24 / 7.
- Movement of all personnel and workers must be limited to areas under construction. Access to surrounding areas is not permitted.
- No employment to take place on site. Employment should take place through reputable recruitment agencies / avenues.
- No wages to be paid on site.
- Restrict employment to local residents as far as possible.
- No weapons / alcohol / narcotics allowed on site
- Sever contractual fines imposed for personnel / contract workers bring weapons / alcohol / narcotics on site.
- Workers are not to be housed on site but to return to their homes after hours.

Phase: **Operational phase**

Aspect: **Criminal activities**

Nature of impact: **Direct**

Description of impact: Criminal activities during operations

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Site	2	Activity	1
Duration	Very short	1	Very short	1
Frequency	Seldom	3	Infrequent	2
Intensity	Low to medium	2	Low	1
Severity	Medium	6	Low	4
Consequence	Medium	8	Low	5
Probability	Plausible	3	Plausible	3
Impact Significance	**Medium**	**11**	**Low**	**8**
Mitigation	Possible			
Confidence	High			
Reversibility	Possible / Difficult			

Mitigation Measures

- There must be strict access control to and from the development.
- Ensure a security measures are in place (i.e. cameras, security guard)

Activity: **No go alternative**

Nature of impact: Direct

Description of impact: Baseline conditions will likely remain the same – criminals can access site

Impact Rating

Impact Status	**Negative**	
Spatial	Activity	1
Duration	Very short	1
Frequency	Infrequent	2
Intensity	Low	1
Severity	Low	4
Consequence	Low	5
Probability	Plausible	3
Impact Significance	**Low**	**8**

TRAFFIC MANAGEMENT

Erf 2074 is immediately to the south of Marine Way (MR00383) approximately 300m east of the N2 / Marine Way Roundabout in Plettenberg Bay. There are a number of residential complexes and houses located along Marine Way. Thulana Hills is directly west and has received planning permission for medium density residential development of 200 units. Castleton is situated further west and consists of 129 units. The Cutty Sark low density residential development is located to the east. Directly north of Marine Way is Santini Village (120 units) and Laridae (24 units). To accommodate the proposed development, it is proposed to rezone the property to "General Residential II" purposes and then subdivide the property into 3 or 4 portions to facilitate phased implementation.

Marine Way (Main Road 00383) is a major road providing access between the N2 and the town of Plettenberg Bay and beach areas. Traffic flow is currently controlled in this road by means of traffic circles; a traffic calming circle is in place on the N2 / Marine Drive, on the eastern corner of Erf 2074 and closer to town to enter Main road. A filling station (Ultra city) is located on the corner of the N2 and Marine Way with the access to the filling station located on Challenge Road.

The primary access is proposed to be from Marine Drive directly from the existing circle. Access is proposed to comprise of two incoming lanes of total width 6.0 meters and an exit lane of width 3.5meters. A secondary access was proposed to be provided from Cutty Sark Avenue and / or Ariel Street on the eastern boundary. Interested / Affected Parties have sent comment to request no access from the quieter residential Cutty Sark / Ariel Street area.

The internal road network will be privately owned and consist of landscaped lanes and parking.

During construction phase, the source of additional volumes of traffic on Marine Way and the N2 will include personnel vehicles, construction vehicles, deliveries and machinery.

Comment from Department of Infrastructure: Chief Directorate: Road Planning:
From an environmental point of view this Branch offers no objection to this development. The compilation of a traffic impact assessment (in accordance with this Branch's Access Management Guidelines, 2020) by a reputable traffic engineer and the Road Authority's subsequent traffic related comments and recommendation to approve will be required by this Branch.

A traffic impact assessment has been carried out by Engineering Advice & Services (Pty) Ltd on behalf of Duinesand (Pty) Ltd in August 2024.
The TIA assessed the impact of the development for the 2025 and 2030 planning horizons and the impact of the proposed development during the peak holiday period:
Access to the proposed residential development will be provided from Marine Way (MR00383);
The SDF denotes the area in which the development is proposed as a Strategic Development area.

- **Marine Way** (MR00383) - Class U3 provincial main road - provides main access to Plettenberg Bay from N2 Section 8. The road consists of a single 4.8m wide lane per direction, sidewalks on the northern edge (towards the town centre) and is in a good condition. Turning lanes are configured on the approach to the Ultracity / Whalesong intersection and the Challenge Drive intersection is configured as a single-lane roundabout. Minibus-taxi services currently operate along MR00383 between the CBD and residential / industrial areas. The posted speed limit is 60km/hr. A 2m wide paved pedestrian walkway exists north of Marine Way (MR00383) from the N2 to the CBD. Pedestrian crossing facilities are in place across Marine Way as well as across the side roads at the Challenge Drive intersection
- **Challenge Drive -** Class U5 residential street - serves residential suburbs to the north of Marine Way. The road consists of a single 3.4m wide lane per direction and is in very good condition. The posted speed limit is 60km/h.
- **Ultracity Access** - access to the Shell Ultracity development situated next to the N2 / Marine Way intersection. The access road is configured with one 3.4 m wide exiting lane and two 3.4m wide approach lanes and is in good condition.

Level of Service (LOS) is defined as the operating condition that may occur at an intersection when it accommodates various traffic volumes. LOS is a qualitative measure of the effect of speed, travel time, traffic interruptions, freedom to manoeuvre, safety, driving comfort and convenience, and operating costs. LOS rating range from A to F with A being excellent and F being Very Poor. The LOS D is considered acceptable.

Results of intersection capacity analysis – 2025 Before development

Intersection	LOS	
	AM	PM
Marine Way / Ultra-City	A	F
Marine Way / Erf 2073	A	A
Marine Way / Challenge Drive	A	A

Further analysis with this intersection (Marine / Ultra City) configured as a roundabout

Intersection	LOS	
	AM	PM
Marine Way / Ultra-City Existing	A	F
Marine Way / Ultra-City Roundabout	A	A

Separate access to Erf 2074 does not meet the spacing requirements for a Class 3 urban arterial road in terms of the Access Management Guidelines (3). As such, the Western Cape Government has indicated that in order to meet the required access spacing standards, access would only be permitted at the existing intersection at Challenge Drive.

Provision has been made for two additional secondary access points between the development and the municipal road network to the east via Cutty Sark Avenue and Ariel Drive. These access points will be gated and locked and only opened should an emergency, e.g., a fire in the complex, result in access via the main entrance from Marine Way being compromised.

The adjacent development on erf 2073, Phase 1 of which gains direct access from Marine Way may not develop further until the access is realigned via the Challenge Drive intersection. This requires that the access to erf 2073 would need to traverse erf 2074. Access to the proposed development as well as erf 2073 is proposed at the existing Marine Way / Challenge Drive intersection. The access road to serve erf 2073 is accommodated at the northern end of erf 2074 such that the planned development on Erf 2074 is contained from a security perspective.

Configuration of the approach to the existing roundabout provides for freeflow for vehicles entering the Erf 2073 access road, i.e., the traffic exiting erf 2074 is controlled such that the movement entering erf 2073 enjoys free flow.

Shoulder sight distance for a stop condition to accommodate a single-unit truck and trailer vehicle on a road with a posted speed limit of 60km/h is 192m. 125m is required for a passenger car. The available sight distance from the proposed access at the Challenge Drive intersection exceeds 200m, given that the alignment is straight and the road is flat to both the east and west.

Access to the development will be security controlled. It is recommended that two entry lanes be provided at the entrance to ensure that no delays are caused by visitors obstructing access and such that any potential queue does not impact on access to Erf 2073 and subsequently extend into Marine Way.

The traffic situation was analysed in order to determine the LOS at which the affected intersections and access points would operate during normal weekday peak hours after development occurs. When considering the traffic generated by the proposed development added to escalated background traffic, the affected intersections and access points all operate at acceptable Levels of Service in terms of capacity for the 2025 development horizon for normal season traffic conditions **with the Ultra City intersection configured as a roundabout**.

Results of intersection capacity analysis – 2025 after development

Intersection	LOS	
	AM	PM
Marine Way / Ultra-City (after roundabout)	A	A
Marine Way / Challenge Drive	A	A

When considering the traffic generated by the proposed development added to escalated background traffic, the affected intersections and access points all operate at acceptable Levels of Service in terms of capacity for the 2030 development horizon for normal season traffic conditions **with the Ultra City intersection configured as a roundabout**.

Results of Intersection Capacity Analysis – 2030 After Development – Normal

Intersection	LOS	
	AM	PM
Marine Way / Ultra-City (after roundabout)	A	A
Marine Way / Challenge Drive	A	A

When considering the traffic generated by the proposed development added to escalated peak season background traffic, the affected intersections and access points all operate at acceptable Levels of Service in terms of capacity for the 2030 development horizon with only the Challenge Drive intersection LOS worsening slightly from A to B.

Results of Intersection Capacity Analysis – 2030 After Development – Peak Season

Intersection	LOS	
	AM	PM
Marine Way / Ultra-City (after roundabout)	A	A
Marine Way / Challenge Drive	B	B

The additional traffic generated by the development has minimal impact on operation of the affected intersections in terms of capacity during a typical peak season weekday. Neither additional public transport nor pedestrian facilities are required.

A total of 2 bays plus a further 0.25 visitor bays per unit will be required in terms of the requirements of the Bitou Municipality Zoning Scheme Bylaw (4) and will be provided on the site. The required parking provision can be accommodated on site and will be indicated on the Site Development Plan to be submitted to the Bitou Municipality.

Access to the development can safely be accommodated from Marine Way (MR00383) at the Challenge Drive intersection provided the access is configured as indicated on Figure 15 in the TIA (Appendix G) (extract provided below). Access control gates to the development on erf 2074 should be configured with a minimum of two entry lanes set back a minimum of 19.5m (3 car lengths) from the erf 2073 access road so that entering vehicles do not block access to erf 2073. Additional secondary access points to the municipal road network to the east via Cutty Sark Avenue and Ariel Drive will be provided for use should an emergency arise in the complex comprising the main access onto Marine Way;

Figure 16: Road and access layout (adapted from figure 15, TIA, EAS, 2024)

Activity	**Medium to high residential development**
Layout	***Concept Layout 2 and final SDP (developed based on recommendations)***
Phase	**Construction Phase**
Aspect	**Personnel vehicles, construction vehicles, deliveries / collections, machinery**
Nature of impact:	**Direct**
Description of impact	**Impact on other road users**

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Municipal	4	Municipal	4
Duration	Very short	1	Very short	1
Frequency	Seldom	3	Rarely	1
Intensity	Low	1	Low	1
Severity	Low	5	Low	3
Consequence	Medium	9	Medium	7
Probability	Plausible	3	Slight	2
Impact Significance	Medium	12	Low	9
Mitigation	Possible			
Confidence	High			
Reversibility	Likely			

Mitigation Measures

Construction and Planning teams

- Entrance to the site only permitted from Marine Drive (not the emergency access points on Ariel drive and Cutty Sark Avenue)
- Appropriate road and construction signage in place. Road signage should be erected and provided to full municipal standards.
- Ensure strict access control to and from the construction site at all times.
- All construction vehicles are to be monitored to ensure they are not overly full so the likelihood of spillage of debris is prevented.
- Any loose materials transported to / from site must be covered.
- Surrounding area and roads should be monitored for debris and materials associated with the proposed development and cleaned up a soon as such becomes apparent.
- All materials to be delivered in a safe manner at designated delivery area located within footprint of the development site; ensure sufficient space is allocated in the construction site plan to provide safe turning for larger trucks.
- Speed travelled by construction vehicles must be kept to a minimum and speed limits enforced.

	• No transport of construction machinery / materials to or from the site to take place on public holidays or weekends.				
Phase	**Planning and Operational Phase**				
Aspect	Residential Development				
Nature of impact:	**Direct / cumulative**				
Description of impact	**Impact on other road users**				
Impact Rating	**Impact Status**	**Negative**		**Negative**	
		Without mitigation		With mitigation (Recommendations of TIA)	
	Spatial	Municipal	4	Municipal	4
	Duration	Very short	1	Very short	1
	Frequency	Seldom	3	Rarely	1
	Intensity	Low	1	Low	1
	Severity	Low	5	Low	3
	Consequence	Medium	9	Medium	7
	Probability	Plausible	3	Slight	2
	Impact Significance	Medium	12	Low	9
	Mitigation	Possible			
	Confidence	High			
	Reversibility	Likely			
Mitigation Measures	• This Traffic Impact Assessment be approved by the Bitou Local Municipality; • The main access to the development be provided from Marine Way (MR00383) at the Challenge Drive intersection; • Secondary locked access gates be provided at Cutty Sark Avenue and Ariel Drive for use in the event of emergency(ies); • The main access gate to erf 2074 be set back a minimum of 20m from the erf 2073 access road and the access be configured with two entering lanes as indicated on **Figure 15 of the TIA** with the cost of access arrangements being met by the developer.				
Activity	**No go alternative**				
Nature of impact:	Baseline conditions will likely remain the same – negligible impacts on traffic conditions as a result of existing activities				
Impact Rating	**Impact Status**	**Negligible**			

ENERGY USE

Bitou IDP 2024 – 2025:

Augmentation of Electricity Supply:

- Formalize housing requirements to reduce electricity theft.
- Identify alternative energy sources (solar for municipal buildings, street/traffic lights, biogas from sewerage/landfill facilities) Eskom/INEP funding.
- Ensure your city has a robust electricity infrastructure to support the growing needs of your citizens.

An electrical report has been compiled by GLS. An estimated maximum demand of 500kVA for the proposed housing development was calculated by De Villiers and Moore Consulting Engineers on the behalf of the developers. The network around the erven is currently mainly supplied by SS-1 Main (Ferdinand), which is the substation supplying electricity to Plettenberg Bay town area. SS-1 Main currently has enough capacity to carry the additional 500kVA maximum demand brought by the proposed development on Erf 2074. The MV feeders supplying the surrounding area have sufficient capacity to carry the additional demand at the proposed development.
The recommended solution is to supply electricity at the proposed development on Erf 2074 is through a connection to RMU Thulana Hill.

The following measures are recommended to be incorporated into the design to reduce energy demands of the residential development on the grid:

- Solar panels on roofs
- Energy efficient lighting (i.e. LED / compact fluorescent)
- Energy saving designs and materials

Activity	**Medium to high residential development**				
Layout	***Concept Layout 2 and final SDP (developed based on recommendations)***				
Phase	**Planning and Operational Phase**				
Aspect	Residential Development				
Nature of impact:	**Direct**				
Description of impact	Depleting non-renewable energy resources is a global problem. Energy capacity in south Africa has often failed to meet energy demands. The impact of the development on energy resources is low and the impact can be reduced by putting in relevant measures to reduce the demand on the National Grid. The cumulative imapct is very high and beyond the scope of this assessment.				
Impact Rating	**Impact Status**	**Negative**		**Negative**	
		Without mitigation		With mitigation	

Spatial	Municipal	4	Municipal	4
Duration	Very short	1	Very short	1
Frequency	Seldom	3	Rarely	1
Intensity	Low	1	Low	1
Severity	Low	5	Low	3
Consequence	Medium	9	Medium	7
Probability	Slim	1	Slim	1
Impact Significance	Low	10	Low	8
Mitigation	Possible			
Confidence	High			
Reversibility	Likely			

Planning and operations

The following measures are recommended to be incorporated into the design to reduce energy demands of the residential development on the grid:

- Solar panels on roofs
- Energy efficient lighting (i.e. LED / compact fluorescent)
- Energy saving designs and materials

Activity	**No go alternative**
Nature of impact:	Baseline conditions will likely remain the same – energy requirements for low density residential
Impact Rating	**Impact Status** **Negligible**

AVIATION

It seems unlikely that the proposed residential development entailing 3 storey blocks (maximum 10.67-meter height) will impact the flight path, considering existing residential developments are already in place to the north, west and east of Erf 2074.

However, the South African Civil Aviation Authority (SACAA) has requested that a formal obstacle assessment be conducted to determine if the proposed residential development will impact flight safety due to its close proximity to Plettenburg Bay Airport. The assessment is required to be conducted by Air Traffic and Navigation Services (ATNS) and is an independent process in line with obtaining final approval from the South African Civil Aviation Authority (SACAA). The ATNS has been contacted to determine relevant assessments required to evaluate whether the proposed development will affect the safety of flight for aerodromes in close vicinity as well as communication, navigation, and surveillance (CNS) equipment however no formal proposal has yet been received to carry out the required assessment.

No impact on aviation is expected during construction or operational phase. The authority will be requested to comment on the draft BAR and EMPr.

Activity	**No go alternative**
Nature of impact:	Baseline conditions will likely remain the same – no impacts on aviation.
Impact Rating	**Impact Status** **Negligible**

SEWAGE MANAGEMENT

According to IDP 2024 – 2025 -there is an increase in demand for bulk services due to rapid growth and development in the area.

During construction, ablution facilities are required. Chemical ablution toilets will likely be used. A ratio of 1 toilet to 15 persons is recommended; ablutions to be well maintained and serviced regularly.

Based on average daily discharge of 400 litres per unit, the 228-unit development will generate an average Daily Discharge of 91,2 kl (0.1 cubic meters) during operational phase. The sewage is proposed to be treated by the Bitou Local Municipality. The sewer connection is proposed to be to the existing municipal sewer manhole located at the northern corner of Erf 2733, close to the north eastern corner of the site.

A Bulk Services capacity analysis report has been undertaken by GLS Consulting Engineers. Services Level Agreement to be concluded with Bitou as a prerequisite for the Development to proceed.

The development is inside the sewer priority area.

The internal sewer pipes will be the property of the development and will not be taken over by Bitou Municipality.

Based on the proposed sewage management option, the internal sewer reticulation system will entail:

- *160mm Class 400 UPVC sewer pipes.*
- *Manholes will be of precast concrete ring structures, in accordance with SABS 1200D standards.*
- *Manholes will be provided at a maximum of 80 meter intervals.*
- *Minimum cover to sewers will be 1000mm under roadways and 700mm elsewhere.*
- *Construction of all sewers, connections and manholes will be in accordance with SABS 1200 specifications.*
- *Two internal pump stations will be required, one at the south- western lowest point of the developable area, which will pump to a point from which it will discharge to a gravity main leading to the second pump station at the north east corner of the site. Sewerage*

will be pumped from this pump station southwards to a manhole to be positioned on the site boundary, to enable a gravity link to the connection point manhole. This gravity link sewer will be 160mm diameter and will be over municipal land for a distance of 36 meters. The conceptual sewerage layout is indicated on Drawing 24G64 S01.

Sewage from the proposed development will drain towards the existing Plettenberg Bay PS 1a. There is sufficient capacity in the existing Plettenberg Bay sewer reticulation system to accommodate the proposed development. The impact from this development on treatment capacity is considered to be low; the cumulative impact of rapid development on the LM sewage treatment capacity is considered high however it is beyond the scope of this assessment.

Activity	**Medium to high residential development**
Layout	***Concept Layout 2 and final SDP (developed based on recommendations)***
Phase	**Construction Phase**
Aspect	**Sewage waste**
Impact	Impacts on social / natural environment from mismanagement of ablution facilities.
Nature of imapct	Direct

Impact Rating

Impact Status	**Negative**		**Negligible**	
	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Very short	1	Very short	1
Frequency	Infrequent	2	Rarely	1
Intensity	Medium	3	Low	1
Severity	Low	6	Negligible	3
Consequence	Low	7	Negligible	4
Probability	Probable	4		
Impact Significance	**Medium**	**11**	Negligible	
Mitigation	Likely			
Confidence	High			
Reversibility	Possible			

Mitigation Measures	Construction Team: • Portable ablutions provided at ratio of 1 toilet per 15 workers; ablutions must be kept clean and in good working order and regularly serviced. • Ensure ablution facilities are secure. • Records of ablution services to be kept
Phase	**Operational Phase**
Aspect	**Sewage management**
Description	Sewage from the proposed development will drain towards the existing Plettenberg Bay PS 1a. There is sufficient capacity in the existing Plettenberg Bay sewer reticulation system to accommodate the proposed development. The impact from this development on treatment capacity is considered to be low; the cumulative impact of rapid development on the LM sewage treatment capacity is considered high however it is beyond the scope of this assessment.

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Activity	1	Activity Specific	1
Duration	Very short	1	Very Short	1
Frequency	Regular	4	Regular	4
Intensity	Low	1	Low	1
Severity	Low	6	Low	6
Consequence	Low	7	Low	7
Probability	Plausible	3	Plausible	3
Impact Significance	Low	10	Low	10
Mitigation	Difficult			
Confidence	High			
Reversibility	Possible			

Activity	**No go alternative**
Nature of impact:	Baseline conditions will likely remain the same sewage generated by low density residential disposed at WWTW

Impact rating

Impact Status	**Negligible**

WATER USE

The following is extracted from Bitou LM IDP 2023 – 2024:

According to the CSIR Green Book, Bitou has a High potential exposure to an increase in drought. Currently 1.9 years per decade are at risk of drought, and this will increase to 3.1 out of every 10 years by 2050. Water, and related sanitation services, is a key ingredient for socioeconomic development, food security and healthy ecosystems, and is vital for reducing the burden of disease and improving the health, welfare and productivity of populations. A deteriorating water catchment system, through ecosystem loss (transformation or land use change) and alien infestation, or watercourse and wetland modification, will lead to lower inputs into the water supply systems, and a lower overall water security due to lower natural retention and lower quality of water. During extended drought periods, even end users far from major source areas are likely to experience shortages as the overall system runs low. Assurance of Water Supply: - Review water tariff to include capital replacement cost. - Implement WC/DM programmes to ensure a reliable water supply. - Use boreholes, rainwater harvesting, treated wastewater to save water resources. - Reduce water leakage and non-revenue water to make sure that your citizens have enough water to meet their needs.

Investigations on water catchment and water reuse options for the development are recommended. Stormwater management includes the installation of rainwater tanks to allow catchment of stormwater from roof structures; It is recommended that reuse of water be considered in the planning stages.

Water will be required during the construction phase; the amount of water required will need to be determined by the resident engineer.
The majority of the water required for the operational phase of the development is proposed to be sourced from the Bitou LM.
A Civil Engineering Report, Version 1, July 2024, was prepared by Poise Consulting Engineers and contained concept water designs. GLS prepared a bulk services report and provided a revised analysis

The following is extracted from GLS:
The proposed development on Erf 2074 should be accommodated in the existing Upper Tower water distribution zone. The connection to the existing system should be done to the existing 100 mm Ø pipeline from the Upper Tower water distribution zone,
The development is situated inside the water priority area.
Re-analysis, the total annual average daily demand (AADD) and fire flow for the proposed development were calculated and classified as follows:

- 228 Residential units @ 0,5 kL/d/unit = 114,0 kL/d
- Fire flow criteria (Moderate risk 2) = 25 L/s @ 10 m

Reticulation
The existing water system has sufficient capacity to accommodate the proposed development in the present Upper Tower water distribution zone to comply with the pressure and fire flow criteria as set out in the master plan.
It is recommended that the diameter of the pipeline connecting to the existing system is 160 mm diameter, in order to prevent energy losses during peak demand conditions. All internal pipes within the development area can be 110 mm diameter pipes if a ring main is formed (to prevent energy losses during fire flow conditions). If a separate fire flow system is however implemented, then the internal pipes can be smaller than 110 mm diameter as per the design of the Civil Engineer for the development.

If a separate fire flow system is however implemented, then the internal pipes can be smaller than 110 mm diameter as per the design of the Civil Engineer for the development

Reservoir and tower capacities
The criteria for total reservoir volume used in the Bitou Municipality Water Master Plan is 48 hours of the AADD (of the reservoir supply zone). The "Upper" and "Lower" towers are supplied with water from the 1 200 kL "Close to Town" reservoir. The existing reservoir volume available at the "Close to Town" reservoir is 151 hours of the total AADD.
The criteria for total volume used for towers in the Bitou Municipality Water Master Plan is 6 hours of the AADD (of the tower supply zone). It is proposed that the development is supplied with water from the "Upper" tower. The existing volume available at the "Upper" tower is 130 hours of the total AADD supplied. This will reduce to 37 hours of the total AADD supplied when the development is fully developed.
There is therefore sufficient reservoir and tower storage capacity available in the existing "Close to Town" reservoir and "Upper" tower to accommodate the proposed development.

Activity	**Medium to high residential development**
Layout	***Concept Layout 2 and final SDP (developed based on recommendations)***
Phase	**Planning, Construction Phase**
Aspect	**Water requirements**
Nature of impact	**Direct**
Description of impact:	Water uses during construction phase include, for example, drinking water, wash water, dust control water, mixing water.

Impact Rating

Impact Status	**Negative**		**Negative**	
	Without mitigation		With mitigation	
Spatial	Activity	1	Activity Specific	1
Duration	Very short	1	Very Short	1
Frequency	Regular	4	Seldom	3
Intensity	Low	1	Low	1
Severity	Low	6	Low	5
Consequence	Low	7	Low	6
Probability	Plausible	3	Slight	2
Impact Significance	Low	10	Low	8

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<tr><td>Mitigation Measures</td><td>Construction Team:
• Water requirements to be calculated by resident engineer and sources of water to be confirmed prior to the start of construction.
• Avoid leaking taps and pipes / unnecessary water waste.
• Put in place rainwater tanks to harvest water off site offices etc.</td></tr>
<tr><td>Phase</td><td>Planning, Operational Phase</td></tr>
<tr><td>Aspect</td><td>Water requirements</td></tr>
<tr><td>Nature of impact:</td><td>Direct impact on available water resources</td></tr>
<tr><td>Description of impact</td><td>There is sufficient reservoir and tower storage capacity available to accommodate the proposed development. The direct impact from the development on water demand is low however water harvesting measures should be put in place The cumulative impact of increasing developments on LM water supply capacity is considered high however it is beyond the scope of this assessment.</td></tr>
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<tr><td>Severity</td><td>Low</td><td>6</td><td>Low</td><td>5</td></tr>
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<tr><td>Mitigation Measures</td><td>Operational Team:
• Avoid leaking taps and pipes / unnecessary water waste.
• It is recommended that rainwater collection is incorporated into the development for re-use (i.e washing / irrigation) to reduce the water demand.</td></tr>
<tr><td>Activity</td><td>No go alternative</td></tr>
<tr><td>Nature of impact:</td><td>Baseline conditions will likely remain the same – negligible impacts on water use</td></tr>
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SECTION B: IMPACT IDENTIFICATION AND ASSESSMENT METHODOLOGY

The purpose of impact assessment is to assign a qualified significance to impacts which are predicted to occur as a result of the various aspects of an activity.

The following definitions apply:

- Activity: A distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation.
- Environmental aspect: An element of an organisations activities, products and services which can interact with the environment. The interaction of an aspect with the environment may result in an impact.
- Environmental impacts: The consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality.
- Receptors: Comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and paleontology.

Aspects

Aspects associated with the proposed project are differentiated into construction and operation phases of the project. The nature of the impact is described. Once this has been undertaken the significance of the impact is determined.

Identifying significant environmental impacts

The significant environmental impacts are identified using three sources of information:

- The nature of the receiving environment (the environment includes the social, cultural and biophysical environment)
- A review and understanding of the aspects associated with the proposed project.
- All comments received from interested and affected parties during the public participation process. The issues raised will be described giving consideration to the associated activity and the aspect of that activity that is likely to result in an impact.

Nature of the impact

Impacts on the environment can lead to changes in existing conditions; the nature of the impact can be direct, indirect or cumulative.

- Direct impacts refer to changes in environmental components that result from direct cause-effect consequences of interactions between the environment and project activities. The direct impact is caused by the action and occurs at the same time and place.
- Indirect (Secondary) impacts result from cause-effect consequences of interactions between the environment and direct impacts. The indirect impact is caused by the action and occurs later in time or is further removed in distance.
- Cumulative impacts refer to the combined effect of changes to the environment caused by multiple human activities over space and time. Cumulative impact is the sum of existing conditions and the direct / indirect impacts resulting from the project. Example: A single cut in the forest is unlikely to have a detectable change, however increasing multiple cuts in the forest caused by a number of human activities is likely to decrease fauna and flora and increase soil erosion. Cumulative effects can thus be additive or synergistic. A synergistic effect refers to when the combined effect is greater than the sum of individual effects.

Method for assessing the overall significance of impacts

The overall significance of the impact is critical for defining mitigation and monitoring strategies. The qualified significance of predicted impacts assists to determine the manner in which aspects should be managed in order to avoid or minimise the predicted impacts.

Overall significance of the impacts is determined through systematically rating the following criteria of the impacts:

- The status of the impact
- The spatial extent of the impact
- The severity of negativity or degree of positivity of the impact
    - The duration of the impact
    - The frequency of the impact
    - The intensity of the impact

- The consequence of the impact
- The probability of the impact occurring

Impact Status
A qualitative rating of positive or negative is assigned to impact status. Refer to Table 1 (methodology).

Spatial Extent
The spatial extent for each aspect, receptor and impact is defined. The geographical coverage (spatial extent) description will take account of the following factors:

- The physical extent / distribution of the aspect
- The physical extent / distribution of the receptor
- The proposed impact as a result of the aspect
- The nature of the baseline environment within the area of impact

For example, the impacts of noise are likely to be confined to a smaller geographical area than the impacts of atmospheric emissions, which may be experienced at some distance. The significance of impacts also varies spatially; noise may be significant in the immediate vicinity. A qualitative description is assigned to the rating. A quantitative value ranging from 1 – 6 is assigned to the rating. Refer to Table 1 (methodology).

Duration
The duration refers to the length of time that an aspect of a proposed project may cause change on the receiving environment. The receiving environment could refer to either the social or cultural or biophysical environment. The change caused may be a positive or negative change. A qualitative description is assigned to the rating. A quantitative value ranging from 1 – 6 is assigned to the rating.

Frequency
The frequency of the impact occurring refers to how often the aspect results in a given impact on the receiving environment. The receiving environment could refer to either the social or cultural or biophysical environment. The impact may be positive or negative. A qualitative description is assigned to the rating. A quantitative value ranging from 1 – 6 is assigned to the rating.

Intensity
The intensity refers to the magnitude of the impact experienced by the receiving environment. The environment could refer to either the social or cultural or biophysical environment. The impact experienced may be a positive or negative impact. A qualitative description is assigned to the rating. A quantitative value ranging from 1 – 6 is assigned to the rating.

Severity / Degree
The severity is the sum of the intensity, duration and frequency of the impact and therefore a quantitative value ranging from 3 – 18 is assigned to the rating. If the impact is positive, the degree of positivity is determined. A qualitative description is assigned to the rating.

Consequence
A qualitative description is assigned to the rating. The consequence is the sum of the Severity (Intensity + Duration + Frequency) and Spatial Extent. Therefore, a quantitative value ranging from 4 – 24 is assigned to the rating.

Probability
In order to determine the significance of the impact, the probability of the impact occurring must first be rated. The probability refers to the likelihood that an impact will result from the aspect in question. A qualitative description is assigned to the rating. A quantitative value ranging from 1 – 6 is assigned to the rating.

Overall Significance
A definition of a "significant impact" for the purposes of the study is: "An impact which, either in isolation or in combination with others, could, in the opinion of the specialist, have a material influence on the decision-making process, including the specification of mitigating measures."

A qualitative description is assigned to the rating. The significance is the sum of the Consequence and Probability. Therefore a quantitative value ranging from 5 - 30 is assigned to the rating. A value of 5, 6 or 7 represents a low significance and described as "not harmful". A value of 30 presents a Very High Significance and is described as an "environmental disaster".

Mitigation

The Mitigation ratings are described qualitatively according to the success and feasibility of the mitigation option in question. The impacts are further rated before and after mitigation / management options. Negative impacts are assessed with mitigation measures in place in order to give an overall significance rating with mitigation in place. Positive impacts are assessed with management measures in place in order to give an overall significance rating with management in place.

Confidence

The confidence of the EAP is assigned a qualitative value.

Table 1: Impact Assessment Rating methodology

Impact Status						
Rating	**Negative**			**Positive**		
Description	An impact is rated negative if any degree of negative change will occur in the receiving environment as a result of any aspect of the proposed project. The environment refers to the social environment or the cultural environment or the biophysical environment. Negative impacts are to be avoided, minimised, or mitigated.			An impact is rated positive if any degree of positive change will occur in the receiving environment as a result of any aspect of the proposed project. The environment refers to the social environment or the cultural environment or the biophysical environment. Positive impacts are to be enhanced.		
Scale (Spatial Extent) Refers to the spatial area the aspect will impact on the environment. The impact may be positive or negative.						
Rating	**Activity specific**	**Site specific**	**Local area Specific**	**Municipal**	**Provincial / National**	**International**
Description	Impact only experienced on area where activity is located	Impact extends to the entire site of the project	Impact extends beyond site into surrounding areas	Impact extends beyond local area into municipal areas	Impact extends beyond municipal area into provincial and may extend nationally	Impact extends beyond national area
Value	1	2	3	4	5	6
Duration Refers to the length of time that the aspect may cause a change on the environment. The change may be positive or negative.						
Rating	**Very Short term**	**Short term**	**Short - Medium term**	**Medium term**	**Medium - Long term**	**Long term**
Description	1 day to 3 month	3 months to one year	One year to three years	Three years to ten years	Life of operation	Extends beyond post closure
Value	1	2	3	4	5	6
Frequency Refers to how often the aspect may impact on the environment. The impact may be positive or negative.						
Rating	**Rarely**	**Infrequent**	**Seldom**	**Regular**	**Often**	**Continuously**
Description	Could occur annually	Could occur within 6 months	Monthly	Weekly	Daily	Non stop
Value	1	2	3	4	5	6
Intensity (Magnitude / Size) Refers to the intensity of the impact experienced by the receiving environment. The impact may be positive or negative.						
Rating	**Low**	**Low to medium**	**Medium**	**Medium to High**	**High**	**Very High**

Description	Low intensity experienced only by receiving environment and / or occurs within 100 metres of activity	Low – medium intensity on receiving environment and / or occurs 100 – 500 metres of activity	Medium intensity on receiving environment and / or occurs 500 – 1000 metres of activity	Medium to high intensity on receiving environment and / or occurs within 1000 – 5000 metres of activity	High intensity on receiving environment and / or occurs within 5000 – 10 000 metres of activity	Very high intensity on receiving environment and / or within 10 000 metres or beyond of the activity
Value	1	2	3	4	5	6
Severity of negative impact Severity (Intensity + Duration + Frequency) The severity of an environmental aspect is determined by the degree of change to the baseline environment, and considers the following: The reversibility of the negative impact, The sensitivity of the receptor to the stressor, The impact duration, its permanency and whether it increases or decreases with time.						
Rating	**Negligible**	**Low Negative**	**Medium Negative**	**Medium - High Negative**	**High Negative**	**Very High Negative**
Description	There will be negligible impact as a result of the aspect	There will be a minor impact as a result of the aspect. This is easily reversible.	The aspect will result in a moderate impact. Reversibility of the impact easy but costly.	The aspect will result in a high impact. Reversibility of the impact possible but costly.	The aspect will result in a high impact. Reversibility of the impact difficult and costly.	The aspect will result in a severe impact. Reversibility of the impact not likely.
Value	3	4-6	7-9	10-12	13-15	16-18
Degree of positive impact Degree (Intensity + Duration + Frequency) The severity of an environmental aspect is determined by the degree of change to the baseline environment, and considers the following: The enhancement of the positive impact, The sensitivity of the receptor to the opportunity, The impact duration, its permanency and whether it increases or decreases with time.						
Rating	**Negligible**	**Low Positive**	**Medium Positive**	**Medium High Positive**	**High Positive**	**Very High Positive**
Description	There will be negligible impact as a result of the aspect	There will be a minor impact as a result of the aspect.	The aspect will result in a moderate impact.	The aspect will result in a high impact.	The aspect will result in a high impact.	The aspect will result in a very high positive impact.
Value	3	4-6	7-9	10-12	13-15	16-18
Negative Consequence Consequence = (Severity + Spatial extent)						
Rating	**Negligible**	**Negative low**	**Negative Medium**	**Negative Medium High**	**Negative High**	**Negative Very High**
Description	Impact has insignificant consequence on receiving environment. Requires little or no mitigation.	Impact requires in situ mitigation and receptor mitigation.	Impact requires in situ mitigation and receptor mitigation	Impact requires in situ mitigation, receptor mitigation and repair or restoration.	Impact requires in situ mitigation, receptor mitigation and repair or restoration and possible compensation.	Impact is to be avoided
Value	4	5-8	9-12	13-16	17-20	20-24
Positive Consequence Consequence = (Degree + Spatial extent)						
Rating	**Negligible**	**Positive low**	**Positive Medium**	**Positive Medium High**	**Positive High**	**Positive Very High**
Description	Impact has insignificant consequence on	Impact has a positive consequence; management	Impact has a positive consequence; management	Impact has a positive consequence; management	Impact has a positive consequence; management	Widespread / substantial beneficial effect. No alternative

	receiving environment.	required to enhance positive outcomes.	required to enhance positive outcomes.	required to enhance positive outcomes.	required to maintain positive outcomes.	ways to achieve same benefits. Management required to maintain positive outcomes.
Value	4	5-8	9-12	13-16	17-20	20-24
Probability Refers to the likelihood that an impact will result from the aspect in question. The impact may be positive or negative.						
Rating	**Slim**	**Slight**	**Plausible**	**Probable**	**Expected**	**Anticipated**
Description	0 - 9% likelihood	10 – 25 % likelihood	26 - 50% likelihood	51 - 75% likelihood	76 - 90% likelihood	91 - 100 % likelihood
Value	1	2	3	4	5	6
Negative Significance (Consequence + Probability)						
Rating	**Negligible**	**Low**	**Medium**	**Medium High**	**High**	**Very High**
Description	Not harmful	Slightly harmful	Harmful	Very Harmful	Considerably Harmful	Disaster
Value	5	6-10	11-15	16-20	21-25	26-30
Positive Significance (Consequence + Probability)						
Rating	**Negligible**	**Low**	**Medium**	**Medium High**	**High**	**Very High**
Description	Insignificant	Slightly positive	Positive	Positive but not substantial.	Substantial positive impact.	Necessity
Value	5	6-10	11-15	16-20	21-25	26-30
Mitigation of negative impact						
Rating	**None**	**Likely**	**Possible**	**Difficult**	**Unlikely**	**Not possible**
Description	Mitigation not required. Impact remains the same.	Impact can be avoided with mitigation which has proven results.	Impact can be minimised and managed with mitigation	Difficult or costly to mitigate.	Difficult and costly to mitigate	Impact cannot be mitigated
Management of positive impact						
Rating	**None**	**Likely**	**Possible**	**Difficult**	**Unlikely**	**Not possible**
Description	Management not required. Impact remains the same.	Impact can be easily enhanced with management which has proven results.	Impact can be enhanced with management	Difficult or costly to enhance but possible	Difficult and costly to enhance	Impact cannot be enhanced
Confidence Refers to the confidence level the EAP has in predicting the impact.						
Rating	**Low**	**Medium low**	**Medium**	**Medium High**	**High**	**Very High**