

Dear Interested and Affected Party / Stakeholder,

RE: Distribution and Public Review of the Draft Basic Assessment Report for the Proposed Development of Residential/ Serviced Apartments Situated at 49 Casuarina Road, Tongaat Beach, eThekweni Metropolitan Municipality

As per EIA Regulation GNR 326, April 2017 the Draft BAR is provided for public review and comment for a 30-day period. ***Kindly note that when a State Department is requested to comment in terms of the EIA Regulations, 2017, such a State department must submit its comments in writing within 30 days from the date on which it was requested to submit comments and if such a State department fails to submit comments within such 30 days, it will be regarded that such a State department has no comments.*** All comments received will be responded to and included in the Final version of the Basic Assessment Report, which will be submitted to the KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA) for review and decision-making.

Closing Date – 16 October 2020

Enclosed please find a copy of the Draft Basic Assessment with appendices that include the specialist studies completed and the Environmental Management Programme (EMPr) prepared. The Application for Environmental Authorisation has been lodged with KZN-EDTEA. The final Application form can be requested from the consultant for review.

Should there be any further enquiries please contact Roschel Maharaj on roschel@1world.co.za or by using the numbers provided above.

Yours faithfully,



Fatima Peer B.Sc. (Hons) Pr. Sci. Nat., IAIASA

Director (Environmental Services), Senior EAP

DRAFT BASIC ASSESSMENT REPORT (DBAR)

PROPOSED DEVELOPMENT OF RESIDENTIAL / SERVICED APARTMENTS
SITUATED AT 49 CASUARINA ROAD, TONGAAT, ETHEKWINI METROPOLITAN
MUNICIPALITY

[SEPTEMBER 2020]



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DRAFT BASIC ASSESSMENT REPORT

**Proposed Development of Residential / Serviced Apartments at 49 Casuarina Road,
 Tongaat, eThekweni Metropolitan Municipality**

| Verification Page | | | | Rev 01 |
|--|-----------------|-----------------|---|----------------|
| Report No. ENV19001 | September 2020 | Status | Draft | |
| © COPYRIGHT 1World Consultants (Pty) Ltd | | | | |
| Verification | Capacity | Name | Signature | Date |
| Author | EAP | Roschel Maharaj |  | 07 August 2020 |
| Reviewed by | Project Manager | Fatima Peer |  | 25 August 2020 |
| Approved by | Reviewer | Yusuf Raja |  | 28 August 2020 |

Disclaimer

This Basic Assessment Report has been based on information provided by Arup (Pty) Ltd. While due care is taken in presentation of information, 1World will not take responsibility for errors and/or exclusion of information. The opinions within this Basic Assessment Report is applicable to site conditions and features which existed at the time of the field inspections. These opinions and conclusions do not necessarily apply to conditions that may arise after the date of this Basic Assessment Report. 1World acts as the independent Environmental Assessment practitioner (EAP) in this application and performs work in an objective manner.

Executive Summary

1World Consultants (Pty) Ltd have been appointed by Arup (Pty) Ltd, to undertake the required Basic Assessment (BA) Process for the proposed development at 49 Casuarina Road, Tongaat Beach. The proposed development will involve the following:

- Demolition of the existing structure;
- Excavations and earthworks as required for the development;
- The construction of new residential / serviced apartments;
- Establishment of new parking blocks;
- Potential widening of a very small portion (approximately 200m) of Casuarina Road by 1m to create easy vehicle movement in either direction; and
- On-site waste water (sewage) treatment.

The area is currently zoned as special residential; however, the applicant is in the process of applying for a re-zoning application to general residential 2. The proposed site is located within 100m of the HWM of the sea.

The proposed development is situated in Tongaat, on Casuarina Road that runs parallel to the M4 motorway in the KwaZulu-Natal province, South Africa. The land use surrounding the project area consists predominantly of planted agriculture (specifically sugarcane plantations), urban developments and some natural coastal forest areas. The Indian Ocean is found to the east of the project area.

The proposed development triggers the need for a Basic Assessment Report due to its proximity to the HWM of the sea. The impacts associated with the proposed development are focused on the demolition, construction and operational phases. Additionally, impacts on Biodiversity and Heritage aspects were also deliberated and this report now provides all required information to advise on the applied environmental authorisation from EDTEA. Some key impacts were:

The following potential impacts were identified for the Design and pre-construction phase:

- Shadow impact
- Climate change impact
- Visual impact
- Health and safety impact
- Bulk services

The following potential impacts were identified for the demolition phase:

- Dust emissions
- Noise and vibration impacts
- Visual quality
- Waste management
- Disturbance to locals
- Safety
- Heritage impacts

The following potential impacts were identified for the construction phase:

- Traffic pressures and access
- Soil erosion

- Stormwater management
- Ground water pollution
- Surface water pollution
- Risk of alien invasive encroachment
- Flora
- Fauna
- Waste management
- Noise disturbance
- Air quality
- Visual quality
- Public health and safety
- Heritage impacts
- Socio-economic impacts

The following potential impacts were identified for the operational phase:

- Stormwater Management
- Surface water pollution
- Climate change impacts
- Noise and disturbance
- Visual quality
- Socio-economic
- Bulk services

Specialist studies were conducted to aid in a thorough investigation of the impacts and included:

- A **Biodiversity Assessment** by The Biodiversity Company to determine flora and fauna on site;
- A **Heritage Impact Assessment** by JLB Consulting to ensure that no items of cultural or historical value would be impacted on by the construction.
- A **Shadow Impact Assessment** by Seedat Architects

Mitigation measures to minimise or eliminate impacts were identified by the specialists and EAP and were utilised towards the preparation of the Environmental Management Programme (EMPr). The EMPr must be read in conjunction with this BAR and is essential towards the protection of the environmental elements whilst establishing the proposed development.

A Public Participation Process (PPP) to review the BAR and EMPr involved consultation with the relevant authorities, the landowners affected along the way, identified Interested and Affected Parties (I&APs). A Newspaper advertisement was published to inform the general public of the Basic Assessment Process. An advertisement was published in English on 09 September 2020 in the Rising Sun North Coast Newspaper. Site notice boards were established on site on 08 September 2020. A public meeting was not requested nor held prior to the distribution of the Draft BAR.

This BAR has been prepared in Accordance with the EIA Regulations, 2017 and follows the requirements for a BAR as specified in Appendix 1 of GNR 326.

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DRAFT BASIC ASSESSMENT REPORT

Double sided printing saves paper!

1. INTRODUCTION

1World Consultants (Pty) Ltd has been appointed by Arup (Pty) Ltd, on behalf of the landowner and applicant, Casuarina 5153 Properties (Pty) Ltd (Mr. Anant Singh), to undertake the required environmental services for the proposed demolishing and construction of residential / serviced apartments situated at 49 Casuarina Road, Tongaat, located within the eThekweni Municipality. The proposed development at 49 Casuarina Road is located within 100m from the High-Water Mark (HWM) of the sea within an urban residential area.

Table 1: Project Specifications

| 49 Casuarina Road | |
|---|--|
| Project Applicant | Casuarina 5153 Properties (Pty) Ltd (Mr Anant Singh) |
| Ward | Ward 58 |
| Local Municipality | eThekweni Metropolitan Municipality |
| District Municipality | eThekweni Metropolitan Municipality |
| Property Description | 49 Casuarina Road, Genazzano, Tongaat |
| Erf Number | <ul style="list-style-type: none"> • Erf Farm No. 1/620 • Erf Farm No. 1/614 • Erf Farm No. R/614 • Erf Farm No. 612 • Erf Farm No. 613 |
| Property Extent | 8419m ² |
| New Development Footprint on the Ground Level | 4781.07m ² |
| Proposed Number of Levels | 2 levels below ground and 8 levels above ground |
| Total Floor Area Ratio (F.A.R) | 12 628.50m ² |
| Development Specifications | <ul style="list-style-type: none"> • Demolition of the existing structures; • Excavations and earthworks as required for the development; • The construction of new residential / serviced apartments; • Establishment of new parking blocks; • Potential widening of a very small portion of Casuarina Road by 1m to create easy vehicle movement in either direction; and • On-site waste water (sewage) treatment. |
| Municipal Services | |
| Stormwater | There is an existing stormwater line in Casuarina Road. The exact diameter of the underground stormwater system is to be determined on site by a survey. The Structure will have a flat roof that will be drained by gutters and rainwater outlets, full-bore outlets. From full-bore outlets, the stormwater will be routed through rainwater downpipes either cast in columns or externally mounted to the building face. At ground level stormwater will be released into a piped network system which will reticulate to the municipal tie-in point via an onsite attenuation structure. |

| | |
|-------------------|---|
| | Surface runoff will be directed into inlets located within the hard-landscaped areas and parking lots. Stormwater will be then reticulated via a piped network system into the attenuation tank prior to discharge into the municipal manhole located outside the property on Casuarina Road. |
| Sewage Management | There is no municipal sewer available for this development. An on-site package plant has been selected as the most viable and cost-effective solution adding future value with the options of recycling and graywater harvesting. |

1.1. Terms of Reference

As per GNR 326 of the EIA Regulations, 2017, a Basic Assessment (BA) Process has been undertaken and the environmental outcomes, impacts and residual risks of the proposed Listed Activity being applied for have been noted in this BA Report and assessed accordingly by the Environmental Assessment Practitioner (EAP). The requirements of the BA Process have been noted in Appendix 1 of the EIA Regulations, GNR 326 (2017) and are consequently adhered to in this report.

It must be noted that the Listed Activities in terms of GNR 327 of the EIA Regulations, 2017, are applicable to this proposed project and will trigger activities in the construction phase. This BA Report focuses on the potential impacts that may arise during the construction and operational phases and provides recommended mitigation measures.

Ultimately, the outcome of a BA Process must be to provide the Competent Authority, the Department of Economic Development, Tourism and Environmental Affairs (EDTEA), with sufficient information to provide an informed decision on the application, in terms of Environmental Authorisation (EA), in order to avoid or mitigate any detrimental impacts that the activity may inflict on the receiving environment.

1.2. Pre-application Meeting

A site inspection was conducted with officials from 1World Consultants and EDTEA on 08 March 2019. Following the site inspection, a biodiversity and a heritage specialist was appointed to ensure that all legislative and permitting requirements are met.

A pre-application meeting was held on 23 June 2020 with officials from EDTEA; Arup (Pty) Ltd; and 1World Consultants (Pty) Ltd in attendance. The purpose of the meeting was to discuss the proposed project, the listed activities and the EIA process as well as the process that will be followed with this application.

Refer to Appendix A for minutes of the pre-application meeting.

1.3. Project Approach

The overall approach to this Basic Assessment Report included the following activities:

- Apply for Environmental Authorisation to the Department regarding the proposed development of residential / serviced apartments located along Casuarina Beach, Tongaat.
- Provide a detailed analysis of the proposed development, the area where it will take place, and identify potential impacts that may arise from its subsequent development.

- Ensure compliance in terms of the EIA Regulations and provide the Department with sufficient information to take a decision regarding the development.

1.4. Landowner Consent Form

The project applicant is Casuarina 5153 Properties (Pty) Ltd (Mr. Anant Hareebun Singh). The existing property is owned by Casuarina 5153 Properties (Pty) Ltd (Mr. Anant Hareebun Singh) therefore no landowner consent form is required.

1.5. Environmental Screening Report

A site visit was undertaken by 1World on 08 March 2019. An EIA Enquiry and a desktop screening report formed the basis of engagement with EDTEA. An Environmental Screening Report was generated via the online DEA Screening Tool. The purpose of the screening report is to provide an initial indication of the likely opportunities and constraints as well as the potential environmental impacts likely to arise from the proposed development. The environmental screening process is a best practice approach to integrated environmental management. The Environmental Screening Report can be reviewed under Appendix A.

2. BASIC ASSESSMENT REPORT

2.1. Environmental Assessment Practitioner

Business name of EAP: **1World Consultants (Pty) Ltd**
 Physical address: **181 Winchester Drive, Reservoir Hills,**
 Postal address: **P.O. Box 2311, Westville,**
 Postal code: **3630** Cell: **082 640 4900**
 Telephone: **031 262 8327** Fax: **086 726 3619**
 E-mail: fatima@1wc.co.za

Table 2: Names and Expertise of the EAPs

| Name and Title | Qualifications and Affiliations | Role | Experience at Environmental Assessments |
|-----------------|---------------------------------------|-------------------------------|---|
| Fatima Peer | B.Sc (Hons) Pr. Sci. Nat., IAIAAsa | Senior EAP | 10 years |
| Adila Gafoor | B.Soc. Sci. (Geog) IAIAAsa | EAP | 5 years |
| Roschel Maharaj | B.Sc IAIAAsa | EAP | 5 year |
| Wasila Vorajee | B.Sc (Hons) IAIAAsa | Junior EAP | 2 year |
| Yusuf Raja | B.Sc IAIAAsa | Environmental Project Manager | 15 years |

A Company Profile, Project Experience and CV's for 1World Consultants (Pty) Ltd is provided in Appendix B.

Table 3: Names and Expertise of Specialists

| Name of specialist | Education qualifications | Field of expertise | Section/s contributed to in this basic assessment report | Title of specialist report/s as attached in Appendix E |
|---------------------------------------|---|---------------------------------------|---|---|
| Andrew Husted Martinus Erasmus | BSc Hon (Botany) Pr Sci Nat B-Tech (Nature Conser.) Cand Sci.Nat | Biodiversity Specialist | Summary of Specialist Study Findings and Impacts (Section 10) | Biodiversity Baseline & Impact Report - Proposed Residential / Hotel Development |
| Jean Beater | MA (Heritage Studies) MSc (Environmental Management) | Heritage Specialist | Summary of Specialist Study Findings and Impacts (Section 10) | Proposed Residential / Hotel Development, 49 Casuarina Road, Tongaat, KwaZulu-Natal Phase 1 Heritage Impact Assessment |
| Mohamed Kajee | Pr. Eng. 20170238 | Senior Transport and Traffic Engineer | Summary of Specialist Study Findings and Impacts (Section 10) | Mr AH Singh 45 – 53 Casuarina Drive Residential Development Traffic Impact Assessment Rezoning Application |

The specialist declarations as well as the CV's can be reviewed under Appendix B.

2.2. Objective of the Basic Assessment Process

According to the EIA Regulations (2017), Appendix 1 of GNR 326:

“The objective of the basic assessment process is to, through a consultative process—

- (a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;*
- (b) identify the alternatives considered, including the activity, location, and technology alternatives;*
- (c) describe the need and desirability of the proposed alternatives;*
- (d) through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine—*
 - (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and*
 - (ii) the degree to which these impacts—*
 - (aa) can be reversed;*
 - (bb) may cause irreplaceable loss of resources; and*
 - (cc) can be avoided, managed or mitigated; and*
- (e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—*
 - (i) identify and motivate a preferred site, activity and technology alternative;*
 - (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and*
 - (iii) identify residual risks that need to be managed and monitored”*

3. LOCATION OF THE ACTIVITY

The proposed development at 49 Casuarina Road is located within Ward 58 of the eThekweni Metropolitan Municipality. The property is currently used as Mr. Singh's vacation home. The site is a consolidation of five erven as per Figure 1 below. Table 4 below provides further site details such as the 21-digit Surveyor General (SG) number for the property and site co-ordinates.

Table 4: Site Details

| Demolishing and development at: | | |
|--|---|-----------------------|
| Property Description | 49 Casuarina Road, Tongaat | |
| Landowner | Casuarina 5153 Properties (Pty) Ltd (Mr Anant Singh) | |
| Current Property Zoning | Property currently zoned as Special Residential. A re-zoning application has been submitted to change the zoning to General Residential 2 | |
| 21-digit Surveyor General (SG) numbers | Erf Number | 21-Digit Code |
| | Erf Farm No. 1/620 | N0FU03350000062000001 |
| | Erf Farm No. 1/614 | N0FU03350000061400001 |
| | Erf Farm No. R/614 | N0FU03350000061400000 |
| | Erf Farm No. 612 | N0FU03350000061200000 |
| Property Size | 8419m ² | |
| Development Footprint at Ground Level | 4781.07m ² | |
| GPS Coordinates | 29° 36' 12.32" S 31° 9' 47.76" E | |

A greater overview of the Tongaat Beach area and project site area are depicted in Figures 2 and 3, respectively.

No. 45 - 53 CASUARINA ROAD, GENAZZANO, TONGAAT

LOCALITY PLAN



PHYSICAL ADDRESS:

- No. 45 CASUARINA ROAD
- No. 47 CASUARINA ROAD
- No. 49 CASUARINA ROAD
- No. 51 CASUARINA ROAD
- No. 53 CASUARINA ROAD

ALL OF
GENAZZANO, TONGAAT

PROPERTY DESCRIPTION:

- ERF 613 TONGAAT
- ERF 612 TONGAAT
- REMAINDER OF ERF 614 TONGAAT
- PORTION 1 OF ERF 614 TONGAAT
- PORTION 1 OF ERF 620 TONGAAT

eThekweni Metropolitan Municipality
North Operational Entity
Registration Division - FU
Province of KwaZulu-Natal

CHRISTINE PLATT
CONSULTING TOWN PLANNER
7 Canal Drive, Westville, 3630
Tel/Fax: 031 267 1237 | Email: plattcf@mweb.co.za

PLAN No. 1701/1

DATE: APRIL 2019

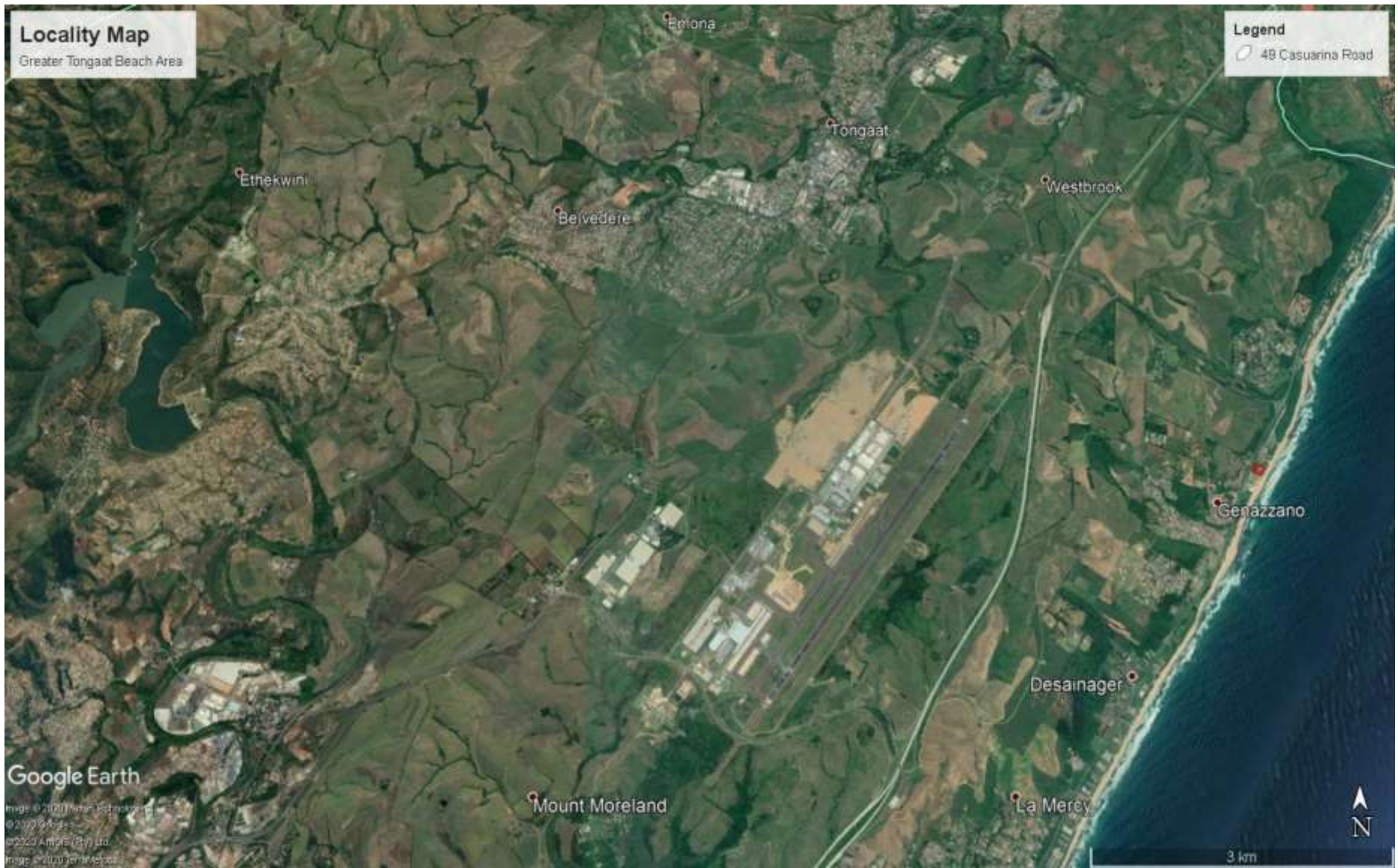


Figure 2: Greater Tongaat Beach Area and Site Location (Red), (Google Earth Imagery, 2019)



Figure 3: Proposed Site Area (Red), (Google Earth Imagery, 2019)

4. PROPOSED ACTIVITY

The proposed development is centered on the construction of residential / serviced apartments. The project is further discussed below.

4.1. Project Description and Plans

Construction Description

The existing residential dwelling will be demolished. There will be a development of new residential/ serviced apartments with a development footprint of 4781.07m² at ground level. A demolition permit will be sort by the applicant prior to construction activities being undertaken. The area is currently zoned as special residential; however, a re-zoning application has been lodged to change the zoning to general residential 2. The site is located within 100m from the High-Water Mark (HWM) of the sea. The site is located within an urban area. The proposed development will entail moving, removing and excavation of soil of more than 5m³ within a distance of 100m inland of the High-Water Mark (HWM) of the sea. The proposed development will involve the following:

- Demolition of the existing structures;
- Excavations and earthworks as required for the development;
- The construction of new residential / serviced apartments;
- Establishment of new parking blocks;
- Potential widening of a very small portion (approximately 200m) of Casuarina Road by 1m to create easy vehicle movement in either direction; and
- On-site waste water (sewage) treatment.

The proposed development will be a multi-storey residential block, which will include 11 levels (including the ground level, and 2 below-ground levels) with an approximate Total Floor Area Ratio (F.A.R.) of 12 628.50m². Table 5 below provides an indication of the development schedule.

Table 5: Development Schedule as per Architects Plans

| Development Schedule – 49 Casuarina Road | |
|---|---------------|
| Consolidated Site Area | 8418 sqm |
| Proposed coverage | 4781.07 sqm |
| Percentage Coverage | 56.7 % |
| Total Proposed Floor Area Ratio (F.A.R) | 12 628.50 sqm |
| Percentage F.A.R. | 1.5 % |
| Total Number of Units (maximum) | 206 |
| Number Parking Provided | 369 Bays |
| Area Schedule – Level -2 to 0 | |
| 10 Units Per Level | 700 sqm |
| Area Schedule – Level 1 to 2 | |
| 22 Units Per Level | 1316.06 sqm |

| Area Schedule – Level 3 to 8 | |
|------------------------------|-------------|
| 21 Units Per Level | 1316.06 sqm |

The above schedules are based on the latest available information. The final development schedule will be in line with local authority (e.g. zoning, town planning, building planning) requirements.

Review of aerial imagery by the eThekweni Municipality: Development Planning, Environment & Management Unit Environmental Planning & Climate Protection, shows that the current manicured gardens associated with the development on the site has encroached into the privately owned land along the coast as per Figure 4 below. The Client as agreed to pull back the proposed development as far away from the seaward facing side. Once the construction of the multi-storey building is complete, the existing boundary wall will be demolished and re-constructed along the correct cadastral boundary as per Figure 4. No new beach access will be constructed.



Figure 4: Actual Property Boundary in Yellow

Based on the existing site extent, the distance from the High-Water Mark (HWM) to the current boundary wall is 33.2m. Refer to Figure 5 below. The boundary wall is at a height of 2 to 3m and the building is also situated approximately 2 to 3m above sea level.

Current Distance from the HWM



March 31, 2020

Existing Boundary Wall at 49 Casuarina Road

HWM of the Sea

1:1128
0 45 90 180 ft
0 12.5 25 50 m
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

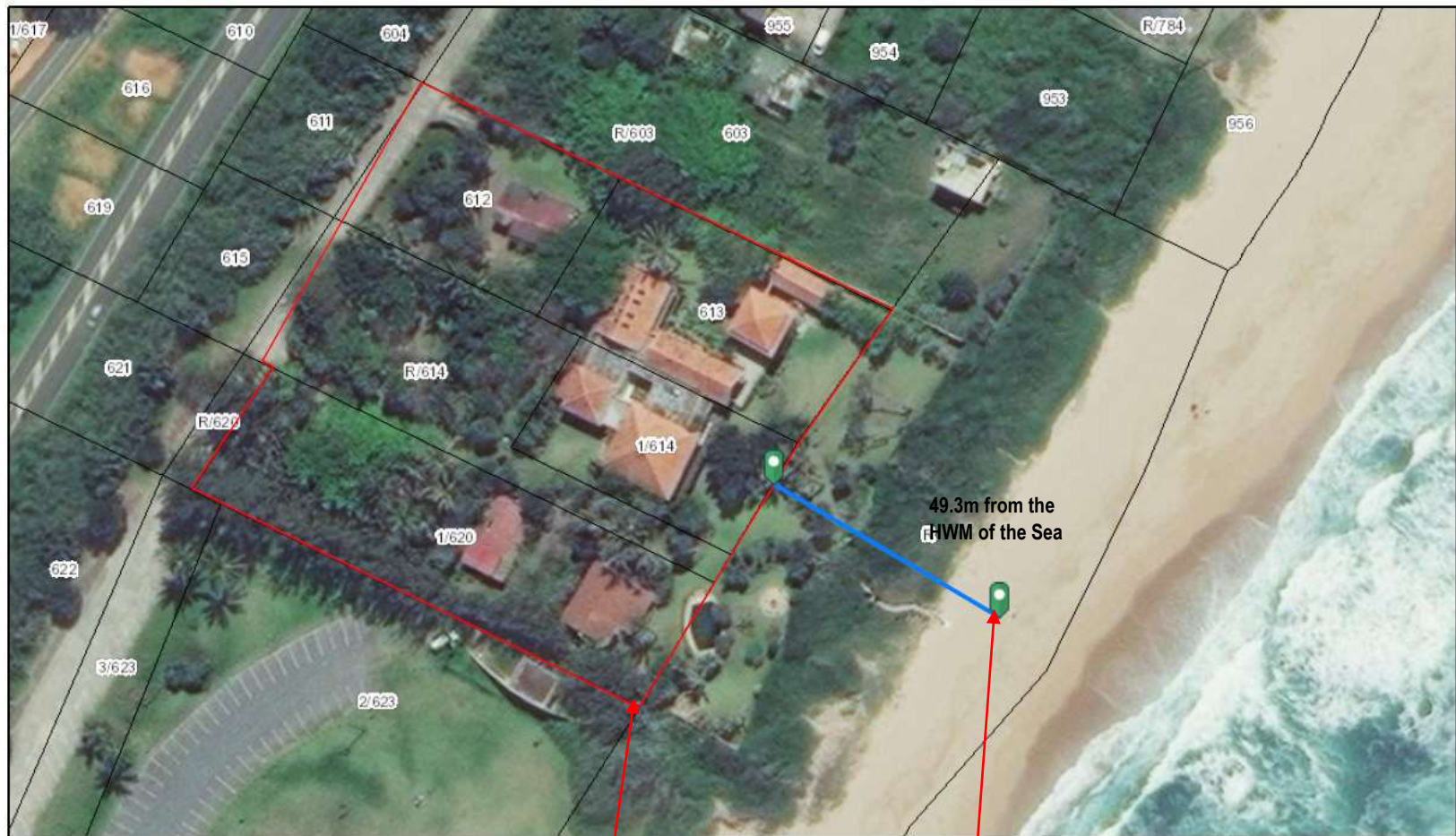
eThekweni Municipality
Copyright 2020

Figure 5: Distance from the HWM of the Sea to the Existing Boundary Wall at 49 Casuarina Road (Red), (eThekweni Municipality Corporate GIS Department, 2020)

The proposed development will be pulled back to remain within the property boundary and no encroachment will take place within the Municipal owned coastal area. The distance from the HWM of the sea to the correct cadastral boundary is 49.3m as per Figure 6 below. The design of the proposed development takes into consideration the risks that are posed by rise in sea levels. The boundary wall is at a height of 2 to 3m which will be maintained. The new development bulk-built structures will be a significant distance away from the HWM of the sea, in comparison with the site boundary.

The layout plan for the proposed demolition of existing structures, and construction of the residential/ serviced apartments at 49 Casuarina Road is provided in Appendix C and are discussed further under section 7 below.

Proposed Distance from the HWM of the Sea



March 31, 2020

New Boundary at 49 Casuarina Road

HWM of the Sea

1:1128
0 45 90 180 ft
0 12.5 25 50 m
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

eThekweni Municipality
Copyright 2020

Figure 6: Distance from the HWM of the Sea to New Boundary at 49 Casuarina Road (Red), (eThekweni Municipality Corporate GIS Department, 2020)

5. LEGISLATION AND GUIDELINES APPLICABLE

5.1. Applicable Listed Activities

In terms of the Environmental Impact Assessment (EIA) Regulations (2017), promulgated in terms of the National Environmental Management Act, 1998 (NEMA), certain Listed Activities are specified for which either a Basic Assessment (GNR 327 and 324 of 2017) or full Scoping and EIA (GNR 325 of 2017) is required. The following Listed Activity in Government Notice (GN) R327 (Listing Notice 1) of 2017 are triggered, requiring a Basic Assessment (BA) Process for the proposed development at 49 Casuarina Road, Tongaat.

Table 6: Relevant Activities from EIA Regulations 2017

| EIA Regulations 2017 | | | |
|----------------------|----------------------|--|---|
| Regulation Year | Listed Activity NEMA | Description of Activity | Applicability to the Project |
| 2017 | LN 1, Activity 19A | <p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from—</p> <ul style="list-style-type: none"> (i). the seashore; (ii). the littoral active zone, an estuary or a distance of 100 metres inland of the highwater mark of the sea or an estuary, whichever distance is the greater; or (iii). the sea; — <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</p> <ul style="list-style-type: none"> (f) will occur behind a development setback; (g) is for maintenance purposes undertaken in accordance with a maintenance management plan; (h) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (i) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or <p>where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p> | <p>The proposed development is located within 100m from the High-Water Mark (HWM) of the sea and will require more than 5 cubic metres of material to be removed from site as the proposed development footprint on the ground level is 4781.07m². The proposed development also includes levels -1 and -2. The total excavated material is inclusive of the construction camp which will be situated within the property boundary.</p> <p>The nature of the material which will be removed will be of the building material being demolished from the existing residence such as concrete, bricks, timber etc. and most of the infill will be consisted from the existing original natural site material.</p> |

Hence, a BA Process is required. An Application for Environmental Authorisation was lodged with KZN-EDTEA Head Office on 07 September 2020. Due to the COVID-19 pandemic, the application is set aside for a period of two days and follows a sanitizing/ cleansing process prior to review. Once the EIA reference number is received, all registered I&APs will be notified accordingly. The completed copy of the application form can be reviewed under Appendix C.

5.2. Policy and Legislative Context

Table 7 provides a list of all applicable legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA regulations.

Table 7: Applicable Legislation, Policies and/or Guidelines

| Title of Legislation, Policy or Guideline | Administering authority | Date |
|--|---|-------------|
| National Environmental Management Act (Act 107 of 1998) – for its potential to cause degradation of the environment (Section 28). | Department of Environmental Affairs | 1998 |
| Environmental Conservation Act (Act 73) – for potential environmental degradation. | Department of Environmental Affairs | 1989 |
| National Water Act (Act 36 of 1998) – for potential to cause pollution of water resources defined under the Act (Section 19). | Department of Water and Sanitation | 1998 |
| Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) – for protection of agricultural resources and for control and removal of alien invasive plants. | National Department of Agriculture | 1983 |
| National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) – for protection of biodiversity. | Department of Agriculture and Environmental Affairs & Ezemvelo KZN Wildlife | 2004 |
| The National Heritage Resources Act (Act No 25 of 1999 as amended) – for the identification and preservation of items of heritage importance. | South African Heritage Resources Agency | 1999 |
| KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No. 5 of 2018) | KwaZulu-Natal Amafa and Research Institute | 2018 |
| EIA Regulations GNR 326 – for guidelines on the process to be followed and the format of the BAR. | Department of Economic Development, Tourism and Environmental Affairs | 2017 |
| Public Participation guideline in terms of NEMA EIA Regulations | Department of Economic Development, Tourism and Environmental Affairs | 2017 |
| National Climate Change Response Plan White Paper | Department of Environmental Affairs | 2011 |
| National Environmental Management: Waste Act | Department of Environmental Affairs | 2008 |
| National Environmental Management: Air Quality Act | Department of Environmental Affairs | 2004 |

| | | |
|---|------------------------|--------------------|
| Minimisation of Shadows on Beaches Policy for eThekwini: Shadow Impacts on Beach and Residential Amenities. | eThekwini Municipality | 2008 |
| eThekwini Municipality By-Laws | eThekwini Municipality | Current |
| Spatial Development Framework | eThekwini Municipality | 2016-2017 |
| Integrated Development Plan | eThekwini Municipality | 2017/18 to 2021/22 |

6. NEED AND DESIRABILITY

Since the applicant/ developer is the landowner, it is only feasible that the proposed development occurs within the boundaries of the property. The project entails the demolishing of existing structures and the construction of residential/ serviced apartments situated at 49 Casuarina Road, Tongaat. Tongaat is a town in KwaZulu-Natal, about 37km North of Durban and 28km South of Stanger. The population within this area ranges from permanent residents, retired persons, holiday houses and beach entertainment activity hot spots. The need and desirability of the project is mostly personal to the developer; however, the proposed development is set at a location that is most appealing for residential and tourist ocean view accommodation. Along Casuarina Road there are a few plots of free-standing residential houses with a few plots comprising residential/ serviced apartments. However, the proposed development would be largest development of this nature in the area, also being a neighbor to the Beach Bums restaurant. The project plot is also situated adjacent to the beach parking lot making it a more desirable location for holiday makers/ the retired/ local beach and nature lovers.

There are socio-economic aspects linked to development and growth within the area. Any additional investors in the area, be it holiday makers or retired people, will be attracted by ongoing growth and development of the properties and the general municipal income is thus bound to increase. The new development is expected to increase property values of the local neighborhood. Local labour for the semi and un-skilled aspects of construction will be acquired during the construction phase, creating jobs for people in the vicinity of the project. Procurement of local construction material and other goods and services would be required, thus, supporting local businesses.

7. CONSIDERATION OF ALTERNATIVES

Ideally, alternatives are considered to evaluate the proposed plans against the No-Go option. Alternatives to the project site selection; layout plans as well as alternatives to construction methodologies and/ or materials used for the development are evaluated. The potential impacts of the preferred alternative are then evaluated in section 11 below.

7.1. Motivation for the Preferred Site, Activity and Technology Alternative

The proposed development triggers Listing Notice 1, GNR 327, Activity 19A of the EIA Regulations (2017). As per GNR 326 (2017), Appendix 1(2)(b) and 1(3)(g); alternatives for the proposed development to be identified and considered. Chapter 1 of the EIA Regulations provides an interpretation of the word “alternatives”, which are options “in relation to a proposed activity, mean(ing) different means of meeting the general purpose and requirements of the activity, which may include alternatives to the-

- a) *Property on which or location where the activity is proposed to be undertaken;*
 - b) *Type of activity to be undertaken;*
 - c) *Design or layout of the activity;*
 - d) *Technology to be in the activity; or*
 - e) *Operational aspects of the activity;*
- And includes the option of not implementing the activity.”*

Based on the above, the following alternatives are presented for the proposed development at 49 Casuarina Road.

7.2. Alternatives to Site Selection – Preferred Site Alternative

The preferred site alternative is a site that is well established within an urban area, approximately 100m from the High-Water Mark (HWM) of the sea. The existing structure is a well-established, residential block inclusive of an outdoor pool. The existing structure will be demolished and developed into a multi-storey block. Construction will be limited to within the boundary of the property. Thus, the extent of environmental impacts will be kept to a minimal that is constrained by the property size. Figure 7 below provides an aerial view of the existing 49 Casuarina Road property, located along Tongaat Beach. No site alternatives have been proposed as the existing property is privately owned. It is therefore more feasible for the proposed development to take place within this property.



Figure 7: Aerial Snapshot of Existing Structures at 49 Casuarina Road (Esri Property Search, April 2019)

Site Photographs



Photo 1: Casuarina Road Leading to the Site.



Photo 2: Entrance Gates on the Western Side of 49 Casuarina Road, Tongaat Beach.



Photo 3: Open Garden on the Western Side of the Property.



Photo 4: Existing Building to be Demolished.



Photo 5: Existing Building, Staff Quarters and Laundry Area to be Demolished.



Photo 6: Existing Vacation Home to be Demolished (seaward facing).



Photo 7: Existing Septic Tank System on Site for the Management of Sewage and Fire Hydrant Water Tanks.



Photo 8: Pool Area and Open Garden at the Eastern Side of the Property (Seaward Facing).



Photo 9: Beach Access on Seaward Side of the Property.

7.3. Alternatives to Layouts and Designs

Two layout alternatives were generated by the architect for the proposed development. Each Alternative will be discussed below. Layouts can be reviewed in A3 under Appendix C.

7.3.1. Preferred Alternative: Layout 1

The preferred alternative would be best suited for the development. As per the screening conducted by eThekweni Municipality Development Planning, Environment & Management Unit Environmental Planning & Climate Protection, the current manicured garden, portion of the pool, fire area and beach access encroach into Municipal owned land. The preferred alternative has been designed to ensure that the development is pulled back to the original property boundary i.e. pulled as far back from the beach as possible. The distance from the HWM of the sea to the correct cadastral boundary is approximately 49.3m. The distance from the HWM of the sea to the development is approximately 58m. The 2 to 3m high boundary wall will be maintained.

The preferred layout comprises of the following as per Table 8 below.

Table 8: Unit Type and Sizes, Preferred Alternative

| Level | Number of Units | Size | Number of Parking Bays | Unit Type |
|--------------|----------------------------|--------------------------------|------------------------|---------------------------|
| -2 | 10 | 700.00m ² | 123 | 10 x 2 Bedroom Units |
| -1 | 10 | 700.00m ² | 123 | |
| 0 | 10 | 700.00m ² | 123 | |
| 1 | 22 | 1316.06m ² | | Studios & 2 Bedroom Units |
| 2 | 22 | 1316.06m ² | | |
| 3 | 21 | 1316.06m ² | | Studios & 2 Bedroom Units |
| 4 | 21 | 1316.06m ² | | |
| 5 | 21 | 1316.06m ² | | |
| 6 | 21 | 1316.06m ² | | |
| 7 | 21 | 1316.06m ² | | |
| 8 | 21 | 1316.06m ² | | |
| Total | 200 (max 206 units) | 12 628.50 m² | 369 | |

The aim was to open the development to the natural landscape that surrounds it, as well as, to maximise on the building height that is allowed. Refer to Figure 8, 9 and 10 below.

Once constructed, the development will be serviced as follows:

Potable Water Reticulation - Local Municipality department of water and sanitation is to comment on whether the proposed development can be served by the current infrastructure and whether the development is aligned to any future master planning of the area. The connection point for the proposed development is obtained from an existing 75mmØ water main located in Casuarina Road. A 75mmØ connection from the existing water main will serve the site. The proposed connection point will need to be identified on site. The local municipality will confirm if there is sufficient capacity to service this development.

The internal reticulation is private and will be designed by a qualified engineer according to the final architectural designs. As a minimum a water meter will have to be installed at the connection point. The water mains will be constructed according to the local municipality design standards and the necessary approvals will be sort. A fire risk assessment will also be undertaken by the engineer and the necessary approvals will be requested as well.

Sewer Drainage Network - The current sites do not have a waterborne sewerage system. The existing individual units are served by individual septic tanks. The local Genazzano Wastewater Treatment Works (WWTW) is unlicensed and assumed to be out of capacity. Sewage disposal for the proposed development proves to be a challenge, therefore, alternative options are being investigated to provide the most cost effective and environmentally friendly solution. Alternatives include:

- Option 1 – the provision of a conservancy tank
- Option 2 – the upgrading of the existing Genazzano WWTW
- Option 3 – the provision of a sewerage package plant

The applicant/ engineer has approached eThekweni Water and Sanitation (EWS) unit for guidance on the three alternatives. EWS has confirmed that the available capacity at the Genazzano WWTW is constrained. The conservancy tank option (option 1) requires a large number of tanks to be installed underground. However, the on-site package plant is the option that is most viable and cost-effective adding future value with the options of recycling and gray water harvesting. The internal reticulation is private and will be designed by a qualified engineer.

Stormwater Drainage Network - There is an existing stormwater line in Casuarina Road. The exact diameter of the underground stormwater system is to be determined on site by a survey. The Structure will have a flat roof that will be drained by gutters and rainwater outlets, full-bore outlets. From full-bore outlets, the stormwater will be routed through rainwater downpipes either cast in columns or externally mounted to the building face. At ground level stormwater will be released into a piped network system which will reticulate to the municipal tie-in point via an onsite attenuation structure. All external landscaped areas will be drained using a combination of a piped network as well as maintain natural surface runoff in areas that have not been altered. Surface runoff will be directed into inlets located within the hard-landscaped areas and parking lots. Stormwater will be then reticulated via a piped network system into the attenuation tank prior to discharge into the municipal manhole located outside the property on Casuarina Road. A survey will be carried out to identify the exact position and invert level.

Electrical - Electricity usage across the development will primarily be from the following occupancy classifications:

- Parking and common/circulation areas
- Residential apartment units

Based on the above the estimated maximum demand of the development would be in the order of 1377 kVA.

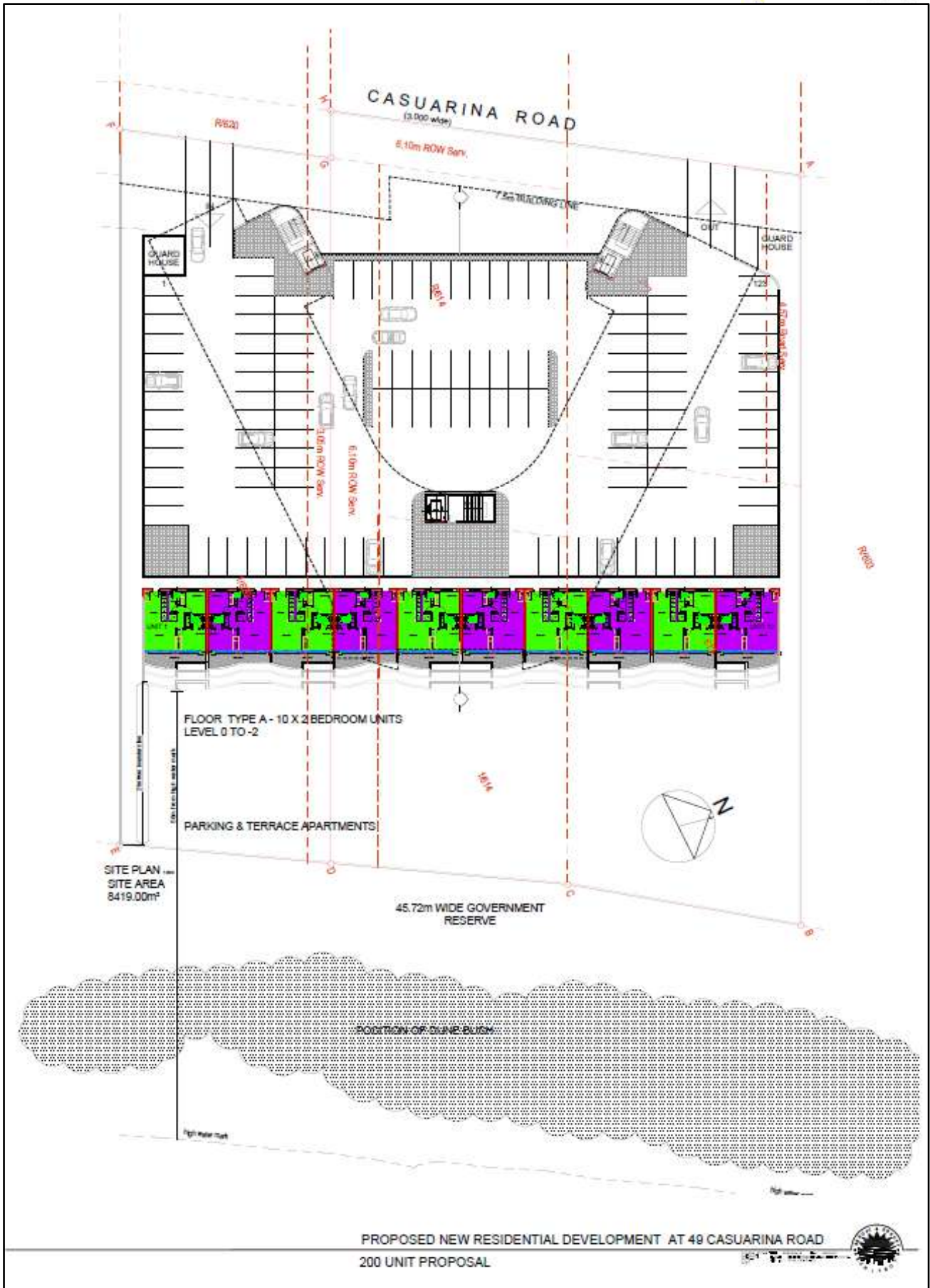


Figure 8: Preferred Layout Plan for Level 0 to -2

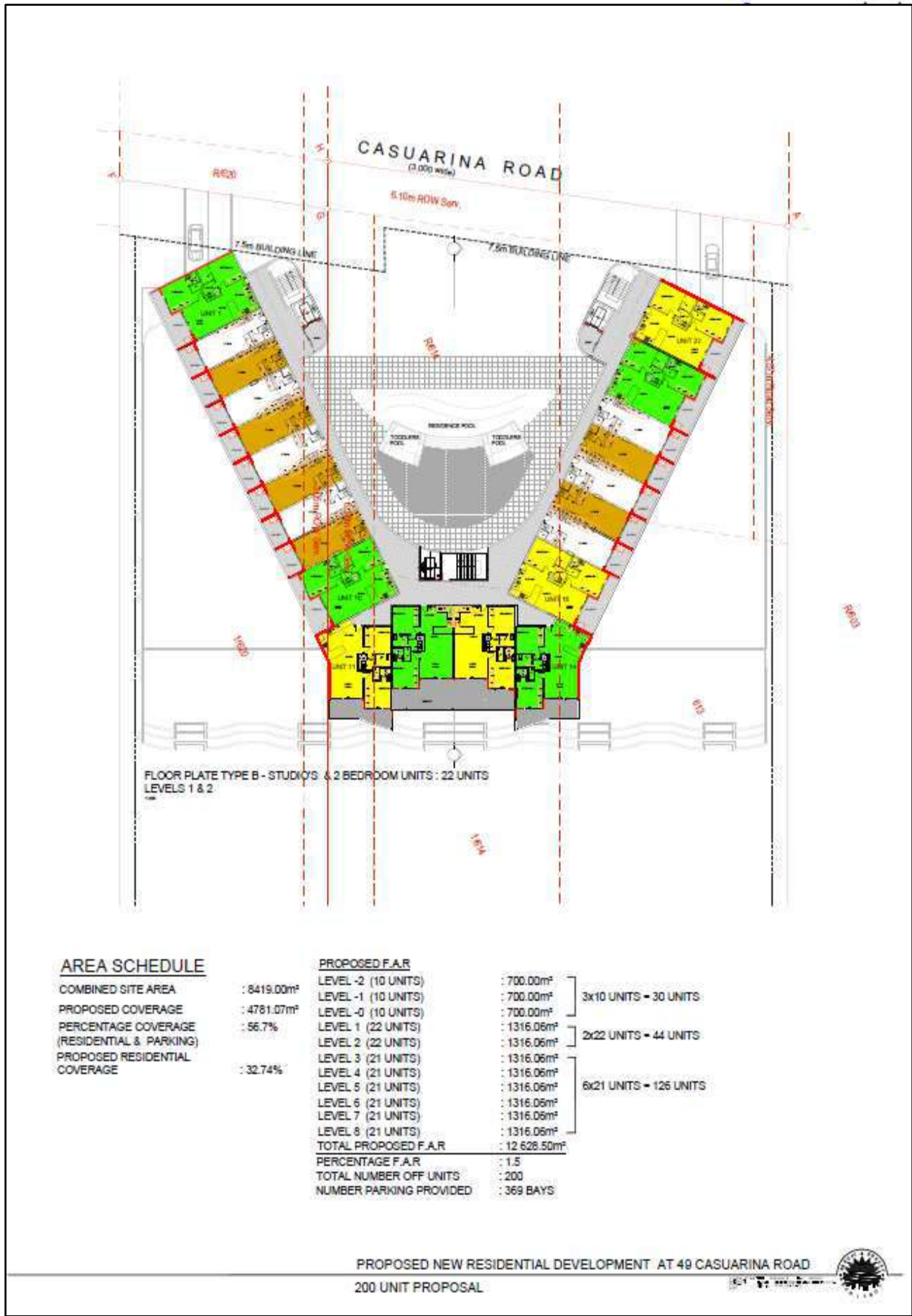


Figure 9: Preferred Layout Plan for Level 1 & 2 with Area Schedule

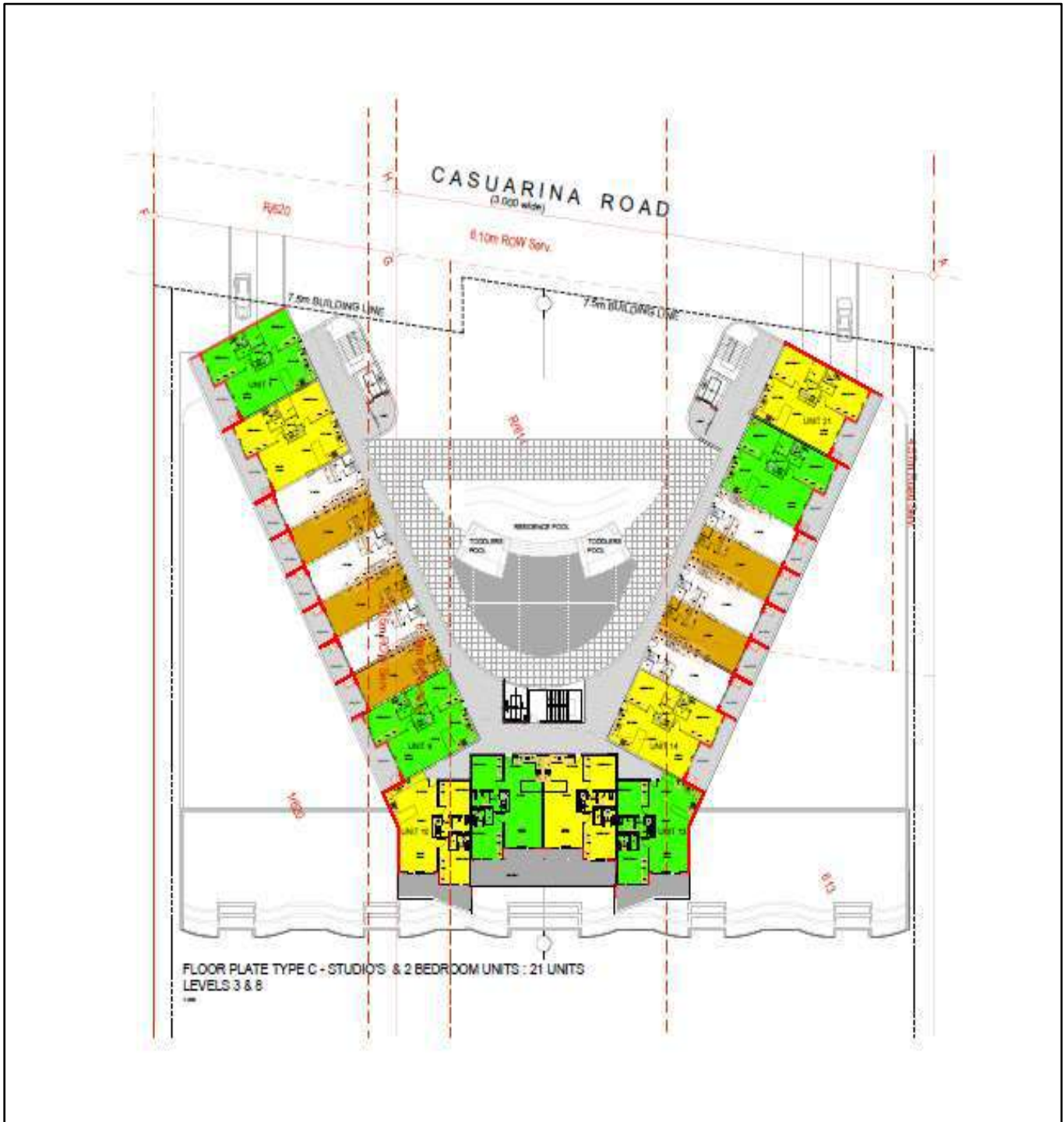


Figure 10: Preferred Layout Plan for Level 3 to 8

7.3.2. Alternative 1: Layout 2

Alternative 1 was designed prior to screening by eThekweni Municipality Development Planning, Environment & Management Unit Environmental Planning & Climate Protection. Alternatives 1 does not consider the encroachment into the municipal owned land and utilizes the complete current property extent. Based on Alternative 1, the distance from the HWM of the sea will remain as 33.2m.

The Alternative layout comprises of the following as per Table 9 below.

Table 9: Unit Type and Sizes, Alternative Layout

| Level | Number of Units | Size | Number of Parking Bays | Unit Type |
|--------------|-----------------|-------------------------------|------------------------|---------------------------|
| -2 | 10 | 687.37m ² | 162 | 10 x 2 Bedroom Units |
| -1 | 10 | 687.37m ² | 162 | |
| 0 | 10 | 687.37m ² | | |
| 1 | 28 | 1370.80m ² | | Studios & 2 Bedroom Units |
| 2 | 28 | 1370.80m ² | | |
| 3 | 28 | 1370.80m ² | | |
| 4 | 28 | 1370.80m ² | | |
| 5 | 28 | 1370.80m ² | | |
| 6 | 28 | 1370.80m ² | | |
| 7 | 28 | 1370.80m ² | | |
| 8 | 28 | 1370.80m ² | | |
| 9 | 16 | 1370.80m ² | | 2 Bedroom Units |
| 10 | 16 | 1370.80m ² | | |
| 11 | 16 | 1370.80m ² | | |
| Total | 302 | 17 140.91m² | 324 | |

Refer to Figure 11, 12 and 13 below.

Once constructed, the development will be serviced as follows:

Potable Water Reticulation - Local Municipality department of water and sanitation is to comment on whether the proposed development can be served by the current infrastructure and whether the development is aligned to any future master planning of the area. The connection point for the proposed development is obtained from an existing 75mmØ water main located in Casuarina Road. A 75mmØ connection from the existing water main will serve the site. The proposed connection point will need to be identified on site. The local municipality will confirm if there is sufficient capacity to service this development.

The internal reticulation is private and will be designed by a qualified engineer according to the final architectural designs. As a minimum a water meter will have to be installed at the connection point. The water mains will be constructed according to the local municipality design standards and the necessary approvals will be sort. A fire risk assessment will also be undertaken by the engineer and the necessary approvals will be requested as well.

Sewer Drainage Network - The current sites do not have a waterborne sewerage system. The existing individual units are served by individual septic tanks. The local Genazzano Wastewater Treatment Works (WWTW) is unlicensed and assumed to be out of capacity. Sewage disposal for the proposed development proves to be a challenge, therefore, alternative options are being investigated to provide the most cost effective and environmentally friendly solution. Alternatives include:

- Option 1 – the provision of a conservancy tank
- Option 2 – the upgrading of the existing Genazzano WWTW
- Option 3 – the provision of a sewerage package plant

The applicant/ engineer has approached eThekweni Water and Sanitation (EWS) unit for guidance on the three alternatives. EWS has confirmed that the available capacity at the Genazzano WWTW is constrained. The conservancy tank option (option 1) requires a large number of tanks to be installed underground. However, the on-site package plant is the option that is most viable and cost-effective adding future value with the options of recycling and gray water harvesting. The internal reticulation is private and will be designed by a qualified engineer.

Stormwater Drainage Network - There is an existing stormwater line in Casuarina Road. The exact diameter of the underground stormwater system is to be determined on site by a survey. The Structure will have a flat roof that will be drained by gutters and rainwater outlets, full-bore outlets. From full-bore outlets, the stormwater will be routed through rainwater downpipes either cast in columns or externally mounted to the building face. At ground level stormwater will be released into a piped network system which will reticulate to the municipal tie-in point via an onsite attenuation structure. All external landscaped areas will be drained using a combination of a piped network as well as maintain natural surface runoff in areas that have not been altered. Surface runoff will be directed into inlets located within the hard-landscaped areas and parking lots. Stormwater will be then reticulated via a piped network system into the attenuation tank prior to discharge into the municipal manhole located outside the property on Casuarina Road. A survey will be carried out to identify the exact position and invert level.

Electrical - Electricity usage across the development will primarily be from the following occupancy classifications:

- Parking and common/circulation areas
- Residential apartment units

Based on the above the estimated maximum demand of the development would be in the order of 1377 kVA.

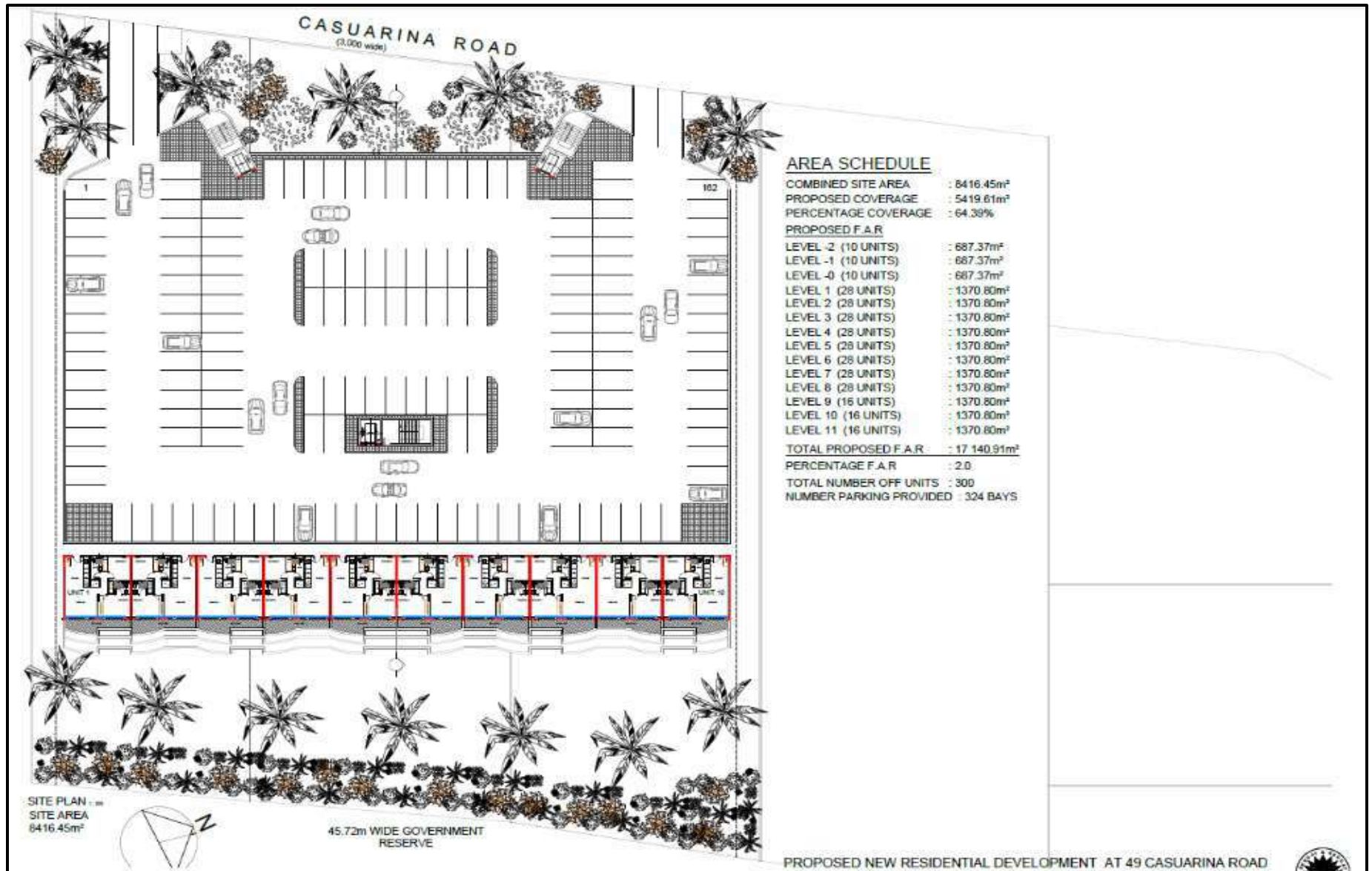


Figure 11: Alternative Layout Plan for Level 0 to -2 with Area Schedule

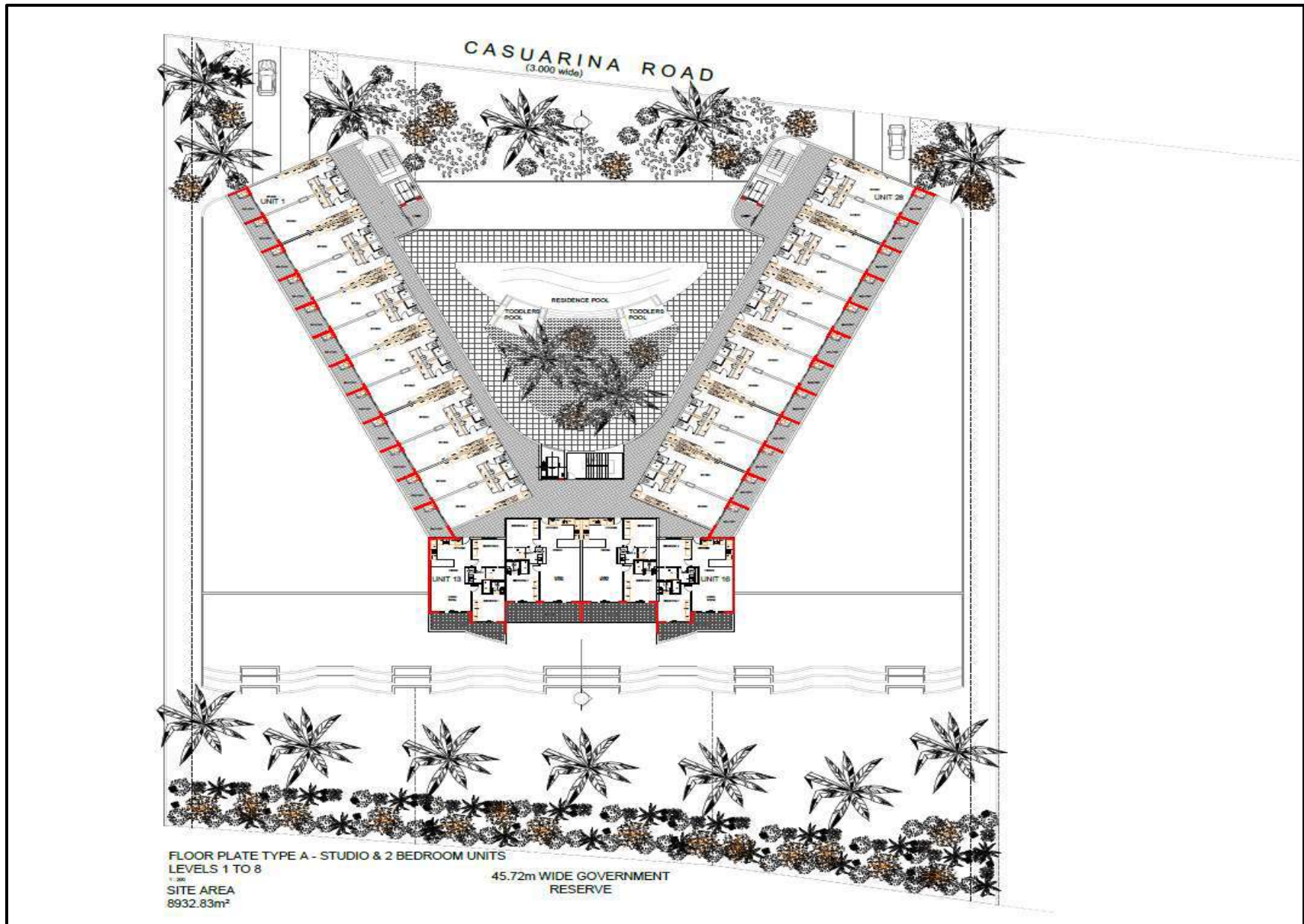


Figure 12: Alternative Layout Plan for Level 1 to 8

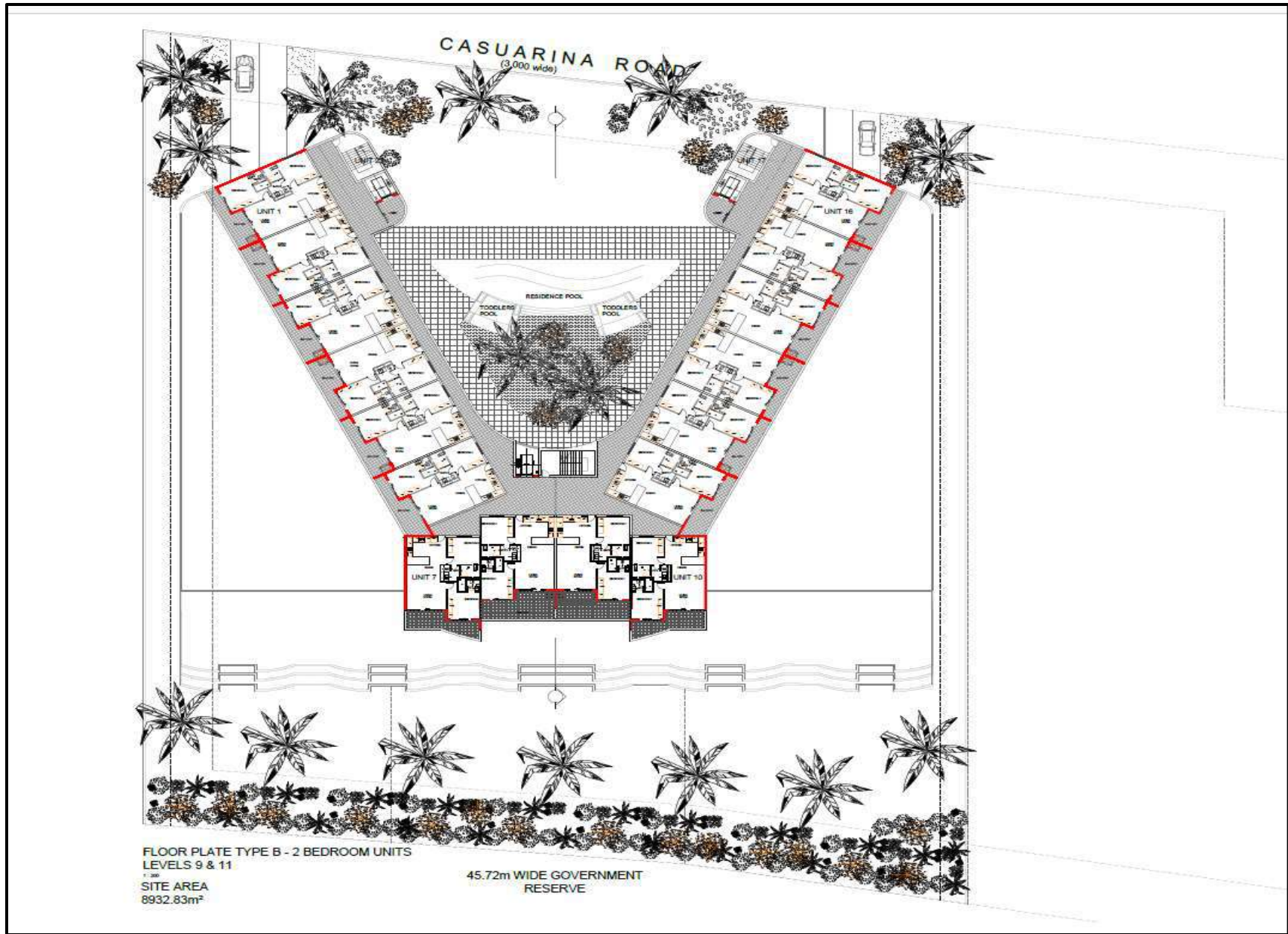


Figure 13: Alternative Layout Plan Level 9 to 11

7.4. Preferred Technology Alternative

The options for positioning the new block was either on the seaward side (east) or along the western portion of the property. In order to maximise the potential of the site in addition to ensuring a softer touch between the site and the beach, the new development has been positioned to the western portion of the property and pulled as far back as possible. The general size and position of the structure is fixed as per the layouts produced, which can be reviewed in Appendix C.

Sewer Drainage Network - The current sites do not have a waterborne sewerage system. The existing individual units are served by individual septic tanks. The local Genazzano Wastewater Treatment Works (WWTW) is unlicensed and assumed to be out of capacity. Sewage disposal for the proposed development proves to be a challenge, therefore, alternative options are being investigated to provide the most cost effective and environmentally friendly solution. Alternatives include:

- Option 1 – the provision of a conservancy tank
- Option 2 – the upgrading of the existing Genazzano WWTW
- Option 3 – the provision of a sewerage package plant

The applicant/ engineer has approached eThekweni Water and Sanitation (EWS) unit for guidance on the three alternatives. EWS has confirmed that the available capacity at the Genazzano WWTW is constrained. The conservancy tank option (option 1) requires a large number of tanks to be installed underground. However, the on-site package plant is the option that is most viable and cost-effective adding future value with the options of recycling and gray water harvesting. The internal reticulation is private and will be designed by a qualified engineer.

7.5. No-Go Alternative

The No-Go Alternative is the option of not undertaking the proposed development of the residential / serviced apartments situated at 49 Casuarina Road. The property would remain as is and the area will retain the current residential feel. Tongaat does not have many developments of similar nature. The nearest is the Zimbali Estate located approximately 7km away from Casuarina Road. This means that most people have to probably drive out of the area for a getaway taking away business from small local enterprises. There would be no negative environmental implications that may have resulted from the construction phase. Based on the current needs and desirability of the area, as well as the anticipated environmental impacts to be caused by the development and operation of this facility, a no-go alternative does not seem necessary. The No-Go Alternative also takes away the potential of increasing local employment and local business opportunities. This development will stimulate positive economic benefits across the entire value chain, property values would also increase.

8. PUBLIC PARTICIPATION

The Public Participation Process (PPP) is a requirement in terms of the 2017 EIA Regulations of the National Environmental Management Act, 1998 (Act 107 of 1998) and it forms an integral part of any EIA process. This section provides information pertaining to the PPP that was conducted by 1World Consultants during this Basic Assessment Process. The purpose of this process is to gather information from the community and relevant Stakeholders that could ultimately affect the decision-making process concerning the planning, construction and operational phases of the proposed development. The community and public have been identified as I&APs and have been given the opportunity to participate in this process. Their comments, whether positive or negative, will influence the decision of the Authorities and the developer's final actions.

8.1. Objectives of the PPP

The PPP has the following objectives:

- To inform I&APs as well as all Stakeholders of the proposed development;
- To provide an opportunity for I&APs and Stakeholders to raise concerns and make suggestions;
- To promote transparency and an understanding of the project and its consequences;
- To serve as a structure for liaison and communication with I&APs and Stakeholders.

Any conclusions agreed upon must be socially, financially and technically acceptable and feasible in order to meet the requirements of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), and the vision of the proposed development.

8.2. Public Participation Process Followed

The following PPP was conducted for the proposed development:

8.2.1. Written Notifications

Interested and Affected Parties (I&APs) were identified and notified of the Basic Assessment Process. A Background Information Document (BID) was prepared and distributed via email to identified stakeholders. The BID provided information on the proposed development, the site and on the process to be followed by the EAP. A copy of the BID and the distribution list, is provided in Appendix D. To ensure maximum effort in conducting public participation, a copy of the BID was hand delivered to neighbors on 08 September 2020. Due to the COVID-19 pandemic, direct interaction with neighbors were prohibited. However, hard copies of the BIDs were physically deposited into the post boxes of neighboring properties. Figure 14 below indicates the neighbors visited within a 100m radius during the Public Participation stage. The neighboring properties visited as indicated on the map below have a copy of the BID in their possession.



Figure 14: Neighboring Properties Consulted During Public Participation Process (Google Earth Imagery, 2019)

8.2.2. Newspaper Advertisement

A newspaper advertisement was published to inform the public of the BA Process. The advertisement was published in the predominant language of the project area, English, in the Rising Sun North Coast Newspaper, on 09 September 2020. A copy of the advertisement is provided in Appendix D.

8.2.3. Site Notice Boards

Site notice boards were established on the site and in close proximity to the development site on 08 September 2020. As per Chapter 6, Regulation 41(4)(a) of 2017, the size of the notice boards was approximately 60cm by 42cm (size A2). The notice boards have been provided in English with illustrations of the property. A copy of the site notice board and pictures are provided in Appendix D of this BAR. The purpose of the notice board is to inform the community members of the proposed BA Application and the proposed development.

Details of the EAP were also provided to facilitate public participation.

8.2.4. Public Meeting

No public meetings were requested nor required following distribution of the BID, publication of the advertisement and establishment of the site notice boards up to date of distribution of this draft BAR.

8.3. Issues Raised by the I&APs

Copies of the draft BAR was circulated to the following I&APs for review and comment:

- KZN Department of Transport
- Ezemvelo KZN Wildlife
- Department of Water and Sanitation
- KwaZulu-Natal AMAFA and Research Institute
- KZN Corporate Governance and Traditional Affairs
- Ward Councilor, Geoffrey Douglas Ayrton Puallan, Ward 58
- Commission on Restitution of Land Rights
- eThekweni Municipality: Various Departments including Environmental Planning & Climate Protection Department
- KZN Department of Economic Development, Tourism and Environmental Affairs
- EDTEA: Coastal and Biodiversity Management Unit
- Eskom Holdings SOC Limited
- All private I&AP's

All registered I&APs were notified on the availability of the draft BAR. All I&APs were reminded that in terms of the EIA Regulations (2017), GNR 326 43(2), all State Departments that administer a law relating to a matter affecting the environment, specific to the Application, must submit comments within 30 days to the Environmental Assessment Practitioner (1World Consultants (Pty) Ltd). Should no comment be received within the 30-day commenting period, it is to be assumed that the relevant State Department has no comment to provide.

Comments received on the BID and the draft BAR are summarised below. The full report is provided as the Comments and Responses Report in Appendix D.

Issues / Comments Raised Following Review of the BID:

1. Commission of restitution on Land Rights
2. KwaZulu-Natal Amafa and Research Institute

Issues / Comments Raised Following Review of the Draft BAR:

No comment received on the draft BAR.

9. ENVIRONMENTAL ATTRIBUTES

9.1. Geographic Location

The eThekweni Municipality is located on the east coast of South Africa in the Province of KwaZulu-Natal. KZN is bordered by three district municipalities, namely, iLembe in the north, Ugu in the south and uMgungundlovu in the west. The eThekweni Municipal Area (EMA) spans an area of approximately 2297km², extending from Tongaat in the North to Umkomaas in the South and from the coastline in the East to Cato Ridge in the West and is characterized by coastal plains and steep and dissected topography (eThekweni Municipality SDF, 2016-2017).

The eThekweni Municipality (EM) is situated at the centre of the Maputaland-Pondoland-Albany Region, an area described as a “Biodiversity Hotspot”, one of only 34 in the world. Over 50% of the world’s plant species and 42% of all terrestrial vertebrate species are endemic to the 34 global biodiversity hotspots, despite these areas covering only 2.3% of Earth’s land surface. The Maputaland-Pondoland-Albany biodiversity hotspot region is home to more than 7000 species of vascular plants, 25% of which are restricted (endemic) to this area (Conservation International, 2013).

The proposed development is situated in Tongaat, on Casuarina Road that runs parallel to the M4 motorway in the KwaZulu-Natal province, South Africa. The land use surrounding the project area consists predominantly of planted agriculture (specifically sugarcane plantations), urban developments and some natural coastal forest areas. The sites in question have not been included in the Durban Metropolitan Open Space System (D’MOSS) due to the partial transformation of the properties as a result of residential development activities. The narrow portion of intact dune vegetation between the sites and the beach is part of D’MOSS. The Indian Ocean is found to the east of the project area.

Figure 15 below is an Environmental Sensitivity map produced for Casuarina Road and surrounding areas.



Figure 15: Environmental Sensitivity Map (SANBI BGIS Tool, 2014)

9.2. General Land Use

The land uses surrounding the project area consist predominantly of planted agriculture (specifically sugarcane plantations), urban development and some natural coastal forest areas. The Indian Ocean is found to the east of the project area. The project area itself is a residential development where the historic natural habitat has previously been modified.

Additionally, the following infrastructure exists within the project area and surrounds:

- Secondary roads (M4) directly adjacent to Casuarina Road;
- Extensive sugarcane plantations;
- Telephone lines and Eskom electrical lines;
- Stormwater infrastructure; and
- Urban (high density) and semi-urban development.

9.3. Heritage

A copy of the BAR has been submitted to AMAFA/ Heritage KwaZulu Natali, (hereafter referred to as 'AMAFA'), the provincial heritage conservation agency for KwaZulu-Natal. AMAFA was established as a statutory body in terms of the KZN Heritage Act of 1997, replaced by the KZN Heritage Act of 2008. The proposed development is approximately 4781.07m² in size therefore the development triggers Section 38 (1) (c) (i) of the National Heritage Resources Act (NHRA), 1999 (Act No 25 of 1999). The relevant section of the NHRA states that:

“(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

(c) any development or other activity which will change the character of a site —

(i) exceeding 5 000 m² (0.5 ha) in extent;

must notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

A Heritage Impact Assessment was conducted for the project. The findings are further discussed in Section 10 below.

9.4. Tourism Profile

Tourism remains one of the most significant components of the metropolitan economy. Recreation opportunity is considered to be the main tourist resource within the eThekweni Municipal Area and is based largely on the natural qualities of the coast. The coastline and beaches are significant tourist anchors for accommodation, commercial and entertainment development.

According to SA Tourism, research conducted in 2005, the value of foreign tourist to KZN was R6,9 billion with the eThekweni Municipality attracting 1,1 million foreign tourists. Accordingly, the KwaZulu-Natal Tourism Authority analysis of the value of KZN's regional tourism markets concluded that eThekweni captures around 33% of foreign consumer spending in the province (eThekweni Municipality SDF, 2016-2017). It is therefore understood that the proposed development at 49 Casuarina Road will also bring the following secondary and tertiary value to the area:

- Increase tourism opportunities in the Tongaat Beach Area;
- Potential skills development and employment in the eco-tourism industry; and
- Potential increase in property values

10. SUMMARY OF SPECIALIST STUDY FINDINGS AND IMPACTS

10.1. Biodiversity Baseline and Impact Report

The Biodiversity Company (TBC) was appointed to conduct a terrestrial ecology baseline and impact (risk) assessment for the proposed development. A wet season terrestrial biodiversity survey was conducted on 7 February 2019 by a terrestrial ecologist. The survey focused on:

- the development footprint area;
- the identification and description of any sensitive receptors; and
- the manner in which these sensitive receptors may be affected by the activity.

Field surveys were conducted to confirm the presence of species identified in the desktop assessment. The specialist disciplines completed for this study included:

- Botanical Assessment;
- Fauna Assessment (Mammals and Avifauna); and
- Herpetology (Reptiles and Amphibians).

Table 10 below is a summary of findings as per the Biodiversity Study.

Table 10: Summary of Findings During the Desktop Study and Field Survey

| | Desktop Study | Field Survey |
|-----------------------------|--|---|
| Botanical Assessment | | |
| Vegetation Types | The majority of the project area is situated within the KwaZulu-Natal Coastal Belt Grassland vegetation type, while the eastern edge falls in the Northern Coastal Forest vegetation type. At present the KwaZulu-Natal Coastal Belt is affected by an intricate mosaic of very extensive sugarcane fields, timber plantations and coastal holiday resorts, with interspersed secondary <i>Aristida</i> grasslands, thickets and patches of coastal thornveld. | <p>The area within the project area has been extensively transformed.</p> <p>Many indigenous plant species were recorded, most of them have been introduced into the area for aesthetic reasons. The coconut as well as the screw pines trees could have potentially been transported via sea in the past and germinated within the area due to the close proximity of the seashore but are not considered indigenous.</p> <p>A total of 34 tree, shrub and herbaceous plant species were recorded in the project area during the field assessment.</p> |
| Important Plant Taxa | Based on the Plants of Southern Africa (BODATSA-POSA, 2016) database, 747 plant species are expected to occur in the project areas vicinity. Of the 747-plant species, five (5) species are listed as being Species of Conservation Concern (SCC). | Protected Tree Species: Eight (8) individual trees of White Milkwood (<i>Sideroxylon inerme</i>) were observed within the property. The option is to either apply for a relocation or destruction permit OR plan the development in order to avoid the trees currently present. Alien and Invasive Plants: Eleven (11) |

| | | |
|--|---|--|
| | | <p>Category 1b invasive plant species were recorded within the project area and must therefore be removed by implementing an alien invasive plant management programme.</p> <p><i>N.B. Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.</i></p> |
| Fauna Assessment (Mammals and Avifauna) | | |
| Avifauna | <p>Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 361 bird species are expected to occur in the vicinity of the Project area. Of the expected bird species, thirty (30) species are listed as Species of Conservation Concern (SCC).</p> | <p>Ten (10) bird species were recorded in the project area during the February 2019 survey based on either direct observations, vocalisations, or the presence of visual tracks & signs. However, since the project area is residential, a low number of birds were expected. No avifaunal SCC were recorded during the survey.</p> |
| Mammals | <p>The IUCN Red List Spatial Data (IUCN, 2018) lists 84 mammal species that could be expected to occur within the project area.</p> <p>Of these species, 5 are medium to large conservation dependant species which are not expected to occur in the project area.</p> <p>14 small to medium sized mammal species are expected to occur in the vicinity of the Project area and are listed as Conservation Concern.</p> | <p>Overall, mammal diversity in the project area was low, with no mammals observed during the survey. This is understandable due to the nature of the project area that consists of a residential development with manicured gardens.</p> |
| Herpetology (Reptiles and Amphibians) | | |
| Reptiles | <p>Based on the IUCN Red List Spatial Data (IUCN, 2017) and the Reptile Map database provided by the Animal Demography Unit (ADU, 2017) 48 reptile species are expected to occur in the Project area. Six reptile species that are of conservation concern are expected to be within the project area.</p> | <p>Herpetofauna diversity was also low. No reptiles or amphibians were observed in the project area.</p> |
| Amphibians | <p>Based on the IUCN Red List Spatial Data (IUCN, 2017) and the Amphibian Map database provided by the Animal Demography Unit (ADU, 2018) 40 amphibian species are</p> | |

| | | |
|--|--|--|
| | <p>expected to occur in the project area. Four (4) amphibian species of conservation concern could be present in the project area.</p> | |
|--|--|--|

The Biodiversity Company (TBC) produced a GIS sensitivity map. The entire project area, 49 Casuarina Road, is regarded as having a low sensitivity due to the nature of area being entirely transformed. Refer to Figure 16 below of 49 Casuarina Road.



Figure 16: Habitat Sensitivity Map of the Project Area (The Biodiversity Company, 2019)

It must be mentioned that the low sensitivity only applied to the project area, whilst areas such as the coastal forest and the seashore vegetation as in Figure 17 are regarded as having a high sensitivity and should not be impacted on in any way during construction.



Figure 17: Vegetation Type Based Map (The Biodiversity Company, 2019)

The project area has been altered historically and continues to do so at present. This is predominantly due to the residential developments and associated human activity and secondary road. Based on the findings of the Biodiversity Study, the specialist is of the opinion that the proposed development can be authorised.

The complete Biodiversity Impact and Baseline Report, inclusive of full lists of species, can be reviewed under Appendix E.

10.2. Heritage Impact Assessment

A site inspection was undertaken by the specialist on 07/02/2019.

There are several structures on the proposed development area. The architect has advised that the main residence was built in 1994 and is currently used by the applicant. The following three (3) structures were identified to possibly be older than 60 years:

- One is a house or residence;
- The second structure is a carport which is currently used for the storage of wood and garden refuse; and
- The third structure may have been a guard house or a pump house.

These structures are not in a good condition with visible cracks in the house and trees growing into the structures.

The site inspection extended to the beach dunes where there was evidence of shell midden which is an indication of the presence of archeological remains of early inhabitants of the area. The South African Fossil Sensitivity Map indicates that the project area is situated in an area of very high fossil sensitivity as per the Figure 18 below.

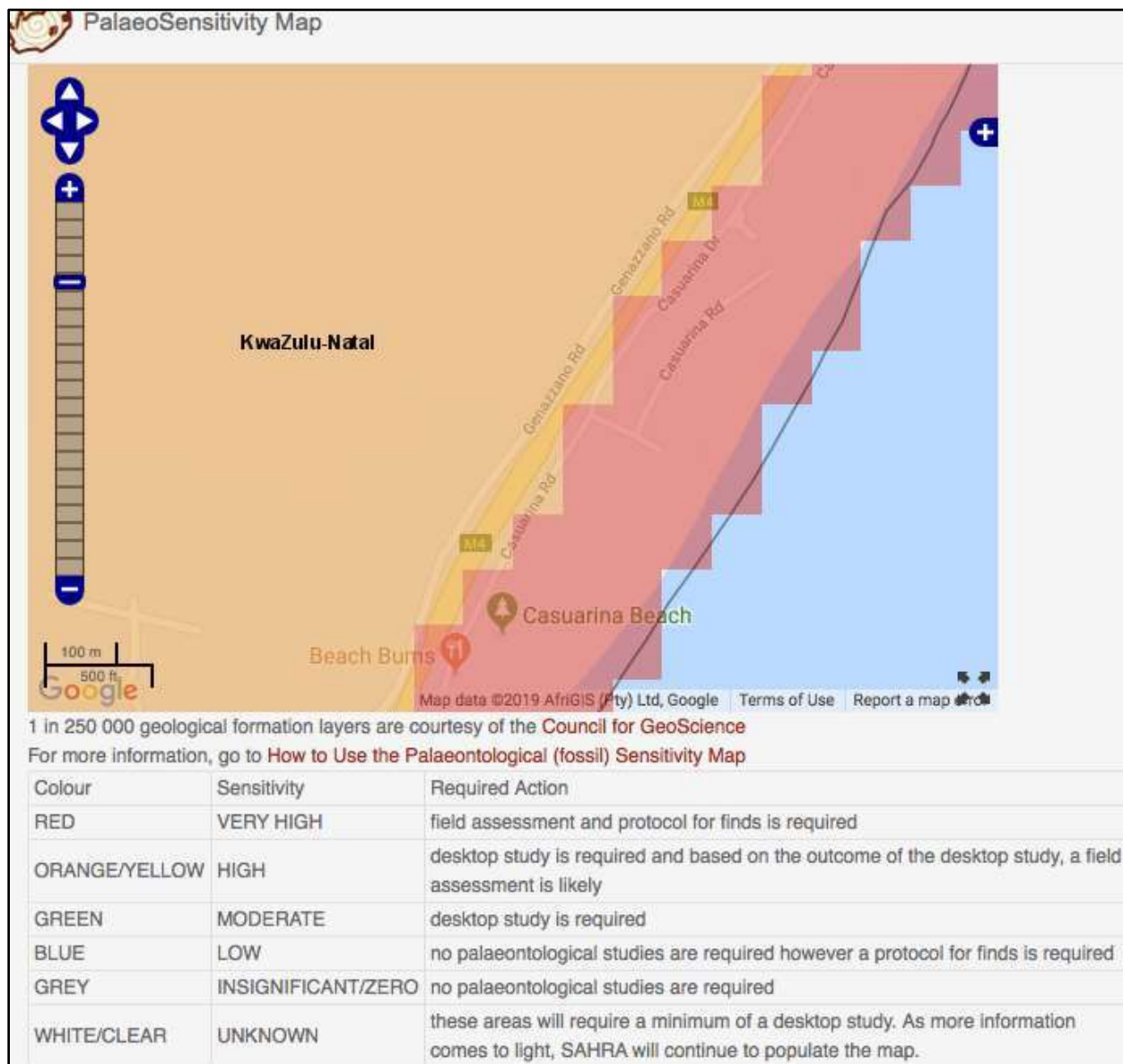


Figure 18: Fossil Sensitivity Map (Phase 1 Heritage Impact Assessment, 2019)

After perusing photographs of the structures that could be older than 60 years, the specialist corresponded with The Built Environment section of AMAFA. Built Environment stated that the windows of the house put the house between the late 1940's and pre 1960's. They also stated that there were features that do not tie in with that period such as the air vents which were required up to 1962. The Built Environment section advised that the applicant make an application to AMAFA for the demolition of the structures unless it is proven that the structures are not older than 60 years. The specialist further recommends that no

development activities take place within 30m of the beach due to the presence of shell middens that could be damaged by such activity. If development does take place in this area, then prior to any construction activity, the removal of vegetation from the dunes must be monitored by an archaeologist to prevent any damage to shell middens or any other archaeological remains that may be found in the dunes.

It is the opinion of the specialist that the proposed development can only proceed once the age of the three (3) structures identified be determined. If the structures are over 60 years, then demolition permits must be applied for via AMAFA Built Environment. If the age of the structures cannot be proven, then the applicant must conduct an Architectural study to prove such.

The detailed Heritage Impact Assessment can be reviewed under Appendix E.

10.3. Minimisation of Shadows on Beaches Policy for eThekweni: Shadow Impacts on Beaches and Residential Amenities

The beachfronts of eThekweni are collectively one of the municipality's key tourism assets, and any future development along the beachfronts needs to ensure that this asset is not undermined. The recreational use of any beach is highly dependent on direct sunlight, and therefore the positioning of developments close to the beach can compromise beach amenity through overshadowing. The eThekweni Municipality recommended that a city-wide policy be implemented, the "**Minimisation of Shadows on Beaches Policy for eThekweni: Shadow Impacts on Beach and Residential Amenities**" has been developed and aims to manage the shadow impacts of all future coastal developments in the eThekweni municipal area.

Current building heights along the city's beachfronts range from 2 to 40 storey's. The shadow impacts of these buildings are associated with their height, orientation and position on site including whether they cast a shadow of a swimming or non-swimming beach. The Shadow Impact Assessment focuses on winter conditions as the worst-case scenario because this is the season when direct sunlight is most wanted, but also when beach overshadowing is most extreme. To protect the beach from overshadowing in the afternoons, two key strategies were adopted:

1. Limit Shading Period
2. Orientation of buildings

The Policy Requirement for the **Limiting of Shading periods** are that "*New Coastal Development shall not result in shadows before 3pm in midwinter (all beaches) and before 4 pm in midwinter (swimming beaches)*".

The Policy Requirement for the **Orientation of Buildings** are that "*New development to meet specific orientation requirements to limit impact of shadows before 3pm (all beaches) and 4pm (swimming beaches) in midwinter*".

Based on the Shadow Simulations below, Figures 19 to 34, the shadow projections indicate that the actual impacted area will be relatively small, and it must be noted that the projected shadows over the beach area is that of a non-swimming beach. Overall, the impacts are not considered to be significant.

The Shadow Simulations can be reviewed under Appendix E.



Figure 19: Shadow Impact Analysis, 22 March 2019 @ 12h00



Figure 20: Shadow Impact Analysis, 22 March 2019 @ 13h00

Figure 19 is the shadow analysis in March at 12h00, the building at this hour of the day does not limit user's enjoyment of a sunny beach by causing any casting of shadows. The building slightly encroaches the public parking area on the southern side of the property. Figure 20 is the shadow analysis in March at 13h00, the shadow cast shifts slightly towards the east of the proposed building. However, shadow casts are limited to the property boundary, thus not limiting user's enjoyment of a sunny beach.



Figure 21: Shadow Impact Analysis, 22 March 2019 @ 14h00



Figure 22: Shadow Impact Analysis, 22 March 2019 @ 15h30

Figure 21 is the shadow analysis in March at 14h00, the shadow cast of the building is towards the eastern side of the property (seaward facing). However, the shadow impact does not encroach the shoreline but merely expands outside of the property boundary. Figure 22 is the shadow analysis in March at 15h30, the shadow cast of the building expands on the eastern side of the property encroaching the beach area. However, the affected beach area is that of a non-swimming beach.



Figure 23: Shadow Impact Analysis, 22 June 2019 @ 12h00

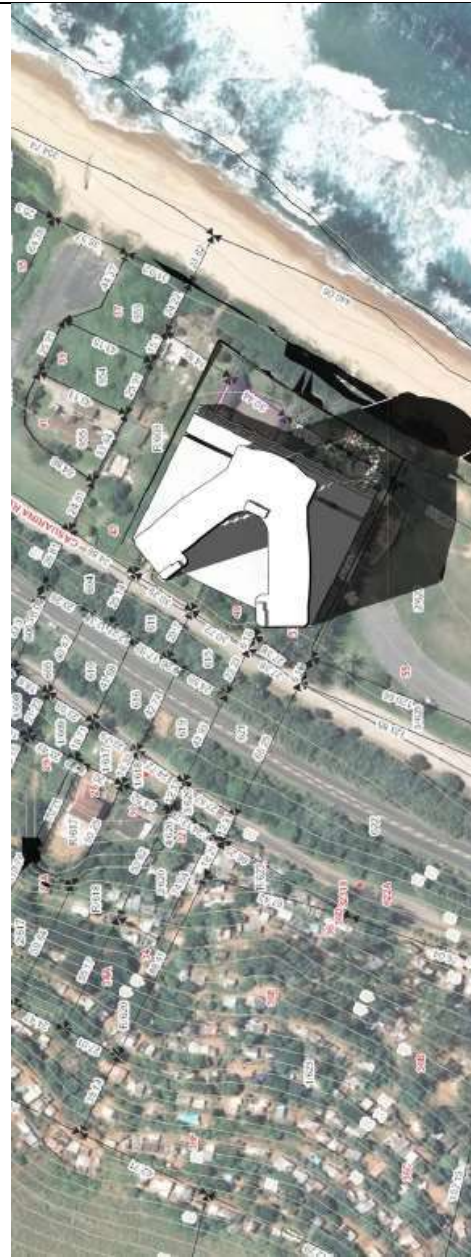


Figure 24: Shadow Impact Analysis, 22 June 2019 @ 13h00

Figure 23 is the shadow analysis in June at 12h00, the shadow cast encroaches the public parking lot located to the South of the property. The beach area has no shadow impact at this hour. Figure 24 is the shadow analysis in June at 13h00, the shadow cast of the building expands in a south easterly direct. A small portion of the public parking area and beach area is affected; however, the shadow does not limit the user's enjoyment.

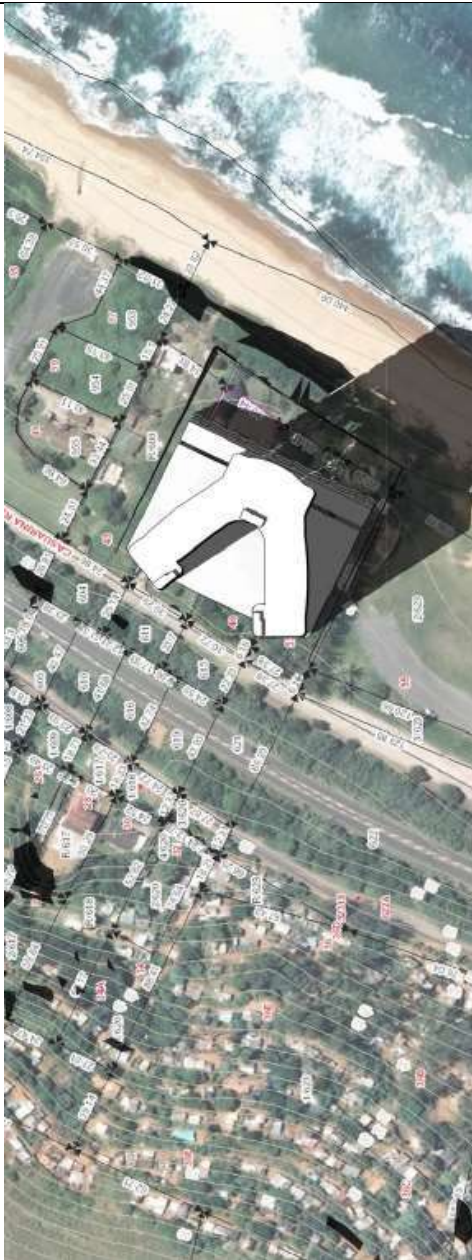


Figure 25: Shadow Impact Analysis, 22 June 2019 @ 14h00



Figure 26: Shadow Impact Analysis, 22 June 2019 @ 15h30

Figure 25 is the shadow analysis in June at 14h00, the shadow cast affects the seaward side of the property. However, it is important to note the shadow simulations are cast over a non-swimming beach. Figure 26 is the shadow analysis in June at 15h30, the shadow cast of the building expands in along the non-swimming beach.



Figure 27: Shadow Impact Analysis, 22 September 2019 @ 12h00



Figure 28: Shadow Impact Analysis, 22 September 2019 @ 13h00

Figure 27 is the shadow analysis in September at 12h00, the building at this hour of the day does not limit user's enjoyment of a sunny beach by causing any shadow impact. Figure 28 is the shadow analysis in September at 13h00, the shadow cast shifts slightly towards the east of the proposed building. However, shadow casts are limited to the property boundary, thus not limiting user's enjoyment of a sunny beach.



Figure 29: Shadow Impact Analysis, 22 September 2019 @ 14h00

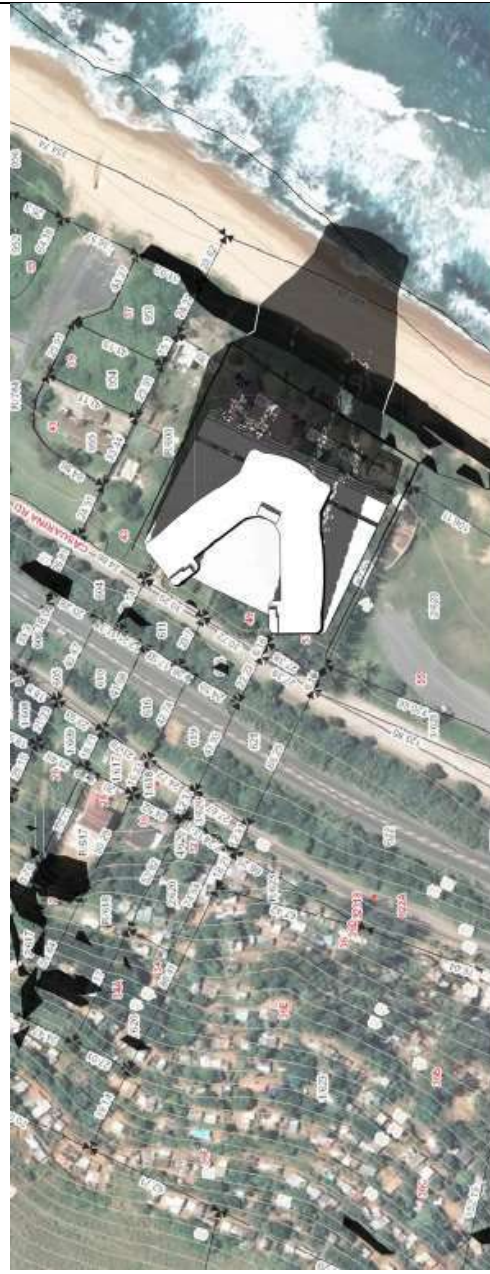
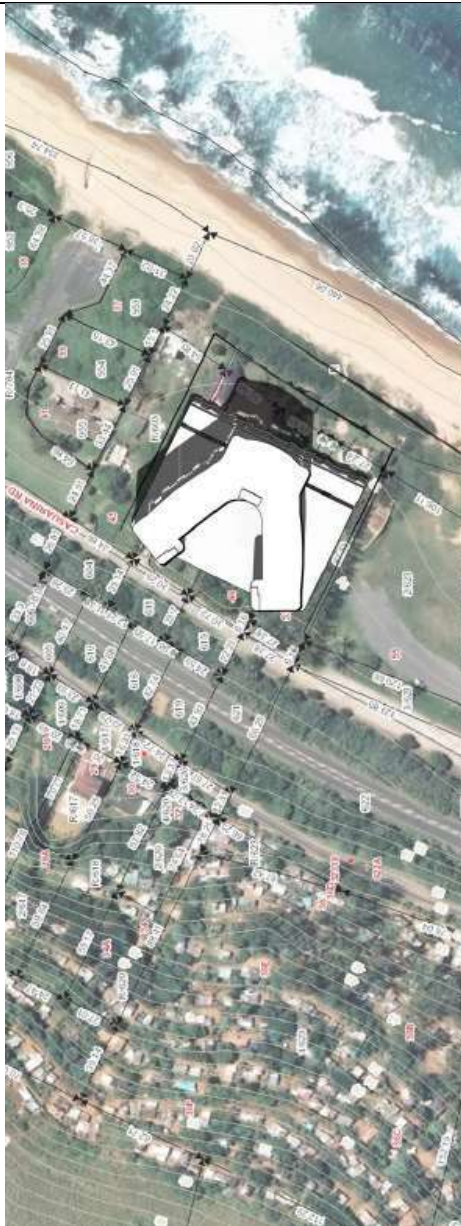


Figure 30: Shadow Impact Analysis, 22 September @ 15h30

Figure 29 is the shadow analysis in September at 14h00, the shadow cast of the building is towards the eastern side of the property (seaward facing). However, the shadow impact does not encroach the shoreline but merely expands outside of the property boundary. Figure 30 is the shadow analysis in September at 15h30, the shadow cast of the building expands on the eastern side of the property encroaching the beach area. However, the affected beach area is that of a non-swimming beach.

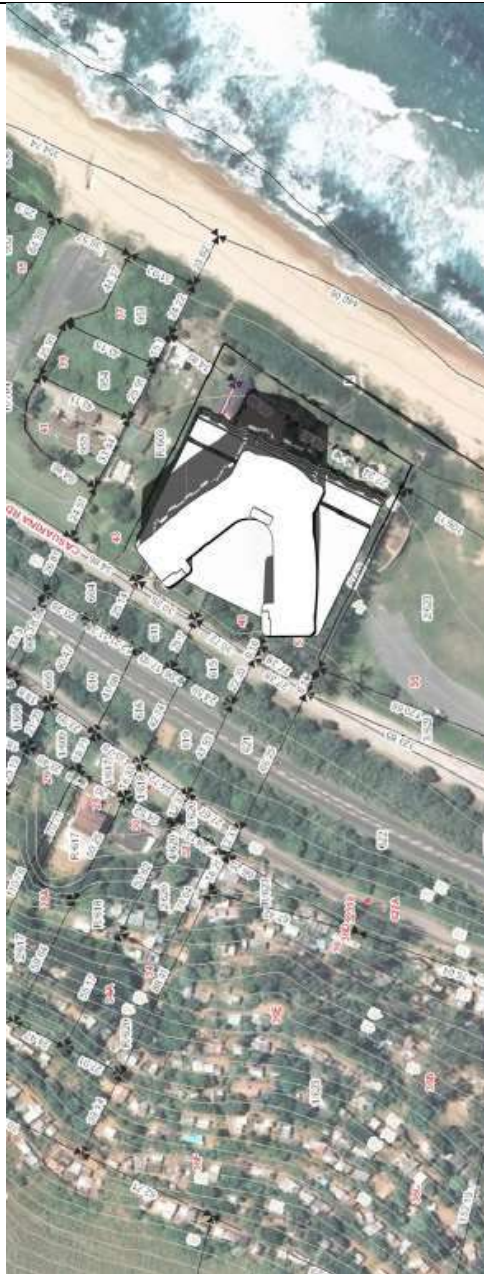


**Figure 31: Shadow Impact Analysis, 22
December 2019 @ 12h00**

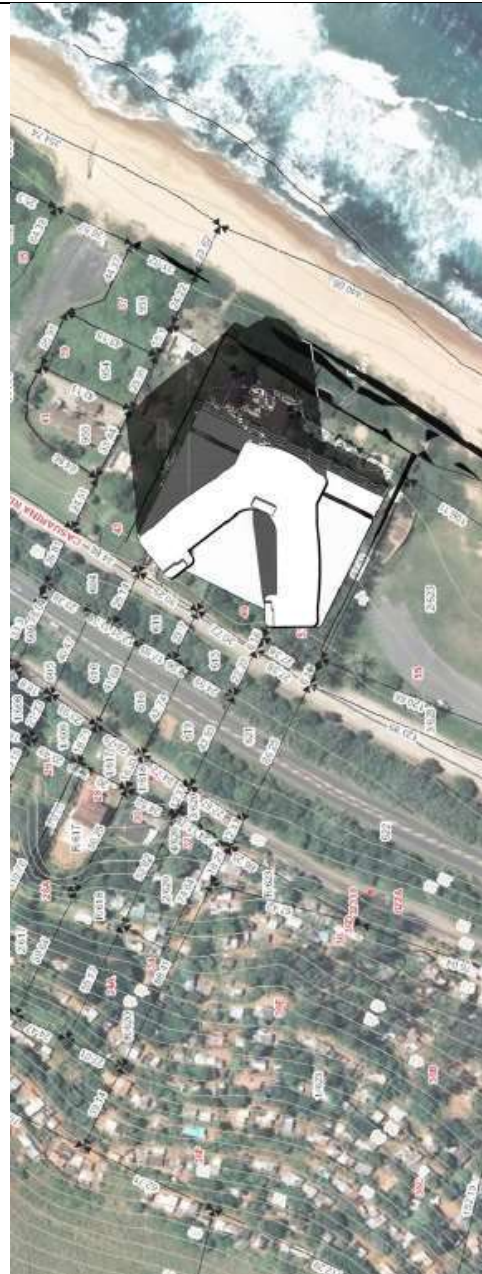


**Figure 32: Shadow Impact Analysis, 22
December 2019 @ 13h00**

Figure 31 is the shadow analysis in December at 12h00, the building at this hour of the day does not limit user's enjoyment of a sunny beach by causing any shadow impact. The shadow impact is small and within the property. Figure 32 is the shadow analysis in December at 13h00, the shadow cast has no effect on the beach. The shadow impact is at an absolute minimal.



**Figure 33: Shadow Impact Analysis, 22
December 2019 @ 14h00**



**Figure 34: Shadow Impact Analysis, 22
December 2019 @ 15h30**

Figure 33 is the shadow analysis in December at 14h00, the building at this hour of the day does not limit user's enjoyment of a sunny beach by causing any shadow impact. Figure 34 is the shadow analysis in December at 15h30, the shadow cast shifts in a northward direction. No shadow impact is caused on the beach.

The Shadow study shows the building casting a shadow on the beach. There are no lifeguards or any sign of lifeguard stations on this beach. Therefore, it can be assumed that this section seldom has a huge crowd and therefore not ideal for swimming.

10.4. Traffic Impact Assessment

The Traffic Impact Assessment Report (Report No. 265309) was lodged with the Department of Transport in November 2019. The said department has reviewed the application and has no object thereof. All costs that arise from the requirements of the said department must be borne entirely by the developer. The letter received can be reviewed under Appendix E.

The Traffic Impact Assessment contained the following information:

This traffic assessment prepared forms the basis of the re-zoning application with a maximum of 206 units proposed. It is proposed that the development takes access off Casuarina Drive, via the M4 highway as per Figure 35 below.



Figure 35: Site Access Arrangement (Traffic Impact Assessment, 2020)

The following roads are of significance as per Figure 36 below:

- M4 Highway – Class 2 road with sections of 3 lanes (includes both directions)
- Watson Highway
- Casuarina Drive – Class 5 road with one lane per direction. The road is less than 5m wide.

- Park Avenue
- South Beach Road



Figure 36: Study Area

A trip rate of 1.3 trips/ dwelling unit has been used. The proposed development will generate approximately 268 trips during the AM and PM peak hours. The traffic analysis and results indicate that there will be minimal impact on the surrounding road network, however minor upgrades are required. It is proposed that the intersection of M4 Highway with Watson Highway and Casuarina Drive be restriped to accommodate 5m short lanes along the west and north approaches. Casuarina Drive is to be widened to at least 5m wide.

The complete Traffic Impact Assessment can be reviewed under Appendix E.

10.5. Bulk Services Report

Arup (Pty) Ltd compiled the services report which highlights the infrastructure that would be put in place to service the site. The five even that make up 49 Casuarina Road are to be become a unified with single water, sewer and stormwater connection points. The following applies:

Potable Water Reticulation - Local Municipality department of water and sanitation is to comment on whether the proposed development can be served by the current infrastructure and whether the development is aligned to any future master planning of the area. The connection point for the proposed development is obtained from an existing 75mmØ water main located in Casuarina Road. A 75mmØ connection from the existing water main will serve the site. The proposed connection point will need to be identified on site. The local municipality will confirm if there is sufficient capacity to service this development.

The internal reticulation is private and will be designed by a qualified engineer according to the final architectural designs. As a minimum a water meter will have to be installed at the connection point. The water mains will be constructed according to the local municipality design standards and the necessary approvals will be sort. A fire risk assessment will also be undertaken by the engineer and the necessary approvals will be requested as well.

Sewer Drainage Network - The current sites do not have a waterborne sewerage system. The existing individual units are served by individual septic tanks. The local Genazzano Wastewater Treatment Works (WWTW) is unlicensed and assumed to be out of capacity. Sewage disposal for the proposed development proves to be a challenge, therefore, alternative options are being investigated to provide the most cost effective and environmentally friendly solution. Alternatives include:

- Option 1 – the provision of a conservancy tank
- Option 2 – the upgrading of the existing Genazzano WWTW
- Option 3 – the provision of a sewerage package plant

The applicant/ engineer has approached eThekweni Water and Sanitation (EWS) unit for guidance on the three alternatives. EWS has confirmed that the available capacity at the Genazzano WWTW is constrained. The conservancy tank option (option 1) requires several tanks to be installed underground. However, the on-site package plant is the option that is most viable and cost-effective adding future value with the options of recycling and gray water harvesting. The internal reticulation is private and will be designed by a qualified engineer.

Stormwater Drainage Network - There is an existing stormwater line in Casuarina Road. The exact diameter of the underground stormwater system is to be determined on site by a survey. The Structure will have a flat roof that will be drained by gutters and rainwater outlets, full-bore outlets. From full-bore outlets, the stormwater will be routed through rainwater downpipes either cast in columns or externally mounted to the building face. At ground level stormwater will be released into a piped network system which will reticulate to the municipal tie-in point via an onsite attenuation structure. All external landscaped areas will be drained using a combination of a piped network as well as maintain natural surface runoff in areas that have not been altered. Surface runoff will be directed into inlets located within the hard-landscaped areas and parking lots. Stormwater will be then reticulated via a piped network system into the attenuation tank prior to discharge into the municipal manhole located outside the property on Casuarina Road. A survey will be carried out to identify the exact position and invert level.

Electrical - Electricity usage across the development will primarily be from the following occupancy classifications:

- Parking and common/circulation areas
- Residential apartment units

Based on the above the estimated maximum demand of the development would be in the order of 1377 kVA.

The complete Bulk Services Report and stormwater layouts can be reviewed under Appendix E.

11. IMPACT ASSESSMENT

Impact assessment takes into account the nature, scale and duration of positive and negative effects on the environment. All activities that are related to the proposed construction and operation of the proposed development that could have some impact on the environment were identified. These impacts can be environmental, socio-economic or cultural in nature. Impacts are often not only confined within the direct scope of the proposed activity and can accumulate as a network of indirect impacts on the surrounding area. Different impacts are associated with the construction and operational phases of the proposed activity.

The following potential impacts were identified for the Design and pre-construction phase:

- Shadow impact
- Climate change impact
- Visual impact
- Health and safety impact
- Bulk services

The following potential impacts were identified for the demolition phase:

- Dust emissions
- Noise and vibration impacts
- Visual quality
- Waste management
- Disturbance to locals
- Safety
- Heritage impacts

The following potential impacts were identified for the construction phase:

- Traffic pressures and access
- Soil erosion
- Stormwater management
- Ground water pollution
- Surface water pollution
- Risk of alien invasive encroachment
- Flora
- Fauna
- Waste management
- Noise disturbance
- Air quality
- Visual quality
- Public health and safety
- Heritage impacts
- Socio-economic impacts

The following potential impacts were identified for the operational phase:

- Stormwater Management

- Surface runoff
- Climate change impacts
- Noise and disturbance
- Visual quality
- Socio-economic
- Bulk services

11.1. Methodology

EIA Regulation and GNR 326 (2017) prescribes the requirements and aims of environmental impact assessments. In terms of the regulations, the following objectives are specified:

- Determine the nature, significance, consequence, extent, duration and probability of impacts; and
- The degree to which these impacts:
 - Can be reversed,
 - May cause irreplaceable loss of resources, and
 - Can be avoided, managed or mitigated

The impacts of any development including the construction and operational phases are identified, using the following definitions:

| Term | Description |
|---------------------------|---|
| Significant Impact | an impact that may have a notable effect on one or more of the aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence. |
| Cumulative impact | In relation to an activity, means the past, present and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities. |

The potential impacts are listed and assessed for significance. Significance is assessed by scoring each impact based on four variables viz. probability, severity, duration and spatial impact. The four variables, with their score criteria are detailed below:

Table 11: Impact Assessment Variables and Rating

| Score | Frequency/ Probability (FR) (Frequency or likelihood of activities impacting on the environment) | Severity (SV) (Degree of change to the baseline environment in terms of reversibility of impact; Sensitivity of receptor, duration of impact and threat to environment and health standards) | Duration (DR) (Length of time over which activities will cause change to the environment) | Spatial Scope (SS) (Geographic coverage) |
|-------|---|---|--|---|
| 1 | Almost Never / impossible | Insignificant / not harmful / totally reversible | One day to a month | Activity Specific |
| 2 | Very seldom / highly unlikely | Small / potentially harmful / reversible within 05 years | One month to a year | Site specific |
| 3 | Infrequent / seldom | Significant / slightly harmful / needs specific mitigation to reverse in a time span of between 05 and 15 years | One year to ten years | Area |
| 4 | Often / regular | Great / harmful / irreversible | Life of project | Regional |
| 5 | Daily / Highly regular | Disastrous / extremely harmful / totally irreversible and damaging | Post closure | National |

The impacts are also scored taking any mitigation into consideration. The impacts are scored and scaled for significance as follows:

| Impact Rating | Score Range | Description |
|-------------------|-------------|--|
| Negligible | 3 or less | The impact is unimportant / indiscernible and hence insignificant – little or no mitigation adequately addresses the impact. |
| Low | 4 to 9 | The impact is of little importance since it is easily and adequately mitigated. |
| Medium | 10 to 15 | The impact is considerable and requires adequate mitigation to reduce potential damage to the environment. |
| High | 16 or more | the impact is adverse and may never be adequately mitigated. The impact has a high probability of causing cumulative effects of other less significant impacts. It may be considered to be a fatal flaw of the project and requires intense consideration. |

11.2. Impacts Identified

The impacts of the pre-construction, demolition, construction and operational phases for the proposed development situated at 49 Casuarina Road, Tongaat Beach are summarized in the tables below.

Table 11.2.1: Shadow Impact

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|-----------------------------|--|-------------|--|-----------|----------|----------|---------------|--------------|---------------|
| Design and pre-construction | Shadow Impact - | Direct | Without | 5 | 3 | 4 | 2 | 14 | Medium |
| | The Shadow Impact Assessment has been conducted for 49 Casuarina Road and the findings of the Shadow Simulations are provided in section 10 of this BAR. | | With | 5 | 3 | 4 | 2 | 14 | Medium |
| | | | <p>Mitigation measures:</p> <ul style="list-style-type: none"> The shadow impacts are significant but are not an impact arising from the triggering of excavation of soils within 100m of the sea. Based on the shadow simulations provided in section 10 of this report, the actual impacted area will be relatively small and is on a non-swimming beach. Overall, the impacts of these properties to direct sunlight are not considered to be significantly comprised. <p>The shadow impact will be permanent once the building is established and will last through the life cycle of the development. However, the severity is considered to be only slightly harmful as showing is peak in winter and only during particular time frames.</p> | | | | | | |

Table 11.2.2: Visual Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|-----------------------------|--|-------------|---|-----------|----------|----------|---------------|--------------|---------------|
| Design and pre-construction | Visual Quality - The general aesthetics and feel of the design must be in keeping with the surrounding area. | Direct | Without | 5 | 3 | 3 | 2 | 13 | Medium |
| | | | With | 3 | 2 | 2 | 1 | 8 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> The height of the building must not obstruct other properties. The design of the building must be in keeping to a South African style (including the use of paint work). <p>With correct implementation of these mitigation measure, the frequency can be reduced from a daily occurrence to a seldom occurrence. While severity will be reduced from slightly harmful to potentially harmful.</p> | | | | | | |

Table 11.2.3: Health and Safety Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|-----------------------------|---|-------------|--|-----------|----------|----------|---------------|--------------|---------------|
| Design and pre-construction | Public safety and health – Occupational safety, security and health of staff and public in general. | Direct | Without | 5 | 3 | 3 | 2 | 13 | Medium |
| | | | With | 3 | 2 | 2 | 1 | 8 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> The design and planning of the development must be conducted by trained and relevant consultants. Skilled contractors must be utilised for specialized tasks. Buildings and/or steel structures must be constructed according to engineers' specifications. Fire safety measures must be included in the design of the facility. <p>These impacts, without mitigation, have the potential to damage the environment on a daily basis but with mitigation are expected to drop significantly both in frequency and severity.</p> | | | | | | |

Table 11.2.4: Bulk Services

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|-----------------------------|--|-------------|---|-----------|----------|----------|---------------|--------------|--------------|
| Design and pre-construction | Increased pressure on municipal water supply | Direct | Without | 2 | 2 | 2 | 2 | 8 | Low |
| | | | With | 2 | 1 | 1 | 1 | 5 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> Local Municipality department of water and sanitation must comment on whether the proposed development can be served by the current infrastructure and whether the development is aligned to any future master planning of the area. The water demand for the proposed development must be assessed according to the adopted design guidelines and standards. Refer to the Bulk Services Report in Appendix E. <p>These impacts are rated low as these aspects must be sort prior to construction activities.</p> | | | | | | |
| Design and pre-construction | Increased pressure on electrical supply | Direct | Without | 2 | 2 | 2 | 2 | 8 | Low |
| | | | With | 2 | 1 | 1 | 1 | 5 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> Electricity usage across the development will primarily be from the following occupancy classifications: <ul style="list-style-type: none"> Parking & common/circulation areas Residential apartment units The estimated maximum demand of the development is 1377 kVA. Refer to the Bulk Services Report in Appendix E. <p>These impacts are rated low as these aspects must be sort prior to construction activities.</p> | | | | | | |
| Design and pre-construction | Sewage discharge | Direct | Without | 2 | 2 | 2 | 2 | 8 | Low |
| | | | With | 2 | 1 | 1 | 1 | 5 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> There is no municipal sewer available for this development. An on-site package plant must be established in accordance to the requirements by the relevant authorities. | | | | | | |

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| | | | <ul style="list-style-type: none">• The on-site package plan is the most viable and cost-effective solution adding future value with the options of recycling and gray water harvesting.• Refer to the Bulk Services Report in Appendix E. <p>These impacts are rated low as these aspects must be sort prior to construction activities.</p> |
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A Demolition Permit must be obtained by the Client prior to any activities being undertaken on site.

Table 11.2.5: Dust Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|------------|---|-------------|---|-----------|----------|----------|---------------|--------------|--------------|
| Demolition | Dust emission - The release of heavy metals, cladding, timber etc. or the on-site crushing. | Direct | Without | 5 | 3 | 2 | 1 | 11 | Medium |
| | | | With | 3 | 2 | 1 | 1 | 7 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> • Soft strip all retaining walls and windows before demolition to act as a screen against dust. • Water suppression methods must be utilized such as hand-held sprays or hoses. • Avoid explosive blasting and use appropriate manual or mechanical alternatives. • Bag and remove any biological debris or damp down such material before demolition. • Re-vegetate earthworks and exposed areas/soils stockpiles to stabilize surfaces. • Use hessian where re-vegetation is not possible to cover topsoil. <p>In terms of frequency, these mitigation measures ensure that the impacts change from a possible daily occurrence to a seldom event. In terms of severity, these mitigation measures change from being slightly harmful to small/ potentially harmful.</p> | | | | | | |

Table 11.2.6: Noise Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|------------|--|-------------|--|-----------|----------|----------|---------------|--------------|--------------|
| Demolition | Noise and Vibration - The presence of personnel and machinery will present a nuisance to the area. | Direct | Without | 5 | 2 | 2 | 2 | 11 | Medium |
| | | | With | 4 | 1 | 1 | 1 | 7 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> • Personnel must be trained in etiquette regarding noise and trespassing, as well as in health issues and occupational safety. • Construction activities must be limited to normal construction industry working hours. • A registered contractor providing a project schedule must be employed. Penalties for extending the timeline must be enforced to try and minimise the period of impact. | | | | | | |

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| | | | <ul style="list-style-type: none"> In addition, construction vehicles and machinery must be fitted with the appropriate noise muffling devices and must be appropriately maintained to ensure that the machines and vehicles do not produce excessive noise disturbance. No loud music is allowed on site and workers must always be aware of disturbance to neighbours. The contractor must inform the surrounding offices and community in advance or prior to operations that bear the risk of nuisance and accidents. The contractor must be responsible for compensating if the vibration during demolition damages any structures. <p>These impacts, without mitigation, have the potential to damage the environment on a daily basis but with mitigation are expected to drop significantly both in frequency and severity.</p> |
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Table 11.2.7: Visual Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|------------|--|-------------|--|-----------|----------|----------|---------------|--------------|---------------|
| Demolition | Visual Quality - The area is urban residential and surrounding neighbors may not appreciate the presence of rubble formed and dust emissions that can alter the visual aesthetics of a residential area during demolition. | Direct | Without | 5 | 3 | 3 | 2 | 13 | Medium |
| | | | With | 3 | 2 | 2 | 1 | 8 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> The site must be well maintained and neat. The use of screening during construction is recommended. The contractor must adhere to project schedule in order to minimise the length of the demolition period. Stockpiles must be covered using material that is environmentally friendly to avoid dust impacts. Chemical toilets must be regularly serviced and maintained. Toilet doors must always remain closed. Waste material must always be disposed off into bins and/or skips. Bins must be covered. <p>With correct implementation of these mitigation measure, the frequency can be reduced from a daily occurrence to an infrequent occurrence. While severity will be reduced from slightly harmful to potentially harmful.</p> | | | | | | |

Table 11.2.8: Waste Management

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|------------|---|-------------|---|-----------|----------|----------|---------------|--------------|---------------|
| Demolition | Waste Management - Littering and Improper storage/ disposal of waste and/or debris accumulated during demolition may affect neighbors as well as contaminate/ pollute the sea. It must be noted that even though there will be excavations, majority will be re-used on site so there would be minimal construction spoil/ waste generated. | Direct | Without | 4 | 3 | 2 | 2 | 11 | Medium |
| | | | With | 3 | 2 | 1 | 1 | 7 | Low |
| | | | <p>Mitigation measures:</p> <ul style="list-style-type: none"> • Personnel must be trained in etiquette regarding littering and waste management. • Demolition debris must be stockpiled and disposed of at an appropriate and licensed disposal facility. Debris can also be re-used in the construction of the proposed development. • Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid). • A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal. • In the case of a spill of hydrocarbons, chemicals or bituminous, the spill must be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk. • On-site chemical toilets must be provided for domestic purposes during construction phase. These must be situated as far as is practically possible from neighbors. • The contractors must be responsible for the maintenance of the chemical toilets. • Waste must be collected by an accredited waste company and disposed of at an appropriate and licensed waste disposal facility. • Littering is prohibited and general housekeeping must be enforced. <p>In terms of frequency, these mitigation measures ensure that the impacts change from a regular occurrence to a seldom event. In terms of severity, these mitigation measures change from being slightly harmful to potentially harmful.</p> | | | | | | |

Table 11.2.9: Disturbance to Locals

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|------------|--|-------------|--|-----------|----------|----------|---------------|--------------|---------------|
| Demolition | Disturbance to the local population and pedestrians - Local population and pedestrians run the risk of injury from demolition works on site. | Direct | Without | 4 | 3 | 2 | 2 | 11 | Medium |
| | | | With | 3 | 2 | 1 | 1 | 7 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> • Install corresponding signs, hoarding boards, temporary alternate route for bypasses. • Obtain necessary hoarding permits from the City. • Install barriers such as plastic construction barriers, fencing, geo-nets, etc. especially at the western side of the building facing the road, to shield from dust and aggregates. • All excavations must be clearly marked. • Provide adequate lighting at demolition site to increase visibility at night, to prevent accident. <p>These impacts, without mitigation, have the potential to damage the environment on a regular basis but with mitigation are expected to drop significantly both in frequency and severity.</p> | | | | | | |

Table 11.2.10: Safety

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|------------|---|-------------|--|-----------|----------|----------|---------------|--------------|---------------|
| Demolition | Safety for the Demolition Workers - Workers are at risk and are prone to injury if they do not have adequate training, gear and knowledge of the processes on site. | Direct | Without | 3 | 3 | 2 | 2 | 10 | Medium |
| | | | With | 2 | 2 | 1 | 1 | 6 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> • Make mandatory the use of Personal Protective Equipment (PPE) which includes helmets, safety belts, masks, gloves and boots by workers. • Necessary planning and safety approach must be made for rescue during emergency. • Workers must be provided with first aid and health facilities at the site. <p>With correct implementation of these mitigation measure, the frequency can be reduced from a seldom occurrence to a highly unlikely event. While severity will be reduced from slightly harmful to potentially harmful.</p> | | | | | | |

Table 11.2.11: Heritage Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|------------|---|-------------|---|-----------|----------|----------|---------------|--------------|--------------|
| Demolition | Buildings and structures that are 60 years and older require a demolition permit from the KZN Amafa and Research Institute. | Direct | Without | | | | | | N/A |
| | | | With | | | | | | N/A |
| | | | <p>Mitigation measures:</p> <ul style="list-style-type: none"> According to section 37(1)(a) of the KwaZulu-Natal Amafa and Research Institute Act, no structure which is, or which may reasonably be expected to be older than 60 years, must be demolished, altered or added to without the prior written approval of the KwaZulu-Natal Amafa and Research Institute having been obtained on written application to the Institute. If the client does not want to apply for a permit to destroy the three structures, then the client must find documentation indicating the date of the three structures to prove that they are not older than 60 years. No activity, developmental or otherwise, must take place within 30m of the beach due to the presence of shell middens that could be damaged by such activity. If development does take place in this area, then prior to any construction activity, the removal of vegetation from the dunes must be monitored by an archaeologist to prevent any damage to shell middens or any other archaeological remains that may be found in the dunes. <p>With correct implementation of these mitigation measure, the frequency can be reduced from a regular occurrence to a seldom occurrence. While severity will be reduced from slightly harmful to potentially harmful.</p> | | | | | | |

The duration of the construction phase is ±24 months while the duration of the rehabilitation phase is ±2 months

Table 11.2.12: General Construction Activities Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|---|-------------|--|-----------|----------|----------|---------------|--------------|--------------|
| Construction | General Construction Activities - Potential harm to the environment due to workers or contractors being unaware of how their activities may impact the environment or due to unauthorised access to the site. | Direct | Without | 5 | 4 | 2 | 3 | 14 | Medium |
| | | | With | 3 | 3 | 1 | 2 | 9 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> The contractor must ensure that all employees, including sub-contractors and their employees, attend on-site Environmental Awareness Training prior to commencing work on site. Follow-up Environmental Awareness Training are required for new subcontractors or crews prior to commencing work or for specific activities that potentially impact the environment, or if work is being undertaken in sensitive environments. The contractor must maintain accurate records of any training undertaken. Training must cover all aspects of the EMP, procedures that must be followed, the sensitivity of the site and importance of adhering to “no-go” areas. The ECO must monitor the contractor’s compliance with the requirement to provide sufficient environmental awareness training to all site staff. Environmental signage must be displayed on the site including – “no smoking”, “fire hazards”, etc. Emergency numbers must be displayed and clearly visible. Access to fuel and other equipment stores must be strictly controlled. <p>In terms of frequency, these mitigation measures ensure that the impacts change from a possible daily occurrence to a seldom event. In terms of severity, these mitigation measures change from being harmful to be slightly. However, the mitigation measures including ongoing environmental awareness training are predicted to be sufficient.</p> | | | | | | |
| Construction | Storage, mixing, and disposal of cement and concrete - Potential water and/or soil pollution due to incorrect management of concrete | Direct | Without | 4 | 3 | 2 | 2 | 11 | Medium |
| | | | With | 3 | 2 | 1 | 2 | 8 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> No mixing of concrete or cement directly on the ground is permitted. The mixing of concrete must only be done on a mixing tray or on impermeable sheeting. | | | | | | |

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| | and cement. | | <ul style="list-style-type: none"> • Ready-mix trucks are not permitted to clean chutes on site. Cleaning into foundations or a dedicated cleaning pit is permitted. • Bricklayers and plasterers must minimise any cement spill or runoff in their work area and must ensure that the work area is cleaned of all cement spillage at the end of each workday. • Both used and unused cement bags must be stored in weatherproof containers so as not to be affected by rain or runoff. • Contaminated soil resulting from concrete or cement spills, must be removed immediately after the spillage has occurred and placed on the appropriate rubble stockpile. • Clean stormwater must be kept away from areas where it could be contaminated and must be directed to the stormwater drainage system. <p>These impacts, without mitigation, have the potential to damage the environment on a regular basis but with mitigation are expected to drop significantly both in frequency and severity.</p> |
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Table 11.2.13: Traffic

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|---|-------------|--|-----------|----------|----------|---------------|--------------|---------------|
| Construction | Traffic Pressures and access - Presence of construction vehicles and personnel leading to traffic congestion, dust, noise and threat of accident. | Direct | Without | 5 | 3 | 2 | 3 | 13 | Medium |
| | | | With | 3 | 2 | 2 | 2 | 9 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> • Construction vehicles and personnel must adhere to business hours. This may be relaxed to accommodate abnormal vehicles, so they do not hinder daily life and/or regular traffic. • Construction vehicles must use predetermined and agreed routes to and from site. • Pointsmen must guide traffic for entry and exit of construction vehicles. • Safety measures such as appropriate pavements, speed humps, signage boards for construction site and vehicles and for workmen must be implemented to slow down traffic within the development. • The construction phase must be as short as possible. Reliable building contractors must be employed to avoid delays. • Vehicles must park on demarcated site only. <p>With correct implementation of these mitigation measure, the frequency can be reduced from a daily occurrence to a seldom</p> | | | | | | |

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| | | | occurrence. While severity will be reduced from slightly harmful to potentially harmful. |
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Table 11.2.14: Soil Erosion

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|---|-------------|---|-----------|----------|----------|---------------|--------------|---------------|
| Construction | Soil erosion - Heavy rains may cause a nuisance to the neighboring properties and also cause pollution to the sea by localised high levels of erosion. Loss of stockpiles, instability of soils and associated loss of vegetation may also result. Ecological disturbances from high levels of erosion are also possible. | Cumulative | Without | 3 | 3 | 2 | 2 | 10 | Medium |
| | | | With | 2 | 2 | 1 | 2 | 7 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> • Project management of construction activities must be done to ensure that only small and/or necessary portions will be disturbed at any given time. Vegetation must not be removed until necessary. • Soil erosion measures must be placed on sensitive areas like banks and slopes. • All stockpiles must be covered with suitable material to prevent loss of sediment via wind/ water. • Topsoil (top 300mm layer minimum) must be removed prior to the construction by earthmoving equipment. Topsoil must be stored in heaps of not higher than 2m in a way that prevents damming. Stored topsoil must not be compacted. • Topsoil must not be used as fill material for backfilling of excavations on site. • Minimize the amount of area that needs to be disturbed and the amount of time spent on sensitive areas. • Offsite runoff around disturbed areas must be diverted to reduce the amount of stormwater which comes into contact with exposed soils, as a result there will be less erosion. <p>In terms of frequency, these mitigation measures ensure that the impacts change from a seldom occurrence to a highly unlikely event. In terms of severity, these mitigation measures change from being slightly harmful to being potentially harmful. However, the mitigation measures including ongoing environmental awareness training are predicted to be sufficient.</p> | | | | | | |

Table 11.2.15: Stormwater Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|---|-------------|--|-----------|----------|----------|---------------|--------------|---------------|
| Construction | Stormwater management | Cumulative | Without | 3 | 3 | 2 | 2 | 10 | Medium |
| | | | With | 2 | 2 | 1 | 2 | 7 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> A storm water layout has been designed and must be implemented once approved by the municipality, for both the construction and operational phases to prevent stormwater from pooling and to direct stormwater to any existing stormwater infrastructure on the surrounding roads and residential areas. Earth, stone and rubble must be properly disposed of so as not to obstruct natural water pathways over the site (i.e. these materials must not be placed in stormwater channels, drainage lines, etc. <p>These impacts, without mitigation, have the potential to damage the environment on a regular basis but with mitigation are expected to drop significantly both in frequency and severity.</p> | | | | | | |
| Operational | Stormwater Management and Maintenance of Structures - Proper management maintenance must be conducted throughout the lifespan of the operational phase. | Cumulative | Without | 3 | 3 | 2 | 2 | 10 | Medium |
| | | | With | 2 | 2 | 1 | 2 | 7 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> The site must be managed in order to prevent pollution of drains or groundwater, due to suspended solids, silt or chemical pollutants. Earth, stone and rubble must be properly disposed of so as to not obstruct natural water pathways over the site (i.e. these materials must not be placed in stormwater channels, drainage lines, etc. There must be a periodic checking of the site's reticulation to ensure that the water flow is unobstructed. <p>With correct implementation of these mitigation measure, the frequency can be reduced from a seldom occurrence to a highly unlikely event. While severity will be reduced from slightly harmful to potentially harmful.</p> | | | | | | |

Table 11.2.16: Impacts on Groundwater

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|---|-------------|---|-----------|----------|----------|---------------|--------------|---------------|
| Construction | Ground water pollution (sea) - Pollution of ground surfaces and water may result from chemical substance spills and sewage spills. It must be noted that no groundwater issues have been identified to date. Pollution of ground water would be difficult as no source receptor pathways have been identified for the site. | Indirect | Without | 4 | 3 | 3 | 2 | 12 | Medium |
| | | | With | 2 | 1 | 2 | 1 | 6 | Low |
| | | | <p>Mitigation measures:</p> <ul style="list-style-type: none"> • Chemical substances must be mixed or handled on impervious surfaces. Concrete must be mixed on impervious surfaces. There must be a contained/ designated area for washing out and cleaning of concrete mixing equipment, to further prevent pollution. In addition, wash waters from site must be collected and disposed of off-site. • An adequate number of chemical toilets for the staff must be provided and serviced regularly. The positioning of the toilets must be determined taking cognisance of the neighbours. The ECO must authorise the positioning of the toilets. • Spills that result in the contamination of ground and/or surface water must be reported immediately to the ECO • Spills must be managed in the following manner: <ul style="list-style-type: none"> - Stop the spill - Contain the spill - Report significant spills to DWS and the Local Municipality Water and Sanitation Department. - Remove spilled material for treatment/disposal. - Determine any possible impact to soils, groundwater, storm water, etc. - Undertake any necessary remedial actions - Document the spill <p>In terms of frequency, these mitigation measures ensure that the impacts change from a regular occurrence to a highly unlikely event. In terms of severity, these mitigation measures change from being slightly harmful to being not harmful.</p> | | | | | | |

Table 11.2.17: Impacts on Surface water

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|---|-------------|---|-----------|----------|----------|---------------|--------------|---------------|
| Construction | Surface water pollution (sea) – Protection of the sea includes the water, the floodlines and the bed. There are no watercourses within the property or close to it. Beach access from the property is prohibited. The boundary wall on the seaward side will remain. The only potential for pollution is uncontrolled dumping in the sea which will be difficult. | Indirect | Without | 4 | 4 | 3 | 2 | 13 | Medium |
| | | | With | 2 | 2 | 2 | 1 | 7 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> • A no-go area to protect the sea must be demarcated. The limits of the working space must be demarcated and adhered to. No personnel working on the site, may enter the designated no-go areas. • Environmental training must be provided to personnel. • No laundry and bathing is allowed in the sea. Contractors must provide ablution facilities to staff. • Abstraction of water for construction use is prohibited unless obtained legally. Municipal water must be brought in by tanker/vessels to the site for use by the contractors. • Concrete and cement mixing wash areas must be placed at least 20m from any drainage line/ the sea to minimise the risk of run-off entering a water source. • Storage areas for any chemical, fuel (for machinery), oil, cement etc. must be located above any flood line and away from high risk areas (i.e. 20m from a water source/sea) to minimise the risk of spill entering the water. <p>These impacts, without mitigation, have the potential to damage the environment on a regular basis but with mitigation are expected to drop significantly both in frequency and severity.</p> | | | | | | |
| Operational | Surface runoff - Proper management and disposal of waste must occur during the lifespan of the project, including during the operational phase. | Cumulative | Without | 3 | 2 | 2 | 2 | 9 | Low |
| | | | With | 2 | 1 | 1 | 1 | 5 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> • The applicant must ensure regular maintenance of all drainage systems within the project area as they help in improving site drainage, and reduce pollutants entering surface waters and groundwater. • Grass filter stripes can be used as they function by slowing runoff velocities, trapping sediment and other pollutants and providing a modest infiltration. • Proper management and disposal of waste must occur during the lifespan of the project. Waste must be disposed off on the roadside or along the dune and beach area. | | | | | | |

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| | | | With correct implementation of these mitigation measure, the frequency can be reduced from a seldom occurrence to a highly unlikely event. While severity will be reduced from potentially harmful to insignificant. |
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Table 11.2.18: Climate Change Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|-------------|--|-------------|--|-----------|----------|----------|---------------|--------------|--------------|
| Operational | Sea level rise due to climate change – Densely populated coastal areas are at elevated risk of storm surges and flooding due to sea level rise caused by climate change. | Indirect | Without | 1 | 4 | 3 | 4 | 12 | Medium |
| | | | With | 1 | 3 | 2 | 3 | 9 | Low |
| | | | <p>Mitigation measures:</p> <ul style="list-style-type: none"> • Protection of the proposed development can be done using green infrastructure such as beach dunes. A beach dune is a hill of loose sand built by wind or the flow of water. Beach dunes currently exist outside the property of the proposed development and must be maintained. • There are one or more sets of dunes running parallel to the shoreline directly outside of the properties boundary and must be maintained. • A temporary gabion wall can be formed along areas of erosion, but life expectancy will normally be between 1 and 5 years. • During adverse weather conditions, erosion control measures must be implemented along areas susceptible to erosion, these include sandbags, hessians sacks, gabion structure. <p>In terms of frequency, these mitigation measures ensure that the impacts change from a regular occurrence to a highly unlikely event. In terms of severity, these mitigation measures change from being slightly harmful to being not harmful.</p> | | | | | | |

Table 11.2.19: Biodiversity Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|--|-------------|---|-----------|----------|----------|---------------|--------------|---------------|
| Construction | Risk of alien invasive encroachment into disturbed areas - Alien species are able to easily invade a wide range of ecological niches thereby altering natural systems. | Cumulative | Without | 3 | 3 | 2 | 2 | 10 | Medium |
| | | | With | 2 | 2 | 1 | 1 | 6 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> Protect as much indigenous vegetation as possible. Do not clear large portions of land at once. Re-grass/ re-vegetate exposed areas as early as practically possible with indigenous vegetation. Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. <p>These impacts, without mitigation, have the potential to damage the environment on a regular basis but with mitigation are expected to drop significantly both in frequency and severity.</p> | | | | | | |
| Construction | Flora, vegetation communities and CBA - Damage and removal of existing indigenous vegetation. | Direct | Without | 3 | 3 | 2 | 2 | 10 | Medium |
| | | | With | 2 | 2 | 1 | 1 | 6 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> Prior to the clearing of the site, the ECO and if necessary, the Biodiversity Specialist must ensure that all plants of conservation significance are relocated for possible reuse. The site boundary must be pegged out to identify the limits of the construction site. Construction activities must be limited to within these boundaries. Burning of removed vegetation is prohibited. Sealant, coatings, adhesives and glazing's, can be toxic to flora, if released into the environment. Therefore, the products used must be stored and used carefully, to save resources as well as protect the environment. The ECO must ensure that a list of any indigenous trees/ shrubs which must be removed is provided. This list must include the tree/ shrub species and the number of each species. Development is only allowed within the project area. As far as possible, the proposed developments must be placed in areas that have already been disturbed, and no further loss of secondary vegetation must be permitted. Areas to be developed must be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon, laydown areas and ablutions can be in the parking area to the east of the project area, and access to the | | | | | | |

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|--------------|---|----------|--|---|---|---|---|---|------------|
| | | | <p>area must only be done from the parking area.</p> <ul style="list-style-type: none"> • Areas of indigenous vegetation, even secondary communities, which were mainly found toward the coastline must under no circumstances be fragmented or disturbed further or used as an area for dumping of waste. • Areas that are denuded during construction must be re-vegetated with indigenous vegetation, the gardens of the new complex must try and use indigenous species and trees that represent what is located within the area. This will reduce the likelihood of encroachment by alien invasive plant species. • The White Milkwood (<i>Sideroxylon inerme</i>) trees found within the project area, depending on the layout of the infrastructure, must rather be left undisturbed and implemented in the garden plan, if possible. Otherwise the trees must be relocated to the nearby CBA if a permit can be acquired. <p>With correct implementation of these mitigation measure, the frequency can be reduced from a seldom occurrence to a highly unlikely event. While severity will be reduced from potentially harmful to insignificant.</p> | | | | | | |
| Construction | Fauna - Hunting/ Fishing/ Poaching by construction workers. | Indirect | Without | 2 | 2 | 2 | 1 | 7 | Low |
| | | | With | 1 | 1 | 1 | 1 | 4 | Low |
| | | | <p>Mitigation measures:</p> <ul style="list-style-type: none"> • Identify sensitive fauna on the site prior to construction. • Trapping/snaring/killing of animals including snakes and reptiles is prohibited. • Fishing by employed staff on this stretch of the sea is prohibited. • Sealant, coatings, adhesives and glazing's, can be toxic to fauna, if released into the environment. Therefore, the products used must be stored and used carefully, to save resources as well as protect the environment. • If any faunal species of conservation concern are recorded during construction, activities must temporarily cease, and allow the species to either move off, or be relocated safely. • Prior and during vegetation clearance, the project area must be walked, and any larger fauna species noted must be given the opportunity to move away from the construction machinery. • Fauna species such as frogs and reptiles that have not moved away must be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified ECO trained in the handling and relocation of animals. • Fencing must be erected around the project area to prevent workers and members of the public from entering the surrounding forest and coastal portions. This fence must have small openings to allow wildlife to pass through. • During the construction phase noise must be kept to a minimum to reduce the impact of the development on the fauna | | | | | | |

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| | | | <p>residing on the site.</p> <ul style="list-style-type: none"> The intentional killing of any animals including snakes, insects, lizards, birds or other animals must be strictly prohibited. <p>In terms of frequency, these mitigation measures ensure that the impacts change from a highly unlikely event to almost never. In terms of severity, these mitigation measures change from being potentially harmful to not harmful.</p> |
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Table 11.2.20: Waste Management Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|---|-------------|---|-----------|----------|----------|---------------|--------------|---------------|
| Construction | Waste and littering around the site - Improper storage/ disposal of waste and litter may affect neighbors as well as contaminate/ pollute identified water sources. | Cumulative | Without | 4 | 3 | 2 | 2 | 11 | Medium |
| | | | With | 2 | 2 | 1 | 1 | 6 | Low |
| | | | <p>Mitigation measures:</p> <ul style="list-style-type: none"> Personnel must be trained in etiquette regarding littering and waste management. Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid). A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal. On-site chemical toilets must be provided for domestic purposes during construction phase. The contractors must be responsible for the maintenance of the chemical toilets. Waste must be collected by an accredited waste company and disposed of at an appropriate and licensed waste disposal facility. Littering is prohibited and general housekeeping must be enforced. <p>These impacts, without mitigation, have the potential to damage the environment on a regular basis but with mitigation are expected to drop significantly both in frequency and severity.</p> | | | | | | |

Table 11.2.21: Noise Impact

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|--|-------------|---|-----------|----------|----------|---------------|--------------|---------------|
| Construction | Noise disturbance - The presence of personnel and machinery will present a nuisance to the area. | Direct | Without | 5 | 3 | 2 | 2 | 12 | Medium |
| | | | With | 3 | 2 | 1 | 1 | 7 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> Personnel must be trained in etiquette regarding noise and trespassing, as well as in health issues and occupational safety. Construction activities must be limited to normal construction industry working hour – avoid nighttime hours. Route construction related traffic along roadways that will cause least disturbance. A registered contractor providing a project schedule must be employed. Penalties for extending the timeline must be enforced to try and minimise the period of impact. In addition, construction vehicles and machinery must be fitted with the appropriate noise muffling devices and must be appropriately maintained to ensure that the machines and vehicles do not produce excessive noise disturbance. No loud music is allowed on site and workers must always be aware of disturbance to neighbours. <p>With correct implementation of these mitigation measure, the frequency can be reduced from a daily occurrence to a seldom occurrence. While severity will be reduced from slightly harmful to highly unlikely.</p> | | | | | | |
| Operational | Noise and disturbance | Indirect | Without | 3 | 2 | 2 | 1 | 8 | Low |
| | | | With | 2 | 1 | 1 | 1 | 5 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> All noise generating plant such as air conditioning, refrigeration, fans, etc. must comply with noise standards. Silencers must be installed if necessary. Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species. <p>In terms of frequency, these mitigation measures ensure that the impacts change from a seldom event to highly unlikely. In terms of severity, these mitigation measures change from being potentially harmful to not harmful.</p> | | | | | | |

Table 11.2.22: Air Quality Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|---|-------------|--|-----------|----------|----------|---------------|--------------|--------------|
| Construction | Air Quality - Dust generated from construction vehicles and on-site activities. | Direct | Without | 4 | 4 | 3 | 3 | 14 | Medium |
| | | | With | 2 | 2 | 2 | 2 | 8 | Low |
| | | | <p>Mitigation measures:</p> <ul style="list-style-type: none"> Dust control measures/suppression of dust must be implemented timeously by the contractor. Water trucks must be utilized to wet exposed road surfaces or stockpiled areas. The dust levels must be kept as minimal as possible to ensure minimal impact to the surrounding community and the environment. Vehicles must be kept in good condition to minimize vehicular fumes. The contractor must remove the vehicle from the site if excessive emissions are observed. Dust and mud must be controlled at vehicle exit and entry points to prevent the dispersion of dust and mud beyond the site boundary. Speed limit sign boards must be erected during the construction phase to limit dust emissions. <p>These impacts, without mitigation, have the potential to damage the environment on a regular basis but with mitigation are expected to drop significantly both in frequency and severity.</p> | | | | | | |

Table 11.2.23: Visual Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|---|-------------|--|-----------|----------|----------|---------------|--------------|---------------|
| Construction | Visual Quality - The area is urban and surrounding neighbors, including businesses, may not appreciate the presence of a construction site in the vicinity. | Direct | Without | 5 | 3 | 3 | 2 | 13 | Medium |
| | | | With | 3 | 2 | 2 | 1 | 8 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> The site must be well maintained and neat. The use of screening during construction is recommended. The contractor must adhere to project schedule in order to minimize the length of the construction period. Inspections of the site by an Environmental Control Officer are required. Facilities such as toilets, bins, tanks and stockpiles must be covered with lids or be placed under covered roofs. <p>With correct implementation of these mitigation measure, the frequency can be reduced from a daily occurrence to a seldom occurrence. While severity will be reduced from slightly harmful to potentially harmful.</p> | | | | | | |
| Operational | Visual Quality – General aesthetics of the area may be unappealing. | Indirect | Without | 2 | 2 | 2 | 2 | 8 | Low |
| | | | With | 1 | 1 | 1 | 1 | 4 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> All flood lighting to comply with relevant municipal standards. No unauthorized or un-approved structures must be erected. <p>In terms of frequency, these mitigation measures ensure that the impacts change from a seldom event to almost never. In terms of severity, these mitigation measures change from being potentially harmful to not harmful.</p> | | | | | | |

Table 11.2.24: Health and Safety Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|---|-------------|-----------------------------|-----------|----------|----------|---------------|--------------|---------------|
| Construction | Public safety and health – Occupational safety, security and health | Direct | Without | 5 | 3 | 3 | 2 | 13 | Medium |
| | | | With | 3 | 2 | 2 | 1 | 8 | Low |
| | | | Mitigation measures: | | | | | | |

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| | of staff and public in general. | | <ul style="list-style-type: none"> • Unskilled labour must be trained relevantly including environmental training. • First aid kits and incident records file must be on site at all times. • Construction related vehicles must adhere to speed limits of the surrounding roads and a limit of 20km/hr on site. • Safety gear including hard hats and safety shoes must be provided and worn at all times while on site. • Emergency numbers must be clearly visible on site. • Trespassing and/or utilising the site as a thorough fare is prohibited by unauthorised persons. • Contractor staff are prohibited from trespassing over the site boundaries. • Interaction with neighbors and objecting parties at the site must be well documented. A complaints register must be readily available on site. Interaction with external parties must be courteous. • Although the Contractor is responsible for ensuring that the environmental awareness training of staff members is put in place, it must be the direct responsibility of the appointed ECO to carry out the training. Each staff member must sign a register confirming their attendance at this training. This register must be included in the site Environmental file. <p>These impacts, without mitigation, have the potential to damage the environment on a daily basis but with mitigation are expected to drop significantly both in frequency and severity.</p> |
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Table 11.2.25: Heritage Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|--|-------------|--|-----------|----------|----------|---------------|--------------|---------------|
| Construction | Disturbance to Existing Infrastructure – The roads, footpaths and crossings are infrastructure that are utilised by the community. Water, electricity, telecommunications, roads and railway infrastructure must | Indirect | Without | 4 | 3 | 3 | 2 | 12 | Medium |
| | | | With | 3 | 2 | 2 | 1 | 8 | Low |
| | | | Mitigation measures: | | | | | | |
| | | | <ul style="list-style-type: none"> • Stakeholders must be notified as soon as possible. This includes the community, the municipalities, the service providers and ward councilor. • Servitudes of infrastructure must be confirmed prior to design of the development and permission granted. • No-Go areas must be demarcated. • The construction team must be made aware that heritage resources, such as archaeological remains, usually occur below the ground surface level. If any archaeological material and other heritage resources be accidentally unearthed during the course of construction, all such activities must be halted immediately, and the Contractor must immediately inform the Project Manager. A registered heritage specialist must be called to site for inspection. Amafa must also be | | | | | | |

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| | also be considered. | | <p>informed about the findings.</p> <ul style="list-style-type: none"> The heritage specialist must assess the significance of the resource and provide guidance on the way forward. Written permission must be obtained from Amafa if heritage resources must be removed, destroyed or altered. All heritage resources found in close proximity to the construction area must be protected by a 5m buffer in which no construction can take place. The buffer material (danger tape, fencing, etc.) must be highly visible to construction crews. Under no circumstances may any heritage material be destroyed or removed from site unless under direction of a heritage specialist. If any recent remains be found on site that is potentially human remains, the South African Police Service as well as Amafa must be contacted. No SAPS official must remove remains (recent or not) until the correct permit/s have been obtained. <p>With correct implementation of these mitigation measure, the frequency can be reduced from a regular occurrence to a seldom occurrence. While severity will be reduced from slightly harmful to potentially harmful.</p> |
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Table 11.2.26: Socio Economic Impacts

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|--------------|---|-------------|--|-----------|----------|----------|---------------|--------------|--------------|
| Construction | Socio Economic Impacts – Job creation and possible economic benefit to construction material suppliers in the area. | Direct | Without | 2 | 2 | 2 | 2 | 8 | Low |
| | | | With | 2 | 1 | 1 | 1 | 5 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> Community members and leaders must be notified as soon as possible by posting notice boards with illustrations on site. Local people must be employed where possible Ward councilors must be involved in the public participation. Strict penalties must be built into tenders to deal with issues such as petty crime, fence cutting, trespassing etc. <p>In terms of frequency and severity, these mitigation measures ensure that the impacts remain as low as possible.</p> | | | | | | |
| Operational | Socio-economic benefits | Cumulative | Without | 2 | 2 | 2 | 2 | 8 | Low |
| | | | With | 2 | 1 | 1 | 1 | 5 | Low |

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|--|--|--|--|
| | | | <p>Mitigation measures:</p> <ul style="list-style-type: none"> Local people must be employed where possible. Increased property values. <p>In terms of frequency and severity, these mitigation measures ensure that the impacts remain as low as possible.</p> |
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Table 11.2.27: Bulk Services

| Phase | Potential Impact | Impact Type | Mitigation | Frequency | Severity | Duration | Spatial Scope | Impact Score | Significance |
|-------------|--|-------------|--|-----------|----------|----------|---------------|--------------|--------------|
| Operational | Increased pressure on municipal water supply | Direct | Without | 2 | 2 | 2 | 2 | 8 | Low |
| | | | With | 2 | 1 | 1 | 1 | 5 | Low |
| | | | <p>Mitigation measures:</p> <ul style="list-style-type: none"> Local Municipality department of water and sanitation must comment on whether the proposed development can be served by the current infrastructure and whether the development is aligned to any future master planning of the area. The water demand for the proposed development must be assessed according to the adopted design guidelines and standards. Refer to the Bulk Services Report in Appendix E. <p>These impacts are rated low as these aspects must be sort prior to construction activities.</p> | | | | | | |
| Operational | Increased pressure on electrical supply | Direct | Without | 2 | 2 | 2 | 2 | 8 | Low |
| | | | With | 2 | 1 | 1 | 1 | 5 | Low |
| | | | <p>Mitigation measures:</p> <ul style="list-style-type: none"> Electricity usage across the development will primarily be from the following occupancy classifications: <ul style="list-style-type: none"> Parking & common/circulation areas Residential apartment units The estimated maximum demand of the development is 1377 kVA. Refer to the Bulk Services Report in Appendix E. | | | | | | |

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|---|------------------|--------|--|---|---|---|---|---|------------|
| | | | These impacts are rated low as these aspects must be sort prior to construction activities. | | | | | | |
| Operational | Sewage discharge | Direct | Without | 2 | 2 | 2 | 2 | 8 | Low |
| | | | With | 2 | 1 | 1 | 1 | 5 | Low |
| | | | Mitigation measures: <ul style="list-style-type: none"> • There is no municipal sewer available for this development. • An on-site package plant must be established in accordance to the requirements by the relevant authorities. • The on-site package plan is the most viable and cost-effective solution adding future value with the options of recycling and gray water harvesting. • Refer to the Bulk Services Report in Appendix E. | | | | | | |
| These impacts are rated low as these aspects must be sort prior to construction activities. | | | | | | | | | |

11.3. Significance of Impacts

Construction Phase:

The duration of the construction phase is approximately ± 24 months. The proposed construction phase for the entire development is anticipated to be about two (2) years (approximately 24 months), given the scope of the project the construction phase is relatively short. A shorter construction phase will act as a mitigation measure in itself as it will reduce exposure of the environment to direct and indirect construction activities. Based on the outcome of the impact assessment matrix noted in Section 11.2. above, the overall significance of the impacts with mitigation measures for the construction phase, is noted to be **LOW/MEDIUM** i.e. the impact is reasonable but requires mitigation to reduce potential impacts to the environment.

Operational Phase:

Based on the outcome of the impact assessment matrix noted in Section 11.2. above, the overall significance of the impacts with mitigation measures for the operational phase, is noted to be **LOW/MEDIUM** i.e. the impact is reasonable but requires mitigation to reduce potential impacts to the environment.

11.4. Biodiversity Impact Assessment

During the field survey, The Biodiversity Company identified potential impacts; evaluated and rated these impacts. Table 12 below is an assessment of potential construction impacts on vegetation and faunal communities. Due to the disturbed nature of the project area and the developments that are currently present in the project area as well as the absence of sensitive species the risk on pre-mitigations is rated as low. The implementation of an alien plant removal and management plan will reduce the impact on the vegetation community to slightly detrimental.

Table 12 and 13 below is an assessment of potential operational impacts on vegetation and faunal communities. The significance of increase human presence into the surrounding forest areas was rated as moderately high prior to mitigations. Implementation of mitigation measures reduced the significance of the impact to low. The significance of operational phase impacts on terrestrial fauna communities was rated as moderate prior to mitigation and low post mitigation.

Table 12: Assessment of Potential Construction Impacts (The Biodiversity Company, 2019)

| Impact | Prior to mitigation | | | | | | Post mitigation | | | | | |
|--|---------------------|----------------------|--------------------|--------------------------------------|-----------------------|--------------|--------------------|-------------------|--------------------|--------------------------------------|-----------------------|----------------------|
| | Duration of Impact | Spatial Scope | Severity of Impact | Sensitivity of Receiving Environment | Probability of Impact | Significance | Duration of Impact | Spatial Scope | Severity of Impact | Sensitivity of Receiving Environment | Probability of Impact | Significance |
| Further loss and fragmentation of the vegetation community (including portions of an Endangered vegetation type and a protected tree species). | 5 | 2 | 3 | 1 | 3 | | 5 | 1 | 2 | 1 | 2 | |
| | Permanent | Development specific | Significant | Ecology not sensitive | Likely | Low | Permanent | Activity specific | Small | Ecology not sensitive | Likely | Slightly detrimental |
| Displacement of faunal community due to habitat loss, disturbance (noise, dust and vibration) and/or direct mortalities. | 5 | 3 | 3 | 1 | 3 | | 5 | 1 | 2 | 1 | 3 | |
| | Permanent | Local | Significant | Ecology not sensitive | Likely | Low | Permanent | Activity specific | Small | Ecology not sensitive | Likely | Slightly detrimental |

Table 13: Assessment of Potential Operational Impacts (The Biodiversity Company, 2019)

| Impact | Prior to mitigation | | | | | | Post mitigation | | | | | |
|--|---------------------|----------------------|--------------------|--------------------------------------|-----------------------|-----------------|--------------------|-------------------|--------------------|--------------------------------------|-----------------------|--------------|
| | Duration of Impact | Spatial Scope | Severity of Impact | Sensitivity of Receiving Environment | Probability of Impact | Significance | Duration of Impact | Spatial Scope | Severity of Impact | Sensitivity of Receiving Environment | Probability of Impact | Significance |
| Continued encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species; | 5 | 3 | 3 | 1 | 3 | | 5 | 1 | 2 | 1 | 3 | |
| | Permanent | Development specific | Small | Ecology not sensitive | Likely | Low | Permanent | Activity specific | Small | Ecology not sensitive | Likely | Low |
| Increased human presence in the adjacent coastal and forest area, leading to trampling of natural vegetation | 5 | 3 | 3 | 4 | 4 | | 5 | 1 | 2 | 1 | 3 | |
| | Permanent | Local | Likely | Ecology highly sensitive | Highly Likely | Moderately High | Permanent | Activity Specific | Small | Ecology not sensitive | Likely | Low |
| Continued displacement and fragmentation of the faunal community (including threatened or protected species) due to ongoing anthropogenic disturbances and habitat degradation (litter, road mortalities, poaching). | 5 | 3 | 3 | 3 | 3 | | 5 | 1 | 2 | 1 | 3 | |
| | Permanent | Local | Likely | Ecology Moderately Sensitive | Likely | Moderate | Permanent | Activity Specific | Small | Ecology not sensitive | Likely | Low |

12. ENVIRONMENTAL IMPACT STATEMENT

According to the **Biodiversity Baseline and Impact Report**, it is the opinion of the specialists that the project (as is), can be authorised. The area has previously been disturbed and further development will not have an extensive impact on the fauna and flora in the areas should the adjacent forest area (Critical Biodiversity Area) be maintained as a “no-go” area. To limit the impact on the surrounding areas strict mitigation measures will need to be adhered to.

According to the **Heritage Impact Assessment**, the specialist advised that the proposed development may only proceed once the age of the three structures identified and discussed in the report has been determined. If any of the structures are over 60 years, then application must be made to the KwaZulu-Natal AMAFA and Research Institute according to the permit application process. In addition, all recommendations made by the specialist must be implemented prior and during the construction of the proposed development.

Several impacts have been identified and rated as can be viewed under section 11 above. Based on the outcome of the Impact Assessment, the overall significance of the impact is Low during the Demolition Phase; Low to Medium during the construction phase; and Low during the operational phase. Through this Basic Assessment, it has been concluded that the proposed development is not expected to have any significant, adverse or lasting impacts on the environment when considering the excavation of soils within 100m of the sea. The project will have positive impacts, viz: Short term skills development; job creation; and potential increase in property values. The positive impacts will be long term as the local economy will be boosted.

The construction phase is short term (± 24 months) and is not anticipated to cause any further detriment to the environment provided the post construction rehabilitation (± 2 months) is implemented. The development will in fact aid in the establishment of indigenous vegetation in the immediate vicinity of the site. The EMPr must be adhered to and will ensure that any negative impacts however minimal are not magnified.

During the post construction phase of the project, the contractors must ensure that all hazardous materials are removed from the site and that rehabilitation of land is undertaken according to the requirements of the EMPr.

13. IMPACT MANAGEMENT MEASURES FROM SPECIALIST STUDIES

13.1. Biodiversity Baseline and Impact Report

Mitigation Measures for Impacts on Vegetation Communities and CBAs

- Development is only allowed within the project area. As far as possible, the proposed development should be placed in areas that have already been disturbed, and no further loss of secondary vegetation should be permitted. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon, laydown areas and ablutions can be in the parking area to the east of the project area, and access to the area should only be done from the parking area.
- Areas of indigenous vegetation, even secondary communities, which were mainly found toward the coastline should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste.
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation, the gardens of the new complex must try and use indigenous species and trees that represent what is located within the area. This will reduce the likelihood of encroachment by alien invasive plant species.
- The White Milkwood (*Sideroxylon inerme*) trees found within the project area, depending on the layout of the infrastructure, should rather be left undisturbed and implemented in the garden plan, if possible. Otherwise the trees should be relocated to the nearby CBA if a permit can be acquired.

Mitigation Measures for Impacts on Faunal Communities

- If any faunal Species of Conservation Concern (SCC) are recorded during construction, activities should temporarily cease, and allow the species to either move off, or be relocated safely.
- Prior and during vegetation clearance, the project area should be walked, and any larger fauna species noted should be given the opportunity to move away from the construction machinery.
- Fauna species such as frogs and reptiles that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified ECO trained in the handling and relocation of animals.
- Fencing should be erected around the project area to prevent workers and members of the public from entering the surrounding forest and coastal portions. This fence should have small openings to allow wildlife to pass through.
- During the construction phase noise must be kept to a minimum to reduce the impact of the development on the fauna residing on the site. Furthermore, during the operational phase, noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species.
- The intentional killing of any animals including snakes, insects, lizards, birds or other animals should be strictly prohibited.

13.2. Heritage Impact Assessment

- The construction team should be made aware that heritage resources, such as archaeological remains, usually occur below the ground surface level. Should any archaeological material and other heritage resources be accidentally unearthed during the course of construction, all such activities are to be halted immediately, and the Contractor will immediately inform the Project Manager. A registered heritage specialist must be called to site for inspection. Amafa must also be informed about the findings.
- The heritage specialist will assess the significance of the resource and provide guidance on the way forward.
- Written permission must be obtained from Amafa if heritage resources are to be removed, destroyed or altered.
- All heritage resources found in close proximity to the construction area to be protected by a 5m buffer in which no construction can take place. The buffer material (danger tape, fencing, etc.) must be highly visible to construction crews.
- Under no circumstances may any heritage material be destroyed or removed from site unless under direction of a heritage specialist.
- Should any recent remains be found on site that could potentially be human remains, the South African Police Service as well as Amafa must be contacted. No SAPS official may remove remains (recent or not) until the correct permit/s have been obtained.
- All areas where trenching or excavation for infrastructure will be deeper than 1.5m must be identified during geotechnical surveys. Where the trenches and excavations will reach this depth, a suitably qualified palaeontologist must be appointed to record and collect the fossils according to South African Heritage Resources Agency (SAHRA) and AMAFA specifications as part of a Phase 1 palaeontological impact assessment during the initial stages of excavation.
- The ECO of the project must be informed of the fact that significant plant fossils may be found because the area is underlain with the Vryheid Formation.

14. CONDITIONS OF AUTHORISATION

In terms of Monitoring and Auditing, the following are recommended to ensure protection of the environment during construction:

- An ECO must monitor the construction site and activities on a monthly basis for the duration of the demolition and construction phases.
- An ECO must document the findings and submit a monthly report to the Competent Authority.
- The Project Manager and Contractor are responsible for the implementation of the EMPr and protection of the environment for the duration of the construction period.
- An ECO must monitor the facility on a monthly basis for the operational phase, for a period of 2 months following completion of construction to ensure that rehabilitation has been successful.
- If the three structures identified in the HIA be proven to be over 60 years, then the Client must make an application to Amafa, the Built Environment section, for the demolition of the structures.
- If the age of the three structures in the HIA cannot be proven, the Client must undertake an Architectural Study prior to any demolition activities being undertaken.

- Where the trenches and excavations will reach a depth of 1.5m, a suitably qualified paleontologist must be appointed to record and collect the fossils according to South African Heritage Resources Agency (SAHRA) and Amafa specifications
- Eleven (11) Category 1b invasive plant species were recorded within the project area and must therefore be removed by implementing an alien invasive plant management programme prior to construction activities beginning.
- Eight (8) individual trees of White Milkwood (*Sideroxylon inerme*) were observed within the property. The Client must either apply for a relocation or destruction permit or plan the development in order to avoid the trees currently present. This must be done prior to any construction related activities beginning. The Client may also mitigate the impact based on the principle of “no net less” i.e. if 8 Milkwood trees are being removed then the client must plant the same number at a selected location.
- The client must ensure a geotechnical investigation is conducted prior to construction activities being undertaken on site. The geotechnical report must be submitted to the KZN-EDTEA for acceptance and approval.

15. ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

The proposed plans and designs of the residential/ serviced apartments have been completed and are included in this BAR as Appendix C. However, these still require approval and Environmental Authorisation from the Competent Authority; the Department of Economic Development, Tourism and Environmental Affairs.

Biodiversity Baseline and Impact Report

- As per the scope of work, the fieldwork component of the assessment comprised of one assessment only, which was conducted during the wet season. This study has not assessed any temporal trends for the respective seasons.
- Despite these limitations, a comprehensive desktop study was conducted, in conjunction with the detailed results from the surveys, and as such there is a high confidence in the information provided.

16. RECOMMENDATIONS OF THE EAP

The information contained in this report and the documentation attached hereto, in the view of the EAP, is sufficient for the Public Participation Process (PPP). Should the Competent Authority request additional studies to be conducted, this shall be conducted and obtained to assist the Competent Authority in making an informed decision.

The EMPr, which includes recommended conditions and mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application, is provided. Refer to Appendix E for the draft Environmental Management Program. The EMPr must be read in conjunction with the BAR.

17. TIMEFRAMES

An environmental authorisation valid for five (05) years is requested. Construction may commence at any time within this 5-year period.

18. UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP

(i) 1World Consultants (Pty) Ltd hereby confirms that the information provided in this Basic Assessment Report is correct at the time of the compilation and distribution for review. Input from specialists was utilised in the compilation of the Report.

(ii) 1World Consultants (Pty) Ltd confirms that all comments received from Stakeholder and I&APs have been included in this report. It is to be noted that in terms of the EIA Regulations (2014), GNR 982 43(2), all State Departments that administer a law relating to a matter affecting the environment, specific to the Application, must submit comments within 30 days to the EAP. Should no comment be received within the 30-day comment period, it will be assumed that the relevant State Department has no comment to provide.

(iii) All information from the specialist studies have been included in this Basic Assessment Report. Recommendations from the specialists have been included in the EMPr.

(iv) All information and comments received in response to this Basic Assessment Report will be summarised and responded to in a final version of the Report, which will be submitted to EDTEA for consideration in terms of issuing Environmental Authorisation.

For 1World Consultants (Pty) Ltd:



Fatima Peer B.Sc. (Hons) Pr. Sci. Nat.
SENIOR ENVIRONMENTAL ASSESSMENT PRACTITIONER

N.B. An original signed EAP Declaration has been downloaded from the Departmental website and can be reviewed under Appendix B.

APPENDICES

The following appendices must be attached as appropriate:

Table 14: List of Appendices

| Appendix | Description of Contents |
|----------|---|
| A | Minutes of the Pre-Application Meeting Environmental screening report |
| B | 1World Consultants - Company Profile 1World Consultants - Company Experience EAP Team – Declaration and CV's Specialist Team – Declaration and CV's |
| C | Completed Copy of the Application for Environmental Authorisation Preferred Alternative: Layout 1 Alternative 1: Layout 2 |
| D | I&AP Distribution List Background Information Document Proof of Distribution of BID Newspaper Advertisements Site Notice Boards & Photographs Comments and Responses Report on BID Proof of Comment and Response Letters on BID |
| E | Biodiversity Baseline and Impact Report Heritage Impact Assessment Shadow Impacts on Beaches and Residential Amenities Traffic Impact Assessment Bulk Services Report |
| F | Draft Environmental Management Programme |

Appendix A



Environmental & Engineering Consultants

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Minutes of the Pre-Application Meeting



KWAZULU-NATAL PROVINCE

ECONOMIC DEVELOPMENT, TOURISM
AND ENVIRONMENTAL AFFAIRS
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:

ENVIRONMENTAL SERVICES

Private Bag X454, PIETERMARITZBURG, 3200

Moses Mabhida Building, 330 Langalibalele Street, Pietermaritzburg, 3200

Tel: 033 341 4830 Fax: 033 341 0986

MEETING REPORT

| | | | | | | | | | | |
|---------------------------|--|--------------------|-------|----|--------------------|------------------------------|----|---------------|----------------|----|
| MEETING DATE | 23 June 2020 | | | | | | | | | |
| VENUE | 9th Floor. Marine Building, 22 Dorothy Nyembe St, Durban | | | | | | | | | |
| TIME | 10:30 | | | | | | | | | |
| MEETING OBJECTIVES | Pre-application meeting: Proposed development of residential / serviced apartments at 49 Casuarina Road, Tongaat Beach | | | | | | | | | |
| CONTENT MATTERS | | | | | | | | | | |
| Attendees | <table border="0"><tr><td>1) Natasha Brijlal</td><td>EDTEA</td><td>NB</td></tr><tr><td>2) Roschel Maharaj</td><td>1World Consultants (Pty) Ltd</td><td>RM</td></tr><tr><td>3) Yusuf Raja</td><td>Arup (Pty) Ltd</td><td>YR</td></tr></table> | 1) Natasha Brijlal | EDTEA | NB | 2) Roschel Maharaj | 1World Consultants (Pty) Ltd | RM | 3) Yusuf Raja | Arup (Pty) Ltd | YR |
| 1) Natasha Brijlal | EDTEA | NB | | | | | | | | |
| 2) Roschel Maharaj | 1World Consultants (Pty) Ltd | RM | | | | | | | | |
| 3) Yusuf Raja | Arup (Pty) Ltd | YR | | | | | | | | |
| Agenda | <ol style="list-style-type: none">1) Introductions2) Discussion of project by Roschel Maharaj and Yusuf Raja3) Discussion and Questions | | | | | | | | | |
| KEY DECISIONS | <p>Introduction to Project & Purpose of Meeting</p> <p>1World Consultants have been appointed to undertake the required environmental services for the demolition and construction of residential / serviced apartments at 49 Casuarina Road.</p> <p>Proposed Development</p> <ul style="list-style-type: none">• Demolition of the existing structures;• Excavations and earthworks as required for the development;• The construction of new residential / serviced apartments;• Establishment of new parking blocks;• Potential widening of a very small portion of Casuarina Road by 1m to create easy vehicle movement in either direction; and• On-site wastewater (sewage) treatment. <div></div> <p>Site Location</p> | | | | | | | | | |

- Various locality maps where presented. Maps indicating the distance from sea were also presented.
- There are five (5) existing structures on site and all structures will be demolished.
- The site is accessed via the M4 heading towards Balito.
- The site is located within 100m from the High-Water Mark of the Sea (triggering the need for a BA).

| | |
|---------------------------------------|--|
| Ward | • 58 |
| Property Size | • 8419 m ² (0.8419 Ha) |
| Development Footprint at Ground Level | • 4781.07 m ² (0.478 Ha) |
| Zoning | • Property currently zoned as Special Residential. A re-zoning application has been submitted to change the zoning to General Residential 2. |

Project Description

- The client currently owns the property at 49 Casuarina Road. At present the property holds the clients vacation home (i.e. there are 5 existing structures on site).
- The client now wishes to demolish the existing infrastructure and construct new residential/ serviced apartments.
- The new development will be a multi-storey residential block which will include 11 levels (inclusive of the ground level and levels -1 and -2).
- The maximum numbers of units proposed are 206 units.
- The associated numbers of parking bays propose are 369 bays.
- **Table 1** below includes detail of the development specification. The figures included within table 1 are considered worst case scenarios and maximum numbers were proposed.
- The property is located approximately 33.2m from the existing boundary wall to the HWM of the sea.
- The current boundary wall is at a height of 3m.
- The client currently has his own beach access.
- A site visit was conducted on 08/03/2019 with 1World Consultants and representatives of EDTEA.

Table 1: Development Schedule as per Architects Plans

| Development Schedule – 49 Casuarina Road | |
|--|---------------|
| Consolidated Site Area | 8418 sqm |
| Proposed coverage | 4781.07 sqm |
| Percentage Coverage | 56.7 % |
| Total Proposed Floor Area Ratio (F.A.R) | 12 628.50 sqm |
| Percentage F.A.R. | 1.5 % |
| Total Number of Units | 206 |
| Number Parking Provided | 369 Bays |
| Area Schedule – Level -2 to 0 | |
| 10 Units Per Level | 700 sqm |
| Area Schedule – Level 1 to 2 | |

| | |
|-------------------------------------|-------------|
| 22 Units Per Level | 1316.06 sqm |
| Area Schedule – Level 3 to 8 | |
| 21 Units Per Level | 1316.06 sqm |

Enquiry with EPCPD

- An enquiry was lodged with EPCPD.
- EPCPD has noted that the current manicured garden as well as the pool and associated infrastructure have encroached into privately owned land.
- The client has agreed to pull back his development as far away from the seaward facing side as possible.

Discussion Based on the EPCPD enquiry

- The current design (preferred alternative) is within the project boundary. Once the construction of the development is complete should the proposal be approved, the existing boundary wall will be demolished and re-established along the correct cadastral boundary.
- The actual boundary line is a function of the distance from the highwater mark of the sea. As the highwater mark changes the boundary line shifts, therefore the boundary line is inaccurate.
- The proposed multi-storey building will be pulled as far away from the seaward facing side to remain within the correct cadastral boundary.
- The client has agreed not to construct any new access paths to the beach and the existing access will remain.

Listed Activity

Activity 19A: The proposed development is located within 100m from the High-Water Mark (HWM) of the sea and will require more than 5 cubic meters of material to be removed as there are levels -1 and -2.

Alternatives

Site Alternatives:

- No site alternatives have been considered since the property is owned by the Applicant.
- It is therefore, more feasible for the proposed development to take place within this property.

Preferred Layout Alternative:

- Max = 206 units
- Levels = 11
- Parking = 369
- The preferred alternative has been designed to ensure that the development is pulled back to the original property boundary i.e. pulled as far back from the beach as possible.
- The distance from the HWM of the sea to the correct boundary is approximately 49.3m. The distance from the HWM of the sea to the development is approximately 58m.

Layout Alternative 1:

- Max = 308 units
- Levels = 11
- Parking = 369
- Layout Alternative 1 continues to encroach into the portion of the municipal owned land.

Service of Site:

- In terms of bulk water supply, there is an existing stormwater line in Casuarina Road. Stormwater will be released into a piped network system which will reticulate to the municipal tie-in point.
- The site does not have water borne sewage. Currently a septic tank system is being used.
- The engineer on the project has advised that there is an upgrade proposed for the local wastewater treatment works but would possibly be undertaken in the near future. Therefore, two alternatives are being considered:
 - A septic tank system; and
 - On-site treatment works.

Septic Tank System:

- Several tanks would be required to be established belowground due to the number of units proposed.
- The operational costs involved are high since the waste is still required to be pumped out, removed and disposed of at a WWTW.

On-Site Treatment Works:

- The water treatments would "polish" the water to a standard that would be allowed to be discharged is the most feasible and practical solution.
- The treated water will be discharged into stormwater.
- The volumes anticipated are going to be far less than that stated within the EIA regulations.
- The on-site treatment works is a more feasible option and most likely to be implemented.
- The system will be procured from a supplier and a service level agreement will be signed with the selected supplier in terms of operation and maintenance of the on-site treatment works.
- The design of the on-site treatment works will be submitted to eThekweni municipality for approval as well.
- The selected alternative will be detailed in the BAR.

Service Level Agreements:

- Not required for water and electricity since this is a direct connection.
- No service level agreement is required in terms of the BAR if the on-site treatment works is selected for sewage management.
- The demolition permit does not have to be included into the BAR, however, it must be noted that Seedat Architects have begun the application with the City.

Public Participation Process (PPP)

- Background Information Document – the BID was distributed 03 April 2020.
- The next steps are to establish site notice boards and publish the newspaper advertisement.
- The site boards and the newspaper advert can be published without the EIA Reference Number. The draft BAR and Application for Environmental Authorization will be lodged simultaneously.
- Usually landowners within 100m of the site would be provided with a copy of the BID and a notification letter would be signed, however, due to the COVID-19 pandemic, this might not be possible (this is done to ensure maximum effort undertaken in terms of PPP).
- N.B. advised that perhaps pictures of BIDs being placed in the post boxes of neighboring properties would suffice.
- The directions issued on 08 June 2020 provides guidelines on uploading the draft and final BARs to the department website, however, the process of obtaining login details has been unsuccessful.

- N.B. advised that the applications can continue to be hand delivered to head office.

State Departments Consulted

- KZN Department of Transport
- Ezemvelo KZN Wildlife
- Department of Water and Sanitation
- KwaZulu-Natal AMAFA and Research Institute
- KZN Corporate Governance and Traditional Affairs
- Ward Councillor, Ward 58
- Commission on Restitution of Land Rights
- eThekweni Municipality
- EDTEA
- EDTEA: Coastal and Biodiversity Management Unit
- Eskom Holdings SOC Limited

Specialist Studies

- The site was screened using the DEA screening tool as well as SANBI GIS Maps. The following specialist studies were identified and required/ conducted:

Biodiversity Assessment:

- A Biodiversity Assessment has already been conducted in Feb 2019.
- Protected Tree Species: Eight (8) individual trees of White Milkwood (*Sideroxylon inerme*) were observed within the property. The option is to either apply for a relocation or destruction permit.
- The site has been altered and continues to do so therefore has a low sensitivity.

Heritage Impact Assessment:

- An HIA has already been undertaken in Feb 2019.
- The age of three structures will be further investigated:
 - One is a house or residence;
 - The second structure is a carport which is currently used for the storage of wood and garden refuse; and
 - The third structure may have been a guard house or a pump house.
- The architect is currently investigating the age of the three structures.

Shadow Impact Assessment:

- A shadow impact study was conducted to determine how the shadow from the proposed apartments will affect overshadowing of the beach area.
- The impact should be considered relatively low since overshadowing impacts a non-swimming beach.
- It must be noted that the mountain hills behind the site casts a shadow impact on the beach before the proposed project would.

Traffic Impact Assessment:

- A Traffic Impact Assessment has been conducted and lodged with Department of Transport (November 2019).
- Traffic will have a minimal impact with respect to the development.
- Department of Transport has already granted approval to expand a portion of Casuarina Road by 1m.

Bulk Services Report:

- A bulk services report has already been compiled which describes how the necessary services will be provided to the site.
- This will be further updated in the BAR to include the preferred option in terms of sewage management.

General

- Once the new development is complete, the boundary wall will be brought back to the original cadastral boundary and the dunes outside the boundary wall will rehabilitate itself.
- Construction laydown area will be within the site.
- The boundary wall will only be demolished once the construction of the multi-storey building is complete for security reasons.
- Biodiversity impact will be conducted on the principle of "no net loss". e.g. if 8 milkwood trees removed, then the client must plant 16 milkwood at selected location.
- A re-zoning application is being undertaken concurrently.

The meeting was closed.

| ACTION PLAN | | |
|------------------|--------------------|----------|
| ACTION | RESPONSIBLE PERSON | DUE DATE |
| 1.Meeting report | Natasha Brijlal | |

| RECOMMENDATIONS FOR MANAGEMENT | | |
|--------------------------------|--|--|
| | | |

| GENERAL COMMENT/S |
|-------------------|
| |



for Head of Department:

KwaZulu-Natal Department of Economic Development Tourism and Environmental Affairs

Signed by: Ms. Natasha Brijlal

Designation: Control Environmental Officer (EIA)

District Office: eThekweni

23 /07 /2020



edtea

Department :
Economic Development, Tourism and
Environmental Affairs

PROVINCE OF KWAZULU-NATAL

Date: 23/06/2020

Venue: MARINE BUILDINGS - 9th FLOOR

Meeting/Site-visit: PRE-APPLICATION MEETING : 49 CASUARINA ROAD

Attendance Register

| NAME | DEPARTMENT/ ORGANISATION | DESIGNATION | TELEPHONE NO. | EMAIL ADDRESS | SIGNATURE |
|-----------------|-----------------------------|-------------|------------------|----------------------------------|-----------|
| YUSUF RAJA | ARUP | CLIENT REP | 0827341168 | YUSUF.RAJA@ARUP.COM | |
| ROSCHEL MAHARAJ | 1WORLD CONSULTANTS | EAP | 031 262 83 27 | roschel@1wc.co.za | |
| NATASHA BRIJVAL | EDTEA | AD: EIA | 031-350 3015 | Natasha.Brijval@kzn.edtea.gov.za | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |



Environmental & Engineering Consultants

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Environmental Screening Report

**SCREENING REPORT FOR AN ENVIRONMENTAL AUTHORIZATION OR
FOR A PART TWO AMENDMENT OF AN ENVIRONMENTAL AUTHORISATION
AS REQUIRED BY THE 2014 EIA REGULATIONS – PROPOSED SITE
ENVIRONMENTAL SENSITIVITY**

EIA Reference number:

Project name: Casuarina Road

Project title: Proposed Development of Residential/ Serviced Apartments at 49 Casuarina Road,
Tongaat Beach, eThekweni

Date screening report generated: 18/03/2020 09:21:49

Applicant: Casuarina 5153 Properties (Pty) Ltd

Compiler: 1World Consultants (Pty) Ltd

Compiler signature:

.....

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Proposed Project Location

Orientation map 1: General location



Map of proposed site and relevant area(s)



Cadastral details of the proposed site

Property details:

| No | Farm Name | Farm/ Erf No | Portion | Latitude | Longitude | Property Type |
|----|-----------|--------------|---------|--------------|-------------|---------------|
| 1 | TONGAAT | 620 | 1 | 29°36'13.13S | 31°9'47.12E | Erven |
| 2 | TONGAAT | 612 | 0 | 29°36'11.08S | 31°9'47.29E | Erven |
| 3 | TONGAAT | 614 | 1 | 29°36'12.57S | 31°9'48.52E | Erven |
| 4 | TONGAAT | 623 | 3 | 29°36'14.74S | 31°9'44.37E | Erven |
| 5 | TONGAAT | 623 | 2 | 29°36'15.1S | 31°9'46.01E | Erven |
| 6 | TONGAAT | 614 | 0 | 29°36'12.13S | 31°9'47.04E | Erven |
| 7 | TONGAAT | 613 | 0 | 29°36'11.76S | 31°9'48.92E | Erven |
| 8 | TONGAAT | 611 | 0 | 29°36'10.6S | 31°9'46.18E | Erven |
| 9 | TONGAAT | 620 | 0 | 29°36'12.43S | 31°9'45.47E | Erven |
| 10 | LOT 44 | 1570 | 0 | 29°36'19.8S | 31°9'44.42E | Farm |

Development footprint¹ vertices:

No development footprint(s) specified.

Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area

| No | EIA Reference No | Classification | Status of application | Distance from proposed area (km) |
|----|------------------|----------------|-----------------------|----------------------------------|
|----|------------------|----------------|-----------------------|----------------------------------|

¹ “development footprint”, means the area within the site on which the development will take place and includes all ancillary developments for example roads, power lines, boundary walls, paving etc. which require vegetation clearance or which will be disturbed and for which the application has been submitted.

| | | | | |
|---|---------------|----------|----------|-----|
| 1 | 12/12/20/2349 | Solar PV | Approved | 3.1 |
|---|---------------|----------|----------|-----|

Environmental Management Frameworks relevant to the application

No intersections with EMF areas found.

Environmental screening results and assessment outcomes

The following sections contain a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development site as well as the most environmental sensitive features on the site based on the site sensitivity screening results for the application classification that was selected. The application classification selected for this report is:
Any activity in an estuary_on the seashore_in the littoral active zone_or in the sea|Any activity in an estuary_on the seashore_in the littoral active zone_or in the sea.

Relevant development incentives, restrictions, exclusions or prohibitions

The following development incentives, restrictions, exclusions or prohibitions and their implications that apply to this site are indicated below.

No intersection with any development zones found.

Map indicating proposed development footprint within applicable development incentive, restriction, exclusion or prohibition zones



Proposed Development Area Environmental Sensitivity

The following summary of the development site environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

| Theme | Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|----------------------------|-----------------------|------------------|--------------------|-----------------|
| Animal Species Theme | | | X | |
| Aquatic Biodiversity Theme | | | | X |

| | | | | |
|--|---|---|---|---|
| Archaeological and Cultural Heritage Theme | | X | | |
| Civil Aviation Theme | X | | | |
| Plant Species Theme | | | X | |
| Defence Theme | | | | X |
| Terrestrial Biodiversity Theme | X | | | |

Specialist assessments identified

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments have been identified for inclusion in the assessment report. It is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the site situation.

| N o | Specialist assessment | Assessment Protocol |
|-----|--|---|
| 1 | Landscape/Visual Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf |
| 2 | Archaeological and Cultural Heritage Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf |
| 3 | Palaeontology Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf |
| 4 | Terrestrial Biodiversity Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Terrestrial_Biodiversity_Assessment_Protocols.pdf |
| 5 | Aquatic Biodiversity Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Aquatic_Biodiversity_Assessment.pdf |
| 6 | Marine Impact Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf |
| 7 | Hydrology Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf |

| | | |
|----|---------------------------|---|
| 8 | Socio-Economic Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf |
| 9 | Plant Species Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf |
| 10 | Animal Species Assessment | https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf |

Results of the environmental sensitivity of the proposed area.

The following section represents the results of the screening for environmental sensitivity of the proposed site for relevant environmental themes associated with the project classification. It is the duty of the EAP to ensure that the environmental themes provided by the screening tool are comprehensive and complete for the project. Refer to the disclaimer.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|-----------------------|------------------|--------------------|-----------------|
| | | X | |

Sensitivity Features:

| Sensitivity | Feature(s) |
|-------------|----------------------------------|
| Medium | Insecta-Durbania amakosa flavida |
| Medium | Amphibia-Hyperolius pickersgilli |

MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|-----------------------|------------------|--------------------|-----------------|
| | | | X |

Sensitivity Features:

| Sensitivity | Feature(s) |
|-------------|-----------------------|
| Low | Low Sensitivity Areas |

MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY

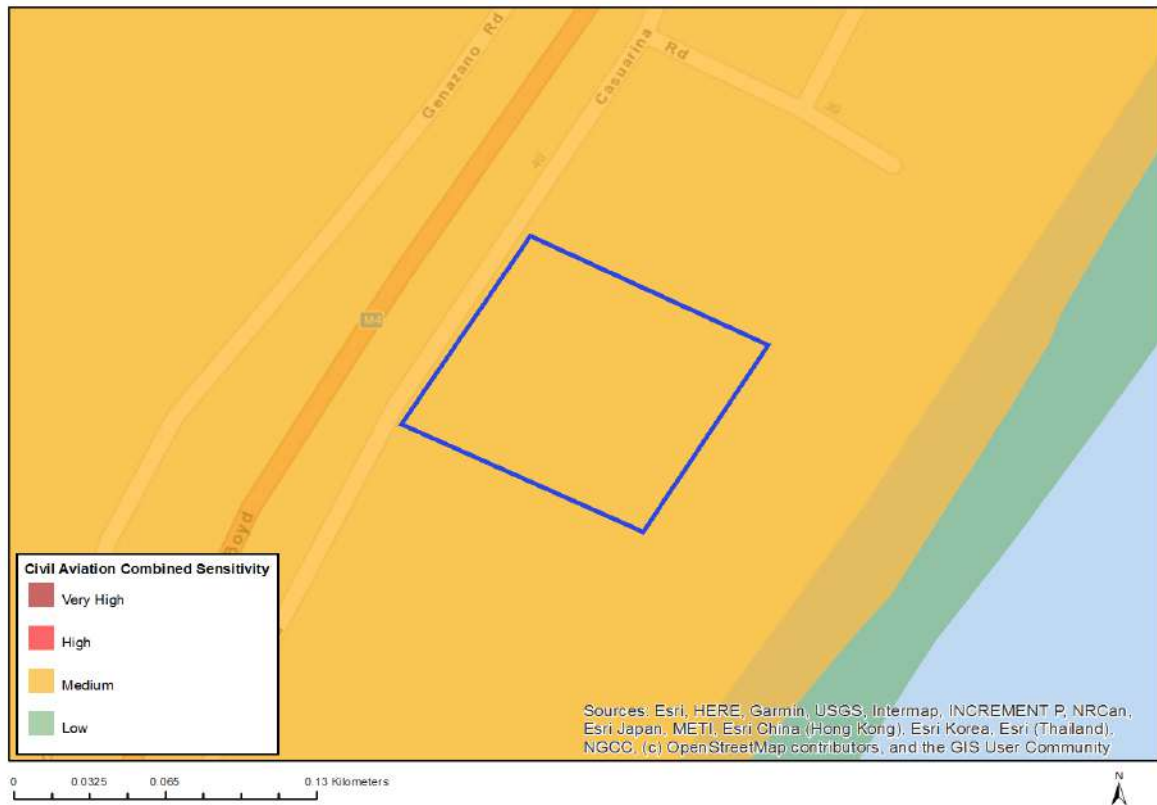


| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|-----------------------|------------------|--------------------|-----------------|
| | X | | |

Sensitivity Features:

| Sensitivity | Feature(s) |
|-------------|---------------------------------|
| High | Within coastal belt |
| High | Within 500 m of a heritage site |

MAP OF RELATIVE CIVIL AVIATION THEME SENSITIVITY

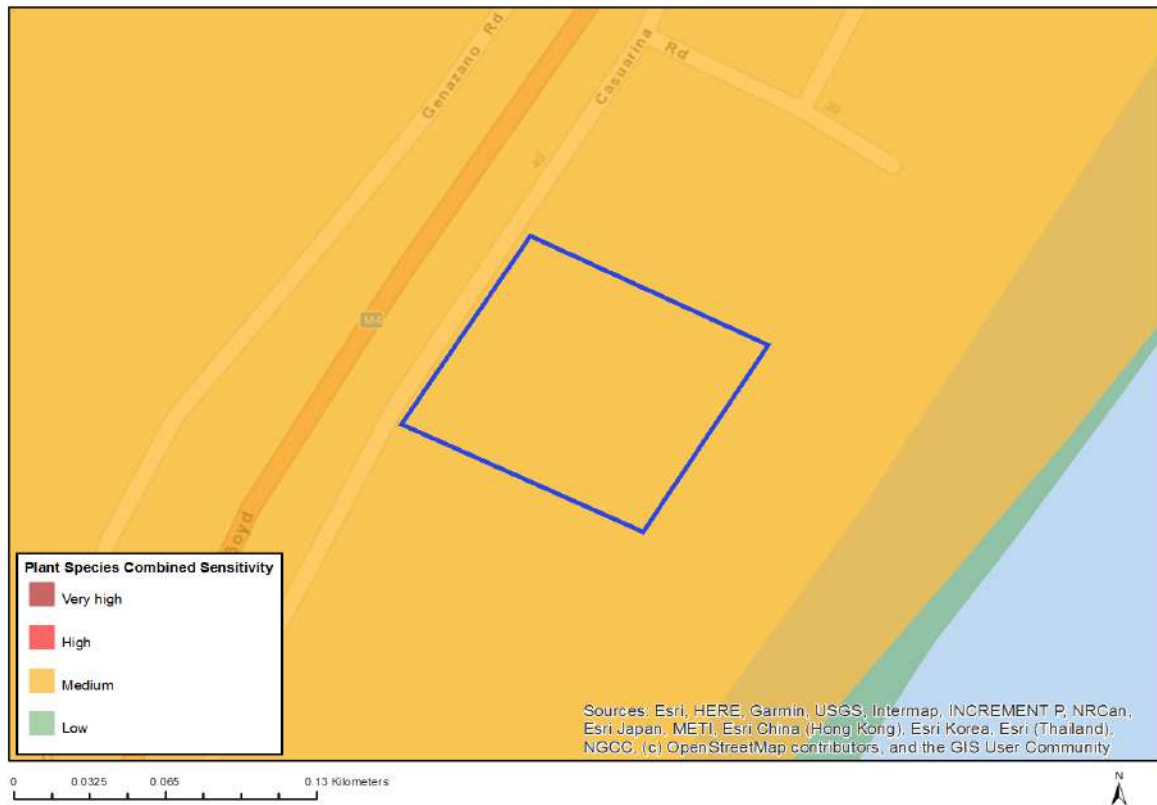


| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|-----------------------|------------------|--------------------|-----------------|
| X | | | |

Sensitivity Features:

| Sensitivity | Feature(s) |
|-------------|--|
| Medium | Within 5 km of an air traffic control or navigation site |
| Medium | Between 8 and 15 km of other civil aviation aerodrome |
| Very High | Within 8 km of a major civil aviation aerodrome |

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|-----------------------|------------------|--------------------|-----------------|
| | | X | |

Sensitivity Features:

| Sensitivity | Feature(s) |
|-------------|--|
| Medium | Sensitive species 275 |
| Medium | <i>Oxygonum dregeanum</i> subsp. <i>streyi</i> |
| Medium | <i>Fimbristylis aphylla</i> |
| Medium | Sensitive species 131 |
| Medium | Sensitive species 471 |
| Medium | <i>Aspalathus gerrardii</i> |
| Medium | <i>Thesium polygaloides</i> |

MAP OF RELATIVE DEFENCE THEME SENSITIVITY



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|-----------------------|------------------|--------------------|-----------------|
| | | | X |

Sensitivity Features:

| Sensitivity | Feature(s) |
|-------------|-----------------|
| Low | Low sensitivity |

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|-----------------------|------------------|--------------------|-----------------|
| X | | | |

Sensitivity Features:

| Sensitivity | Feature(s) |
|-------------|---------------------------------|
| Very High | Critically endangered ecosystem |

Appendix B



Environmental & Engineering Consultants

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Tel: 031 262 8327

Fax: 086 726 3619

1World Consultants – Company Profile



1WORLD CONSULTANTS (PTY) LTD

COMPANY PROFILE

1world
consultants

P.O. BOX 2311
WESTVILLE, 3630
TEL: 031 262 8327
FAX: 086 726 3619

INTRODUCTION

1World Consultants (PTY) Ltd. is a multidisciplinary Professional services company, catering to a variety of clients in both the public and private sectors.

At 1World, we have extensive experience in the environmental and energy sectors mostly developed through practical involvement in projects for utilities and private consultants. All our divisions offer personalised attention on every project, by allocating key resources as project champions. The environmental consultants on our team have successfully executed work for large municipalities, namely eThekweni, Msunduzi and Kwadukuza Municipalities. Our consultants in the recently formed Engineering divisions have added knowledge and skills, ranging across many fields of the Built Environment. The unique combination of engineering and environmental knowledge, and experience

enables 1World to provide holistic solutions to a vast range of projects.

VISION

1World Consultants (Pty) Ltd. prides itself on providing individual attention to every project. We aim to be a leading provider of consultancy services for projects in South Africa and beyond.

MISSION

We aim to deliver a quality and efficient service by:

- ✓ Using highly skilled and motivated professionals
- ✓ Consulting with all stakeholders
- ✓ Training and developing our staff
- ✓ Working with local communities
- ✓ Being honest and humble in dealings with stakeholders, providing best value in all aspects of our services

FIELDS OF EXPERTISE

1World Consultants (PTY) Ltd. provide a wide range of services with specialist expertise in the following key core areas and tasks:

- Environmental Services
- Electrical Engineering
- Mechanical Engineering
- Land Survey

ENVIRONMENTAL SERVICES

Drawing on our extensive experience with private and public sector clients, we are able to offer our clients the following services:

- Environmental Planning/Risk Assessments/Screenings/ Due Diligence
- Basic Assessments
- Full scoping and Environmental Impact Assessments (EIA's) and reporting
- Strategic Environmental Assessments
- Facilitation of the Public Participation process
- Water Use License Applications (NWA)
- Waste Management License Applications (NEM:WA)
- Section 24G Rectification Applications
- Environmental Auditing and Site Compliance
- Environmental Control Officer (ECO)
- Environmental Management Plans, recommendations and advice
- Biodiversity/Vegetation Specialist Studies
- Social Impact Assessments

ELECTRICAL ENGINEERING EXPERTISE AND SERVICES

Our past involvement and ongoing engagements with Eskom, especially in KZN, allow us to afford our clients the comfort of knowing that, on matters involving Eskom, the correct people are being addressed to resolve issues quickly and completely.

We offer the following professional services:

Building Services

- Supply alternatives – whether municipal power, backup or power-wheeling agreements.
- Electrical reticulation & distribution design,

- Lighting Design
- Security, Access Control,
- Standby Power generation
- Energy Efficiency Analysis – base line establishment, projects scoping, ROI analysis and roll out co-ordination.
- Building Information Management (BIM) Systems.

Reticulation & Electrification design

- Rural and urban electrification design;
- Building reticulation and refurbishment
- Highway and Street Lighting Designs
- Cathodic Protection Design

Substation & Line design

- High and medium voltage substation design;
- High and medium voltage line design;
- High and medium voltage cable design;

Demand Side Management / Energy Audits

DSM is the process by which electric utilities achieve predictable changes in customer demand, which can be considered as alternatives to the provision of additional generation plant. The following services are offered:

- Commercial
 - Energy efficiency and load management in buildings;
 - In line water heaters;
 - Thermal energy storage;
 - Tariff analysis;
 - Power factor correction
- Industrial
 - Industrial and Power Station energy efficiency;
 - In line water heaters;
 - Industrial Load Control;
 - Tariff analysis;
 - Power factor correction

Power System modelling and simulation

1World has expertise in the following simulation software; PSS/e, DigSILENT, Reticmaster and PowMaster providing the following broad services:

- Master planning;
- Network development planning (NDP);
- Long term load forecasting.
- System analysis and optimisation

Project management

1World offers project management and on-site supervision capabilities for any type of electrical project, especially where we are responsible for detail design of such projects. This allows our engineers to ensure that required standards and quality is maintained during the construction/implementation phases of the project, given the budget and schedule constraints.

CONTROL AND INSTRUMENTATION ENGINEERING

Our exposure to the mining and chemical processing industries provide in-depth understanding of the C&I function within a production plant. We offer the following services:

- Process Engineering
- P & ID generation
- Communication Architecture specification
- Equipment specification

MECHANICAL ENGINEERING EXPERTISE AND SERVICES

Engineering Project Management

Inspection and Evaluation; Status Quo Reports; Repair & Maintenance Programs; Facilities Management; Engineering Construction Management

HVAC Engineering

Design of a Wide Variety of HVAC Systems; Retail; Commercial; Special Process; Chilled water; Air/Water cooled; VRV Ventilation; Smoke extract; Fume/Dust extract

Rational Fire Design

Rational Fire Design, Firefighting Equipment; Fire detection, Public address, Gas Suppression; SCADA Monitoring systems; Fire Department Consultation; And National Building Regulation Fire assessments

Lifts and Escalators

Traffic study; Design of Lifts

Winches and Cranes

Design of Escalators; Winches and Cranes; Weighbridges

Occupational Health & Safety

Risk assessments, HASOP Study; Guidelines to Occupational Health & Safety; Compliance to Construction Regulations; Health & Safety Inspections & reporting

Green Building Design

Analysis of Heat transmission into Building Structures; Solar/Heat pump Hot Water Generation systems; Grey water recycling, Rain water harvesting, boreholes; Energy efficient Electrical systems; Analysis of Electrical and water usage; Compliance SANS204-2011 Energy efficiency in buildings; SANS 10400:XA calculations.

Land Surveying Services Offered

Topographic Surveys

We combine the latest in surveying technology with highly skilled and experienced personnel to deliver cost-effective, high accuracy surveys in both hardcopy and digital mediums, tailored to meet your requirements.

Our Contour Surveys also known as Detail Surveys, Tache /Topographic Surveys, detail all noteworthy features relevant to a particular site. We include positions of buildings, trees, sewerage, draining, communication points, roads, driveways, municipal utilities / services, and levels across the property. This survey can be used as the base plan for your subdivision design/ Development plan.

The professionally drafted plans record:

- Property levels/ spots shots
- Contours at 0.5m intervals (or as required)
- Benchmark level on site
- Building footprint and floor levels
- Noteworthy physical / manmade features
- Utility services (drainage, gas, power, sewer, phone, water, etc)

Infrastructure Surveys

We are able to meet all your Infrastructure Surveying needs from project concept, through to completion.

Benefits of our surveys include:

- Achieve optimal conformance of excavation, shotcrete and final lining layers
- Existing conditions or as-built can be captured rapidly using 3D laser scanning
- Location and survey of underground services prior to works commencing

- Accurate installation and erection of structural steel components on complex and high tolerance structures
- We can manage the entire survey package or work integrated with the main contractors survey team

Services we offer on Infrastructure Surveying projects are:

- Roads setting out
- Pipeline Surveys
- Setting out civils work for construction sites
- Setting out buildings
- Solar farms
- Powerline Surveys
- Underground utility detection
- Volumetric surveys

Cadastral Surveys

From simple property Subdivisions, New township establishments, Consolidations of stands, Beacon certificates and relocations and Sectional title surveys, the team can give you the best advice. By utilizing our range of specialized services such as site surveys and sectional title units development, we can partner with you through the entire 'survey to final sale' process.

We are equipped for every aspect of the job requirement, providing the complete solution. By using the latest technology we're able to be efficient and reactive, with the team available whenever you need them. From topographic and site surveys, through to site subdivisions, township pegging and sectional titles development projects. We also provide assistance on cadastral land advisory (Expropriations, Land reform and management) as well as arbitration on boundary disputes

If you need advice on how best to utilize your land or assistance through the entire land development process, talk to us.

Building Construction Surveys

Benefits include:

- Efficient systems that ensure accuracy and precision without causing delays to construction of high-rise

and low-rise buildings

- Calculate and set-out structures accurately and efficiently

- Rapidly capture precise 3D data to compare as-built to design
- Create 3D modeling of structural modules prior to their mobilization to site
- Unreachable or constricted places can be captured due to highly mobile measuring systems
- Ensure items are within fabrication tolerance specification, safeguarding against compliance issues
- Improved safety through precision monitoring of movement of structures

Services we offer on Building Construction Surveys projects are:

- Super High-rise construction
- Hospitals
- Residential complex and houses
- Schools
- Refurbishments
- Low to medium-rise

SELECTED CLIENT LIST

- Eskom
- Umgeni Water
- Ethekewini Municipality
- Umhlathuze Municipality
- City Power
- UKZN
- Wits University
- Nike South Africa
- Aucor South Africa

KEY PERSONNEL

| | |
|-----------------------|--|
| Environmental: | Fatima Peer, BSc (Hons) Chemistry, Pr Sci Nat fatima@1wc.co.za |
| Electrical: | Mohamed Peer, BSc Electrical Eng, Pr Eng mohamed@1wc.co.za |
| Mechanical: | Mahomed Suhale Baksh, BSc Mechanical Eng, Pr Eng suhale@1wc.co.za |
| Survey: | Yusuf Kajee, BSc Land Surveying, GPrLS yusufk@1wc.co.za |

SUPPORT PERSONNEL

| | |
|-----------------------|---|
| Environmental: | Adila Gafoor, BA Environmental Management Roschel Maharaj, BA Environmental Management Wasila Vorajee, BSc Geology Hassan Mahomed, MSc (contract) |
| Electrical: | Ubaidullah Pandor, BSc Electrical Eng Trevern Naidoo, BTech Electrical Eng Dave Schutte, Pr Techni Eng. Richard Hope-Jones, Pr Eng (contract) Tiego Morowasi, Pr Eng (contract) Sicelo Shongwe, Pr Tech Eng (contract) |
| Mechanical: | Rameez Dendar, B Eng Mechanical Areo Pieterse, Fire Specialist |
| Land Survey: | Congress Mafukele, GPrLS |

PROFESSIONAL REGISTRATION

The team members at 1World Consultants (PTY) Ltd are affiliated to and registered with, amongst other industry specific organisations, the following recognised institutions:

- South African Council for Natural Scientific Professions (SACNASP)
- International Association for Impact Assessment South Africa (IAIASa)
- Engineering Council of South Africa (ECSA)
- South African Federation of Hospital Engineering (SAFHE)
- South African Institute of Mechanical Engineers (SAIMechE)
- South African Institute of Electrical Engineers (SAIEE)
- South African Geomatics Council (SAGC), ex PLATO
- South African Geomatics Institute (SAGI)

COMPANY DETAILS

| | |
|------------------------------|--|
| Legal Name: | 1World Consultants (PTY) Ltd. |
| Operational Years: | 9 years (originally operated as a Sole Proprietor from 2011) |
| Company Reg No.: | 2015/084540/07 |
| VAT Registration No.: | 445 0271 756 |
| B-BBEE Level: | 01 |



Environmental & Engineering Consultants

Postal Address: P.O Box 2311, Westville, 3630

Tel: 031 262 8327

Fax: 086 726 3619

1World Consultants – Company Experience

Current & Previous Work Experience

| NAME OF CONTRACT/ NATURE OF WORK | DURATION | | VALUE OF WORK | | NAME, ADDRESS & TELEPHONE NO. OF CLIENT AND/ OR PROJECT LEADER |
|---|---------------|---------|---------------|----------------------|---|
| | FROM | TO | FEE | CONTRACT (RMILLIONS) | |
| CURRENT PROJECTS | | | | | |
| Basic Assessment Process for the proposed development of residential/ serviced apartments. Location: 49 Casuarina Road, Tongaat Beach | March 2019 | Current | R 127 000 | Undisclosed | Arup (Pty) Ltd Address: Postnet Suite No. 93, Private Bag X1 Melrose Arch 2076 Tel: 082 734 1168 Email: Yusuf.raja@arup.com |
| Basic Assessment and Water Use License Application for the Bhokwe Community Sanitation Project Location: Vryheid | June 2019 | Current | R 250 000 | R 4 000 000 | UKUZA Consulting (Pty) Ltd Name: Chris Govender Address: 15 The Boulevard, Westway Office Park, 3630 Tel: 031 265 0444 Email: chris@ukuza.co.za |
| Basic Assessment Process for the proposed Klerksdorp filling station. Location: Klerksdorp | July 2019 | Current | R 77 100 | Undisclosed | DMC Holdings Name: Naeem Karim Tel: 018 462 9477 |
| Basic Assessment Process for the proposed filling station and associated food outlets. Location: Grimsby Road, Mobeni | April 2019 | Current | R 45 000 | Undisclosed | Aniston Investments (Pty) Ltd Name: Zakir Mahomedy Address: 2 Grimsby Road, Mobeni Tel: 079 513 1025 Email: zmahomedy@gmail.com |
| Basic Assessment Report for the proposed Eskom Battery Energy Storage System (BESS) Elandskop and Pongola Substations. Location: Elandskop and Pongola | February 2019 | Current | R 650 000 | Undisclosed | Eskom Holdings SOC Ltd Name: Mhleli Vezi and Bruce Burger Address: 25 Valley Value Road, New Germany Tel: 031 710 5689/ 031 710 5386 Email: vezimm@eskom.co.za / burgerbj@eskom.co.za |

Current & Previous Work Experience

| | | | | | |
|---|----------------|----------------|-----------|-------------|---|
| Water Use License Applications for the Grootvlei Power Station Location: Grootvlei, Gauteng | September 2018 | Current | R 115 000 | Undisclosed | Eskom Soc Ltd. Name: Hulisani Mutati Address: N3 South Between Heidelberg and Villiers Tel: 017 779 7146 Email: MutatiH@eskom.co.za |
| Water Use License for the construction of a proposed graveyard located in the Mandeni Municipality Location: Mandeni, KZN | October 2018 | Current | R 167 000 | Undisclosed | Mandeni Local Municipality Name: Masupha Mathenjwa Address: 2 Kingfisher Road, Mandeni, KwaZulu-Natal Tel: 082 218 4737 Email: Masupha.Mathenjwa@ilembe.gov.za |
| 2 x EIA Enquiry for proposed new Bethlehem Graveyard Location: Bethlehem, Free State | October 2018 | October 2018 | R 10 000 | Undisclosed | MSS Design Group Name: Mohamed Sayed Address: Unit 24, 53 Anthony Road, Durban North Tel: 031 563 3379 Email: mssarch@wol.co.za |
| Environmental Services to facilitate Wetland Delineation and Functional Assessment for the Orthman Road Shopping Centre Location: Orthman Road, PMB | October 2018 | November 2018 | R 32 000 | Undisclosed | Royal Rice Company Name: Imraan Badrudin Address: 397 Victoria Road, PMB Tel: 033 345 9751 Email: imraan@royalrice.co.za |
| Biodiversity Assessment for the Lodge Uitval and Conference Centre with 26 accommodation chalets and associated infrastructure and related buildings Location: Uitval, KZN | September 2018 | September 2018 | R 30 000 | Undisclosed | Mondli Consulting Name: Brian Mthembu Address: 66 Main Street, Howick Tel: 033 330 2513 Email: mondlib@webmail.co.za |
| Ecological Assessment for 2 Proposed Borrow Pits Associated with the Upgrade of the R61 National Route Location: Ray Nkonyeni Municipality, KZN | September 2018 | September 2018 | R 30 000 | Undisclosed | Kerry Seppings Environmental Consulting Name: Nishkar Maharaj Address: 4 Woodville Lane, Summervelt, Assagay Tel: 063 684 9195 |

Current & Previous Work Experience

| | | | | | |
|---|---------------|---------------|-----------|-------------|---|
| | | | | | Email: nishkar@ksems.co.za |
| Vegetation Assessment and Environmental Screening for the Proposed Solevita Gardens Housing Development Location: Amanzimtoti, KZN | April 2018 | April 2018 | R 30 000 | Undisclosed | ARUP Name: Yusuf Raja Address: 167 Florida Road, Durban, 4001 Tel: 031 328 8700/ 082 734 1168 Email: yusuf.raja@arup.com |
| Basic Assessment for the construction of the Umdloti Beach far South sewage pump station, rising main, gravity sewer reticulation and access road. Location: Umdloti Beach, KZN | February 2018 | Current | R 209 000 | Undisclosed | eThekweni Municipality: Water & Sanitation Name: Vernon Ndlhozi Address: 3 Prior Road, Durban Central, 4001 Tel: 031 311 8549 Email: Vernon.Ndlhozi@durban.gov.za |
| Environmental Screening for the Proposed Nodal Development Location: Umbumbulu, Kzn | December 2017 | December 2017 | R 20 000 | Undisclosed | ARUP Name: Yusuf Raja Address: 167 Florida Road, Durban, 4001 Tel: 031 328 8700/ 082 734 1168 Email: yusuf.raja@arup.com |
| Environmental Screening for the Proposed Cato Ridge Abattoir Location: Cato Ridge, KZN | December 2017 | December 2017 | R 20 000 | Undisclosed | ARUP Name: Yusuf Raja Address: 167 Florida Road, Durban, 4001 Tel: 031 328 8700/ 082 734 1168 Email: yusuf.raja@arup.com |
| ECO Monitoring for the Rehabilitation of the Jukskei River and refurbishment of the Jukskei Park Location: Jukskei, JHB | October 2017 | June 2018 | R 50 000 | Undisclosed | VCAQS Name: Casandra Naidoo Address: 4 Rockdale Avenue, Westville Tel: 031 266 8615 Email: cas@vcaqs.co.za |

Current & Previous Work Experience

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|--|------------------|-----------------|-----------|-------------|--|
| Section 24G application for the rectification of the unlawful commencement and Continuation of a listed Activity situated at 56 Ocean Terrace. Location: Isipingo Beach, KZN | October 2017 | Current | R 85 000 | Undisclosed | AKR Property Development (Pty) Ltd Name: Trivolan Govender Tel: 031 507 7473 Email: accounts@akrgroup.co.za |
| Environmental Impact Report for Proposed Residential Development Location: Pinetown, KZN | May 2017 | May 2017 | R 15 000 | Undisclosed | ARUP Name: Yusuf Raja Address: 167 Florida Road, Durban, 4001 Tel: 031 328 8700/ 082 734 1168 Email: yusuf.raja@arup.com |
| Environmental authorisation, EMP and WULA for the 52km, 300mm diameter Pipeline and associated reservoirs and pump stations for the Umshwathi Bulk Infrastructure Upgrade Project. Location: Ndwedwe Local Municipality, KZN | May 2017 | Current | R683 000 | R 75m | Umgeni Water Name: Zethu Jili Address: 310 Burger St, Pietermaritzburg, 3201 Tel: 033 341 1083/ 083 306 7435 Email: zethu.jili@umgeni.co.za |
| Biodiversity Assessment for the Proposed Port Edward Housing Development Location: Port Edward, KZN | April 2017 | April 2017 | R 20 000 | Undisclosed | ARUP Name: Yusuf Raja Address: 167 Florida Road, Durban, 4001 Tel: 031 328 8700/ 082 734 1168 Email: yusuf.raja@arup.com |
| Nonoti Abattoir - Basic Assessment, EMP and WULA for the establishment of a new bovine abattoir Location: Stanger, KZN | April 2017 | Current | R80 000 | R 12m | ARUP Name: Yusuf Raja Address: 167 Florida Road, Durban, 4001 Tel: 031 328 8700/ 082 734 1168 Email: yusuf.raja@arup.com |
| ECO Monitoring for the Village Walk Shopping Centre (construction of a high rise, mixed-use, building) located on Rivonia Road, Sandton Location: Sandton, JHB | February 2017 | October 2018 | R 100 000 | Undisclosed | ARUP Name: Yusuf Raja Address: 167 Florida Road, Durban, 4001 Tel: 031 328 8700/ 082 734 1168 Email: yusuf.raja@arup.com |

Current & Previous Work Experience

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|--|--------------------------|----------------|--------------------|---------------|--|
| <p>Eastmoor Crescent - Basic Assessment, EMP for the demolishing and re-building of a residential dwelling Location: Eastmoor Crescent, La Lucia</p> | <p>January 2017</p> | <p>Current</p> | <p>R80 000</p> | <p>R 5m</p> | <p>ARUP & Nxasana Sizwe Errol Name: Yusuf Raja Address: 167 Florida Road, Durban, 4001 Tel: 031 328 8700/ 082 734 1168 Email: yusuf.raja@arup.com</p> |
| <p>Glebe Sewer Reticulation; Amendment of Environmental Authorisation Location: Inanda Glebe, Inanda, Durban</p> | <p>November 2016</p> | <p>Current</p> | <p>R172 000</p> | <p>R 25m</p> | <p>eThekwini Municipality: Water & Sanitation Name: Silondiwe Gumede Address: 3 Prior Road, Durban Central, 4001 Tel: 031 311 8751 Email: Silondiwe.gumede@durban.gov.za</p> |
| <p>Lagoon Drive (Fleetwood on Sea) - Basic Assessment, EMP for the refurbishment and extension of a residential block Location: Umhlanga Rocks, Durban</p> | <p>November 2016</p> | <p>Current</p> | <p>R72 000</p> | <p>R 30m</p> | <p>ARUP & Dalmatian Duo Investments Name: Yusuf Raja Address: 167 Florida Road, Durban, 4001 Tel: 031 328 8700/ 082 734 1168 Email: yusuf.raja@arup.com</p> |
| <p>Vegetation Assessment, EMP, ECO Monitoring and Contractor Training Location: Donnelly Road, Wentworth</p> | <p>July 2016</p> | <p>Current</p> | <p>R60 693.60</p> | <p>R 8m</p> | <p>eThekwini Municipality: Department of Human Settlements & Infrastructure- Social Housing Name: Nokuthula Madondo Address: Shell House, 221 Anton Lembede Street, Durban, 4001 Tel: 031 311 - 3218 Email: nokuthula.madondo@durban.gov.za</p> |
| <p>ECO Monitoring for the Pipeline Projects, Wartburg to Bruynshill and South Coast Phases 2B & 2A and Amendment to Environmental Authorisation Location: Wartburg to Bruynshill and South Coast (Scottburg & Kelso)</p> | <p>June 2016</p> | <p>Current</p> | <p>R928 487.93</p> | <p>R 120m</p> | <p>Umgeni Water Name: Asha Ramjatan Address: 310 Burger St, Pietermaritzburg, 3201 Tel: 033 3411 335/ 083 679 4423 Email: Asha.Ramjatan@umgeni.co.za</p> |
| <p>Basic Assessment for the construction of a petrol station and associated infrastructure Location: Overport</p> | <p>June 2016</p> | <p>Current</p> | <p>R90 345</p> | <p>R 6m</p> | <p>Brickfield Investments (Pty) Ltd Name: E.C Vayej Address: 296 Jan Smuts Hwy, Durban, 4091 Tel: 031 207 5683/082 768 0700 Email: evayej@gmail.com</p> |

Current & Previous Work Experience

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|---|------------------|---------|----------|-------|--|
| SANRAL National Route 2 ECO Monitoring: Routine Road Maintenance Environmental Compliance Monitoring Location: Umdloti | February 2016 | Current | R90 288 | R 12m | Aurecon & SANRAL Name: Johan Calitz Address: 4 Daventry Street, Lynnwood manor, 0081 Tel: 012 427 2634 Email: Johan.Calitz@aurecongroup.com |
| EAP & ECO Monitoring, Environmental Training Location: Adams Mission | March 2016 | Current | R124 650 | R 30m | eThekwini Municipality Name: Nomagugu Ncemane Address: 3 Prior Road, Durban Central, 4001 Tel: 031 311 8148 / 071 855 8124 Email: nomagugu.ncemane@durban.gov.za |
| Basic Assessment, Vegetation Assessment, Water Use License Application, Environmental Control Officer Monitoring and Environmental Training for a water pipeline. Location: Alverstone, Hillcrest, Durban | January 2016 | Current | R325 500 | R 47m | eThekwini Municipality: Water & Sanitation Name: Leisel Bowes Address: 3 Prior Road, Durban Central, 4001 Tel: 031 311 8656/ 082 395 8195 Email: leiselbowes@durban.gov |
| Basic Assessment, Water Use License Application, Environmental Control Officer Monitoring and Environmental Training for a water pipeline. Location: Maphephetheni, Inanda, Durban | December 2015 | Current | R355 000 | R 68m | eThekwini Municipality Name: Nomagugu Ncemane Address: 3 Prior Road, Durban Central, 4001 Tel: 031 311 8148 / 071 855 8124 Email: nomagugu.ncemane@durban.gov.za |
| Basic Assessment, Water Use License Application, Environmental Control Officer Monitoring and Environmental Training for the Mbhele Pedestrian Bridge Location: Margate | November 2015 | Current | R260 000 | R 4m | PGA Consulting Name: Marcus Sadhai Address: 53 Intersite Avenue, Umgeni Business Park Tel: 031 263 2583 Email: marcus.sadhai@pgaconsulting.co.za |
| Basic Assessment, Water Use License Application, Environmental Control Officer Monitoring and Environmental Training for a Dressing Pedestrian Bridge Location: Bhomela | November 2015 | Current | R260 000 | R 4m | PGA Consulting Name: Marcus Sadhai Address: 53 Intersite Avenue, Umgeni Business Park |

Current & Previous Work Experience

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|--|-------------------|---------|-----------|--------|--|
| | | | | | Tel: 031 263 2583 Email: marcus.sadhai@pgaconsulting.co.za |
| Basic Assessment, Water Use License Application and ECO Monitoring for Burbreeze Reservoir and Pipeline Location: Tongaat | October 2015 | Current | R280 000 | R 70 | eThekweni Municipality & RHDHV Name: Roxanne Mans Address: 3 Prior Road, Durban Central, 4001 Tel: 083 776 0626 Email: Roxanne.mans@rhdhv.com |
| Training and ECO Monitoring for Reforestation Hub within Buffelsdraai Landfill Site Location: Buffelsdraai | September 2015 | Current | R112 176 | +-R20m | eThekweni Municipality (EPCPD) Name: Errol Douwes Address: 166 K.E Masinga Road, Durban, 4001 Tel: 031 311 7952 Email: Errol.Douwes@durban.gov.za |
| Environmental Control Monitoring Location: Cedara, PMB | November 2015 | Current | +-R20 000 | R 2 | Madrassa An-Noor for the Blind Name: Mohamed Timol Address: Lot 3 Cedara Road, Pietermaritzburg, 3201 Tel: 033 343 3301 Email: admin@mnblind.org |
| Basic Assessment, Water Use License Application and ECO Monitoring for Midnite Café Reservoir and Pipeline Location: Craigieburn | August 2015 | Current | R420 889 | R50m | Royal Haskoning DHV & EtheKwini Municipality Name: Roxanne Mans Address: 19 Park Lane. Umhlanga, 4319 Tel: 083 776 0626 Email: Roxanne.mans@rhdhv.com |
| ECO Monitoring for construction of Brookside Taxi Holding Area Location: Pietermaritzburg | May 2014 | Current | R28 000 | R10m | Msunduzi Municipality: Dept. of Transportation Name: Khethiwe Mvelase Address: 333 Church Street, AS Chetty Building, Pietermaritzburg Tel: 073 593 1885 Email: khethiwe.mvelase@msunduzi.gov.za |

Current & Previous Work Experience

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|--|----------------|----------------|----------|-------|---|
| Formulation of EMP for Rehabilitation of Pipeline Bridge. ECO Monitoring for Rehabilitation of Pipeline Bridge Location: Canelands, Verulam | May 2014 | Current | R94 000 | R10m | eThekwini Municipality & SMEC Name: Leisel Bowes Address: 3 Prior Road, Durban Central, 4001 Tel: 031 311 8656/ 082 395 8195 Email: leiselbowes@durban.gov |
| PREVIOUS PROJECTS | | | | | |
| Environmental Screening for Strip Mall in Newlands West Inanda Square Basic Assessment Location: Newlands West | June 2014 | June 2015 | R52 500 | R6.5m | Arup & SMFT Properties Name: Nadheem Sheik Address: 167 Florida Road, Durban, 4001 Tel: 072 437 8299 Email: nsa@vodamail.co.za |
| Environmental Screening for two sites for waste management facilities Location: Merebank and Verulam | May 2014 | July 2014 | R2 500 | R5m | We're Recycling Pty (Ltd) Name: Riaz Vanker Address: Myrtle Road, Green Office Building, New Germany, 3600 Tel: 082 080 9764 Email: vankersinternational@telkomsa.net |
| Environmental Screening for Warehousing. Location: Newlands West | May | 2014 | R2 500 | R6m | Eminen Architects Name: Muhammed Naroth Address: 292 Grey Street, Durban, 4001 Tel: 078 573 9970 Email: muhammed@eminem.co.za |
| Halpin Avenue Muslim Cemetery – Environmental Screening Location: Halpin Avenue, Reservoir Hills | July 2014 | August 2014 | R5 000 | R3m | PAR Quantity Surveyors Name: Rasheed Peer Address: 2 Chesham Pl, Westville, 3630 Tel: 082 876 5887 Email: arpqs@wol.co.za |
| Sewage Pipeline Basic Assessment, Public Participation and EMP Water Use License Application Location: Pietermaritzburg | August 2014 | July 2016 | R182 000 | R10m | Msunduzi Municipality Water and Sanitation Name: Dhamendra Ragunathan Address: 333 Church Street, AS Chetty Building, Pietermaritzburg |

Current & Previous Work Experience

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|--|------------------|-----------------|---------|------|---|
| | | | | | Tel: 033 392 2115 Email: Dhamendra.Ragoonandan@msunduzi.gov.za |
| EMP for Fuel Retail License Location: Marian Hill | July 2014 | August 2014 | R30 000 | R5m | Woodford Motors cc Name: Owaiys Soleman Address: 41 Woodford Grove, Berea, 4001 Tel: 083 577 8600 Email: owaiys@woodford.co.za |
| Application of Water Use License and coordination of Specialist Study for Rehabilitation of Pipeline Bridge Location: Canelands, Verulam | May 2014 | April 2015 | R25 000 | R10m | eThekweni Municipality: Water & Sanitation Name: Leisel Bowes Address: 3 Prior Road, Durban Central, 4001 Tel: 031 311 8656/ 082 395 8195 Email: leiselbowes@durban.gov |
| Formulation of Vegetation Rehabilitation Plan for Pipeline Bridge. ECO Monitoring for Vegetation Rehabilitation Location: Umgeni | July 2014 | October 2015 | R47 000 | R10m | eThekweni Municipality & SMEC Name: Leisel Bowes Address: 3 Prior Road, Durban Central, 4001 Tel: 031 311 8656/ 076 412 8575 Email: leiselbowes@durban.gov |
| Environmental screening for seven sites earmarked for places of worship. Location: Kwadukuza | May 2014 | July 2014 | R17 000 | R7m | Kwadukuza Municipality Name: Nokubonga Kunene Address: 14 Chief Albert Luthuli Street, KwaDukuza, 4450 Tel: 071 897 9366 Email: nokubongak@kwadukuza.gov.za |
| Application for Waste Management License and related Environmental Authorisation (Basic Assessment) for sewage, contaminated stormwater and food grease storage facilities within the Proposed Drag Race Track and Entertainment Complex. Location: Eddie Hagen Drive, Cato Ridge, Kwazulu Natal | February 2012 | May 2013 | R22 000 | R5m | Pilson Developers cc Name: Rajan Pillay Address: 198 Saunders Circle, Tongaat, 4400 Tel: 084 440 0887 Email: ranap@sanlamsky.co.za |
| Environmental Authorisation (Basic Assessment) for a Proposed Drag Race Track and Entertainment Complex. Location: Eddie Hagen Drive, Cato Ridge, Kwazulu Natal | January 2011 | March 2013 | R35 000 | R5m | Pilson Developers cc Name: Rajan Pillay Address: 198 Saunders Circle, Tongaat, 4400 |

Current & Previous Work Experience

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|---|------------------|------------------|---------|-----|---|
| | | | | | Tel: 084 440 0887 Email: ranap@sanlamsky.co.za |
| Appeals Process (S24G) for Diesel Storage facilities. Location: Erf 104, Cliffdale, Kwazulu Natal | November 2012 | December 2012 | R10 000 | R5m | Trans Africa Farms Name: Rishi Sookoo Address: 20 Montague Drive, Umhlanga Ridge, 4320 Tel: 082 418 6599 Email: transafrica@mweb.co.za |
| Retrospective Environmental Authorisation (Basic Assessment) for unlawful clearing of vegetation and for proposed hydroponic tunnel farm and associated warehousing and facilities. Location: Erf 104, Cliffdale, Kwazulu Natal | January 2010 | March 2011 | R30 000 | R5m | Trans Africa Farms Name: Rishi Sookoo Address: 20 Montague Drive, Umhlanga Ridge, 4320 Tel: 082 418 6599 Email: transafrica@mweb.co.za |
| Appeals Process (S24G) for unlawful clearing of vegetation in a D'MOSS protected area. Location: Erf 104, Cliffdale, Kwazulu Natal | March 2011 | November 2011 | R10 000 | R5m | Trans Africa Farms Name: Rishi Sookoo Address: 20 Montague Drive, Umhlanga Ridge, 4320 Tel: 082 418 6599 Email: transafrica@mweb.co.za |

EAP Team – Declaration and CV’s

DECLARATION OF INTEREST BY ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)



| | |
|--|-------------------------|
| Provincial Reference Number: | (For official use only) |
| NEAS Reference Number: | KZN / EIA / |
| Waste Management Licence Number (if applicable): | |
| Date Received by Department: | |

DETAILS OF EAP AND DECLARATION OF INTEREST

Submitted in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014.

KINDLY NOTE:

1. This form is current as of **October 2019**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.

PROJECT TITLE

Proposed Development of Residential/ Serviced Apartments Situated at 49 Casuarina Road, Tongaat Beach, eThekweni Metropolitan Municipality

DISTRICT MUNICIPALITY

eThekweni Metropolitan Municipality

| | | |
|--|--|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the EAP and Declaration of Interest | Oct 2019 V1 |
|--|--|----------------|

Attainment of a Radically Transformed, Inclusive and Sustainable Economic Growth for KwaZulu-Natal"

DECLARATION OF INTEREST BY ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

IMPORTANT INFORMATION

PLEASE NOTE:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of **October 2019**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the Department for consideration.
4. This form must be hand delivered or posted to the relevant District office. The Head Office Registry may be contacted on **033 - 264 2898 / 2572** for details of the relevant district.
5. All documentation delivered to Head Office must be delivered during the official Departmental Office Hours visible on the Departmental premises.
6. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box or Job Application Box will NOT be accepted, only hardcopy submissions are accepted.

| | | |
|--|--|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the EAP and Declaration of Interest | Oct 2019 V1 |
|--|--|----------------|

“Attainment of a Radically Transformed, Inclusive and Sustainable Economic Growth for KwaZulu-Natal”

DECLARATION OF INTEREST BY ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

1. ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP) INFORMATION

| | | | |
|--|---|-------|--------------|
| Environmental Assessment Practitioner (EAP): | Fatima Peer 1World Consultants (Pty) Ltd | | |
| Contact person: | Fatima Peer | | |
| Postal address: | P.O. Box 2311, Westville | | |
| Postal code: | 3630 | Cell: | 082 640 4900 |
| Telephone: | 031 262 8327 | Fax: | 086 726 3619 |
| E-mail: | fatima@1wc.co.za | | |
| Professional affiliation(s) (if any) | Professional Scientist with South African Council for Natural Scientific Professionals (SACNASP) – Membership No. 400287/11 International Association for Impact Assessment (IAIAsa) – Membership No. 3974 | | |
| Project Consultant: | 1World Consultants (Pty) Ltd | | |
| Contact person: | Roschel Maharaj | | |
| Postal address: | P.O. Box 2311, Westville | | |
| Postal code: | 3630 | Cell: | 063 062 7725 |
| Telephone: | 031 262 8327 | Fax: | 086 726 3619 |
| E-mail: | roschel@1wc.co.za | | |

2. DECLARATION BY EAP

I, **Fatima Peer**, declare that –

General declaration:

- I will comply with the requirements for EAPs as stipulated in Regulation 13(1) of the EIA Regulations, 2014;
- I act as the independent environmental practitioner in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting environmental impact assessments, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected

| | | |
|--|--|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the EAP and Declaration of Interest | Oct 2019 V1 |
|--|--|----------------|

DECLARATION OF INTEREST BY ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;

- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- I will keep a register of all interested and affected parties that participated in a public participation process; and
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- all the particulars furnished by me in this form are true and correct;
- will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998)

Disclosure of Vested Interest (delete whichever is not applicable)

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;



Signature of the environmental assessment practitioner:

1World Consultants (Pty) Ltd

Name of company:

26 August 2020

Date

| | | |
|--|--|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the EAP and Declaration of Interest | Oct 2019 V1 |
|--|--|----------------|

“Attainment of a Radically Transformed, Inclusive and Sustainable Economic Growth for KwaZulu-Natal”

PROJECT ROLE: SENIOR ENVIRONMENTAL ASSESSMENT PRACTITIONER

| | | |
|-----------------------------------|--|---|
| Name: | Fatima Peer |  |
| Telephone: | 031 262 8327 | |
| Fax: | 086 726 3619 | |
| Email: | fatima@1wc.co.za | |
| Professional Registration: | SACNASP – Membership No.: 400287/11 IAIAsa – Membership No.: 3974 | |

| | |
|---------------------------------------|--|
| Nationality at birth | South African |
| Present nationality | South African |
| Date of birth (day,month,year) | 13/12/1976 |
| Place of birth | Durban |
| sex | Male <input type="checkbox"/> Female <input checked="" type="checkbox"/> |

EDUCATION AND TRAINING**(ADD SEPARATE ENTRIES FOR EACH RELEVANT COURSE YOU HAVE COMPLETED, STARTING WITH MOST RECENT)**

| | |
|---|--|
| Date (from – to) | January 1995 – December 2000 |
| Name and type of organization providing education and training | UKZN - University |
| Principal subject/ occupational skills covered | Chemistry and Cell Biology Environmental Management Science, Photochemistry, Wood and Paper Milling, Computational Chemistry |
| Title of qualification awarded | Bachelor of Science in Chemistry (Hons) |

WORK EXPERIENCE**(ADD SEPARATE ENTRIES FOR EACH RELEVANT POST OCCUPIED STARTING WITH THE MOST RECENT)**

| | |
|---|--|
| Date (from- to) | August 2010- Present |
| Name and address of employer | 1World Consultants 181 Winchester Drive, Reservoir Hills, Durban, 4091 |
| Type of business sector | Engineering and Environmental Consultants |
| Occupation or position held | Owner Senior Environmental Assessment Practitioner |
| Main activities and responsibilities | Facilitation of environmental authorisations from Department of Environmental Affairs, Public Participation of projects for authorisation processes Water Use License Applications Waste Management Applications and/or Plans Environmental Management Plans Environmental Control Officer Monitoring Appeals processes Environmental Screening Processes and general advice to clients |

| | |
|---|---|
| Date (from- to) | 2008 – May 2010 |
| Name and address of employer | PAR Quantity Surveyors |
| Type of business sector | Quantity Surveying |
| Occupation or position held | Environmental Consultant |
| Main activities and responsibilities | Environmental Screening Processes and general advice to clients |

| | |
|---|---|
| Date (from- to) | May 2002 - March 2004 |
| Name and address of employer | Sasol Ltd Research and Development |
| Type of business sector | Coal Research and Development |
| Occupation or position held | Senior Scientist |
| Main activities and responsibilities | Research coal processes and investigate novel equipment and/or processes. Lead teams of research. Present at conferences. |

| | |
|---|--|
| Date (from- to) | June 2002- December 2003 |
| Name and address of employer | Sasol Ltd Research and Development |
| Type of business sector | Coal Research and Development |
| Occupation or position held | Safety Representative for Coal & Syngas Research |
| Main activities and responsibilities | Ensure the Coal Processing Unit adhered to safety plans and protocols, by inspections and monitoring |

| | |
|---|---|
| Date (from- to) | January 2001- April 2002 |
| Name and address of employer | Sasol Ltd Research and Development |
| Type of business sector | Coal Research and Development |
| Occupation or position held | Grade 01 Scientist |
| Main activities and responsibilities | Research coal processes and investigate novel equipment and/or processes. |

| | |
|---|---|
| Date (from- to) | 1999-2001 |
| Name and address of employer | University of Natal (Durban) |
| Type of business sector | Academic |
| Occupation or position held | First Year Chemistry Laboratory Demonstrator |
| Main activities and responsibilities | Coach students on lab protocols Assess students on research done in laboratories |

| | |
|---|---|
| Date (from- to) | December 1998 |
| Name and address of employer | Sasol Technology (Process Water) |
| Type of business sector | Research |
| Occupation or position held | Vacation Student |
| Main activities and responsibilities | Investigate used process water and attempt to mitigate it by researching novel ways to reduce the volumes released into rivers. |

PERSONAL SKILLS AND COMPETENCES

(ACQUIRED IN THE COURSE OF LIFE AND CAREER BUT NOT NECESSARILY COVERED BY FORMAL CERTIFICATES AND DIPLOMA)

| | |
|------------------------|-----------------------------------|
| MOTHER TONGUE | ENGLISH |
| OTHER LANGUAGES | AFRIKAANS (BASIC) ZULU (BASIC) |

| (SPECIFY LANGUAGE) | ENGLISH | AFRIKAANS | ZULU |
|--------------------|---------|-----------|------|
| READING SKILLS | PERFECT | GOOD | POOR |
| WRITING SKILLS | PERFECT | GOOD | POOR |
| VERBAL SKILLS | PERFECT | GOOD | FAIR |

| | |
|--------------------|--------|
| DRIVING LICENSE(S) | CODE 8 |
|--------------------|--------|

| | |
|------------------------|---|
| ADDITIONAL INFORMATION | <p>SACNASP MEMBER</p> <p>IAIASa MEMBER</p> <p>ENVIRONMENTAL LAW COURSE</p> <p>ENVIRONMENTAL IMPACT ASSESSMENT : THEORY AND PRACTICE (BY VICKI KING OF METAMORPHOSIS ENVIRONMENTAL CONSULTANTS)</p> <p>ROLES AND RESPONSIBILITIES OF AN ECO (BY IAIASA- INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT SOUTH AFRICA)</p> <p>SPATIAL PLANNING AND LAND USE MANAGEMENT ACT (SPLUMA) (BY IAIASA- INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT SOUTH AFRICA)</p> |
|------------------------|---|

| | |
|--|--|
| BRIEF PROJECT HISTORY: (SELECTED PROJECTS) | <p>CATO RIDGE RACETRACK & ENTERTAINMENT COMPLEX ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED DEVELOPMENT OF A DRAG RACE TRACK, WITH RECREATIONAL AND ENTERTAINMENT FACILITIES IN CATO RIDGE, KWAZULU-NATAL.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • WASTE MANAGEMENT LICENSE • ENVIRONMENTAL MANAGEMENT PLAN • PUBLIC PARTICIPATION PROCESS |
| | <p>CLIFFDALE HYDROPONIC FARM & ASSOCIATED WAREHOUSING ENVIRONMENTAL CONSULTING SERVICES FOR THE DEVELOPMENT OF A HYDROPONIC FARM AND RELATED WAREHOUSING FACILITIES, IN CLIFFDALE, OUTER WEST DURBAN, KWAZULU-NATAL.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • ENVIRONMENTAL MANAGEMENT PLAN • PUBLIC PARTICIPATION PROCESS • APPEALS PROCESS |
| | <p>REHABILITATION OF A PIPELINE BRIDGE ENVIRONMENTAL CONSULTING SERVICES FOR THE REHABILITATION OF A PIPELINE BRIDGE, FOR eTHEKWINI MUNICIPALITY, DEPARTMENT OF WATER & SANITATION, IN VERULAM, DURBAN, KWAZULU-NATAL.</p> <ul style="list-style-type: none"> • ENVIRONMENTAL MANAGEMENT PLAN • WATER USE LICENSE • ECO MONITORING • ENVIRONMENTAL TRAINING |
| | <p>SEWAGE RETICULATION SYSTEM ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED SEWAGE RETICULATION SYSTEM, FOR THE MSUNDUZI MUNICIPALITY, DEPARTMENT OF WATER & SANITATION, IN WARD 20 EDENDALE, PIETERMARITZBURG.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • WATER USE LICENSE • PUBLIC PARTICIPATION • HERITAGE IMPACT ASSESSMENT |
| | <p>UMGENI VEGETATION REHABILITATION ENVIRONMENTAL CONSULTING SERVICES FOR VEGETATION REHABILITATION PLAN FOR A PIPELINE BRIDGE, IN UMGENI.</p> <ul style="list-style-type: none"> • VEGETATION REHABILITATION PLAN • ECO MONITORING |
| | <p>ALVERSTONE WATER PIPELINE PROJECT ENVIRONMENTAL CONSULTING SERVICES FOR A PROPOSED WATER PIPELINE FOR THE eTHEKWINI WATER & SANITATION, IN ALVERSTONE, HILLCREST, KWAZULU-NATAL.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • ECO MONITORING • WATER USE LICENSE • ECO MONITORING • ENVIRONMENTAL TRAINING |
| | <p>BUFFELSDRAAI REFORESTATION HUB ENVIRONMENTAL CONSULTING SERVICES FOR A BUILDING UPGRADE PROJECT AT THE BUFFELSDRAAI LANDFILL SITE, BUFFER ZONE (COMMUNITY REFORESTATION PROJECT), BUFFELSDRAAI, VERULAM, DURBAN, KWAZULU-NATAL.</p> <ul style="list-style-type: none"> • ECO MONITORING • ENVIRONMENTAL TRAINING |
| | <p>FELIX DLAMINI PETROL FILLING STATION AND CONVENIENCE STORE ENVIRONMENTAL CONSULTING SERVICES FOR THE CONSTRUCTION OF A FILLING STATION AND CONVENIENCE STORE LOCATED IN OVERPORT, DURBAN, KWAZULU-NATAL.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • PUBLIC PARTICIPATION • ENVIRONMENTAL AUTHORISATIONS |
| | <p>UMGENI BULK WATER SUPPLY ENVIRONMENTAL CONSULTING SERVICES FOR UMGENI WATER BULK WATER PIPELINE PROJECT, FROM WARTBURG TO BRYUNSHILL AND SOUTH COAST.</p> <ul style="list-style-type: none"> • ECO MONITORING • ENVIRONMENTAL TRAINING • PROJECT ENVIRONMENTAL EXPERT |

DONNELLY ROAD SOCIAL HOUSING PROJECT

ENVIRONMENTAL CONSULTING SERVICES FOR THE CONSTRUCTION OF SOCIAL HOUSING, IN WENTWORTH, DURBAN, KWAZULU-NATAL, FOR THE DEPARTMENT OF HUMAN SETTLEMENTS & INFRASTRUCTURE: SOCIAL HOUSING UNIT.

- VEGETATION ASSESSMENT
- ENVIRONMENTAL MANAGEMENT PLAN
- ECO MONITORING
- ENVIRONMENTAL TRAINING



THE SOUTH AFRICAN COUNCIL
FOR
NATURAL SCIENTIFIC PROFESSIONS

herewith certifies that

Fatima Peer

Registration number: 400287/11

is registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice
(Schedule I of the Act)

Chemical Science

31 August 2011

31 August 2011

Pretoria


President


Chief Executive Officer



University of Natal

We, the Vice-Chancellor, the Registrar,
and the Dean of the Faculty,
hereby certify
that

Fatima Peer

has this day been admitted to
the degree of

Bachelor of Science Honours (Chemistry)



Vice-Chancellor

Registrar

Dean

20 April 2001



IAIAsa Secretariat
Tel +27(0)11 655 7183
Fax 086 662 9849

Address:
43 Birchwood Court, Montrose
Street, Vorna Valley, Midrand,
1618

Postal address:
PO Box 11666, Vorna Valley,
1686
Email: operations@iaiasa.co.za
Website: www.iaiasa.co.za

IAIAsa Confirmation of Membership: 2020/2021
Fatima Peer Membership Number: 3974

04 Mar 2020

TO WHOM IT MAY CONCERN

Mrs Fatima Peer, 1 World Consultants (Pty) Ltd (IAIAsa membership Number **3974**) is a paid-up Full Member in good standing of International Association for Impact Assessment, South Africa and has been a member of IAIAsa since 31 Mar 2015.

Membership has been continuous from 31 Mar 2015 to date.

This membership is valid from 01 Mar 2020 to 28 Feb 2021.

IAIAsa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisation's code of ethics which is available on our website.


Any enquiries regarding this membership may be directed to the Secretariat at the above contact details.

Yours sincerely

Sabelo Nkosi
President 2019/2020

President: S. Nkosi, Past President: R. Luyt, President Elect: A. Adams, Treasurer: T. Bokwe, Secretary: T. Bigwood.
Members: N. Lushozi, J. Richardson, P. Sithole. Branch Chairs: M. Groenink, S. Nkomonde, R. Mbokodi, P. Radford,
C. Roos.

PROJECT ROLE: ENVIRONMENTAL ASSESSMENT PRACTITIONER & WULA OFFICER

| | | |
|-----------------------------------|--|---|
| Name & Surname: | Adila Sheik Gafoor |  |
| Telephone: | +2782 524 3367 | |
| Email: | adila@1wc.co.za | |
| Professional Registration: | IAIAsa (membership no.: 5238) | |

| | |
|---------------------------------------|---|
| Nationally at birth | South African |
| Present nationality | South African |
| Date of birth (day,month,year) | 01/10/1990 |
| Place of birth | Durban |
| Sex | <input type="checkbox"/> Male <input type="checkbox"/> Female <input checked="" type="checkbox"/> x |

WORK EXPERIENCE

(ADD SEPARATE ENTRIES FOR EACH RELEVANT POST OCCUPIED STARTING WITH THE MOST RECENT)

| | |
|---|--|
| Date (from- to) | October 2014- Present |
| Name and address of employer | 1World Consultants |
| Type of business sector | Engineering and Environmental Consultants |
| Occupation or position held | Environmental Assessment Practitioner, WULA Officer & Executive PA |
| Main activities and responsibilities | Project Manager Environmental Compliance Monitoring/Environmental Inspector/Environmental Officer GIS Water Use License Application Officer Basic Assessment Reports Environmental Impact Assessments Screening Public Participation Specialist Co-ordination Office Administrator Tender administrator Data capturing Report writing Minute taking |

| | |
|---|--|
| Date (from- to) | September 2013- September 2014 |
| Name and address of employer | Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH- South African- German Energy Programme (SAGEN) |
| Type of business sector | Renewable Energy, Energy Efficiency and Climate Change |
| Occupation or position held | Intern |
| Main activities and responsibilities | Data capture GIS Digitizing Training of Staff from various municipalities on energy efficient household surveys Field work Report Writing |

| | |
|---|---|
| Date (from- to) | August 2009 – January 2010 |
| Name and address of employer | Umoya-Nilu Consulting |
| Type of business sector | Air Quality Consulting |
| Occupation or position held | Intern |
| Main activities and responsibilities | Administration Database Registration |

EDUCATION AND TRAINING

(ADD SEPARATE ENTRIES FOR EACH RELEVANT COURSE YOU HAVE COMPLETED, STARTING WITH MOST RECENT)

| | |
|---|--|
| TERTIARY LEVEL EDUCATION | |
| Date (from – to) | February 2010 – June 2013 |
| Name and type of organization providing education and training | UKZN – University of KwaZulu Natal |
| Principal subject/ occupational skills covered | Geography and Environmental Management Geographic Information Systems Political Ecology Political Science |
| Title of qualification awarded | BSc/B.Soc.Sci Geography and Environmental Management Science |
| Level in national classification (if appropriate) | NQF 6 |

| | |
|---|--|
| SECONDARY LEVEL EDUCATION | |
| Date (from – to) | January 2004 – November 2008 |
| Name and type of organization providing education and training | Dr. A.D Lazarus Secondary School |
| Principal subject/ occupational skills covered | Maths Accounting History Biology Afrikaans English Life Orientation |
| Title of qualification awarded | Bachelors Pass/Admission to Bachelor's Degree Distinctions in: History Biology English Life Orientation |

PERSONAL SKILLS AND COMPETENCES

(ACQUIRED IN THE COURSE OF LIFE AND CAREER BUT NOT NECESSARILY COVERED BY FORMAL CERTIFICATES AND DIPLOMAS)

| | |
|----------------------|---------|
| MOTHER TONGUE | ENGLISH |
|----------------------|---------|

| | |
|------------------------|-----------------------------------|
| OTHER LANGUAGES | AFRIKAANS (BASIC) ZULU (BASIC) |
|------------------------|-----------------------------------|

| (SPECIFY LANGUAGE) | ENGLISH | AFRIKAANS | ZULU |
|--------------------|---------|-----------|------|
| READING SKILLS | PERFECT | GOOD | POOR |
| WRITING SKILLS | PERFECT | GOOD | POOR |
| VERBAL SKILLS | PERFECT | GOOD | FAIR |

| | |
|--------------------|--------|
| DRIVING LICENSE(S) | CODE 8 |
|--------------------|--------|

| | |
|------------------------|--|
| ADDITIONAL INFORMATION | <p>PROFESSIONAL BUSINESS WRITING</p> <p>ENVIRONMENTAL IMPACT ASSESSMENT: THEORY AND PRACTICE (BY VICKI KING OF METAMORPHOSIS ENVIRONMENTAL CONSULTANTS)</p> <p>ROLES AND RESPONSIBILITIES OF AN ECO (BY IAIASA- INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT SOUTH AFRICA)</p> <p>SPATIAL PLANNING AND LAND USE MANAGEMENT ACT (SPLUMA) (BY IAIASA- INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT SOUTH AFRICA)</p> |
|------------------------|--|

| | |
|---|---|
| BRIEF PROJECT HISTORY: (SELECTED PROJECTS) | <p>SEWAGE RETICULATION SYSTEM ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED SEWAGE RETICULATION SYSTEM, FOR THE MSUNDUZI MUNICIPALITY, DEPARTMENT OF WATER & SANITATION, IN WARD 20 EDENDALE, PIETERMARITZBURG.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • WATER USE LICENSE • PUBLIC PARTICIPATION • HERITAGE IMPACT ASSESSMENT |
| | <p>FELIX DLAMINI PETROL FILLING STATION AND CONVENIENCE STORE ENVIRONMENTAL CONSULTING SERVICES FOR THE CONSTRUCTION OF A FILLING STATION AND CONVENIENCE STORE LOCATED IN OVERPORT, DURBAN, KWAZULU-NATAL.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • PUBLIC PARTICIPATION • ENVIRONMENTAL AUTHORISATIONS |
| | <p>ALVERSTONE WATER PIPELINE PROJECT ENVIRONMENTAL CONSULTING SERVICES FOR A PROPOSED WATER PIPELINE FOR THE ETHEKWINI WATER & SANITATION, IN ALVERSTONE, HILLCREST, KWAZULU-NATAL.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • WATER USE LICENSE • PUBLIC PARTICIPATION |

| | |
|--|--|
| | <p>MAPHEPHETHENI WATER TREATMENT WORKS ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED WATER TREATMENT WORKS PROJECT, WHICH WILL INCLUDE THE INSTALLATION OF A WATER PIPELINE AND THE CONSTRUCTION OF RESERVOIRS AND PUMP STATIONS FOR THE DEPARTMENT OF WATER & SANITATION, IN MAPHEPHETHENI, INANDA, KWAZULU-NATAL.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • WATER USE LICENSE • PUBLIC PARTICIPATION |
| | <p>BURBREEZE WATER PIPELINE AND ASSOCIATED INFRASTRUCTURE ENVIRONMENTAL CONSULTING SERVICES FOR A WATER PIPELINE, RESERVOIR AND PUMP STATION FOR ETHEKWINI WATER & SANITATION, IN TONGAAT, KWAZULU-NATAL.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • WATER USE LICENSE • PUBLIC PARTICIPATION |
| | <p>BUFFELSDRAAI REFORESTATION HUB ENVIRONMENTAL CONSULTING SERVICES FOR A BUILDING UPGRADE PROJECT AT THE BUFFELSDRAAI LANDFILL SITE, BUFFER ZONE (COMMUNITY REFORESTATION PROJECT), BUFFELSDRAAI, VERULAM, DURBAN, KWAZULU-NATAL.</p> <ul style="list-style-type: none"> • ECO MONITORING • ENVIRONMENTAL TRAINING |
| | <p>UMGENI BULK WATER SUPPLY ENVIRONMENTAL CONSULTING SERVICES FOR UMGENI WATER BULK WATER PIPELINE PROJECT, FROM WARTBURG TO BRYUNSHILL AND SOUTH COAST.</p> <ul style="list-style-type: none"> • ECO MONITORING • ENVIRONMENTAL TRAINING |
| | <p>DONNELLY ROAD SOCIAL HOUSING PROJECT ENVIRONMENTAL CONSULTING SERVICES FOR THE CONSTRUCTION OF SOCIAL HOUSING, IN WENTWORTH, DURBAN, KWAZULU-NATAL, FOR THE DEPARTMENT OF HUMAN SETTLEMENTS & INFRASTRUCTURE: SOCIAL HOUSING UNIT.</p> <ul style="list-style-type: none"> • ECO MONITORING • VEGETATION ASSESSMENT • ENVIRONMENTAL MANAGEMENT PLAN |



UNIVERSITY OF TM
KWAZULU-NATAL

INYUVESI
YAKWAZULU-NATALI

This is to certify that

Adila Sheik Gafoor

was admitted this day
at a congregation of the University
to the degree of

Bachelor of Social Science
(Geography and Environmental Management)

having satisfied the conditions prescribed for the degree.



M W Makgoba
Vice-Chancellor

MC Bafoyi
Registrar

SM Mutula
Acting Dean



7 April 2014



LIV PROTECTED



IAIAsa Secretariat
Tel +27(0)11 655 7183
Fax 086 662 9849

Address:
43 Birchwood Court, Montrose
Street, Vorna Valley, Midrand,
1618

Postal address:
PO Box 11666, Vorna Valley,
1686
Email: operations@iaiasa.co.za
Website: www.iaiasa.co.za

IAIAsa Confirmation of Membership: 2020/2021
Adila Sheik Gafoor Membership Number: 5238

04 Mar 2020

TO WHOM IT MAY CONCERN

Miss Adila Sheik Gafoor, 1 World Consultants (Pty) Ltd (IAIAsa membership Number **5238**) is a paid-up Full Member in good standing of International Association for Impact Assessment, South Africa and has been a member of IAIAsa since 01 Jul 2016.

Membership has been continuous from 01 Jul 2016 to date.

This membership is valid from 01 Mar 2020 to 28 Feb 2021.

IAIAsa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisation's code of ethics which is available on our website.


Any enquiries regarding this membership may be directed to the Secretariat at the above contact details.

Yours sincerely

Sabelo Nkosi
President 2019/2020

President: S. Nkosi, Past President: R. Luyt, President Elect: A. Adams, Treasurer: T. Bokwe, Secretary: T. Bigwood.
Members: N. Lushozi, J. Richardson, P. Sithole. Branch Chairs: M. Groenink, S. Nkomonde, R. Mbokodi, P. Radford,
C. Roos.

PROJECT ROLE: ENVIRONMENTAL ASSESSMENT PRACTITIONER & ECO

| | | |
|-----------------------------------|--|---|
| Name & Surname: | Roschel Maharaj |  |
| Telephone: | +2763 062 7725 | |
| Email: | roschel@1wc.co.za | |
| Professional Registration: | Registered EAP (membership no.: 2019/824) IAIAsa (membership no.: 5390) | |

| | |
|---------------------------------------|--|
| Nationally at birth | South African |
| Present nationality | South African |
| Date of birth (day,month,year) | 04/06/1992 |
| Place of birth | Durban |
| Sex | <input type="checkbox"/> Male <input checked="" type="checkbox"/> Female |

EDUCATION AND TRAINING

(ADD SEPARATE ENTRIES FOR EACH RELEVANT COURSE YOU HAVE COMPLETED, STARTING WITH MOST RECENT)

| | |
|---|--|
| TERTIARY LEVEL EDUCATION | |
| Date (from – to) | February 2011– November 2014 |
| Name and type of organization providing education and training | UKZN – University of KwaZulu Natal |
| Principal subject/ occupational skills covered | Geography Environmental Science Geographic Information Systems |
| Title of qualification awarded | BSc Geography and Environmental Science |
| Level in national classification (if appropriate) | NQF 7 |

WORK EXPERIENCE

(ADD SEPARATE ENTRIES FOR EACH RELEVANT POST OCCUPIED STARTING WITH THE MOST RECENT)

| | |
|---|---|
| Date (from- to) | 01 November 2016 - Current |
| Name of employer | 1World Consultants (Pty) Ltd |
| Type of business sector | Environmental and Engineering Consultants |
| Occupation or position held | Environmental Consultant |
| Main activities and responsibilities | <ul style="list-style-type: none"> - Drafting Basic Assessment Reports, Scoping and EIA'S - Drafting Water Use License Applications and Technical Reports - Compliance & Monitoring (ECO Duties) - Environmental Audits - Drafting EMP'S - Lodging Applications with Government Authorities - Public Participation Facilitator |
| Date (from- to) | 16 March 2015 – 30 October 2016 |
| Name of employer | HANSLAB (Pty) Ltd |
| Type of business sector | Environmental and Ground Engineering Specialist |
| Occupation or position held | Environmental Consultant |
| Main activities and responsibilities | <ul style="list-style-type: none"> Drafting Basic Assessment Reports, Scoping and EIA'S - Drafting Water Use License Applications and Technical Reports - Compliance & Monitoring (ECO Duties) - Environmental Audits |

| | |
|--|--|
| | <ul style="list-style-type: none"> - Drafting EMP'S - Lodging Applications with Government Authorities - Public Participation Facilitator |
|--|--|

| | |
|---|--------------------------------------|
| Date (from- to) | 13 June 2013 – 27 June 2013 |
| Name of employer | Royal Haskoning DHV |
| Type of business sector | Consulting |
| Occupation or position held | Intern |
| Main activities and responsibilities | Assist mentor in all aspects of work |

PERSONAL SKILLS AND COMPETENCES

(ACQUIRED IN THE COURSE OF LIFE AND CAREER BUT NOT NECESSARILY COVERED BY FORMAL CERTIFICATES AND DIPLOMAS)

| | |
|----------------------|---------|
| MOTHER TONGUE | ENGLISH |
|----------------------|---------|

| | |
|------------------------|-----------------------------------|
| OTHER LANGUAGES | AFRIKAANS (BASIC) ZULU (BASIC) |
|------------------------|-----------------------------------|

| (SPECIFY LANGUAGE) | ENGLISH | AFRIKAANS | ZULU |
|--------------------|---------|-----------|------|
| READING SKILLS | PERFECT | GOOD | POOR |
| WRITING SKILLS | PERFECT | GOOD | POOR |
| VERBAL SKILLS | PERFECT | GOOD | FAIR |

| | |
|---------------------------|--------|
| DRIVING LICENSE(S) | CODE 8 |
|---------------------------|--------|

| | |
|--|--|
| BRIEF PROJECT HISTORY: (SELECTED PROJECTS) | <p>EXTENSION AND REFURBISHMENT OF A MULTI-STORY RESIDENTIAL BLOCK</p> <p>ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED REFURBISHMENT AND EXPANSION OF A MULTI-STORY RESIDENTIAL BLOCK SITUATED AT 50 LAGOON DRIVE, LOCATED WITHIN THE ETHEKWINI MUNICIPALITY.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • PUBLIC PARTICIPATION • ENVIRONMENTAL AUTHORISATIONS |
| | <p>DEMOLISHING AND REBUILD OF A RESIDENTIAL DWELLING</p> <p>ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED DEMOLISHING AND RE-BUILD OF A RESIDENTIAL DWELLING SITUATED AT 18 EASTMOOR CRESCENT, LA LUCIA WITHIN THE ETHEKWINI MUNICIPALITY.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • PUBLIC PARTICIPATION • ENVIRONMENTAL AUTHORISATIONS |
| | <p>MADRASSA AN-NOOR FOR THE BLIND</p> <p>ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED EXPANSIONS TO THE MADRASSA AN-NOOR FOR THE BLIND ON ERF2 AND 3, CEDARA ROAD, UMNGENI MUNICIPALITY.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • PUBLIC PARTICIPATION • ENVIRONMENTAL AUTHORISATIONS |
| | <p>SEWER RETICULATION PROJECT</p> <p>ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED CONSTRUCTION OF THE INANDA GLEBE SEWER RETICULATION WITHIN THE ETHEKWINI MUNICIPALITY.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • PUBLIC PARTICIPATION • ENVIRONMENTAL AUTHORISATIONS |
| | <p>KWA JUSTICE FOODS AGRI-PROJECT</p> <p>ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED CONSTRUCTION OF THE NONOTI ABATTOIR WITHIN THE ILEMBE DISTRICT.</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • PUBLIC PARTICIPATION • ENVIRONMENTAL AUTHORISATIONS • WATER USE LICENSE APPLICATION |
| | <p>56 OCEAN TERRACE</p> <p>ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED RECTIFICATION AND CONTINUATION OF THE MULTI-STOREY RESIDENTIAL COMPLEX AT 56 OCEAN TERRACE, ISIPINGO BEACH, ETHEKWINI MUNICIPALITY</p> <ul style="list-style-type: none"> • S24G APPLICATION • PUBLIC PARTICIPATION • ENVIRONMENTAL AUTHORISATIONS |
| | <p>ESKOM BATTERY ENERGY STORAGE SYSTEM</p> <p>ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED BATTERY ENERGY STORAGE SYSTEM FOR THE EXISTING ELANDSKOP AND PONGOLA SUBSTATIONS</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • PUBLIC PARTICIPATION • ENVIRONMENTAL AUTHORISATIONS |
| | <p>PROPOSED RESIDENTIAL/ SERVICED APARTMENTS</p> <p>ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED RESIDENTIAL/ SERVICED APARTMENTS SITUATED AT 49 CASUARINA ROAD</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • PUBLIC PARTICIPATION • ENVIRONMENTAL AUTHORISATIONS |
| | <p>VULINDLELA ECO-VILLAGE</p> <p>ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED VULINDLELA ECO-VILLAGE</p> <ul style="list-style-type: none"> • BASIC ASSESSMENT • PUBLIC PARTICIPATION • ENVIRONMENTAL AUTHORISATIONS |

EAPASA

Unit 19 Oxford Office Park
3 Bauhinia Street
Highveld Techno Park
Centurion
0157
Tel. (+27) 12 880 2154

Environmental Assessment Practitioners Association of South Africa

Advancing environmental assessment practice in South Africa



Email: registrar@eapasa.org / Website: www.eapasa.org

Miss Roschel Maharaj
48 Deltapalm Gardens Palmview Phoenix
Durban
4068

Sent by email to: roschelmaharaj@gmail.com

Dear Miss Maharaj

**Registered Environmental Assessment Practitioner: Number 2019/824
Roschel Maharaj : South African ID 9206040060083**

The Environmental Assessment Practitioners Association of South Africa (EAPASA) herewith certifies that Roschel Maharaj is a Registered Environmental Assessment Practitioner (EAP) in accordance with the prescribed criteria of Regulation 15.(1) of the Section 24H Registration Authority Regulations (Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).

Your registration is duly authorised by EAPASA as the single Registration Authority for EAPs in South Africa (appointed as per Regulation No. 104, Gazette No. 41434 of 8 February 2018, in terms of section 24H(3)(a) of the NEMA). Your status as a Registered EAP is displayed in the 'EAP Register' - please find your name and contact email address at

<https://registration.eapasa.org/registered-practitioners>

Your registration is effective for a period of five years from 12 May 2020, and expires on 12 May 2025. The renewal of your registration in 2025 will be contingent on you having met the requirements of EAPASA's Continuing Professional Development (CPD) policy during each year of registration.

As a Registered EAP you are required to uphold the EAPASA Code of Ethical Conduct and Practice in your professional endeavours, towards the goal of quality assurance in environmental assessment practice.

Please accept my congratulations on your registration.

Best regards

Dr Richard Hill
Registrar
Date: 12 May 2020

Board Members: Ms Snowy Makhudu (Chairperson), Mr Khangwelo Desmond Musetsho (Vice-Chairperson),
Mr Ntsako Baloyi, Mr Zama Dlamini, Mr Siyabonga Gqalangile, Ms Jacqui Hex, Mr Phumudzo Nethwadzi, Mr Danie Neumann.
Registrar: Dr Richard Hill
NPO Reg. No. 122-986



UNIVERSITY OF TM
KWAZULU-NATAL

INYUVESI
YAKWAZULU-NATALI

This is to certify that

Roschel Maharaj

was admitted this day
at a congregation of the University
to the degree of

Bachelor of Science

having satisfied the conditions prescribed for the degree.



A S van Jaarsveld
Vice-Chancellor

B Poo
Acting Registrar

A Modi
Dean



15 April 2015



UV PROTECTED



IAIASa Secretariat
Tel +27(0)11 655 7183
Fax 086 662 9849

Address:
43 Birchwood Court, Montrose
Street, Vorna Valley, Midrand,
1618

Postal address:
PO Box 11666, Vorna Valley,
1686
Email: operations@iaiasa.co.za
Website: www.iaiasa.co.za

IAIASa Confirmation of Membership: 2020/2021
Roschel Maharaj Membership Number: 5390

04 Mar 2020

TO WHOM IT MAY CONCERN

Miss Roschel Maharaj, 1World Consultants (Pty) Ltd (IAIASa membership Number **5390**) is a paid-up Full Member in good standing of International Association for Impact Assessment, South Africa and has been a member of IAIAsa since 29 Nov 2016.

Membership has been continuous from 29 Nov 2016 to date.

This membership is valid from 01 Mar 2020 to 28 Feb 2021.

IAIASa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisation's code of ethics which is available on our website.

Any enquiries regarding this membership may be directed to the Secretariat at the above contact details.

Yours sincerely

Sabelo Nkosi
President 2019/2020

President: S. Nkosi, Past President: R. Luyt, President Elect: A. Adams, Treasurer: T. Bokwe, Secretary: T. Bigwood.
Members: N. Lushozi, J. Richardson, P. Sithole. Branch Chairs: M. Groenink, S. Nkomonde, R. Mbokodi, P. Radford,
C. Roos.

PROJECT ROLE: TRAINEE ENVIRONMENTAL ASSESSMENT PRACTITIONER

| | |
|----------------------------|------------------|
| Name & Surname: | Wasila Vorajee |
| Telephone: | +2760 395 8597 |
| Email: | wasila@1wc.co.za |



| | |
|---------------------------------------|--|
| Nationally at birth | South African |
| Present nationality | South African |
| Date of birth (day,month,year) | 26/09/1995 |
| Place of birth | Ladysmith |
| Sex | Male <input type="checkbox"/> Female <input checked="" type="checkbox"/> |

EDUCATION AND TRAINING

(ADD SEPARATE ENTRIES FOR EACH RELEVANT COURSE YOU HAVE COMPLETED, STARTING WITH MOST RECENT)

| TERTIARY LEVEL EDUCATION | |
|---|---|
| Date (from – to) | February 2017 – November 2017 |
| Name and type of organization providing education and training | UKZN – University of KwaZulu Natal |
| Principal subject/ occupational skills covered | Environmental and Engineering Geology Hydrogeology Geographic Information Systems |
| Title of qualification awarded | BSc HONS Geological Sciences |
| Level in national classification (if appropriate) | NQF 8 |

WORK EXPERIENCE

(ADD SEPARATE ENTRIES FOR EACH RELEVANT POST OCCUPIED STARTING WITH THE MOST RECENT)

| | |
|---|--|
| Date (from- to) | 01 February 2018 - Current |
| Name of employer | 1World Consultants (Pty) Ltd |
| Type of business sector | Environmental and Engineering Consultants |
| Occupation or position held | Trainee Environmental Consultant |
| Main activities and responsibilities | - Drafting Basic Assessment Reports, Scoping and EIA'S - Drafting EMP'S - Assisting with Public Participation - Assisting with Tender Documents - Administration |

PERSONAL SKILLS AND COMPETENCES

(ACQUIRED IN THE COURSE OF LIFE AND CAREER BUT NOT NECESSARILY COVERED BY FORMAL CERTIFICATES AND DIPLOMAS)

| | |
|---------------|---------|
| MOTHER TONGUE | ENGLISH |
|---------------|---------|

| | |
|-----------------|-----------------------------------|
| OTHER LANGUAGES | AFRIKAANS (BASIC) ZULU (BASIC) |
|-----------------|-----------------------------------|

| (SPECIFY LANGUAGE) | ENGLISH | AFRIKAANS | ZULU |
|--------------------|---------|-----------|------|
| READING SKILLS | PERFECT | GOOD | POOR |
| WRITING SKILLS | PERFECT | GOOD | POOR |
| VERBAL SKILLS | PERFECT | GOOD | FAIR |

| | |
|--------------------|--------|
| DRIVING LICENSE(S) | CODE 8 |
|--------------------|--------|

| | |
|---|--|
| BRIEF PROJECT HISTORY: (SELECTED PROJECTS) | <p>SECTION 24G ENVIRONMENTAL CONSULTING SERVICES FOR THE RECTIFICATION OF THE UNLAWFUL COMMENCEMENT AND CONTINUATION OF THE DEVELOPMENT SITUATED AT 56 OCEAN TERRACE, ISIPINGO BEACH LOCATED WITHIN THE ETHEKWINI MUNICIPALITY</p> <ul style="list-style-type: none"> SECTION 24G APPLICATION PUBLIC PARTICIPATION ENVIRONMENTAL AUTHORISATION |
| | <p>SEWER RETICULATION PROJECT ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED CONSTRUCTION OF THE INANDA GLEBE SEWER RETICULATION WITHIN THE ETHEKWINI MUNICIPALITY.</p> <ul style="list-style-type: none"> BASIC ASSESSMENT PUBLIC PARTICIPATION ENVIRONMENTAL AUTHORISATION |
| | <p>KWA JUSTICE FOODS AGRI-PROJECT ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED CONSTRUCTION OF THE NONOTI ABATTOIR WITHIN THE ILEMBE DISTRICT.</p> <ul style="list-style-type: none"> BASIC ASSESSMENT PUBLIC PARTICIPATION ENVIRONMENTAL AUTHORISATION |
| | <p>UMSHWATHI BULK WATER SUPPLY SCHEME: PHASE 4 ENVIRONMENTAL CONSULTING SERVICES FOR THE PROPOSED CONSTRUCTION OF THE 51KM PIPELINE AND VARIOUS RESERVOIRS WITHIN THE NDWEDWE LOCAL MUNICIPALITY.</p> <ul style="list-style-type: none"> BASIC ASSESSMENT PUBLIC PARTICIPATION ENVIRONMENTAL AUTHORISATION |

herewith certifies that

Wasila Vorajee

Registration Number: 123009

is registered as a

Candidate Natural Scientist

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

Geological Science

Effective **11 September 2019**

Expires **31 March 2020**



Botha

Chairperson

M. J. ...

Chief Executive Officer





UNIVERSITY OF TM
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

This is to certify that

Wasila Vorajee

was admitted this day
at a congregation of the University
to the degree of

Bachelor of Science Honours
(Geology)

having satisfied the conditions prescribed for the degree

AS van Jaarsveld
Vice – Chancellor

SS Mokoena
Registrar

O Mutanga
Dean



18 April 2018
LIV PROTECTED



00003340



IAIASa Secretariat
Tel +27(0)11 655 7183
Fax 086 662 9849

Address:
43 Birchwood Court, Montrose
Street, Vorna Valley, Midrand,
1618

Postal address:
PO Box 11666, Vorna Valley,
1686
Email: operations@iaiasa.co.za
Website: www.iaiasa.co.za

IAIASa Confirmation of Membership: 2020/2021
Wasila Vorajee Membership Number: 5891

04 Mar 2020

TO WHOM IT MAY CONCERN

Ms Wasila Vorajee, 1World Consultants (Pty) Ltd (IAIASa membership Number **5891**) is a paid-up Full Member in good standing of International Association for Impact Assessment, South Africa and has been a member of IAIAsa since 27 Mar 2018.

Membership has been continuous from 27 Mar 2018 to date.

This membership is valid from 01 Mar 2020 to 28 Feb 2021.

IAIASa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisation's code of ethics which is available on our website.

Any enquiries regarding this membership may be directed to the Secretariat at the above contact details.

Yours sincerely

Sabelo Nkosi
President 2019/2020

President: S. Nkosi, Past President: R. Luyt, President Elect: A. Adams, Treasurer: T. Bokwe, Secretary: T. Bigwood.
Members: N. Lushozi, J. Richardson, P. Sithole. Branch Chairs: M. Groenink, S. Nkomonde, R. Mbokodi, P. Radford,
C. Roos.

Yusuf Raja



Profession

Environment and Sustainability

Date of Birth

11 June 1978 (Durban)

Current Position

Associate

Joined Arup

May 2008

Years of Experience

15

Nationality

South African

Qualifications

BSc University of Natal, Durban
(April 2002)

Masters Course on Smart Cities –
Imperial College London

Masters Course in Low Carbon
Economies – Arup University
Warwick (February 2013)

Master of Business Administration
(MBA - pending dissertation) -
Management College of South
Africa (2009)

Green Building Council SA
(Accredited Professional) (June
2009)

IFC Performance Standards
Training (2014) – Conducted by
the IFC

Environmental Law – Aldo
Leopold Institute (June 2004)

Environmental Management
Inspectors Course (Green
Scorpions), University of Pretoria
& DEAT (September 2007)

Environmental Management
Inspector: Compliance and

ARUP

Yusuf has unique experience as an environmental specialist working both within multi-disciplinary consulting teams and within the public sector. His experience ranges from major infrastructure projects through to macro & micro integrated planning projects around Africa. His particular strength being able to direct and guide other technical specialists on the aspects and impacts of their activities throughout the project life cycle.

Yusuf also has many years' experience working in the statutory monitoring & enforcement environment and was a qualified Environmental Management Inspector (Green Scorpion) during his time working for the Provincial Department of Environmental Affairs. This has provided him with a good understanding of environmental management regulations and enforcement of legal process and good conflict management and facilitation skills. He has particular experience in undertaking environmental and sustainability due diligence studies and his ability to understand the link between value and risk a key attribute.

Yusuf brings the complementary skills of environmental, business, planning, sustainability and project management to any team through his background, education, and experience.

Arup: Associate (April 2011 – current)

Selected Recent Projects:

- **Equator Principles & IFC Standards:** acting as lenders technical advisor specifically in terms of compliance with Equator Principles and IFC Standards for various projects in South Africa, Zimbabwe, and Nigeria. Majority of these were renewable energy projects.
- **Renewable Energy Projects:** Have been involved with various renewable energy projects across South Africa and sub-Saharan Africa. Majority of these include wind, PV, rooftop PV, biomass and CSP projects ranging from 1MW to >150MW which fall within the South Africa REIPPP program. Experience varies across the project life cycle including feasibility studies; ESIA permitting and authorisations; construction monitoring and reporting; and operational monitoring and reporting.
- **EIA / ESIA Projects**
 - Kampala BRT Project: project managing the environmental and social aspects of the project in line with Ugandan regulations and the World Bank equator principles IFC Performance Standards requirements
 - BOST Oil & Gas, Ghana
 - Hammarsdale Logistics park – 30 hectare greenfields development
 - New multi products pipeline project
 - Bulk Fuel Storage Facility in Alrode
 - Multi-use development – Durban
 - Warehouse development, Cliffdale – 10ha greenfields development
 - Coastal Residential Development, La Lucia, Durban
 - High Rise Residential Development, Umhlanga, Durban
- **Due Diligence & Environmental Screening:** Have undertaken due diligence and environmental screening for various projects (recent projects below):
 - PV Facility in the Northern Cape
 - Bulk Fuel Storage Facility, Durban Harbour
 - Renewable energy projects across South Africa and Africa
 - Bulk fuel storage facility in Alrode, Gauteng
 - Rail route selection studies
 - Liberty Property Group – Umhlanga mixed use development
 - Foxwood dam

ARUP

Enforcement Training – University of Pretoria (March 2006)

Project Management - Certificates SQDC (July 2008) & ProjectPro (July 2010)

Carbon Foot Print Course – Aspects International (July 2009)

Environmental Management Systems ISO14001, Potchefstroom University (October 2003)

Introduction to Environmental Auditing, ISO14001, Wynleigh International & Potchefstroom University (March 2004)

Environmental Impact Assessment, University of Natal (April 2003)

Hazardous Waste Course – Institute of Waste Management (November 2007)

Hazard Material, First Responder Awareness Level Training, Sasol (October 2003)

Waste Management Training, Ray and June Lombard (Icando) (August 2003)

Construction Procurement – CESA (November 2008)

Professional Associations

Member of the International Association of Impact Assessment - IAIA

Green Building Council SA

Project Management Institute

Conferences

Presented paper/poster at IAIA 2009 Conference titled, “*Project Managing the Environmental Approvals Process*” (Awarded 3rd place)

Jack Zunz Leadership Forum (Beijing, 2013)

Panel of Environmental Experts on the 2015 ASRI Civil Society Conference Discussing South Africa’s National Development Plan

- Nampak Bevcan Plant Expansion
- Greytown Hospital
- OR Tambo Midfield Development
- Joburg Fresh Produce Market
- Richard Carte Road, Durban South – 65 000m² warehouse development
- Wilshire Road, Pinetown – 40 000m² light industrial project
- Pipeline routing study – Durban South
- Nonoti Red Meat Abattoir, Stanger
- Mixed-use Development, Bhisho, Eastern Cape
- Sustainability Frameworks:
 - UKZN Medical Campus: compiled the sustainability framework for the proposed new campus
 - University of Zululand: compiled the sustainability framework for the proposed upgrade
 - Pick and Pay: Assisted with the development of the corporate sustainability study
 - BMW SA: Assisted with development of a site specific sustainability plan and carbon foot print assessment
- Transnet DIA Dig-Out-Port: Part of the Transaction Advisory team that undertook the feasibility study and business plan for the proposed R100bn new port in Durban
- EMP Development & Environmental Control Office Roles:
 - Jozini Bulk Water Supply Project
 - Umdoni Municipality Rehabilitation projects
 - Ellis Brown Viaduct (North and South)
 - Eris Properties GreenStar Building
 - Richards Bay Industrial Facility.
 - Hammarsdale 30ha Logistics Warehouse development
 - 210000m² warehouse in South Durban
- Carbon Footprint Assessment:
 - COP17: Appointed by eThekweni to calculate the carbon footprint of the COP17 event together with assisting on the offset strategy and carbon disclosure report.
 - BOST Ghana Oil and Gas Project
- NBI Private Sector Energy Efficiency Project: Appointed to a select panel by the NBI (project partly funded by DFID) to undertake energy efficiency audits of large companies with energy bills in excess of R45m /annum that have registered within the programme.
- Site Environmental / Contamination Assessments:
 - Rupture of fuel pipeline in the KZN Midlands. Responsible for remediation process
 - Assessment of contamination of various fuel filling station sites
 - Undertook a first level environmental assessment of the Nampak Collect-a-Can site in Vanderbijlpark, Gauteng
 - Vegetable Oil Refinery fire with canal and harbour contamination: responsible for managing the NEMA Section 30 process as well as the clean-up operations.
 - Baseline assessment of existing warehouse in South Durban

Arup: Senior Environmental Consultant (May 2008 – March 2011)

Projects:

- Transnet New-Multi Product Pipeline: This is a ±R22bn project and includes a 550km fuel pipeline between Durban and Heidelberg and includes 2 accumulation terminals and 8 pump stations. Responsible for project managing the EIA process which was completed in 11 months which is a South African record for a project of this scale and magnitude. Presented to the International Association for Impact Assessment (IAIA) for which we received an award.
- DAEA Energy Audit: Appointed by the Provincial Department of Agriculture and Environmental Affairs to undertake a comprehensive energy audit on its main campus in Cedara. Employed the Arup Building Retrofit Tool to develop an action plan to address the outcomes of the audit.
- N1 / N2 Equator Principles Review: Technical advisor to Standard Bank. Involved the review of environmental documents (i.e. EIA, EMP, specialist

Committees

Arup Employment Equity Committee

Arup Sustainability Task Force

Publications & Interviews

Arup Thoughts Article on COP17 (www.arup.com)

Profiled by the South African Broadcasting Corporation (SABC3) television show “An NUR” Season 9 Episode 30
[Watch Here](#)

studies) for the N1 / N2 road project to determine compliance to Equator Principles.

- Master planning for FIFA World Cup 2010: Involved from an environmental planning and approvals perspective for 2 of the Host Cities (i.e Durban and Polokwane).
- Green Star Multi Unit Residential Tool Development: Development of a Green Star multi-unit residential tool for the green building council of South Africa

Dept of Agriculture & Environmental Affairs KZN, Associate Director, Pollution & Waste Management (Aug '06 – May '08) – Implementation and enforcement of pollution and waste management legislation within the eThekweni (Durban) and Ilembe (Stanger) Region.

Participated on the following national projects / initiatives / programmes:

- Assessed and decided upon various Industrial EIA's pertaining to pollution and waste related activities
- National Refineries Project – audited all 6 major fuel refineries in the country
- National Ferro Alloy Project – audited a few ferro alloy plants across the country
- National Pulp and Paper Project – audited Sappi & Mondi plants across the country
- Represented government of the Coastal Working Groups and Blue Flag Committee
- Represented government on landfill monitoring committees
- Responded to NEMA Section 30 emergency incidents
- Represented government in monitoring the rehabilitation of various contaminated sites (chrome 6 contamination; hydrocarbon contamination etc.)

Department of Agriculture & Environmental Affairs KZN – Senior Environmental Officer (April '05 – July '06)

Key responsibility of this role was Monitoring and Enforcement of the region to achieve responsible development and the protection of the environment.

- Assessed and decided upon EIA applications for various types of projects across the region
- Audit development to ensure compliance with EMPs and Record of Decision
- Provide technical, procedural and legal advice, to applicants, consultants and other stakeholders with respect to relevant environmental legislation and policies
- Review and assess reports, documents and specialist studies
- Attend meetings and site visits with developers and consultants
- Analyse, interpret & evaluate environmental data information for decision making

Department of Agriculture & Environmental Affairs KZN – Environmental Officer (April '02- March '05)

Key responsibility was compliance monitoring and enforcement of the region, to achieve responsible development and the protection of the environment.

- Audit development to ensure compliance with EMPs and Record of Decision
- Provide technical, procedural and legal advice, to applicants, consultants and other stakeholders with respect to relevant environmental legislation and policies
- Review and assess reports, documents and specialist studies
- Attend meetings and site visits with developers and consultants
- Analyse, interpret & evaluate environmental data information for decision making



Environmental & Engineering Consultants

Postal Address: P.O Box 2311, Westville, 3630

Tel: 031 262 8327

Fax: 086 726 3619

Specialist Team - Declaration and CV's

DECLARATION OF INTEREST BY SPECIALIST



| | |
|--|-------------------------|
| | (For official use only) |
| Provincial Reference Number: | |
| NEAS Reference Number: | KZN / EIA / |
| Waste Management Licence Number (if applicable): | |
| Date Received by Department: | |

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

Submitted in terms of section 24(2) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) or for a waste management licence in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

KINDLY NOTE:

1. This form is current as of **October 2019**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.

PROJECT TITLE

Biodiversity Baseline & Impact Report - Proposed Residential/Hotel Development

DISTRICT MUNICIPALITY

eThekweni Metropolitan Municipality

1. SPECIALIST INFORMATION

| | | | |
|--------------------------------------|--|-------|--------------|
| Specialist name: | Andrew Husted – The Biodiversity Company | | |
| Contact person: | Andrew Husted | | |
| Postal address: | 777 Peridot Street, Jukskei Park | | |
| Postal code: | 2188 | Cell: | 081 319 1225 |
| Telephone: | | Fax: | 086 527 1965 |
| E-mail: | andrew@thebiodiversitycompany.com | | |
| Professional affiliation(s) (if any) | Pr Sci Nat registered (400213/11) | | |

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the Specialist and Declaration of Interest | Oct 2019 V1 |
|--|---|----------------|

DECLARATION OF INTEREST BY SPECIALIST

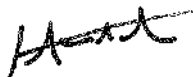
| | | | |
|---------------------------|--|-------|--------------|
| Project Consultant / EAP: | 1World Consultants (Pty) Ltd | | |
| Contact person: | Roschel Maharaj | | |
| Postal address: | P.O. Box 2311, Westville | | |
| Postal code: | 3630 | Cell: | 063 062 7725 |
| Telephone: | 031 262 8327 | Fax: | 086 726 3619 |
| E-mail: | roschel@1wc.co.za | | |

2. DECLARATION BY THE SPECIALIST

I, **Andrew Husted**, declare that --

General declaration:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist

The Biodiversity Company

Name of company

24/07/2020

Date

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the Specialist and Declaration of Interest | Oct 2019 V1 |
|--|---|----------------|

Andrew Husted

M.Sc Aquatic Health (*Pr Sci Nat*)

Cell: +27 81 319 1225

Email: andrew@thebiodiversitycompany.com

Identity Number: 7904195054081

Date of birth: 19 April 1979



Profile Summary

Working experience throughout South Africa, West and Central Africa and also Armenia.

Specialist experience with on-shore drilling, mining, engineering, hydropower and renewable energy.

Considerable experience with project management of national and international multi-disciplinary projects. Including managing and compiling ESHIAs and EMPs

Specialist guidance, support and facilitation for the compliance with legislative processes, for in-country requirements, and international lenders.

Specialist expertise include Instream Flow and Ecological Water Requirements, aquatic ecology and wetlands resources.

Areas of Interest

Mining, Oil & Gas, Renewable Energy & Bulk Services Infrastructure Development, Sustainability and Conservation.

Publication of scientific journals and articles.

Key Experience

- Familiar with World Bank, Equator Principles and the International Finance Corporation requirements
- Environmental, Social and Health Impact Assessments (ESHIA)
- Environmental Management Programmes (EMP)
- Ecological Water Requirement determination experience
- Wetland delineations and ecological assessments
- Rehabilitation Plans and Monitoring
- Fish population structure assessments
- The use of macroinvertebrates to determine water quality
- Aquatic Ecological Assessments
- Aquaculture

Country Experience

Botswana
Cameroon
Democratic Republic of Congo
Ghana
Ivory Coast
Lesotho
Liberia
Mali
Mozambique
Republic of Armenia
Senegal
Sierra Leone
South Africa

Nationality

South African

Languages

English – Proficient

Afrikaans – Conversational

German - Basic

Qualifications

- MSc (University of Johannesburg) – Aquatic Health.
- BSc Honours (Rand Afrikaans University) – Aquatic Health
- BSc Natural Science
- Pr Sci Nat (400213/11)
- Certificate of Competence: Mondli Wetland Assessments
- Certificate of Competence: Wetland WET-Management
- SASS 5 (Expired) – Department of Water Affairs and Forestry for the River Health Programme
- EcoStatus application for rivers and streams

SELECTED PROJECT EXPERIENCE

Project Name: A biodiversity baseline assessment for the proposed Siguiri Gold Mine Project, in Kankan Province, Guinea.

Client: SRK Consulting.

Personal position / role on project: Project Manager.

Location: Siguiri, Guinea, West-Africa (2018).

Main project features: To conduct a dual season ecological baseline assessment for the expected impact footprint area. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline and impact assessment for the proposed Lesotho Bulk Water Supply Scheme, Lesotho.

Client: WSP.

Personal position / role on project: Wetland & Aquatic Ecologist, PROBFLO and Project Manager.

Location: Mohale's Hoek, Lesotho (2018).

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the pipeline route and proposed weir. The study was required to meet national and IFC requirements, including a Critical Habitat assessment. The study also contributed to prescribing Instream Flow Requirements using PROBFLO for the system.

Project Name: A biodiversity baseline and impact assessment for the proposed Pavia Hydropower Project, in Sofala Province, Central Mozambique.

Client: Mott MacDonald.

Personal position / role on project: Project Manager.

Location: Sofala Province, Mozambique (2017).

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the expected impact footprint area, including Gorongosa National. The study was required to meet national and IFC requirements, including a Critical Habitat assessment. The study also contributed to prescribing Instream Flow Requirements for the system.

Project Name: An aquatic and wetland specialist baseline and impact assessment for the proposed Onshore 2D seismic Survey in Block P5-A, in Maputo and Gaza Provinces.

Client: Impacto.

Personal position / role on project: Wetland / Aquatic Specialist.

Location: Maputo & Gaza Provinces, Mozambique (2016).

Main project features: To conduct a dry season (Winter) ecological baseline and impact assessment of the watercourses for the proposed Delonex Energy project.

Project Name: The ecological constraints mapping and Critical Habitat re-evaluation for the Anadarko LNG project: Specialist Consultant to conduct Ecological Studies (Fauna and Habitat) and the delineation of wetland systems.

Client: Anadarko.

Personal position / role on project: Wetland Specialist.

Location: Afungi, Mozambique (2015).

Main project features: To identify and map the ecological constraints is to support contractor activities. To redefine the critical habitats within the project area

Project Name: A Joint Basin Survey of the Upper Orange, Lower Orange and Vaal catchments to determine the current status of the systems: Specialist Consultants to conduct Ecological Studies (Fish, Macroinvertebrate, Diatoms, Water Quality and Habitat) and report on the current status (defining system trends).

Client: ORASECOM.

Personal position / role on project: Specialist Ichthyologist.

Location: South Africa (including Namibia, Botswana & Lesotho) (2015).

Main project features: To determine the current status of the catchments and to discuss the temporal and spatial trends of the monitoring reaches.

Project Name: Ecological baseline assessment of local river systems for the Ntem Iron Ore Mine: Specialist Consultants to Undertake Baseline Studies (Fish, Macroinvertebrate, Water Quality and Habitat).

Client: IMIC.

Personal position / role on project: Senior Ichthyologist.

Location: Cameroon (2013).

Main project features: Establishment of the ecological baseline status and functioning assessment of the local river systems.

Project Name: Instream Flow Requirement determination study for the Kibali River hydropower project: Specialist Consultants to Undertake Baseline Studies (Flow, Water Quality and Geomorphology) and Instream Flow Requirement (IFR) Assessment.

Client: Randgold Resources.

Personal position / role on project: Ichthyologist and IFR.

Location: DRC (2012).

Main project features: Establishment of the ecological flow requirements of fishes within the Kibali River.

Project Name: Cost analysis, including the current and potential earning potential of an aquaculture facility: Specialist Consultants to determine the Cost (Current & Potential Earnings) and the Construction of an identical facility (Physical Costs).

Client: Goldstone Resources.

Personal position / role on project: Ichthyologist.

Location: Ghana (2012).

Main project features: Conduct a detailed costs analysis of an aquaculture facility for the compensation for the removal of the operation.

Project Name: Instream Flow Requirement determination study for the Nzoro River hydropower project: Specialist Consultants to Undertake Baseline Studies (Flow, Water Quality and Geomorphology) and Instream Flow Requirement (IFR) Assessment.

Client: Randgold Resources.

Personal position / role on project: Ichthyologist and IFR.

Location: DRC (2011).

Main project features: Establishment of the ecological flow requirements of fishes within the Nzoro River.

Project Name: Environmental study to establish the baseline biological and physical conditions of the Letsibogo Dam.

Client: European Union

Personal position / role on project: Ichthyologist.

Location: Selebi-Phikwe, Botswana (2007 - 2009).

Main project features: Evaluation of the existing fish communities within the Letsibogo Man-made lake with specific consideration of the threats of alien invasive fishes in the lake. The study resulted in the publication of two peer-reviewed papers titled: Comparative behavioural assessment of an established and a new Tigerfish *Hydrocynus vittatus* population in two man-made lakes in the Limpopo (O'Brien et al., 2013) and First observation of Africa Tigerfish (*Hydrocynus vittatus*) preying on Barn Swallows (*Hirundo rustica*) in flight (O'Brien et al., in press).

Project Name: Environmental and Social Impact Assessment of the Kazungula Bridge, Zambezi River.

Client: Loci on behalf of the Government of Botswana.

Personal position / role on project: Ichthyologist.

Location: Botswana, Zambia, Namibia and Zimbabwe (2009-2010).

Main project features: Evaluation of the current ecological integrity status of various living and non-living components of the Zambezi River ecosystem and the potential ecological and social consequences of the construction and use of the Kazungula Bridge. The study showed that although water quality and habitat modification impacts will occur as a result of the construction and use of the bridge the long term impacts associated with the operation of the bridge should not result in any major impacts to the local aquatic ecosystem.

OVERVIEW

An overview of the specialist technical expertise include the following:

- Aquatic ecological state and functional assessments of rivers and dams.
- Instream Flow Requirement or Ecological Water Requirement using PROBFLO studies for river systems.
- Ecological wetland assessment studies, including the integrity (health) and functioning of the wetland systems.
- Wetland offset strategy designs.
- Wetland rehabilitation plans.
- Monitoring plans for rivers and other wetland systems.
- Toxicity and metal analysis of water, sediment and biota.
- Bioaccumulation assessment of fish communities.
- Fish telemetry assessment that included the translocation of fish as well as the monitoring of fish in order to determine the suitability of the hosting system.
- Faunal surveys which includes mammals, birds, amphibians and reptiles.
- The design, compilation and implementation of Biodiversity and Land Management Plans and strategies.

TRAINING

Some of the more pertinent training undergone includes the following:

- Wetland and Riparian Delineation Course for Consultants (Certificate of Competence) – DWAF 2008
- The threats and impacts posed on wetlands by infrastructure and development: Mitigation and rehabilitation thereof – Gauteng Wetland Forum 2010
- Ecological State Assessment of Lentic Systems using Fish Population Dynamics – University of Johannesburg/Rivers of Life 2010
- Soil Classification and Wetland Delineation – Terra Soil Science 2010
- Wetland Rehabilitation Methods and Techniques - Gauteng Wetland Forum 2011
- Application of the Fish Response Assessment Index (FRAI) and Macroinvertebrate Response Assessment Index (MIRAI) for the River Health Programme 2011
- Tools for a Wetland Assessment (Certificate of Competence) – Rhodes University 2011
- PROBFLO for conducting Ecological Flow Assessments – 2018/19

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (January 2015 – Present)

I founded The Biodiversity Company in 2015, now consisting of experienced ecologists who provide technical expertise and policy advice to numerous sectors, such as mining, agriculture, construction and natural resources. The team at The Biodiversity Company have conducted stand-alone specialist studies, and provided overall guidance of studies with a pragmatic approach for the management of biodiversity that takes into account all the relevant stakeholders, most importantly the environment that is potentially affected. We manage risks to the environment to reduce impacts with practical, relevant and measurable methods.

EMPLOYMENT: Digby Wells Environmental (October 2013 – December 2014)

Digby Wells assigned me to the role of Country Manager for the United Kingdom. This was a new endeavour for the company as the company's global footprint continues to increase. The primary responsibilities for the role included the following:

- **Client liaison** to be able to interact more efficiently and personally with current mining clients, mining industry service providers, legal firms and banking institutions in order to introduce Digby Wells as a services provider with the aim of securing work.
-

- **Project management** for international projects which may require a presence in the United Kingdom, this was dependent on the location and needs of the client. These projects would mostly be based on the Equator Principles (EP) and International Finance Corporation (IFC) Performance Standards.
- **Technical input** to provide specialist technical expertise for projects, this included fauna, aquatic ecology, wetlands and rehabilitation. Continued with the design and implementation of Biodiversity and Land Management Plans to assist clients with managing the natural resources. Responsibilities also included the mentorship and management (including reviewing and guiding) other expertise such as flora, fauna and pedology.

EMPLOYMENT: Digby Wells Environmental (March 2012 – September 2013)

Manager of a multi-disciplinary department of scientists providing specialist services in support of national and international requirements as well as best practice guidelines, primarily focussing on the mining sector. In addition to managing the department, I was also expected to contribute specialist services, most notably focusing on water resources. Further responsibilities also included the management of numerous projects on a national or international scale. A general overview of the required responsibilities are as follows:

- **Project management** for single as well as multi-disciplinary studies on a national and international scale. This included legislation and commitments for the respective country being operated in, as well as included the World Bank (WB), EP and IFC requirements.
- **Individual and/or team management** in order to provide mentoring and supportive structures for development and growth in support of the company's strategic objectives.
- **Scientific report writing** to ensure that the relevant standards and requirements have been attained, namely local country legislation, as well as WB, EP and IFC requirements.
- **Report reviewing** in order to ensure compliance and consideration of relevant legislation and guidelines and also quality control.
- **Specialist management** to facilitate the collaboration and integration of specialist skills for the respective projects. This also included the development of Biodiversity and Land Management Plan for clients.
- **Client Resource Manager** for numerous clients in order to establish as well as maintain working relationships.

An overview of the tenure working with the company is provided below:

- **October 2013 – December 2014: London Operations Manager** – Deployed to establish a presence for the company (remote office) in the United Kingdom by means of generating project work to support the employment of staff and operation of a business structure.
- **March 2012 – September 2013: Biophysical Department Manager** – Responsible for the development and growth of the department to consist of four specialist units. This included the development of a new specialist unit, namely Rehabilitation.
- **January 2011 - February 2012: Ecological Unit Manager** – In addition to implementing aquatic and wetland specialist services, the role required the overall management of additional specialist services which included fauna & flora.
- **June 2010 - December 2010: Aquatic Services Manager** – This required the marketing and implementation of specialist programmes for the client base such as biomonitoring and wetland off-set strategies. In addition to this, this also included expanding on the existing skill set to include services such as toxicity, bioaccumulation and ecological flow assessments.
- **August 2008: Aquatic ecologist** – Employed as a specialist to establish the aquatic services within the company. In addition to this, wetland specialist services were added to the existing portfolio.

PREVIOUS EMPLOYMENT: Econ@UJ (University of Johannesburg)

- June 2007 – July 2008: Junior aquatic ecologist
 - Researcher
 - Technical assistant for fieldwork
-

- Reporting writing
- Project management

ADDITIONAL EXPERIENCE

| | |
|----------------------------|--|
| Compliance audits | Conducting site investigations in order to determine the level of compliance attained, ensuring that the client maintains an appropriate measure of compliance with environmental regulations by means of a legislative approach |
| Control officer | Acting as an independent Environmental Control Officer (ECO), acting as a quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts |
| Screening studies | Project investigations in order to determine the level of complexity for the environmental and social studies required for a project. This is a form of risk assessment to guide the advancement of the project. |
| Public consultation | The provision of specialist input in order to communicate project findings as well as assist with providing feedback if and when required. |
| Water use licenses | Consultation with the relevant authorities in order to establish the project requirements, as well as provide specialist (aquatics/wetland) input for the application in order to achieve authorisation. |
| Closure | Primarily the review of closure projects, with emphasis on the closure cost calculations. Support was also provided by assisting with the measurements of structures during fieldwork. |
| Visual | The review of visual studies as well as the collation of field data to be considered for the visual interpretation for the project. |

ACADEMIC QUALIFICATIONS

University of Johannesburg, Johannesburg, South Africa (2009): MAGISTER SCIENTIAE (MSc) - Aquatic Health:

Title: *Aspects of the biology of the Bushveld Smallscale Yellowfish (*Labeobarbus polylepis*): Feeding biology and metal bioaccumulation in five populations.*

Rand Afrikaans University (RAU), Johannesburg, South Africa (2004): BACCALAUREUS SCIENTIAE CUM HONORIBUS (Hons) – Zoology

Rand Afrikaans University (RAU), Johannesburg, South Africa (2001 - 2004): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Zoology and Botany.

PUBLICATIONS

Tate RB and Husted, A. 2015. Aquatic Biomonitoring in the upper reaches of the Boesmanspruit, Carolina, Mpumalanga, South Africa. African Journal of Aquatic Science.

Tate RB and Husted A. 2013. Bioaccumulation of metals in *Tilapia zillii* (Gervai, 1848) from an impoundment on the Badeni River, Cote D'Ivoire. African Journal of Aquatic Science.

O'Brien GC, Bulfin JB, Husted A. and Smit NJ. 2012. Comparative behavioural assessment of an established and new Tigerfish (*Hydrocynus vittatus*) population in two manmade lakes in the Limpopo catchment, Southern Africa. African Journal of Aquatic Science.

Tomschi, H, Husted, A, O'Brien, GC, Cloete, Y, Van Dyk C, Pieterse GM, Wepener V, Nel A and Reisinger U. 2009. Environmental study to establish the baseline biological and physical conditions of the Letsibogo Dam near Selebi Phikwe, Botswana. EC Multiple Framework Contract Beneficiaries.8 ACP BT 13 – Mining Sector (EDMS). Specific Contract N° 2008/166788. Beneficiary Country: Botswana. By: HPC HARRESS PICKEL

CONSULT AG

Husted A. 2009. Aspects of the biology of the Bushveld Smallscale Yellowfish (*Labeobarbus polylepis*): Feeding biology and metal bioaccumulation in five populations. The University of Johannesburg (Thesis).

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Andrew Husted

Registration number: 400213/11

is registered as a

Professional Natural Scientist

**in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)**

in the following field(s) of practice (Schedule I of the Act)

Aquatic Science

13 July 2011



13 July 2011

Pretoria

President

Executive Director



UNIVERSITY
OF
JOHANNESBURG

The Council and the Senate of the
UNIVERSITY OF JOHANNESBURG
hereby certify that the degree

MAGISTER SCIENTIAE

with field of study

Aquatic Health

with all its associated rights and privileges
in accordance with the Statute of the
University has been conferred upon

ANDREW HUSTED

at a congregation of the University

Vice-Chancellor

Registrar

01 OCTOBER 2009
Johannesburg
ID 7904195054081

LUCY KOESLAG
COMMISSIONER OF OATHS
SECTION 9, FERN ISLE BUILDING
359 PRETORIA AVENUE, RANDBURG
TEL: 011 789-9495

**CERTIFIED A TRUE
COPY OF THE ORIGINAL**
6 AUGUST 2013



37167

DECLARATION OF INTEREST BY SPECIALIST



| | |
|--|-------------------------|
| | (For official use only) |
| Provincial Reference Number: | |
| NEAS Reference Number: | KZN / EIA / |
| Waste Management Licence Number (if applicable): | |
| Date Received by Department: | |

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

Submitted in terms of section 24(2) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) or for a waste management licence in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

KINDLY NOTE:

1. This form is current as of **October 2019**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.

PROJECT TITLE

Biodiversity Baseline & Impact Report - Proposed Residential/Hotel Development

DISTRICT MUNICIPALITY

eThekweni Metropolitan Municipality

1. SPECIALIST INFORMATION

| | | | |
|--------------------------------------|--|-------|--------------|
| Specialist name: | Martinus Erasmus – The Biodiversity Company | | |
| Contact person: | Martinus Erasmus | | |
| Postal address: | 777 Peridot Street, Jukskei Park | | |
| Postal code: | 2188 | Cell: | |
| Telephone: | | Fax: | 086 527 1965 |
| E-mail: | martinus@thebiodiversitycompany.com | | |
| Professional affiliation(s) (if any) | Cand Sci Nat | | |

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the Specialist and Declaration of Interest | Oct 2019 V1 |
|--|---|----------------|

DECLARATION OF INTEREST BY SPECIALIST

| | | | |
|---------------------------|--|-------|--------------|
| Project Consultant / EAP: | 1World Consultants (Pty) Ltd | | |
| Contact person: | Roschel Maharaj | | |
| Postal address: | P.O. Box 2311, Westville | | |
| Postal code: | 3630 | Cell: | 063 062 7725 |
| Telephone: | 031 262 8327 | Fax: | 086 726 3619 |
| E-mail: | roschel@1wc.co.za | | |

2. DECLARATION BY THE SPECIALIST

I, **Martinus Erasmus**, declare that --

General declaration:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist

The Biodiversity Company

Name of company

24/07/2020

Date

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the Specialist and Declaration of Interest | Oct 2019 V1 |
|--|---|----------------|

Martinus Erasmus

B-Tech Nature Conservation (*Cand Sci Nat*)

Cell: +27 82 448 1667

Email: martinus@thebiodiversitycompany.com

Identity Number: 9209035136082

Date of birth: 03 September 1992



Profile Summary

Working experience throughout South Africa and Africa.

Specialist experience with mining, hydropower, renewable energy, development and veld management.

Specialist guidance, support and facilitation for the compliance with legislative processes, for in-country requirements.

Specialist expertise includes Botany and Terrestrial Ecology.

Areas of Interest

Mining, Oil & Gas, Renewable Energy & Bulk Services
Infrastructure Development, Sustainability and Conservation.

Key Experience

- Environmental, Social and Health Impact Assessments (ESHIA)
- Terrestrial Ecological Assessments
- Rehabilitation Plans and Monitoring
- Botany, especially in the Limpopo, Mpumalanga, Gauteng and North-West provinces in South-Africa.
- Veld management and Veld Condition

Countries worked in

Guinea
Lesotho
Liberia
Mozambique
Nigeria
South Africa
Swaziland

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient

Qualifications

- B-Tech in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa.
- National Diploma in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa.
- Cand Sci Nat (118630)
- SASS Accredited

SELECTED PROJECT EXPERIENCE

Project Name: A biodiversity baseline and impact assessment for the proposed Umsimbithi Emakhazeni Coal Mining Project, in Mpumalanga Province, South Africa.

Personal position / role on project: Terrestrial Ecologist.

Location: Mpumalanga Province, South Africa (2017).

Main project features: To conduct a dual season terrestrial ecology baseline and impact assessment for the expected impact footprint area.

Project Name: Biodiversity Assessment associated with eThembeni Integrated Mixed-use Housing Development, KwaZulu-Natal province.

Personal position / role on project: Terrestrial Ecologist

Location: South Africa (2017).

Main project features: Conduct a detailed terrestrial ecology basic assessment for the expected impact footprint area.

Project Name: A biodiversity baseline and impact assessment for the proposed Pavua Hydropower Project, in Sofala Province, Central Mozambique.

Personal position / role on project: Assistant Botanist

Location: Sofala Province, Mozambique (2017).

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the expected impact footprint area, including Gorongosa National. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline and impact assessment for the proposed Gold Mine Project, in Grand Cape Mt Province, Liberia.

Personal position / role on project: Assistant to specialist/ field technician

Location: Grand Cape Mt Province, Liberia (2015).

Main project features: To conduct a dual season ecological baseline assessment for the expected impact footprint area. The study was required to meet national and IFC (International Finance Corporation) requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline and impact assessment for the proposed Siguiri Gold Mine Project, in Kankan Province, Guinea.

Personal position / role on project: Terrestrial Ecologist

Location: Siguiri, Guinea, West-Africa (2018)

Main project features: To conduct a dual season terrestrial ecological baseline and impact assessment for the expected impact footprint area. The study was required to meet national and IFC (International Finance Corporation) requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline and impact assessment for the proposed Nondvo Dam Project in Eswatini, Southern Africa

Personal position / role on project: Terrestrial Ecologist (Botany)

Location: Swaziland (2019)

Main project features: To conduct a dual season terrestrial ecological baseline and impact assessment for the expected impact footprint area. The study was required to meet national and IFC (International Finance Corporation) requirements, including a Critical Habitat assessment.

Project Name: Biodiversity Baseline & Impact Assessment for the proposed Cuamba 15MW Solar PV Plant, Cuamba, Mozambique

Personal position / role on project: Terrestrial Ecologist (Botany)

Location: Mozambique (2019)

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the proposed development.

OVERVIEW

An overview of the specialist technical expertise includes the following:

- Terrestrial Ecological Assessments.
- Faunal surveys which includes mammals, birds, amphibians and reptiles.
- Floral surveys
- Rehabilitation Plans and Monitoring for the terrestrial component.
- Botany, especially in the Limpopo, Mpumalanga, Gauteng and North-West provinces in South-Africa.
- Veld management
- Environmental Control Officer (ECO) experience

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (August 2017 – Present)

I started working at The Biodiversity Company in mid-2017.

The team at The Biodiversity Company have conducted stand-alone specialist studies and provided overall guidance of studies with a pragmatic approach for the management of biodiversity that takes into account all the relevant stakeholders, most importantly the environment that is potentially affected. We manage risks to the environment to reduce impacts with practical, relevant and measurable methods.

My roles include:

- Faunal and Floral surveys for baseline, basic or impact assessments;
- Floral surveys for vegetation verifications, management plans and alien invasive species control;
- Report writing;
- Equipment management;
- Technical assistant for fieldwork for the aquatics and wetland departments; and
- Specialist inputs to the above mention services.

EMPLOYMENT: Enviro-Insight (January 2015 – July 2017)

Enviro-Insight assigned me to the role of general and field assistant. I assisted most specialists in field but also had administrative duties:

- The processing and uploading of several organisms to the ADU (Animal Demography Unit) virtual museum, which assists in obtaining spatial data concerning those species.
- Assisted with the generation of the companies' DNA database which distributes the DNA samples to the South African National Biodiversity Institute (SANBI).
- Assisted with field work involving all the different specialist work which includes mammalogy, herpetology and botany.

ADDITIONAL EXPERIENCE

| | |
|----------------------------|--|
| <i>Compliance audits</i> | Conducting site investigations in order to determine the level of compliance attained, ensuring that the client maintains an appropriate measure of compliance with environmental regulations by means of a legislative approach |
| <i>Control officer</i> | Acting as an independent Environmental Control Officer (ECO), acting as a quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts |
| <i>Public consultation</i> | The provision of specialist input in order to communicate project findings as well as assist with providing feedback if and when required. |
| <i>Closure</i> | Primarily the review of closure projects, with emphasis on the closure cost calculations. Support was also provided by assisting with the measurements of structures during fieldwork. |

ACADEMIC QUALIFICATIONS

B-Tech in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa:

Title: The expansion of the distribution of *Xenopus muelleri*.

National Diploma in Nature Conservation , Tshwane University of Technology, Pretoria, South Africa

DECLARATION OF INTEREST BY SPECIALIST



| | (For official use only) |
|--|-------------------------|
| Provincial Reference Number: | |
| NEAS Reference Number: | KZN / EIA / |
| Waste Management Licence Number (if applicable): | |
| Date Received by Department: | |

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

Submitted in terms of section 24(2) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) or for a waste management licence in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

KINDLY NOTE:

1. This form is current as of **October 2019**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.

PROJECT TITLE

Biodiversity Baseline & Impact Report - Proposed Residential/Hotel Development

DISTRICT MUNICIPALITY

eThekweni Metropolitan Municipality

1. SPECIALIST INFORMATION

| | | | |
|--------------------------------------|--|-------|--------------|
| Specialist name: | Lindi Steyn – The Biodiversity Company | | |
| Contact person: | Lindi Steyn | | |
| Postal address: | 777 Peridot Street, Jukskei Park | | |
| Postal code: | 2188 | Cell: | |
| Telephone: | | Fax: | 086 527 1965 |
| E-mail: | lindi@thebiodiversitycompany.com | | |
| Professional affiliation(s) (if any) | PhD in Biodiversity and Conservation | | |

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the Specialist and Declaration of Interest | Oct 2019 V1 |
|--|---|----------------|

DECLARATION OF INTEREST BY SPECIALIST

| | | | |
|---------------------------|--|-------|--------------|
| Project Consultant / EAP: | 1World Consultants (Pty) Ltd | | |
| Contact person: | Roschel Maharaj | | |
| Postal address: | P.O. Box 2311, Westville | | |
| Postal code: | 3630 | Cell: | 063 062 7725 |
| Telephone: | 031 262 8327 | Fax: | 086 726 3619 |
| E-mail: | roschel@1wc.co.za | | |

2. DECLARATION BY THE SPECIALIST

I, **Lindi Steyn**, declare that --

General declaration:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist

The Biodiversity Company

Name of company

24/07/2020

Date

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the Specialist and Declaration of Interest | Oct 2019 V1 |
|--|---|----------------|

Lindi Steyn

PhD Biodiversity and Conservation
(*Cand Sci Nat*)

Cell: +27 72 129 3759

Email: Lindi@thebiodiversitycompany.com

Identity Number: 8805250059080

Date of birth: 25 May 1988



Profile Summary

Working experience throughout South Africa.

Specialist experience with mining, road development and engineering.

Specialist guidance, support and facilitation for the compliance with legislative processes, for in-country requirements.

Specialist expertise include Avifauna and Terrestrial Ecology.

Areas of Interest

Mining, Oil & Gas, Renewable Energy & Bulk Services Infrastructure Development, Sustainability and Conservation.

Research publication with a conservation influence.

Birding

Key Experience

- Environmental Impact Assessment
- Terrestrial Ecological Assessments
- Rehabilitation Plans and Monitoring
- Avifaunal Conservation Surveys
- Conservation Management Plans
- Laboratory analysis
- The use of avifaunal species as indicators of pollution.

Countries worked in

South Africa
Swaziland

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient

Qualifications

- PhD Biodiversity and Conservation, University of Johannesburg, South Africa.
- MSc Biodiversity and Conservation, University of Johannesburg, South Africa.
- BSc Hons Biodiversity and Conservation.
- BSc Botany and Zoology.
- Certificate in Field Guiding, Damelin.
- Certificate in Ecotraining.
- Field Guiding FGASA level 1 certificate (2007).

SELECTED PROJECT EXPERIENCE

Project Name: An environmental and impact assessment for the proposed Jozini (N2) road expansion for SANRAL, KwaZulu Natal, South Africa.

Client: EnviroPro

Personal position / role on project: Terrestrial Ecologist.

Location: KwaZulu Natal, South Africa (2018).

Main project features: To conduct a terrestrial environmental and impact assessment for the expected impact footprint area.

Project Name: Biodiversity Assessment associated with Greylingstad Waste Water Treatment work and reticulation network, Mpumalanga, South Africa.

Client: EcoSphere

Personal position / role on project: Terrestrial Ecologist

Location: South Africa (2018).

Main project features: Conduct a detailed terrestrial ecology basic assessment for the expected impact footprint area.

Project Name: An Environmental and impact assessment for the proposed Kalabasfontein Coal Mining Expansion Project, Mpumalanga, South Africa.

Client: EIMS

Personal position / role on project: Terrestrial Ecologist/ Avifaunal specialist

Location: Mpumalanga, South Africa

Main project features: To conduct a terrestrial environmental and impact assessment for the expected impact footprint area.

OVERVIEW

An overview of the specialist technical expertise includes the following:

- Terrestrial Ecological Assessments.
- Faunal surveys which includes mammals, birds, amphibians and reptiles.
- Conservation Plans and Monitoring for the terrestrial component.
- Avifaunal surveys
- Bioaccumulation assessments for birds
- Toxicity analysis of air dust samples, sediment, water and biota.

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (May 2018 – Present)

I started working at The Biodiversity Company in mid-2018.

The team at The Biodiversity Company have conducted stand-alone specialist studies and provided overall guidance of studies with a pragmatic approach for the management of biodiversity that takes into account all the relevant stakeholders, most importantly the environment that is potentially affected. We manage risks to the environment to reduce impacts with practical, relevant and measurable methods.

My roles include:

- Faunal and Floral surveys for baseline, basic or impact assessments
- Report writing
- GIS map work
- Equipment management
- Technical assistant for fieldwork for the aquatics and wetland departments
- Specialist inputs to the above mention services.

EMPLOYMENT: University of Johannesburg (January 2012 – July 2018)

UJ assigned me to the role of laboratory assistant and assistant lecture.

- Research
 - Report writing
 - Performed toxicity testing on biota, sediment, water and air dust samples.
 - Completed day to day administration of the laboratory.
 - Assisted with field work involving all the different specialist work which includes mammalogy, aquatics and botany.
 - Lectured courses, including parasitology and Biology for teachers
-

ACADEMIC QUALIFICATIONS

University of Johannesburg, Johannesburg, South Africa (2018): PHILOSOPHIAE DOCTOR (PhD) – Biodiversity and Conservation

Title: *The effect of DDT on the histology, reproductive success and overall health of the House Sparrow in designated areas.*

University of Johannesburg, Johannesburg, South Africa (2013): MAGISTER SCIENTIAE (MSc)- Biodiversity and Conservation

Title: Comparative determination of the numbers of four garden bird species, the House Sparrow, *Passer domesticus*, the Cape Glossy Starling, *Lamprotornis nitens*, the Cape Turtle Dove, *Streptopelia capicola* and the Laughing Dove, *Streptopelia senegalensis* in the Johannesburg and Vaalwater areas with study into possible causes of expected declines.

University of Johannesburg, Johannesburg, South Africa (2011): BACCALAUREUS SCIENTIAE CUM HONORIBUS (Hons) – Zoology

Title: The influence of agriculture on selected Mpumalanga Pans.

University of Johannesburg, Johannesburg, South Africa (2010): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Zoology and Botany.

Damelin, Bramley, Johannesburg: National Certificate in Field Guiding (Lodge Management) (2007)

Damelin, Bramley, Johannesburg: Field guiding FGASA level 1 certificate (2007)

Damelin, Bramley, Johannesburg: Ecotraining- Karongwe & Selati (2007)

PUBLICATIONS

Steyn, L., Bouwman, H., Maina, J.N. (2018). Associations between DDT and egg parameters of the House Sparrow *Passer domesticus* from the Thohoyandou area of South Africa, Chemosphere.

Steyn, L., Bouwman, H., Maina, J.N. (2018). The effect of DDT and its metabolites on the structure of the shells of the eggs of the House Sparrow, *Passer domesticus*: A morphometric study. 7th International Toxicology Symposium in Africa.

Steyn, L., Bouwman, H., Maina, A.W, Hoffman, J., Maina, J.N. (2018). Bone density and asymmetry are not related to DDT in House Sparrows: insights from micro-focus X-ray computed tomography. Chemosphere.

Steyn, L., Maina, J.N. (2016). Comparison of the numbers of three species of birds in an urban- and a rural area of South Africa and possible relationship to the numbers of free (surface) macrophages in the respiratory systems. Journal of Ornithology

Willoughby, B., Steyn, L., Maina, J.N. (2015). X-ray microcomputed tomography study of the microstructure and the morphometry of the shell of the ostrich, *Struthio camerus*, egg. Anatomical record

Steyn, L., Maina, J.N. (2013). Die verwagte afname van die getalle van vier voël spesie, die Huisvossie, Kleinglansspreeu, Gewone Tortelduif en die Rooiborsduifie in Gauteng en Limpopo provinsies en moontelike oorsake van die dalings. Die Suid-Afrikaanse akademie vir wetenskap en kuns afdeling biologiese wetenskappe, Pretoria.

DECLARATION OF INTEREST BY SPECIALIST



edtea

Department:
Economic Development, Tourism and
Environmental Affairs

PROVINCE OF KWAZULU-NATAL

| | |
|--|-------------------------|
| | (For official use only) |
| Provincial Reference Number: | |
| NEAS Reference Number: | KZN / EIA / |
| Waste Management Licence Number (if applicable): | |
| Date Received by Department: | |

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

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KINDLY NOTE:

1. This form is current as of **October 2019**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.

PROJECT TITLE

Proposed Residential / Hotel Development, 49 Casuarina Road, Tongaat, Kwazulu-Natal

DISTRICT MUNICIPALITY

eThekweni Metropolitan Municipality

1. SPECIALIST INFORMATION

| | | | |
|--------------------------------------|---|-------|--------------|
| Specialist name: | Jean Beater – JLB Consulting | | |
| Contact person: | Jean Beater | | |
| Postal address: | P.O. Box 653, Umhlanga Rocks | | |
| Postal code: | 4320 | Cell: | 084 404 1118 |
| Telephone: | | Fax: | |
| E-mail: | Jean.beater@gmail.com | | |
| Professional affiliation(s) (if any) | Member of the Association of South African Professional Archaeologists (No. 349) Member of IAIAAs (No. 1538) | | |

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|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the Specialist and Declaration of Interest | Oct 2019 V1 |
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DECLARATION OF INTEREST BY SPECIALIST

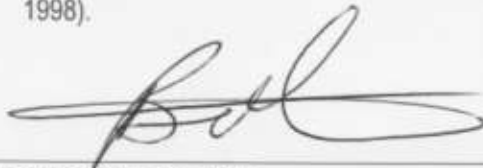
| | | | |
|---------------------------|------------------------------|-------|--------------|
| Project Consultant / EAP: | 1World Consultants (Pty) Ltd | | |
| Contact person: | Roschel Maharaj | | |
| Postal address: | P.O. Box 2311, Westville | | |
| Postal code: | 3630 | Cell: | 063 062 7725 |
| Telephone: | 031 262 8327 | Fax: | 086 726 3619 |
| E-mail: | roschel@1wc.co.za | | |

2. DECLARATION BY THE SPECIALIST

I, **Jean Beater**, declare that --

General declaration:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist

JLB Consulting

Name of company

24/07/2020

Date

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the Specialist and Declaration of Interest | Oct 2019 V1 |
|--|---|----------------|

Nationality: South African

Qualifications & Membership with Professional societies:

Accredited Heritage Professional: Amafa aKwaZulu-Natali

Affiliate Member of the Association of Southern African Professional Archaeologists (ASAPA) (No. 349)

International Association of Impact Assessment (SA Branch) (Membership No. 1538)

Contact Details: 084 4041118 / jean.beater@gmail.com

EMPLOYMENT RECORD

- April 2015 – present:** **JLB Consulting - Heritage and Environmental Consultant**
Undertake Heritage Impact Assessments (HIAs) and Heritage Management Plans (HMPs)
Environmental authorisation processes (S&EIRs, BARs); Water Use Licence Applications (WULAs); EMPRs, public participation process, etc.
- February 2014 – March 2015:** **Senior Environmental Consultant with Nemai Consulting cc**
Project management of various Basic Assessments and Scoping & Environmental Impact Assessments; EMFs
Undertake HIAs and WULAs for clients;
Manage clients, appoint & manage specialists, undertake public participation process;
Compile and manage budgets for projects
- March 2010 – January 2014:** **Environmental & Heritage Impact Consultant**
Undertake Heritage Impact Assessments (HIAs) for various clients;
Project management of environmental authorisation processes (S&EIRs, BARs); WULAs; EMPRs, public participation, etc
- June 2005 – February 2010:** **Senior Environmental Specialist with PBA International (South Africa) Pty Ltd / Fourth Element**
Project management of various EIA studies (Basic Assessments and Scoping & Environmental Impact Assessments);
Undertake HIAs for various clients;
Manage clients, appoint & manage specialists, undertake public participation process;
Compile and manage budgets for projects
- 2004 – 2005** : **Assistant Director: Gauteng Department of Agriculture, Conservation & Environment Cradle of Humankind World Heritage Site**
Implement site management plans according to UNESCO standards; ensure management of resources includes an integrated environmental and conservation approach; monitor fossil sites and cultural resources; negotiate site management plans with landowners; engage with landowners and other key stakeholders
- 2003 – 2004** : **Heritage Management Consultancy**
Heritage impact assessments; conservation management plans; historical records management

HERITAGE PROJECTS UNDERTAKEN INCLUDE:

- Heritage Impact Assessment for EIA for Peaking Power Project, Coega Industrial Development Zone near Port Elizabeth, Eastern Cape
- Heritage Impact Assessment for Zamokuhle substation site and associated 132kV Distribution power line, Hendrina, Mpumalanga Province
- Cultural heritage survey of several farms in Northern and Eastern Cape for proposed photovoltaic developments (solar power)
- Heritage Impact Assessment for the Sunninghill sewer pipeline, Adams Mission, Amanzimtoti
- Heritage Impact Assessment for the Hammersdale water supply pipeline, Hammersdale, KZN
- Heritage Impact Assessment for the Moretele South Bulk Water Supply project, Moretele, North West and Gauteng provinces
- Heritage Impact Assessments for the Raw Water and Potable Water components of the uMkhomazi Water Supply Project.
- Heritage Management Plan for the Raw Water and Potable Water components of the uMkhomazi Water Supply Project
- Heritage Impact Assessment for Quha River Bridge, Umzumbe area
- Heritage Impact Assessment for Barton Place Housing Project, Durban
- Heritage Impact Assessment for Bloukrans and Qabango River crossings near Frere in Umtshezi Local Municipality
- Heritage Impact Assessment for the Burbreeze Water Infrastructure project, Tongaat
- Heritage Impact Assessment for the Mbhele and Dressing pedestrian bridges near Ramsgate
- Heritage Impact Assessment for the Ezimbokodweni *in-situ* housing project, Amanzimtoti
- Heritage Impact Assessment for Maphephethweni water pipeline project, eThekweni Municipality
- Heritage Impact Assessment for a road determination project in Greater Johannesburg area, Gauteng Province
- Heritage Impact Assessment for the Kingsburgh West Housing Project, Kingsburgh, KZN
- Heritage Impact Assessment for the Impendle Water Treatment Plant
- Heritage Impact Assessment for the Madrassa An-Noor Facility for the Blind near Cedara Agricultural College, Umngeni Municipality
- Heritage Impact Assessment: Ixopo CRU Housing development, Ubuhlebezwe Local Municipality
- Heritage Impact Assessment for Blackburn Phase 2D Housing project, Cornubia
- Heritage Impact Assessment: Kokstad CRU Housing development, Greater Kokstad Municipality
- Walk down heritage survey of proposed construction of Neptune to Pembroke 400kV power lines, near East London, Eastern Cape Province
- Heritage Impact Assessment for Mahadeni Vehicular Bridge, Ndwedwe Local Municipality
- Heritage Impact Assessment for Mona Vehicular Bridge, Ndwedwe Local Municipality
- Heritage Impact Assessment for Mangwenya Pedestrian Bridge, Hibiscus Local Municipality.
- Heritage Impact Assessment for Inanda Glebe Water Reticulation project, eThekweni Municipality
- Heritage Impact Assessment for Charlottedale Housing project, Groutville, KwaDukuza
- Heritage Impact Assessment for upgrade of section of N2 highway from Lovu River to Umlaas Canal, eThekweni Municipality
- Heritage Impact Assessment for Hammarsdale water pipeline project, eThekweni Municipality
- Heritage Impact Assessment for Port Edward borrow pit, Port Edward

POST-GRADUATE EDUCATION AND DEGREES

| | | | |
|-------------|---|---------------------------------|--------------------------------|
| 2002 | : | University of the Witwatersrand | MA (Heritage Studies) |
| 2016 | : | University of the Free State | MSc (Environmental Management) |

DECLARATION OF INTEREST BY SPECIALIST



| | |
|--|-------------------------|
| | (For official use only) |
| Provincial Reference Number: | |
| NEAS Reference Number: | KZN / EIA / |
| Waste Management Licence Number (if applicable): | |
| Date Received by Department: | |

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

Submitted in terms of section 24(2) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) or for a waste management licence in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

KINDLY NOTE:

1. This form is current as of **October 2019**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.

PROJECT TITLE

Mr AH Singh, 45 – 53 Casuarina Drive, Residential Development, Traffic Impact Assessment, Rezoning Application

DISTRICT MUNICIPALITY

eThekweni Metropolitan Municipality

1. SPECIALIST INFORMATION

| | | | |
|--------------------------------------|--|-------|--------------|
| Specialist name: | Mohamed Kajee – Arup (Pty) Ltd | | |
| Contact person: | Mohamed Kajee | | |
| Postal address: | 167 Florida Road | | |
| Postal code: | 4001 | Cell: | 083 639 9933 |
| Telephone: | 031 328 8720 | Fax: | |
| E-mail: | mohamed.kajee@arup.com | | |
| Professional affiliation(s) (if any) | ECSA PrEng 20170283 | | |

| | | |
|---|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Details of the Specialist and Declaration of Interest | Oct 2019 V1 |
|---|---|----------------|

DECLARATION OF INTEREST BY SPECIALIST

| | | | |
|---------------------------|--|-------|--------------|
| Project Consultant / EAP: | 1World Consultants (Pty) Ltd | | |
| Contact person: | Roschel Maharaj | | |
| Postal address: | P.O. Box 2311, Westville | | |
| Postal code: | 3630 | Cell: | 063 062 7725 |
| Telephone: | 031 262 8327 | Fax: | 086 726 3619 |
| E-mail: | roschel@1wc.co.za | | |

2. DECLARATION BY THE SPECIALIST

I, **Mohamed Kajee**, declare that --

General declaration:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist

Arup (Pty) Ltd

Name of company

31 July 2020

Date

| | | |
|---|--|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu- Natal | Details of the Specialist and Declaration of Interest | Oct 2019 V1 |
|---|--|----------------|

Mohamed Kajee



Profession

Civil Engineer

Current Position

Senior Traffic and Transport Engineer

Joined Arup

2008

Years of Experience

12

Nationality

South African

Qualifications

BSc Eng (civil) – 2001-2005
UKZN

Date of Birth and Place

20-12-1983/Durban

Professional Associations

ECSA 20170283

SAICE

Experienced Gain In:

- Project Management
- Demand Forecasting
- MicroSimulation Modelling
- Public Transport planning (Road and Rail)
- Traffic Road Layout Level Design
- Freight Transport
- Road Safety
- Transport Master Planning
- Traffic Management for Events
- Road Signage
- Traffic Surveys
- GIS

Software

- Sidra
- HCS
- Aimsun
- ArcGIS

Mohamed is a Traffic Engineer and Transport Planner with more than 12 years' experience. For the past four years he's been the head of Arup's KZN transportation team. He has been involved in projects across the country, in Africa and in the Middle East.

Mohamed has a broad range of Traffic Engineer and Transport Planning skills. He has developed expertise in demand forecasting, traffic modelling, traffic data collection, traffic management, freight transport, public transport planning, transport master planning and traffic management for major events.

He has been involved in a number of multi-disciplinary projects over the years such as the Pearls of Umhlanga, Mr Price DC, Hyde Park Country Estate, Ntshongweni Urban Development to name a few.

Mohamed has unique experience in the planning, design, implementation and monitoring of traffic and transport related projects.

Transport Planning for Mega Events

Qatar 2022 FIFA World Cup Masterplan - 2012

Mohamed worked in Qatar in 2012 providing strategic transportation input into the masterplan for the Qatar 2022 FIFA World Cup.

COP17/CMP7 Transport Operational Plan - 2011

Mohamed was responsible for the demand forecast, planning of cycle facilities and supervision of transport services during the event.

Durban's Detailed Transport Operational Plan (TOP) for 2010 FIFA World Cup, Durban, South Africa 2008 - 2010

Mohamed was responsible for planning, design, implementation and monitoring of the Transport Plan for Durban's Transport Operational Plan. Some of the aspects which he was intimately involved in include the demand forecast, park and ride plan, special needs spectator plan, priority pedestrian network, park and walk plan, signage, road closure plan, permit system design and marketing. He was also assisted in developing the business model for the park and ride operators (with bus & taxi owners), developing the timetable for Park & Ride services and liaison with drivers & operators.

Public Transport Projects

Passenger Rail Masterplan for South Africa – 2011

Mohamed was responsible for assisting in the status quo assessment for KZN and EC, where he looked at current passenger volumes along the corridors. Mohamed was also responsible for preparing a Technology Review report for PRASA which included a review and assessment of

- Saturn (Working knowledge)
- **Courses**
- Highway Capacity Manual Course 2007
- Advanced Aimsun Course 2010
- Advanced Excel Course 2011

Committees

different public transport modes and systems such as bus, BRT, LRT, Tram Train and Heavy Rail

Hammarsdale Urban Regeneration Assessment - 2010

Mohamed was the project manager and traffic engineer for this project. The project included a status quo assessment, identification of future road and transport network infrastructure, preparation of a Traffic Road Layout (TRL) and concept design for Taxi Rank upgrade.

Durban C1A Detail Design - 2014

Mohamed was involved in the development of preliminary layouts for the new Umgeni River Crossing along the C1A corridor. The concepts considered the integration of the C1, C2 and C8 corridors at a single location. Mohamed also reviewed the conceptual layouts for the C1 and C3 integration station layouts

eThekwini IRPTN Change Management Programme - Current

Mohamed is part of PWC's Change Management Team providing specialist public transport planning into the Change Management Process for Durban's IRPTN Project

DubeTradePort Internal Public Transport Service - 2015

Mohamed was responsible for the review of the demand forecast analysis, the proposed internal PT service schedules and the operational cost estimates.

Harry Gwala DM Integrated Public Transport Network (IPTN) - Current

Mohamed is the project manager and lead transport planner responsible for the development of the Harry Gwala DM IPTN. The project includes the extensive data gathering, analysis of data and the development of an integrated network plan.

Transport Master Planning Projects

Anglers Rod Traffic Study – 2009 to 2010

Anglers Rod in Richards Bay is a transport corridor that is really busy. The local council has received a high number of rezoning applications for property along this corridor. Mohamed was the project manager and engineer responsible for the development of an AIMSUN traffic model which was used in analysing various land use forecast scenarios.

Hibiscus Coast Traffic Study – 2008

This study involved the development of a SATURN Model for the Hibiscus Coast in KZN to test future development scenarios. Mohamed was responsible for the O-D Surveys, journey time surveys and development of the base year matrices.

uShukela Drive Urban Renewal Study – 2011

Mohamed was the project manager and traffic engineer for this project. The project included a status quo assessment, identification of future road

and transport network infrastructure and preparation of a Traffic Road Layout (TRL) for Ushukela Drive, Tongaat.

Richards Bay Port MasterPlan – 2012

Mohamed worked on this project as a traffic engineer providing input to the geometric upgrades of the internal road layout of the port and for the development of a traffic simulation model.

Isipingo Local Area Plan - 2015

Mohamed was the project manager and transport planner for the Isipingo Local Area Plan. The plan considered the future land uses to occur in the Isipingo area in support of the Dig Out Port. Mohamed was responsible for the development of a public transport plan, NMT plan and road master plan for the study area.

Beauplan Mixed Use Development (Mauritius) – 2017

Mohamed was the project manager responsible for the development of an Aimsun model for the Beauplan Mixed Use development in Mauritius. Using the outputs from the model, Mohamed provided advice to the developer in optimising his development from a transportation perspective.

Ntshongweni Mixed Use Development – Current

Mohamed is the project manager and traffic engineer for a new 2000 ha mixed use development in the Ntshongweni area, Durban. The study was undertaken using SATURN and the municipality's EMME4 model. Mohamed worked closely with the modellers, authorities and the client in defining the road and transport upgrade needs. In addition, Mohamed developed the Sustainable Mobility Framework Plan for the development.

www.ntshongweni.co.za

Hyde Park Country Estate - Current

Mohamed is the project manager and traffic engineer on a new mixed use development situated in KwaDukuza, KZN. The site will include 4500 new residential units, hospital, schools and a new CBD. Mohamed is providing strategic advice to the project manager on external road network requirements, internal road network requirements, pedestrian facilities, public transport and other sustainable transport initiatives.

Other Master Planning Projects include:

- Pinetown South LAP
- Umzimvubu Transportation Study
- Hammarsdale Urban Renewal Study
- Outer West Corridor Study
- Shongweni FAP
- Ottawa FAP
- Ixopo CBD Precinct Plan

- Selebi Pikwe Transportation Study (Botswana)
- Durban's Inner City LAP
- Northdale LAP
- Mangosuthu University of Technology Master Plan
- Umbumbulu CBD Transportation Upgrade Plan
- Umgababa FAP
- Zimbali Palms Transport Master Plan

Numerous TIA for Various Developments

- **Retail** - Kwa Dukuza Mall and Civic Centre, Blue Heights Shopping centre, Westville Mall, Umlazi Mega City Extension, Rushbrook Shopping Centre, Jozini Shopping Centre, Africa Cash and Carry, Hirsch North Coast Road, The Crest Centre (Hillcrest), Chicken Lickens, KFCs, Port Shepstone Taxi Rank Shopping Centre, Richards Bay Boardwalk Parking Study, Mavundla Square Shopping Centre Greytown, Galleria SC Expansion, 5 Ways Mall Expansion (Empangeni), Chatsworth PnP Expansion, Sunpine SC Pinetown, Village Way SC, Woodburn SC PMB.
- **Residential** - Pearls of Umhlanga, Bella Vista Apartments Umhlanga, Summer View Umhlanga, Summer Place Umhlanga, Dumisani Mkhaye Village Ph 6 and 8, Shalamar Garden Development
- **Offices** – Chep Offices, LIPAM TIA (Lesotho), Abrey Road Office Block, Edstan Business park
- **Warehouse/Industrial** - Mr Price DC, Richards Bay IDZ Ph 1a, Smiley Footwear Warehouse, Freedom Stationers warehouse
- **Medical/Hospitals** - Parklands Hospital, Entabeni Hospital, New Ahmed al Kadi Hospital, Midmedic Hospital, Mt Edgecombe Hospital, eThekwini Hospital and Heart Centre, Kingsway Hospital, Umhlanga Hospital, The Bay Hospital, Akeso Clinic Westridge, St Annes Hospital
- **Schools** – Umhlanga College, Al Falaah College, Sherwood Therapy Centre, Flodden Rd Day Care Centre, Alida Rd Day Care Centre, JG Zuma School (Inanda), Curro School Hillcrest
- **Filling Station** – Umgeni Road Sasol, Marburg Filling station, N12 Sasol Filling station, Inanda Total, Waterloo PFS, Fairview PFS, 605 South Coast Rd PFS,
- **Mines** – Fuleni Anthracite Mine, Pentlands Granite Quarry

Appendix C



Environmental & Engineering Consultants

Postal Address: P.O Box 2311, Westville, 3630

Tel: 031 262 8327

Fax: 086 726 3619

Application for Environmental Authorisation

APPLICATION FORM FOR ENVIRONMENTAL AUTHORISATION



| | (For official use only) |
|------------------------------|-------------------------|
| Provincial Reference Number: | |
| NEAS Reference Number: | KZN / EIA / |
| Date Received by Department: | |
| Date Received by District: | |
| Application fee paid on: | |

APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

Submitted in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and regulation 6 (1) and 16 (1) of the Environmental Impact Assessment (EIA) Regulations, 2014.

PROJECT TITLE

Proposed Development of Residential/ Serviced Apartments at 49 Casuarina Road, Tongaat Beach, eThekweni Metropolitan Municipality

DISTRICT MUNICIPALITY

eThekweni Metropolitan Municipality

| | | |
|--|---|----------------|
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

IMPORTANT INFORMATION

PLEASE NOTE:

1. It is the responsibility of the applicant to confirm that the Department is the competent authority to which this application must be submitted (refer to NEMA section 24C).
2. This form is current as of **October 2019**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.
3. The application must be typed within the spaces provided in the form. The size of the space provided is not necessarily indicative of the amount of information required. A legible font type and size must be used when completing this form. The font size should not be smaller than 10pt.
4. Where required, place a tick (✓) in the box you select.
5. Incomplete applications or applications that do not meet the requirements in terms of Regulation 16 of the 2014 NEMA EIA Regulations will not be accepted.
6. The use of the phrase "not applicable" in the form must be done with circumspection. Should it be done in respect of material information required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the Regulations.
7. An application for Environmental Authorisation/Amendment lapses if the applicant fails to meet any of the timeframes prescribed in terms of the EIA Regulations, 2014, as amended.

PRE-APPLICATION MEETING

8. This Department requires that a pre-application meeting be held at the discretion of the relevant district office. Kindly liaise with the relevant district office to determine if a pre-application meeting is required for this application, before it is submitted. The Head Office Registry may be contacted on **033 - 264 2898 / 2572** for details of the relevant district office for this application.
 - Provide details of the Pre-Application Meeting below (if applicable):

| Date of Pre-Application Meeting | Time and Venue of Pre-Application Meeting |
|---------------------------------|---|
| 23 June 2020 | Time: 10h30 Venue: EDTEA: The Marine Building, Dorothy Nyembe Street, Durban Central, Durban |

- If a Pre-application meeting was held, the minutes of the Pre-Application Meeting **MUST BE ATTACHED** as **Appendix 1**, to this application (refer to the List of Appendices).

SCREENING TOOL

9. A report generated by the national web-based environmental screening tool as required in terms of regulation 16(1)(b)(v) of the environmental impact assessment regulations, 2014 is required to be appended as an **Appendix**, in order for an application to be considered.

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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

SUBMISSION OF COMBINED APPLICATIONS FOR ENVIRONMENTAL AUTHORIZATION

1. If applicable, written confirmation that the Department has granted permission for the combination of applications for an environmental authorization in terms of the provisions of sub-regulation 11(1) of the EIA Regulations, 2014, must be attached to this application form.

FEES APPLICABLE FOR APPLICATIONS FOR ENVIRONMENTAL AUTHORIZATIONS

2. The following fees for the consideration and processing of applications for an environmental authorization will be applicable from **01 April 2014** (refer to the Annexure in Government Notice No.141 dated 28 February 2014):

| Application | Fee |
|--|------------|
| Application for an environmental authorization subject to a Basic Assessment in terms of the EIA Regulations | R2 000.00 |
| Application for an environmental authorization subject to a Scoping and Environmental Impact Report in terms of the EIA Regulations | R10 000.00 |

3. Where an applicant is required to pay fees for an application for environmental authorization as contemplated in this form, this must be made by means of a bank deposit or electronic fund transfer into the bank account of this Department (refer to section 8).
4. **Payment reference number for applications for environmental authorizations and banking details** for the Department:

| | |
|--|--|
| Reference number (only reference number to be used for environmental authorization applications): | 04003903 |
| Account name: | KwaZulu-Natal Provincial Government - Economics |
| Bank name: | ABSA |
| Branch code: | 630495 |
| Account number: | 4072482787 |

5. Proof of payment of fees (if applicable) for an environmental authorization application must be attached as an **Appendix** to this application form and submitted with it. Proof of payment is either a stamped deposit slip or an electronic fund transfer payment advice.

INSTANCES WHERE FEES FOR APPLICATIONS FOR ENVIRONMENTAL AUTHORIZATIONS ARE NOT APPLICABLE

6. Where an application is for a community based project funded by a government grant or the application is made by an organ of state, the fees for considering and processing applications for an environmental authorization do not apply (refer to regulation 2 in Government Notice No.141 dated 28 February 2014).
7. Where an applicant is not required to pay a fee as contemplated in this form, a **written motivation** (with proof of funding if a government grant is applicable) must be attached as an **Appendix** to this application form and submitted with it.

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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

8. If you have any queries regarding the EIA process or fees applicable for applications for environmental authorizations please contact the Head Office of this Department. (see below).

COMMENTS BY THE DEPARTMENT

9. According to sub-regulation 40(1) of the EIA Regulations the Department, as the competent authority, **MUST during the public participation process be given a period of at least 30 days to comment** on the basic assessment report, EMPPr, scoping report or environmental impact assessment report as applicable.

HEAD OFFICE REGISTRY DETAILS

10. The original applications with original signatures must be hand delivered or posted to the Head Office Registry of this Department at the address provided below:

Postal address:

**Head Office
KwaZulu-Natal Department of Economic Development, Tourism & Environmental Affairs
Private Bag X9152
PIETERMARITZBURG
3200**

**Physical address:
270 Jabu Ndlovu Street
PIETERMARITZBURG
3201**

Contact Person: Ms Zama Mbanjwa

**Telephone No: 033 - 264 2898
Cellular No.: 081 - 271 9541**

Email: Zama.Mbanjwa@kznedtea.gov.za

11. All documentation delivered to Head Office must be delivered during the official Departmental Office Hours visible on the Departmental premises.
12. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box or Job Application Box will NOT be accepted, only hardcopy submissions are accepted.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the declaration of interest of the specialist must also be submitted.
14. Unless protected by law, all information filled in on this application will become public information on receipt by this Department. Any interested and affected party must be provided with the information contained in this application on request, during any stage of the application process.
15. Please note an exemption application (if applicable) must be finalized before lodging an application for environmental authorization with the Department.

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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

16. If an Environmental Assessment Practitioner (EAP) has not been appointed at the time of the submission of this application form, the declaration from the EAP must be included in the Basic Assessment Report.

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LIST OF APPENDICES

| | | SUBMITTED (tick (✓) the relevant option) | |
|------------|--|---|-----|
| Appendix 1 | Minutes of the Pre-Application Meeting held with the Department. | ✓ | |
| Appendix 2 | Written consent from the land owner or the person in control of the land (Regulation 39(1) (If the applicant is not the land owner and Regulation 39(2) does not apply). | | N/A |
| Appendix 3 | Correspondence from the Department confirming the Listing Notice 3 activities triggered (if applicable) | | N/A |
| Appendix 4 | Approval by the Department that a combined application in terms of Regulation 11 of the EIA Regulations, 2014 may be submitted (if applicable) | | N/A |
| Appendix 5 | A description of the location of the development footprint and a plan which locates the proposed activity/ies (Regulation 16 (1) (vi) (vii)) | ✓ | |
| Appendix 6 | Proof of payment of environmental authorization fees (if applicable). Proof of payment includes a stamped deposit slip or an electronic fund transfer payment advice. | ✓ | |
| Appendix 7 | A written motivation explaining why the payment of environmental authorization fees are not applicable (an application for a community based project funded by a government grant or an application by an organ of state). | | N/A |
| Appendix 8 | A report generated from the national web based environmental screening tool, as contemplated in Regulation 16(1)(b)(v) of the EIA Regulations, 2014 is <u>compulsory</u> when submitting an application for environmental authorisation in terms of regulation 19 and 21 of the EIA Regulations, 2014 from 04 October 2019 | ✓ | |
| Appendix 9 | Locality Map | ✓ | |

| | | |
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

PROJECT DESCRIPTION

Please provide a **detailed** description of the project.

World Consultants (Pty) Ltd has been appointed by Arup (Pty) Ltd, on behalf of the landowner and applicant, Casuarina 5153 Properties (Pty) Ltd (Mr. Anant Singh), to undertake the required environmental services for the proposed demolishing and construction of residential/ serviced apartments situated at 49 Casuarina Road, Tongaat Beach, located within the eThekweni Metropolitan Municipality. The proposed development at 49 Casuarina Road is located within 100m from the High-Water Mark (HWM) of the sea within an urban residential area.

The proposed development at 49 Casuarina Road is located within ward 58 of the eThekweni Metropolitan Municipality. The property is currently used as Mr. Singh's vacation home. The site is a consolidation of five erven as follows:

- Erf Farm No. 1/620
- Erf Farm No. 1/614
- Erf Farm No. R/614
- Erf Farm No. 612
- Erf Farm No. 613

The existing residential dwelling will be demolished. There will be a development of new residential/ serviced apartments with a development footprint of 4781.07m² at ground level. The site is located within 100m from the High-Water Mark (HWM) of the sea. The site is located within an urban area. The proposed development will entail moving, removing and excavation of soil of more than 5m³ within a distance of 100m inland of the High-Water Mark (HWM) of the sea. The proposed development will involve the following:

- Demolition of the existing structure;
- Excavations and earthworks as required for the development;
- The construction of new residential/ serviced apartments;
- Establishment of new parking blocks;
- Potential widening of a very small portion (approximately 200m) of Casuarina Road by 1m to create easy vehicle movement in either direction; and
- On-site waste water (sewage) treatment.

The proposed development will be a multi-story residential block, which will include 11 levels (including the ground level, and 2 below-ground levels) with an approximate Total Floor Area Ratio (F.A.R.) of 12 628.50m². Table 1 below provides an indication of the development schedule.

The schedules below are based on the latest available information. The final development schedule will be in line with local authority (e.g. zoning, town planning, building planning) requirements.

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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

Table 1: Development Schedule as per Architects Plans

| Development Schedule – 49 Casuarina Road | |
|--|---------------|
| Consolidated Site Area | 8418 sqm |
| Proposed coverage | 4781.07 sqm |
| Percentage Coverage | 56.7 % |
| Total Proposed Floor Area Ratio (F.A.R) | 12 628.50 sqm |
| Percentage F.A.R. | 1.5 % |
| Total Number of Units | 206 |
| Number Parking Provided | 369 Bays |
| Area Schedule – Level -2 to 0 | |
| 10 Units Per Level | 700 sqm |
| Area Schedule – Level 1 to 2 | |
| 22 Units Per Level | 1316.06 sqm |
| Area Schedule – Level 3 to 8 | |
| 21 Units Per Level | 1316.06 sqm |

Based on the existing site extent, the distance from the High-Water Mark (HWM) to current boundary wall is 33.2m. The boundary wall is at a height of 3m and the building is also situated approximately 2 to 3m above sea level. The proposed development will be pulled back to remain within the property boundary and no encroachment will take place within the Municipal owned coastal area. The distance from the HWM of the sea to the correct boundary is 49.3m. The design of the proposed development takes into consideration the risks that are posed by rise in sea levels. The boundary wall is at a height of 3m which will be maintained. The new development bulk-built structures will be a significant distance away from the HWM of the sea, in comparison with the site boundary. The building will also be situated at least 2 to 3m above sea level reducing the risk of being affected by the rise in sea level.

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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

(a) Strategic Infrastructure Projects

| | Tick (✓) the relevant option | |
|--|------------------------------|----|
| | Yes | No |
| Does the project form part of any of the Strategic Infrastructure Projects (SIPs) as described in the National Development Plan, 2011? | | ✓ |

1. BACKGROUND INFORMATION

Project applicant:

| | | |
|------------------------|---|--|
| Trading name (if any): | Casuarina 5153 Properties (Pty) Ltd | |
| Contact person: | Mr Anant Sign / Mr Yusuf Raja | |
| Physical address: | 49 Casuarina Road, Genazzano, | |
| | Tongaat Beach | |
| Postal address: | P.O. Box 1005 | |
| | Umhlanga | |
| Postal code: | 4320 | |
| Telephone: | 031 328 8700 | |
| Cellular | 082 734 1168 | |
| E-mail: | yusuf.raja@arup.com / sudhir@videovision.co.za | |

PLEASE NOTE: The following information is required for each site (location) on which the project will be undertaken:

Owner or person in control of the land:(if the applicant is not the owner or the person in control of the land or Regulation 39(2) in the EIA Regulations 2014 does not apply)

| | | |
|-----------------|-------|--|
| Contact person: | | |
| Postal address: | | |
| Postal code: | | |
| Telephone: | () - | |
| Cellular: | | |
| E-mail: | | |

| | | |
|--|---|----------------|
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

| | |
|------------------------|-------------------------------------|
| District Municipality: | eThekwini Metropolitan Municipality |
| Local Municipality: | eThekwini Metropolitan Municipality |

In instances where the project includes more than one local or district municipality, please provide a list.

Contact person at Local Municipality: Michelle Lotz / Nhle Zuma

| | |
|-----------------|--|
| Postal address: | 166 K.E. Masinga Road |
| Postal code: | 4001 |
| Telephone: | 031 322 7694 |
| Cellular: | |
| E-mail: | Michelle.Lotz@Durban.gov.za Nhle.Zuma@Durban.gov.za |

In instances where there is more than one local authority involved, please include details of local authorities with their contact details in an Appendix.

| |
|--|
| |
|--|

Property description/physical address:

The project site is located at 49 Casuarina Road, Genazano, Tongaat Beach. The site spans across five erven:

- Erf Farm No. 1/620
- Erf Farm No. 1/614
- Erf Farm No. R/614
- Erf Farm No. 612
- Erf Farm No. 613

(Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list in an Appendix to the application.

| |
|--|
| |
|--|

**Nearest town/s:
Directions to the physical address:**

Tongaat

From Durban Central continue on M4 heading towards Umhlanga. Take exit 182 for M41 towards N2/ Umhlanga Ridge/ Mount Edgecombe. Take exit onto N2. Take exit 190 for M27 towards M4/Umdloti/Verulam. Merge onto M4 towards Ballito. At the roundabout, take the 2nd exit and stay on M4 heading to Ballito. At the next roundabout, take the third exit onto Casuarina Drive. 49 Casuarina Road is the last plot.

Current land-use zoning:

The property is currently zoned as special residential. A re-zoning application will be conducted to change the zoning to General Residential.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings in the Appendix and also indicate which portions are relevant to this application.

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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

Is a change of land-use or a consent use application required?

Must a building plan be submitted to the local authority?

| Tick (✓) the relevant option | |
|------------------------------|----|
| YES ✓ | NO |
| YES ✓ | NO |

Locality map:

An A3 locality map must be attached to the back of this document, as Appendix 9. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:

- an accurate indication of the development footprint for the project in relation to known landmarks such as towns/villages, as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- GPS co-ordinates for each activity (indicate the position of the activity/ies). The co-ordinates should be in degrees, minutes and seconds.

Site identification and linkage

Please indicate all the Surveyor-General 21 digit site reference numbers for all sites (including portions of sites) that are part of the application.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | O | F | U | 0 | 3 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 6 | 2 | 0 | 0 | 0 | 0 | 1 |
| N | O | F | U | 0 | 3 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 4 | 0 | 0 | 0 | 1 |
| N | O | F | U | 0 | 3 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 4 | 0 | 0 | 0 | 0 |
| N | O | F | U | 0 | 3 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 2 | 0 | 0 | 0 | 0 |
| N | O | F | U | 0 | 3 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 3 | 0 | 0 | 0 | 0 |

(if there are more than 6, please expand the list with the rest of the numbers)

(These numbers will be used to link various different applications, authorizations, permits etc. that may be connected to a specific site)

Please provide the **geographical coordinates** for the site:

| Latitude /Longitude | Degrees | Minutes | Seconds |
|---------------------|---------|---------|---------|
| South | 29 | 36 | 12.32 |
| East | 31 | 9 | 47.76 |

| | | |
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

2. ACTIVITIES APPLIED FOR

- a. For an application for authorization that involves more than one listed or specified activity that, together, make up one development proposal, all the listed activities pertaining to this application must be indicated.

Indicate the Activity Number: Provide the relevant **Activity (ies)** as set out in **Listing Notice 1, 2 & 3** (GN R327, GNR325 & GNR324) **Describe each listed activity as per the project description (and not as per wording of the relevant Government Notice)¹:**

| | | |
|--|--|--|
| <p>GNR327 LN 1, Act 19A</p> | <p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from—</p> <p>(i). the seashore;</p> <p>(ii). the littoral active zone, an estuary or a distance of 100 metres inland of the highwater mark of the sea or an estuary, whichever distance is the greater; or</p> <p>(iii). the sea; —</p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</p> <p>(f) will occur behind a development setback;</p> <p>(g) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>(h) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(i) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p> | <p>The proposed development is located within 100m from the High-Water Mark (HWM) of the sea and will require more than 5 cubic metres of material to be removed from site as the proposed development footprint on the ground level is 4781.07m².</p> <p>The nature of the material which will be removed will be of the building material being demolished from the existing residence such as concrete, bricks, timber etc. and most of the infill will be consisted from the existing original natural site material.</p> |
|--|--|--|

Please note that any authorization that may result from this application will only cover activities specifically applied for.

¹Please note that this description should not be a repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description, i.e. describe the components of the desired development.

| | | |
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

3. NATIONAL SECTOR CLASSIFICATION IN TERMS OF REGULATION 9 OF THE EIA REGULATIONS, 2014

Please indicate which sector the project falls under in terms of Regulation 9 of the EIA Regulations, 2014:

| Select the applicable sector by ticking (✓) the relevant block / s in the table below: | |
|---|---|
| Infrastructure /Transport Services/Roads - Public | |
| Infrastructure /Transport Services/Roads - Private | |
| Infrastructure /Transport Services/Rail - Public | |
| Infrastructure /Transport Services/Rail - Private | |
| Infrastructure /Transport Services/Airport/Runways/Landing Strip/Helipad - Commercial | |
| Infrastructure /Transport Services/Airport/Runways/Landing Strip/Helipad - Private | |
| Infrastructure /Transport Services/Airport/Runways/Landing Strip/Helipad - Public Services | |
| Infrastructure /Transport Services - Ports | |
| Infrastructure /Transport Services - Inland Waterways | |
| Infrastructure /Transport Services - Marina | |
| Infrastructure /Transport Services - Canal | |
| Infrastructure /Localised infrastructure - Infrastructure in the Sea/Estuary/Littoral Active Zone/Development Setback/100M Inland/or coastal public property. | ✓ |
| Infrastructure /Localised infrastructure - Zip Lines & Foefie Slides | |
| Infrastructure /Localised infrastructure - Cableway or Funiculars | |
| Infrastructure /Localised infrastructure - Billboards | |
| Infrastructure /Localised infrastructure/Storage/Dangerous Goods/Hydrocarbon - Gas | |
| Infrastructure /Localised infrastructure/Storage/Dangerous Goods/Hydrocarbon - Petroleum | |
| Infrastructure /Localised infrastructure/Storage/Dangerous good – Chemicals | |
| Utilities Infrastructure/Pipelines/water - Fresh/Storm Water | |
| Utilities Infrastructure/Pipelines/water - Waste Water | |
| Utilities Infrastructure/Pipelines/Dangerous Goods - Chemicals | |
| Utilities Infrastructure/Pipelines/Hydrocarbon – Petroleum | |
| Utilities Infrastructure/Pipelines/Hydrocarbon - Gas | |
| Utilities Infrastructure/Telecommunications/ Radio Broadcasting - Tower | |
| Utilities Infrastructure/Telecommunications/ Radio Broadcasting - Mast | |
| Utilities Infrastructure/Telecommunications/ Radio Broadcasting - Receivers | |
| Utilities Infrastructure - Marine Cables | |
| Utilities Infrastructure/Electricity /Generation/Non Renewable/Hydrocarbon - Petroleum | |

| | | |
|--|---|----------------|
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

| | |
|---|--|
| Utilities Infrastructure/Electricity /Generation/Non Renewable/Hydrocarbon - Coal | |
| Utilities Infrastructure/Electricity /Generation/Non Renewable - Nuclear | |
| Utilities Infrastructure/Electricity /Generation/Renewable - Hydro | |
| Utilities Infrastructure/Electricity /Generation/Renewable/Solar - PV | |
| Utilities Infrastructure/Electricity /Generation/Renewable/Solar - CSP | |
| Utilities Infrastructure/Electricity /Generation/Renewable - Wind | |
| Utilities Infrastructure/Electricity /Generation/Renewable - Biomass/ biofuels | |
| Utilities Infrastructure/Electricity /Generation/Renewable - Wave | |
| Utilities Infrastructure/Electricity /Distribution and Transmission - Power line | |
| Utilities Infrastructure/Electricity /Distribution and Transmission – Substation | |
| Utilities Infrastructure/Gas /Distribution and Transmission – Compressor Station | |
| Services/Waste Management Services/Disposal facilities - Hazardous | |
| Services/Waste Management Services/Disposal facilities - Nuclear | |
| Services/Waste Management Services/Disposal facilities - General | |
| Services/Waste Management Services/Treatment facilities - Hazardous | |
| Services/Waste Management Services/Treatment facilities - General | |
| Services/Waste Management Services/Storage Facilities - General | |
| Services/Waste Management Services/Storage Facilities - Hazardous | |
| Services/Waste Management Services/Storage Facilities - Nuclear | |
| Services/Burial and cemeteries - Cemeteries | |
| Services/Burial and cemeteries - Cremators | |
| Services/Water services/Storage - Dams | |
| Services/Water services/Storage - Reservoirs | |
| Services/Water services - Desalination | |
| Services/Water services - Treatment & Waste Water | |
| Services - Hospitality | |
| Mining - Prospecting rights | |
| Mining - Mining Permit | |
| Mining - Mining Right | |
| Mining/Exploration Right - Gas or Oil Marine | |
| Mining/Exploration Right - Gas or Oil Terrestrial | |
| Mining/Production Right - Gas or Oil Marine | |
| Mining/Production Right - Gas or Oil Terrestrial | |
| Mining/Underground gasification of coal - Oil | |

| | | |
|---|---|----------------|
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“Attainment of a Radically Transformed, Inclusive and Sustainable Economic Growth for KwaZulu-Natal”

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| | |
|--|--|
| Mining/Beneficiation - Hydrocarbon | |
| Mining/Beneficiation - Mineral | |
| Agriculture/Forestry/ Fisheries - Crop Production | |
| Agriculture/Forestry/ Fisheries - Animal Production | |
| Agriculture/Forestry/ Fisheries - Afforestation | |
| Agriculture/Forestry/ Fisheries/Aquaculture/Inland- Alien | |
| Agriculture/Forestry/ Fisheries/Aquaculture/Inland- Indigenous | |
| Agriculture/Forestry/ Fisheries/Aquaculture/Marine - Alien | |
| Agriculture/Forestry/ Fisheries/Aquaculture/Marine - Indigenous | |
| Agriculture/Forestry/ Fisheries - Agro-Processing | |
| Transformation of land - Indigenous vegetation | |
| Transformation of land - From open space or Conservation | |
| Transformation of land - From agriculture or afforestation | |
| Transformation of land - From mining or heavy industrial areas | |
| Any activities within or close to a watercourse | |
| Any activity in an estuary, on the seashore, in the littoral active zone, or in the sea. | |
| Activity requiring permit or licence in terms of National or Provincial legislation governing the release or generation of emissions - Emissions | |
| Activity requiring permit or licence - Marine Effluent | |
| Activity requiring permit or licence - Fresh Water Effluent | |
| Release of Genetically Modified Organisms | |

| | | |
|--|---|----------------|
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Attainment of a Radically Transformed, Inclusive and Sustainable Economic Growth for KwaZulu-Natal

APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

4. STATE DEPARTMENTS CONSULTED

Please indicate to which State departments reports related to your application will be forwarded to provide comments in terms of section 24 0 (2) of NEMA:

Please note: details of the relevant contact person and the address of the State department must be provided. Add the names and other details for State departments not listed.

| Tick (✓) relevant option/s | | Name of Department | Contact person | Address |
|----------------------------|----|---|--|--|
| YES | NO | | | |
| ✓ | | KZN Department of Transport | Judy Reddy | Private Bag X9043 Pietermaritzburg 3200 |
| ✓ | | Ezemvelo KZN Wildlife | Dominic Wieners Noluthando Dlamini | P.O. Box 13053 Cascades 3202 |
| ✓ | | Department of Water and Sanitation | Siyabonga Buthelezi Mokoena Nonkululeko | 88 Joe Slovo Street Durban 4001 |
| ✓ | | KwaZulu-Natal AMAFA and Research Institute | Bernadet Pawandiwa | P.O. Box 2685 Pietermaritzburg 3200 |
| ✓ | | KZN Corporate Governance and Traditional Affairs | Vishnu Govender | 7 Buro Crescent Mayville Durban 4091 |
| ✓ | | Ward Councillor, Ward 58 | Geoffrey Douglas Ayrton Pullan | geoffpullan@iafrica.com |
| ✓ | | Commission on Restitution of Land Rights | Lynn Boucher | Private Bag X9120 Pietermaritzburg 3200 |
| ✓ | | eThekweni Municipality Environmental Planning & Climate Protection Department | Michelle Lots Nhle Zuma Thenjiwe Msani | City Engineers Building 166 K.E. Masinga Road Durban 4001 |
| ✓ | | KZN Department of Economic Development, Tourism and Environmental Affairs | Ndumiso Msuku | 1 Dorothy Nyembe Street Durban Central Durban 4001 |
| ✓ | | EDTEA: Coastal and Biodiversity Management Unit | Omar Parak | Private Bag X9152 Pietermaritzburg 3200 |
| ✓ | | Eskom Holdings SOC Limited | Neil Purdon | P.O. Box 66 New Germany 3620 |

Please note that: The EAP must request comments from all relevant State departments and remind such departments that failure to submit comments with 30 days will, in terms of sub-regulation 3(4) of the EIA Regulations, 2014 be regarded as no comments.

| | | |
|--|---|----------------|
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

5. ECONOMIC AND SOCIAL INFORMATION

Details on the anticipated socio-economic values associated with the proposed project MUST be provided below:

| | |
|---|--|
| Anticipated CAPEX value of the project on completion | R 70mil |
| What is the expected annual turnover to be generated by or as a result of the project? | No turnover as it's a residential project |
| New skilled employment opportunities created in the <u>construction</u> phase of the project | ±50-100 |
| New skilled employment opportunities created in the <u>operational</u> phase of the project | Not applicable |
| New un-skilled employment opportunities created in the <u>construction</u> phase of the project | ±500 |
| New un-skilled employment opportunities created in the <u>operational</u> phase of the project | ±300 |
| What is the expected value of the employment opportunities during the operational and construction phase? | ±R35m during construction ±R2m – R3m / annum during operation |

6. TYPE OF APPLICATION

(a) Application for Basic Assessment (BA)

This is an application that is subject to a basic assessment (EIA Regulations 2014: Chapter 4, Part 2)) and Regulation 19 in the EIA Regulations 2014 will be complied with.

| Tick (✓) relevant option | |
|-----------------------------|-----|
| YES ✓ | N/A |

(b) Application for Scoping and Environmental Impact Assessment (S/EIA)

This is an application that is subject to Scoping and EIA (EIA Regulations 2014: Chapter 4: Part 3) and Regulation 21 in the EIA Regulations 2014 will be complied with.

| Tick (✓) relevant option | |
|-----------------------------|----------|
| YES | N/A ✓ |

| | | |
|--|---|----------------|
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

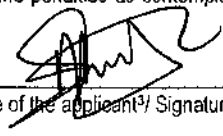
7. DECLARATIONS

(a) Declaration by the applicant

I, ANANT HAREEBRUN SINGH, declare that I-

- am, or represent², the applicant in this application;
- have appointed an environmental assessment practitioner to act as the independent environmental assessment practitioner for this application;
- will provide the environmental assessment practitioner and the KZN Department of Economic Development, Tourism & Environmental Affairs with access to all information at my disposal that is relevant to this application;
- will be responsible for the costs incurred in complying with the Environmental Impact Assessment Regulations, 2014, including but not limited to –
 - costs incurred in connection with the appointment of the environmental assessment practitioner;
 - costs incurred in respect of the undertaking of any process required in terms of the Regulations;
 - costs in respect of any fee prescribed by the Minister or MEC in respect of the Regulations;
 - costs in respect of specialist reviews, if the competent authority decides to recover costs; and
 - the provision of security to ensure compliance with conditions attached to an environmental authorization, should it be required by the KZN Department of Economic Development, Tourism & Environmental Affairs;
- will ensure that the environmental assessment practitioner is competent to comply with the requirements of the EIA Regulations, 2014 and will take reasonable steps to verify whether the EAP complies with the Regulations;
- will inform all registered interested and affected parties of any suspension of the application, as well as of any decisions taken by the KZN Department of Economic Development, Tourism & Environmental Affairs in this regard;
- am responsible for complying with the conditions of any environmental authorization issued by the KZN Department of Economic Development, Tourism & Environmental Affairs;
- hereby indemnify the Government of the Republic of South Africa, the KZN Department of Economic Development, Tourism & Environmental Affairs and all its officers, agents and employees, from any liability arising out of the content of any report, any procedure or any action which the applicant or environmental assessment practitioner is responsible for in terms of the EIA Regulations, 2014;
- will not hold the KZN Department of Economic Development, Tourism & Environmental Affairs responsible for any costs that may be incurred by the applicant in proceeding with an activity prior to obtaining an environmental authorization or prior to an appeal being decided in terms of the EIA Regulations, 2014;
- I will perform all other obligations as expected from an applicant in terms of the EIA Regulations, 2014;
- all the particulars furnished by me in this form are true and correct; and

I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B-(1) of the National Environmental Management Act, 1998 (Act 107 of 1998)


Signature of the applicant³/ Signature on behalf of the applicant

Trading name (if applicable)

28 JULY 2020

Date

²If this is signed on behalf of the applicant, proof of such authority from the applicant must be attached.

³If the applicant is a juristic person, a signature on behalf of the applicant is required as well as proof of such authority.

| | | |
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

(b) Declaration by the environmental assessment practitioner.

Environmental assessment practitioner (EAP):⁴

| | | | |
|---|--|-------|--------------|
| Trading name (if any): | 1World Consultants (Pty) Ltd | | |
| Contact person: | Fatima Peer | | |
| Postal address: | P.O. Box 2311, Westville | | |
| Postal code: | 3630 | Cell: | 061 514 5942 |
| Telephone: | 031 262 8327 | | |
| E-mail: | fatima@1wc.co.za | | |
| Education Qualifications ⁵ : | BSc. Hons | | |
| Professional affiliation(s) (if any) ⁶ | SACNASP (Membership No. 400287/11) IAIAsa (Membership No. 3974) | | |

I, **Fatima Peer**, declare that I

- am the independent environmental practitioner in this application;
- will comply with the requirements for an EAP as stipulated in Regulation 13 of the EIA Regulations, 2014;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- declare that there are no circumstances that may compromise my objectivity in performing such work;
- have expertise in conducting environmental impact assessments, including knowledge of the National Environmental Management Act, 1998 (Act107 of 1998), regulations and any guidelines that have relevance to the proposed activity;
- will comply with the National Environmental Management Act, 1998 (Act107 of 1998), regulations and all other applicable legislation;
- 2014undertake to disclose to the applicant and the KZN Department of Economic Development, Tourism & Environmental Affairs all material information in my possession that reasonably has or may have the potential of influencing its decision with respect to this application;
- will ensure that information containing all reports in respect of this application is distributed or made available to interested and affected parties and that their participation is facilitated in such a manner that they will be provided with a reasonable opportunity to participate and provide comments on the reports;
- will provide the competent authority with access to all information at my disposal regarding this application, whether such information is favourable to the applicant or not;
- declare that all the particulars furnished by me in this form are true and correct;
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998); and
- I will comply with all the requirements as indicated in the National Environmental Management Act, 1998(Act 107 of 1998) and Environmental Impact Assessment Regulations, 2014.



Signature of the environmental assessment practitioner

1World Consultants (Pty) Ltd

Trading name

26 August 2020

Date

⁵⁸Please include details of names, education qualifications and professional affiliations of the EAP and each representative of the EAP appointed to manage this application.

| | | |
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| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Application for Environmental Authorization | Oct 2019 V1 |
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

Appendix 1
Minutes of the Pre-Application Meeting held with the Department

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Application for Environmental Authorization | Oct 2019 V1 |
|--|---|----------------|

APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

Appendix 2

Written consent from the landowner or the person in control of the land (Regulation 39(1) (If the applicant is not the landowner and Regulation 39(2) does not apply)

Not Applicable

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Application for Environmental Authorization | Oct 2019 V1 |
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

Appendix 3

**Correspondence from the Department confirming the Listing Notice 3 activities triggered
(if applicable)**

Not Applicable

| | | |
|---|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Application for Environmental Authorization | Oct 2019 V1 |
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

Appendix 4

Approval by the Department that a combined application in terms of Regulation 11 of the EIA Regulations, 2014 may be submitted (if applicable)

Not Applicable

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Application for Environmental Authorization | Oct 2019 V1 |
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

Appendix 5

A description of the location of the development footprint and a plan which locates the proposed activity/ies (Regulation 16 (1) (vi) (vii))

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Application for Environmental Authorization | Oct 2019 V1 |
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

Appendix 6

Proof of payment of environmental authorization fees (if applicable). Proof of payment includes a stamped deposit slip or an electronic fund transfer payment advice

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Application for Environmental Authorization | Oct 2019 V1 |
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

Appendix 7

A written motivation explaining why the payment of environmental authorization fees are not applicable (an application for a community-based project funded by a government grant or an application by an organ of state)

Not Applicable

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Application for Environmental Authorization | Oct 2019 V1 |
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APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

Appendix 8

A report generated from the national web based environmental screening tool, as contemplated in Regulation 16(1)(b)(v) of the EIA Regulations, 2014 is compulsory when submitting an application for environmental authorisation in terms of regulation 19 and 21 of the EIA Regulations, 2014 from 04 October 2019

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Application for Environmental Authorization | Oct 2019 V1 |
|--|---|----------------|

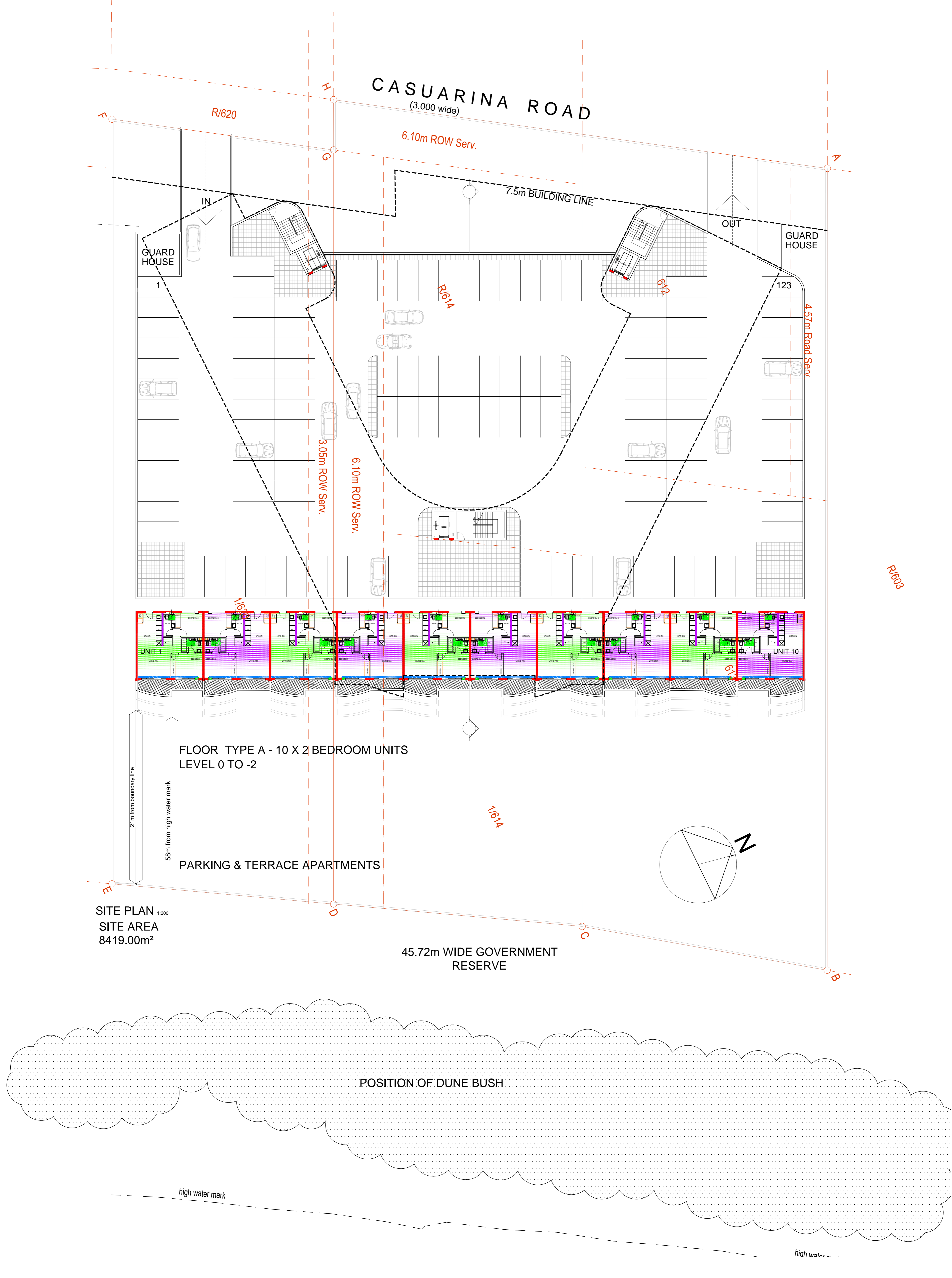
APPLICATION FOR ENVIRONMENTAL AUTHORIZATION

**Appendix 9
Locality Map**

| | | |
|--|---|----------------|
| Department of Economic Development, Tourism & Environmental Affairs, KwaZulu-Natal | Application for Environmental Authorization | Oct 2019 V1 |
|--|---|----------------|

“Attainment of a Radically Transformed, Inclusive and Sustainable Economic Growth for KwaZulu-Natal”

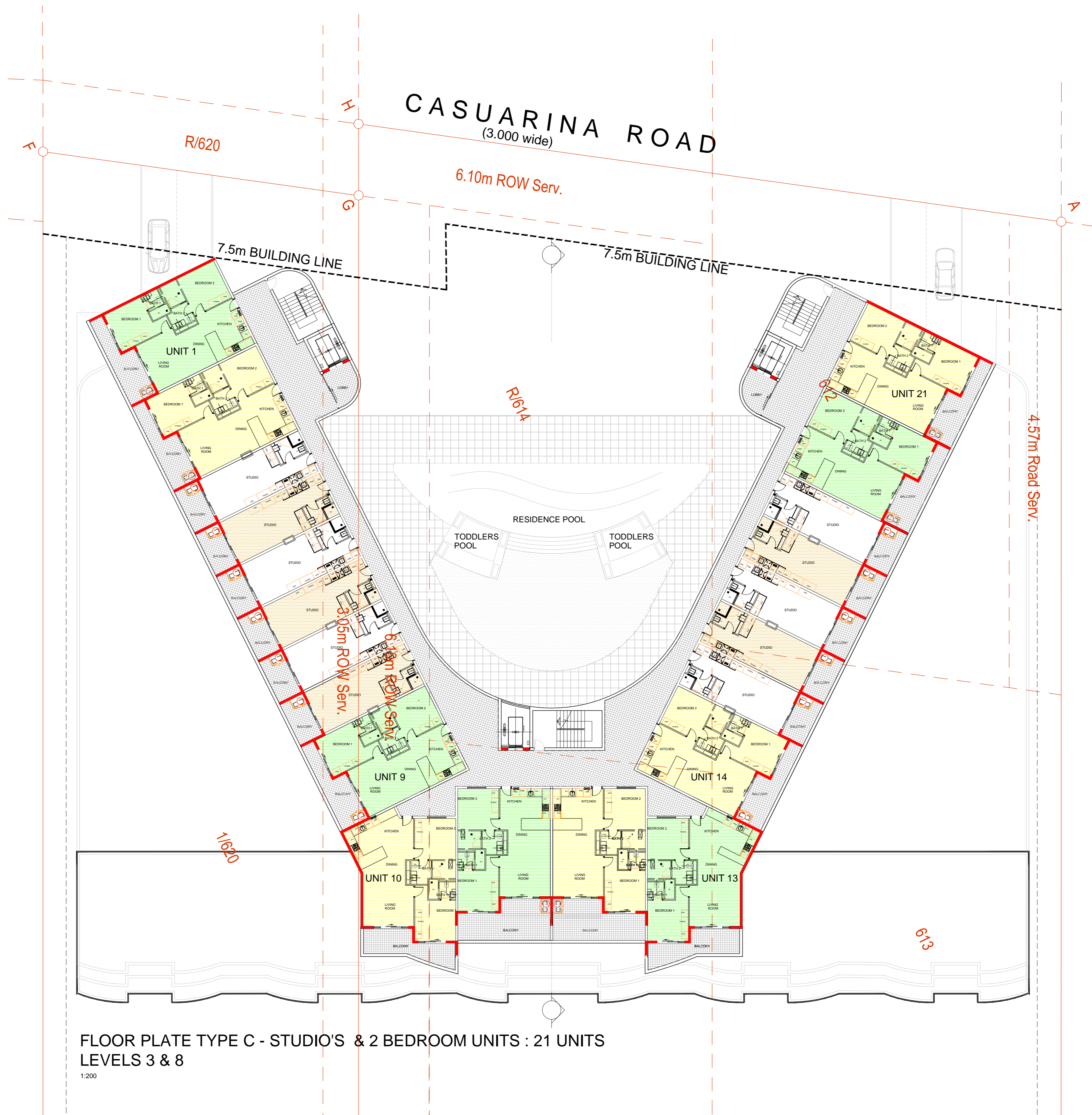
Preferred Alternative: Layout 1



PROPOSED NEW RESIDENTIAL DEVELOPMENT AT 49 CASUARINA ROAD
200 UNIT PROPOSAL

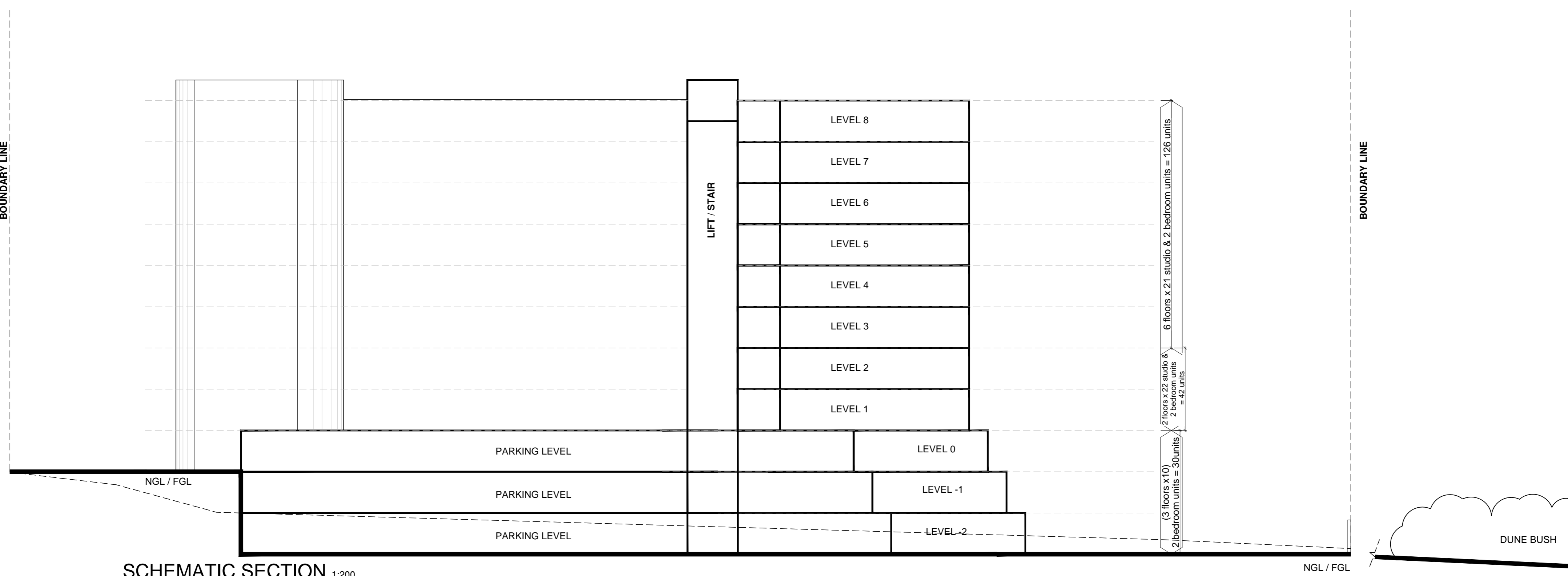
P.O. BOX 37188 TELE : 2097245/6 FAX : 2097247
DURBAN
REG. NO : 3140 (S.A.C.A.P.)





FLOOR PLATE TYPE C - STUDIO'S & 2 BEDROOM UNITS : 21 UNITS
LEVELS 3 & 8

1:200

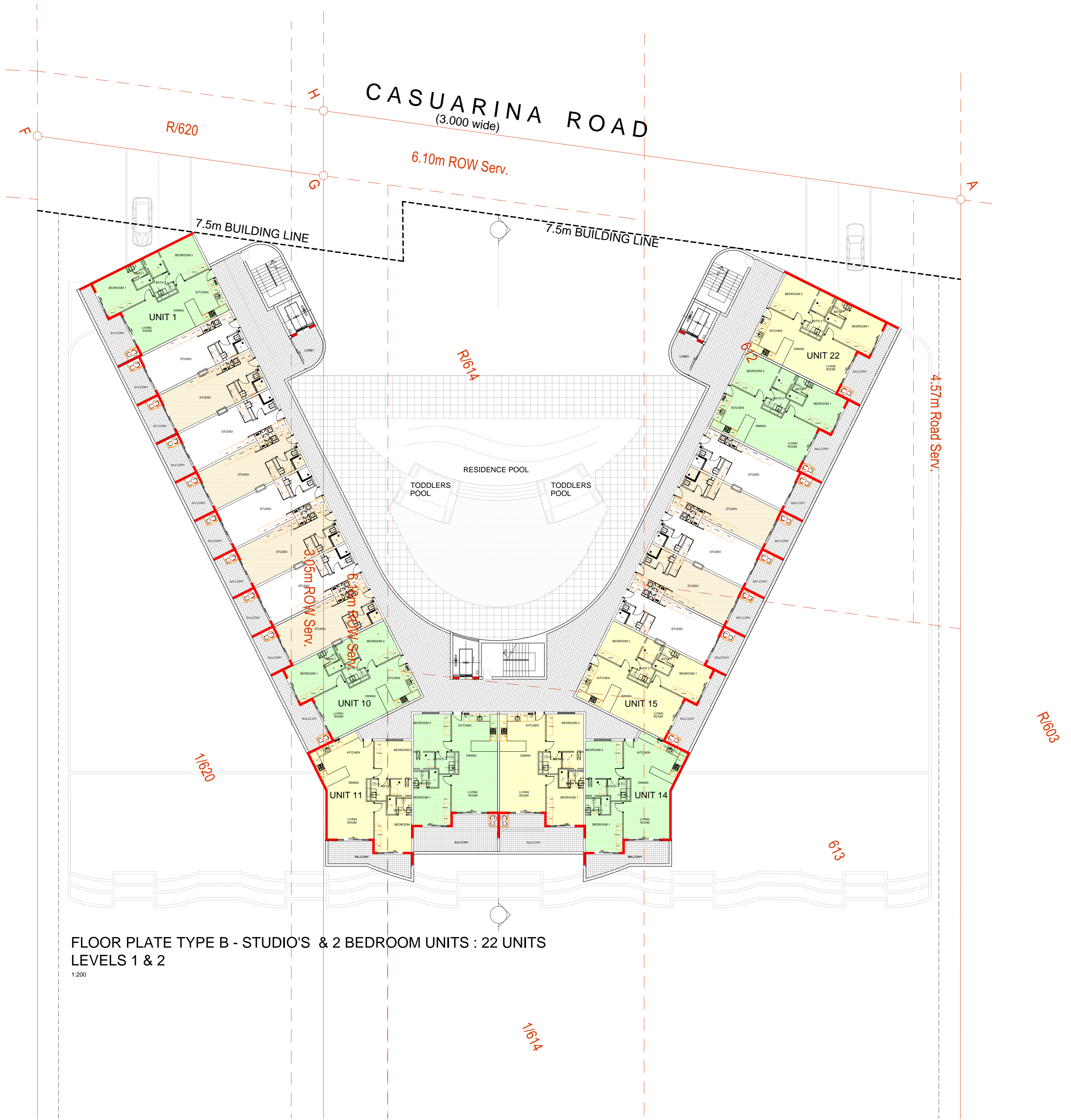


SCHEMATIC SECTION 1:200

PROPOSED NEW RESIDENTIAL DEVELOPMENT AT 49 CASUARINA ROAD
200 UNIT PROPOSAL

P.O. BOX 37188 TELE : 2097245/6 FAX : 2097247
OVERSPORT E-MAIL : RECEIPTION@ELCANTARARCHITECTS.CO.ZA
DURBAN REG. NO : 3140 (S.A.C.A.P)
4067





FLOOR PLATE TYPE B - STUDIOS & 2 BEDROOM UNITS : 22 UNITS
LEVELS 1 & 2

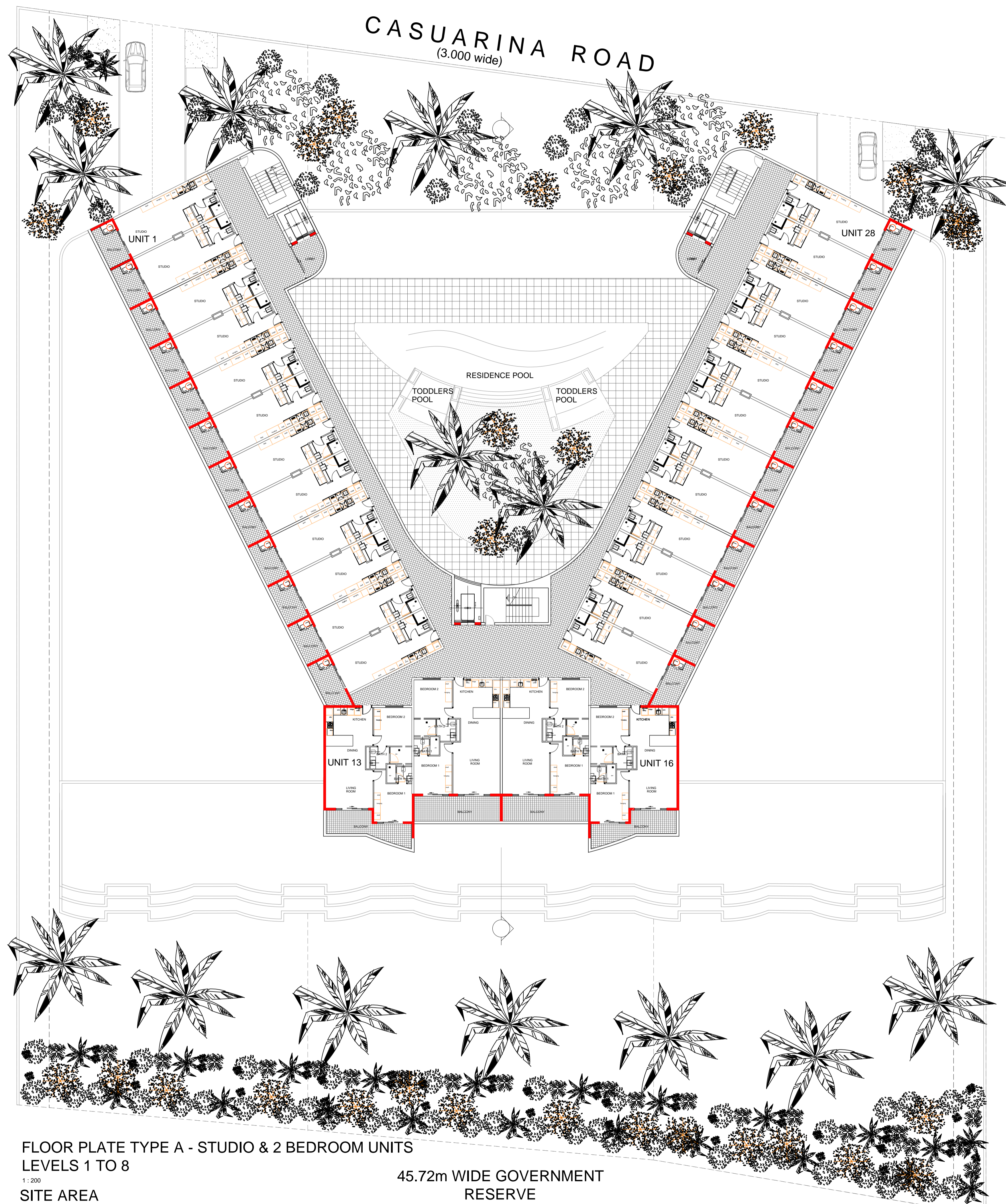
1:200

AREA SCHEDULE

| | |
|--|-------------------------|
| COMBINED SITE AREA | : 8419.00m ² |
| PROPOSED COVERAGE | : 4781.07m ² |
| PERCENTAGE COVERAGE (RESIDENTIAL & PARKING) | : 56.7% |
| PROPOSED RESIDENTIAL COVERAGE | : 32.74% |

| | | |
|-------------------------|---------------------------|--------------------------|
| PROPOSED F.A.R | | |
| LEVEL -2 (10 UNITS) | : 700.00m ² | } 3x10 UNITS = 30 UNITS |
| LEVEL -1 (10 UNITS) | : 700.00m ² | |
| LEVEL -0 (10 UNITS) | : 700.00m ² | |
| LEVEL 1 (22 UNITS) | : 1316.06m ² | } 2x22 UNITS = 44 UNITS |
| LEVEL 2 (22 UNITS) | : 1316.06m ² | |
| LEVEL 3 (21 UNITS) | : 1316.06m ² | } 6x21 UNITS = 126 UNITS |
| LEVEL 4 (21 UNITS) | : 1316.06m ² | |
| LEVEL 5 (21 UNITS) | : 1316.06m ² | |
| LEVEL 6 (21 UNITS) | : 1316.06m ² | |
| LEVEL 7 (21 UNITS) | : 1316.06m ² | |
| LEVEL 8 (21 UNITS) | : 1316.06m ² | |
| TOTAL PROPOSED F.A.R | : 12 628.50m ² | |
| PERCENTAGE F.A.R | : 1.5 | |
| TOTAL NUMBER OFF UNITS | : 200 | |
| NUMBER PARKING PROVIDED | : 369 BAYS | |

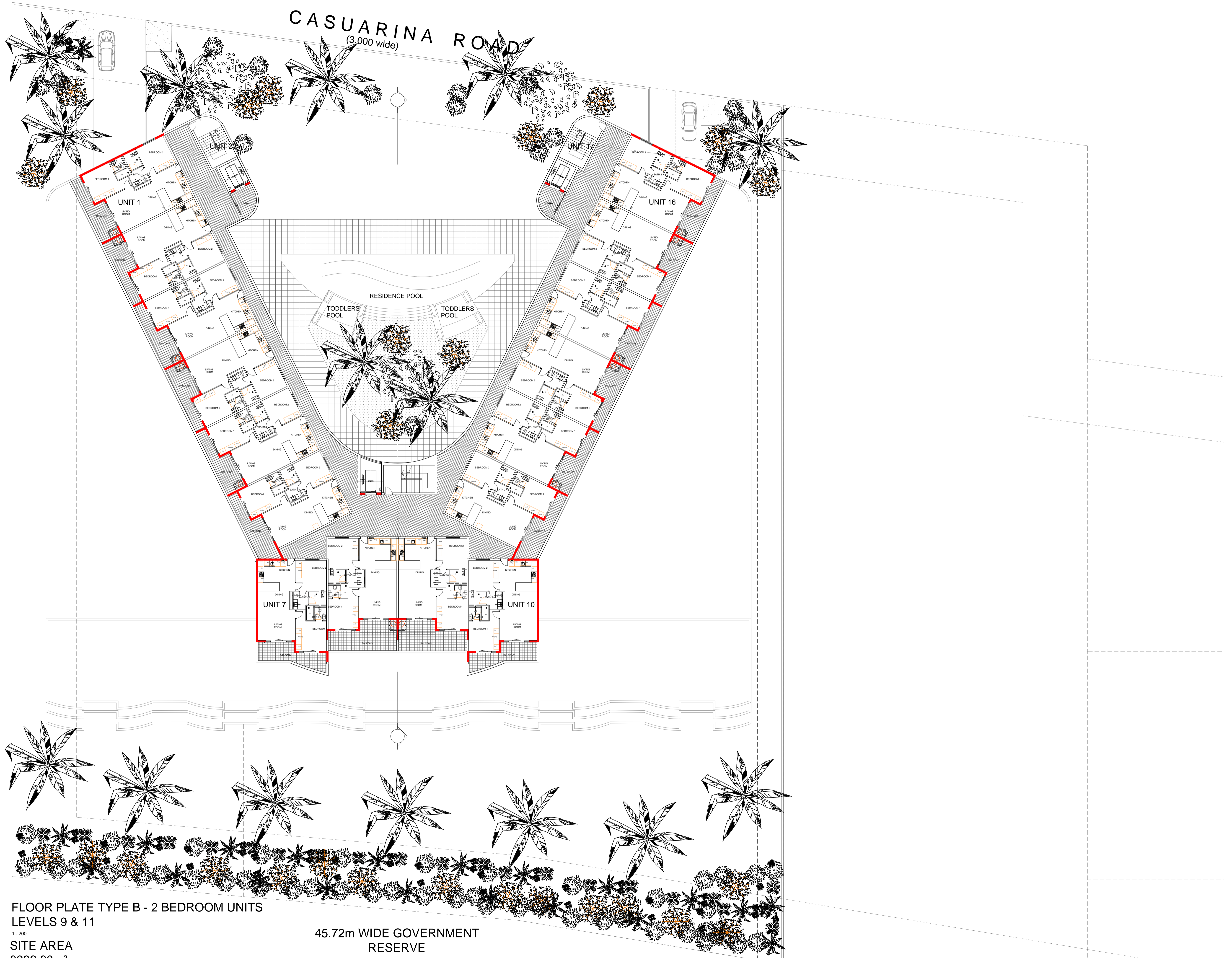
Alternative 1: Layout 2



FLOOR PLATE TYPE A - STUDIO & 2 BEDROOM UNITS
 LEVELS 1 TO 8
 1:200
 SITE AREA
 8932.83m²

45.72m WIDE GOVERNMENT
 RESERVE

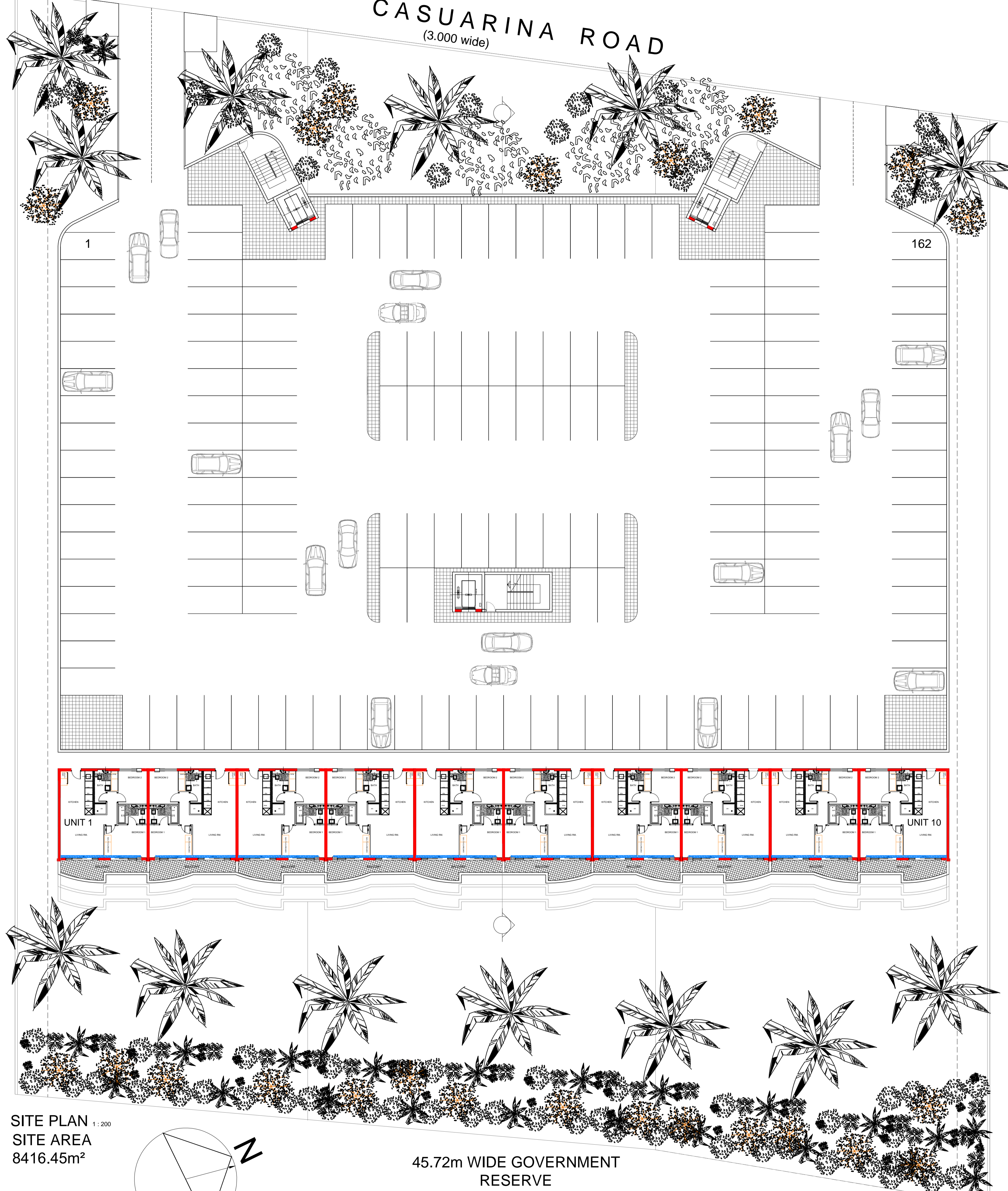
CASUARINA ROAD
(3,000 wide)



FLOOR PLATE TYPE B - 2 BEDROOM UNITS
LEVELS 9 & 11
1:200
SITE AREA
8932.83m²

45.72m WIDE GOVERNMENT
RESERVE

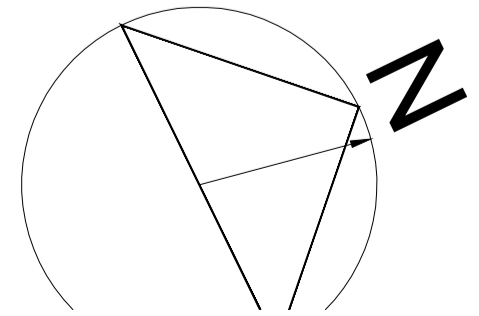
CASUARINA ROAD
(3.000 wide)



AREA SCHEDULE

| | |
|-------------------------|---------------------------|
| COMBINED SITE AREA | : 8416.45m ² |
| PROPOSED COVERAGE | : 5419.61m ² |
| PERCENTAGE COVERAGE | : 64.39% |
| PROPOSED F.A.R | |
| LEVEL -2 (10 UNITS) | : 687.37m ² |
| LEVEL -1 (10 UNITS) | : 687.37m ² |
| LEVEL -0 (10 UNITS) | : 687.37m ² |
| LEVEL 1 (28 UNITS) | : 1370.80m ² |
| LEVEL 2 (28 UNITS) | : 1370.80m ² |
| LEVEL 3 (28 UNITS) | : 1370.80m ² |
| LEVEL 4 (28 UNITS) | : 1370.80m ² |
| LEVEL 5 (28 UNITS) | : 1370.80m ² |
| LEVEL 6 (28 UNITS) | : 1370.80m ² |
| LEVEL 7 (28 UNITS) | : 1370.80m ² |
| LEVEL 8 (28 UNITS) | : 1370.80m ² |
| LEVEL 9 (16 UNITS) | : 1370.80m ² |
| LEVEL 10 (16 UNITS) | : 1370.80m ² |
| LEVEL 11 (16 UNITS) | : 1370.80m ² |
| TOTAL PROPOSED F.A.R | : 17 140.91m ² |
| PERCENTAGE F.A.R | : 2.0 |
| TOTAL NUMBER OFF UNITS | : 300 |
| NUMBER PARKING PROVIDED | : 324 BAYS |

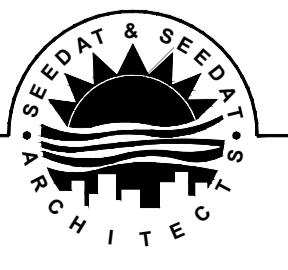
SITE PLAN 1:200
SITE AREA
8416.45m²



45.72m WIDE GOVERNMENT
RESERVE

PROPOSED NEW RESIDENTIAL DEVELOPMENT AT 49 CASUARINA ROAD

P.O. BOX 37188 TELE : 2097245/6 FAX : 2097247
DURBAN
4067



Appendix D

I&AP Distribution List

PROPOSED RESIDENTIAL / SERVICES APARTMENTS – CASUARINA ROAD

| I&AP REGISTER AND DATABASE | | | | | | |
|--|--|------------------------------|--------------------|--|------------------|-------------------|
| ORGANISATION | CONTACT PERSON | PHONE NUMBER | FILE REFERENCE NO. | CONTACT DETAILS | COPY OF BID SENT | COPY OF DBAR SENT |
| KZN Department of Transport | Judy Reddy | 033 355 8600 033 355 0569 | ENV19001 | KwaZulu-Natal Department of Transport Private Bag X9043 Pietermaritzburg 3200 Judy.Reddy@Kzntransport.gov.za | ✓ | ✓ |
| Ezemvelo KZN Wildlife | Dominic Wieners Noluthando Dlamini | 033 845 1346 033 845 1363 | ENV19001 | Ezemvelo KZN Wildlife P.O.Box 13053 Cascades 3202 Dominic.Wieners@kznwildlife.com Noluthando.Dlamini@kznwildlife.com | ✓ | ✓ |
| Department of Water and Sanitation | Siyabonga Buthelezi Mokoena Nonkululeko | 031 336 2700 031 336 2789 | ENV19001 | Department of Water and Sanitation 88 Joe Slovo Street Durban 4001 ButheleziS2@dws.gov.za MokoenaN@dws.gov.za | ✓ | ✓ |
| KwaZulu-Natal AMAFA and Research Institute | Bernadet Pawandiwa | 033 394 6543 | SAH19/13664 | KwaZulu-Natal AMAFA and Research Institute P.O. Box 2685 Pietermaritzburg 3200 bernadetp@amafapmb.co.za | ✓ | ✓ |
| KZN Corporate Governance and Traditional Affairs | Vishnu Govender | 031 204 1711 | ENV19001 | KwaZulu-Natal: Corporate Governance and TraditionalAffairs 7 Buro Crescent Mayville | ✓ | ✓ |

PROPOSED RESIDENTIAL / SERVICES APARTMENTS – CASUARINA ROAD

| | | | | | | |
|---|--|------------------------------|----------|---|---|-----|
| | | | | Durban 4091 <u>Vishnu.Govender@kzncogta.gov.za</u> | | |
| Ward Councillor, Ward 58 | Geoffrey Douglas Ayrton Pullan | 083 695 9190 | ENV19001 | <u>geoffpullan@iafrica.com</u> <u>PullanGDA@durban.gov.za</u> | ✓ | ✓ |
| Commission on Restitution of Land Rights | Lynn Boucher | 033 341 2600 | ENV19001 | Commission on Restitution of Land Rights Private Bag X9120 Pietermaritzburg 3200 <u>lynn.boucher@drdlr.gov.za</u> | ✓ | N/A |
| eThekweni Municipality Environmental Planning & Climate Protection Department | Michelle Lots Nhle Zuma Thenjiwe Msani | 031 322 7694 | ENV19001 | eThekweni Municipality Environmental Planning & Climate Protection Department Room 200 2nd Floor City Engineers Building 166 K.E. Masinga Road Durban 4001 <u>Michelle.Lotz@Durban.gov.za</u> <u>Nhle.Zuma@Durban.gov.za</u> <u>Thenjiwe.Msani@durban.gov.za</u> | ✓ | ✓ |
| KZN Department of Economic Development, Tourism and Environmental Affairs | Ndumiso Msuku Natasha Brijlal | 031 350 3015 079 898 0491 | ENV19001 | KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs 1 Dorothy Nyembe Street Durban Central Durban 4001 <u>Ndumiso.Masuku@kznedtea.gov.za</u> <u>Natasha.Brijlal@kznedtea.gov.za</u> | ✓ | ✓ |

PROPOSED RESIDENTIAL / SERVICES APARTMENTS – CASUARINA ROAD

| | | | | | | |
|---|-------------------------------|------------------------------|----------|---|---|-----|
| EDTEA: Coastal and Biodiversity Management Unit | Omar Parak Alfred Matsheke | 033 897 6680 | ENV19001 | EDTEA: Coastal and Biodiversity Management Private Bag X9152 Pietermaritzburg 3200 <u>Omar.Parak@kznedtea.gov.za</u> <u>Alfred.Matsheke@kznedtea.gov.za</u> | ✓ | ✓ |
| Eskom Holdings SOC Limited | Siyabonga Nsele | 031 710 5264 073 550 1572 | ENV19001 | P.O. Box 66 New Germany 3620 <u>nselesi@eskom.co.za</u> | ✓ | ✓ |
| 30 Casuarina Road Genazano Tongaat | Private Landowner | n/a | ENV19001 | BID Hand Delivered. I&AP to confirm registration onto database | ✓ | TBC |
| 32 Casuarina Road Genazano Tongaat | Private Landowner | n/a | ENV19001 | BID Hand Delivered. I&AP to confirm registration onto database | ✓ | TBC |
| 34 Casuarina Road Genazano Tongaat | Private Landowner | n/a | ENV19001 | BID Hand Delivered. I&AP to confirm registration onto database | ✓ | TBC |
| 36 Casuarina Road Genazano Tongaat | Private Landowner | n/a | ENV19001 | BID Hand Delivered. I&AP to confirm registration onto database | ✓ | TBC |
| 38 Casuarina Road Genazano Tongaat | Private Landowner | n/a | ENV19001 | BID Hand Delivered. I&AP to confirm registration onto database | ✓ | TBC |
| 33 Casuarina Road Genazano Tongaat | Private Landowner | n/a | ENV19001 | BID Hand Delivered. I&AP to confirm registration onto database | ✓ | TBC |

PROPOSED RESIDENTIAL / SERVICES APARTMENTS – CASUARINA ROAD

| | | | | | | |
|--|-------------------|-----|----------|--|---|-----|
| 41 Casuarina Road Genazano Tongaat | Private Landowner | n/a | ENV19001 | BID Hand Delivered. I&AP to confirm registration onto database | ✓ | TBC |
| 61 Casuarina Road Genazano Tongaat | Private Landowner | n/a | ENV19001 | BID Hand Delivered. I&AP to confirm registration onto database | ✓ | TBC |
| 63 Casuarina Road Genazano Tongaat | Private Landowner | n/a | ENV19001 | BID Hand Delivered. I&AP to confirm registration onto database | ✓ | TBC |
| 65 Casuarina Road Genazano Tongaat | Beach Bums | n/a | ENV19001 | BID Hand Delivered. I&AP to confirm registration onto database | ✓ | TBC |



Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Background Information Document

Purpose of a Background Information Document (BID)

The purpose of this Background Information Document (BID) is to provide Interested and Affected Parties (I&AP's) with background information on the proposed project and introduce the Environmental Basic Assessment (BA) process to be followed. It also aims to (i) inform I&AP's on how to participate in the BA, (ii) encourage responses to documents that will be distributed for review and (iii) encourage I&AP's to attend any public meetings.

1World Consultants have been appointed as the independent Environmental Assessment Practitioner (EAP), to undertake the Basic Assessment Process for the Environmental Authorisation for the Proposed Development of Residential / Serviced Apartments at 49 Casuarina Road, Tongaat Beach, eThekweni Municipality.

Nature and Location of Activity

Casuarina 5153 Properties (Pty) Ltd proposes the demolishing of existing infrastructure for the construction of new residential/ serviced apartments situated at 49 Casuarina Road, Tongaat Beach within the eThekweni Municipality.

The site is located within an urban area and approximately 100m from the High-Water Mark of the sea. The extent of the proposed new development at ground level is ±4781.07m². The proposed development is 8 storey's high with a maximum of 200 units and associated parking blocks.



Environmental Impact

The Environmental Impact Assessment (EIA) Regulations (2017) promulgated under the National Environmental Management Act (Act No. 107 of 1998) (as amended), a Basic Assessment Study will be required. The proposed development triggers the following listed activity, as per GNR 327 Listing Notice 1 (07 April 2017):

Listing Notice 1: Activity 14:

The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from—

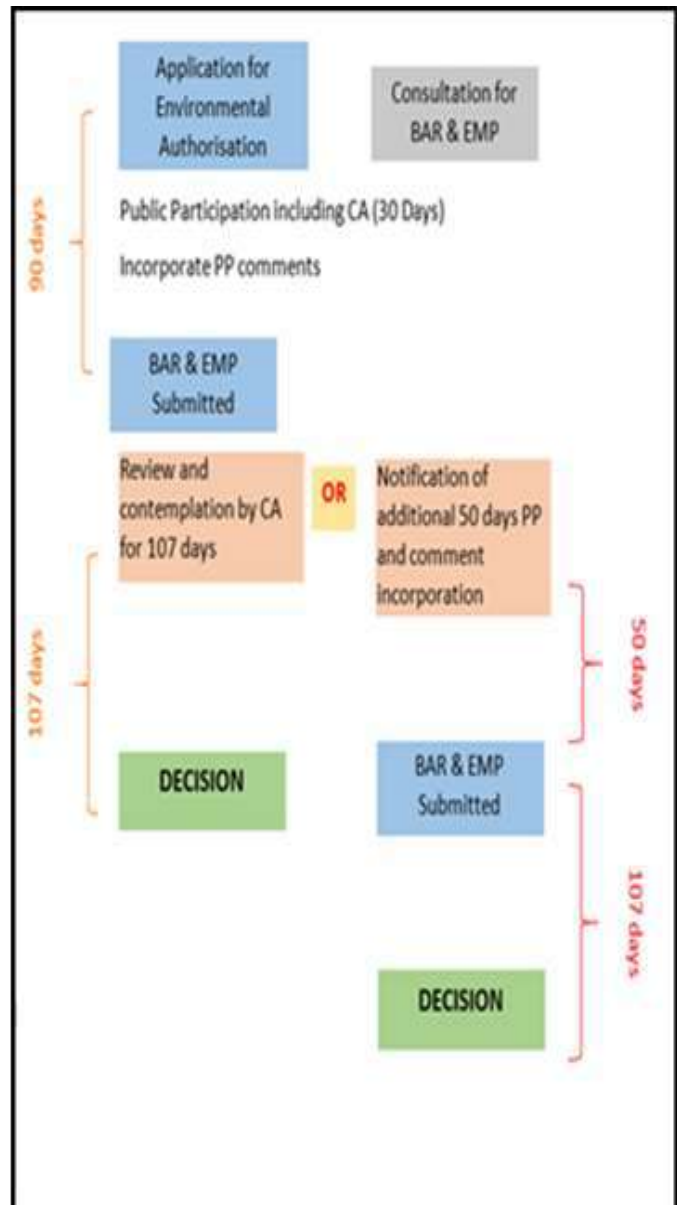
- (ii). the littoral active zone, an estuary or a **distance of 100 metres inland of the highwater mark of the sea** or an estuary, whichever distance is the greater.

The Basic Assessment Process and Public Participation Process (PPP)

The primary aim of the Basic Assessment is to ensure that any potential environmental impacts that may occur, due to the construction and/or operation of the proposed development, are mitigated.

The main aspects of a Basic Assessment are:

- Investigate and gather information on the area,
- Describe the environment and how the development would fit in,
- Identify and involve potential I&AP's and stakeholders,
- Identify potential impacts,
- Investigate alternatives to the proposed development,
- Recommend mitigation measures and compile an Environmental Management Program (EMPr) for the construction and operational phases.



Mitigation Measures

There are several risks associated with construction activities. Initial mitigation measures include a minimal working footprint, site demarcation, demarcation of no-go areas, designated and demarcated site access routes, sediment control measures, spillage control measures, dust control measures, general construction control, staff training and site rehabilitation post construction. A monitoring and auditing plan for the construction phase of the development, will be formulated to ensure that the mitigation measures, detailed in the Environmental Management Program (EMPr) are followed.

Elements of the Public Participation Process (PPP)

The public is invited to register as an I&AP and take part in the PPP via the following methods:

- Media Notices placed in newspapers.
- Distribution of this Background Information Document (BID)
- Site notice boards
- Stakeholder meetings
- Public meeting (if necessary)
- Submission of comments on the media notices, BID, and Draft Basic Assessment Report.

Note: All information is available on request.

How to Participate?

All Interested and Affected Parties (I&AP's) are invited to register, on the database managed by 1World Consultants (Pty) Ltd by email using the details provided.

Comments and recommendations regarding the proposed development are welcome and may be addressed to:

Roschel Maharaj

Tel: 031 262 8327

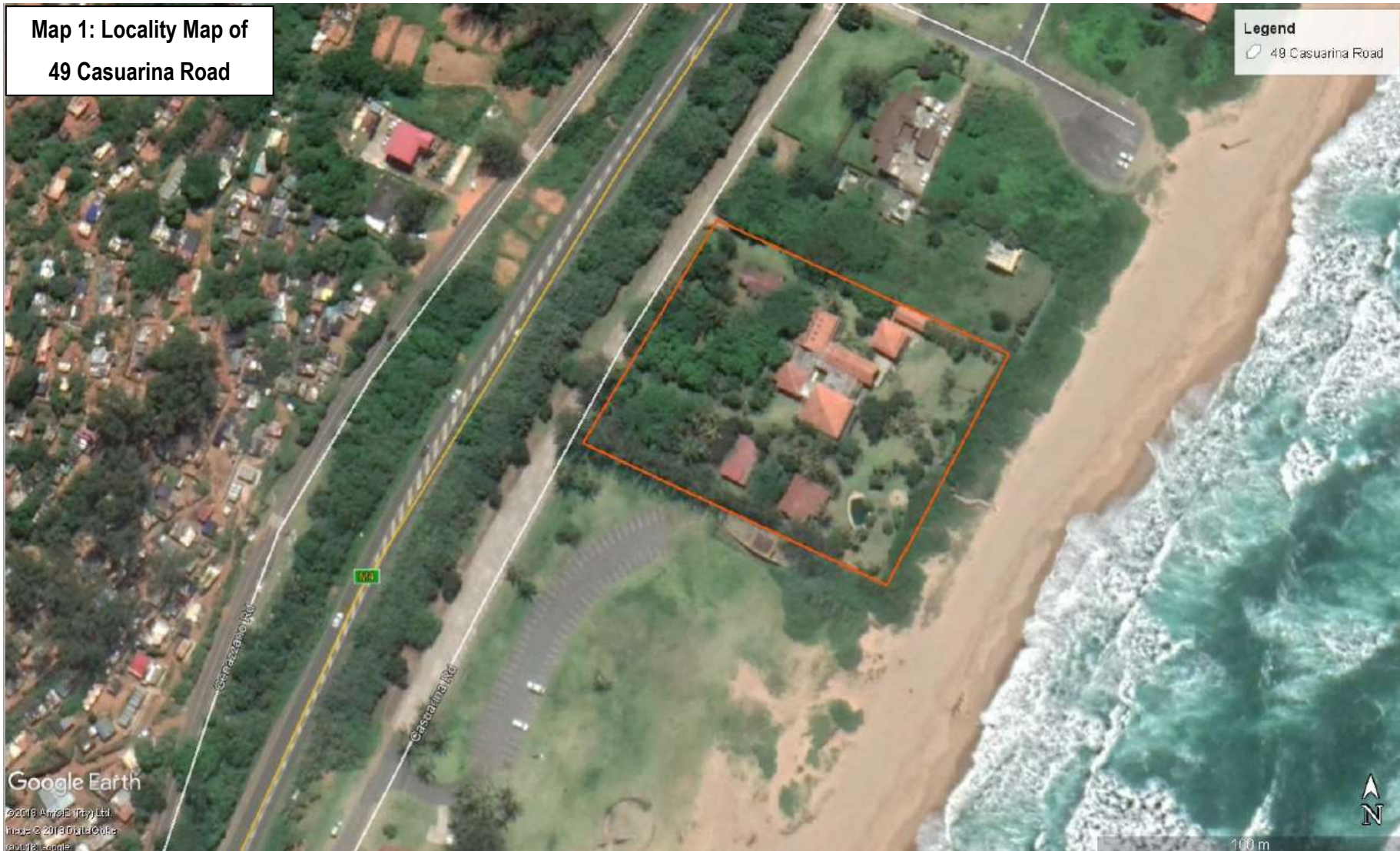
Postal: P.O. Box 2311, Westville, 3630

Email: roschel@1wc.co.za

Site Photographs

| | Snapshot | Description |
|---|---|---|
| 1 |  | Snapshot 1: Main Entrance Gate at 49 Casuarina Road |
| 2 |  | Snapshot 2: Existing Structure at 49 Casuarina Road, sea-ward facing. |
| 3 |  | Snapshot 3: Beach access point (sea-ward side), and staircase to beach (outside the property). |

**Map 1: Locality Map of
49 Casuarina Road**





Environmental & Engineering Consultants

Postal Address: P.O Box 2311, Westville, 3630

Tel: 031 262 8327

Fax: 086 726 3619

Proof of Distribution of BID

From: roschel@1wc.co.za
Sent: Friday, 03 April 2020 10:26
Subject: Background Information Document (BID) for Casuarina Road, Tongaat Beach
Attachments: 1WC_Arup_Casuarina Road_BID_April 2020.pdf

Dear Sir/ Mam

RE: Background Information Document (BID) for the Proposed Residential/ Serviced Apartments at 49 Casuarina Road, Tongaat Beach

1World Consultants (Pty) Ltd have been appointed as the Environmental Assessment Practitioner (EAP) for the above-mentioned project. You have been identified as a possible Interested and Affected Party (I&AP) or stakeholder for the EIA process. Attached, please find the Background Information Document (BID) for your review. You are hereby invited to register on the database of I&AP's and we look forward to liaising with you.

1World utilizes email as our primary communication tool. Should you have any queries/comments please provide via email.

Kindly acknowledge receipt of this email and one attachment. Please feel free to contact our offices should you require any further details.

Thank you

Kind regards,

Roschel Maharaj, BSc
Environmental Assessment Practitioner



P.O. Box 2311, Westville, 3630
Tel | 031 262 8327 Fax | 086 726 3619 Cell | 063 062 7725

Screenshot of BID Circulation to I&APs and Stakeholders

Background Information Document (BID) for Casuarina Road, Tongaat Beach - Message (HTML)

File Message Help Tell me what you want to do

Ignore Delete Archive Reply Reply All Forward More Meeting Archive (This co... To Manager Team Email Reply & Delete Create New Move OneNote Actions Move Follow Unread Up Tags Mark Follow Unread Up Translate Find Related Select Read Aloud Zoom

Background Information Document (BID) for Casuarina Road, Tongaat Beach

roschel@1wc.co.za
To: judy.reddy@kzntransport.gov.za; Dominic.Wieners@kznwildlife.com; Noluthando.Dlamini@kznwildlife.com; Buthelezisi@dws.gov.za; MokoenaN@dws.gov.za; benadetp@amafapmb.co.za; Vishnu.Govender@kzncogta.gov.za; NdzimbomvuMK@durban.gov.za; Lynn.boucher@drdlr.gov.za; Michelle.Lotz@Durban.gov.za; Thenjwe.Msani@durban.gov.za; Ndumiso.Masuku@kznedtea.gov.za; Omar.Parak@kznedtea.gov.za; PurdonNW@eskom.co.za

Fri 2020/04/03 10:26

1WC_Anup_Casuarina Road_BID_April 2020.pdf
352 KB

Dear Sir/ Mam

RE: Background Information Document (BID) for the Proposed Residential/ Serviced Apartments at 49 Casuarina Road, Tongaat Beach

1World Consultants (Pty) Ltd have been appointed as the Environmental Assessment Practitioner (EAP) for the above-mentioned project. You have been identified as a possible interested and Affected Party (I&AP) or stakeholder for the EIA process. Attached, please find the Background Information Document (BID) for your review. You are hereby invited to register on the database of I&AP's and we look forward to liaising with you.

1World utilizes email as our primary communication tool. Should you have any queries/comments please provide via email.

Kindly acknowledge receipt of this email and one attachment. Please feel free to contact our offices should you require any further details.

Thank you

Kind regards,

Roschel Maharaj, BSc
Environmental Assessment Practitioner

1world
CONSULTANTS

P.O. Box 2311, Westville, 3630
Tel | 031 252 8327 Fax | 086 726 3619 Call | 083 862 7725

Roschel@1wc.co.za

From: Geoff D A Pullan [geoffpullan@iafrica.com]
Sent: 03 September 2020 14:02
To: Roschel Maharaj; PullanGDA@durban.gov.za
Subject: Ward 58 - Casuarina Beach - Background Information Document - 3 Sep 2020

Hi Roschel,

Please include me as an IAAP, for this project. 49 Casuarina Beach Road.

Casuarina Beach is in my ward, and is an important beachfront suburb. I have a few concerns and queries, but we can get to those once I am on your database.

Thanks.

Kind regards

Geoff D A Pullan
58 Ward Councillor
083 6959190
Support Blue Flag Beaches
Durban's Aerotropolis Ward

From: Roschel Maharaj <roschel@1world.co.za>
Sent: Monday, 31 August 2020 13:27
To: geoffpullan@iafrica.com; PullanGDA@durban.gov.za
Subject: Background Information Document

Dear Sir,

RE: Background Information Document (BID) for the Proposed Residential/ Serviced Apartments at 49 Casuarina Road, Tongaat Beach

1World Consultants (Pty) Ltd have been appointed as the Environmental Assessment Practitioner (EAP) for the above-mentioned project. You have been identified as a possible Interested and Affected Party (I&AP) or stakeholder for the EIA process. Attached, please find the Background Information Document (BID) for your review. You are hereby invited to register on the database of I&AP's and we look forward to liaising with you.

1World utilizes email as our primary communication tool. Should you have any queries/comments please provide via email.

Kindly acknowledge receipt of this email and one attachment. Please feel free to contact our offices should you require any further details.

Thank you

Kind regards,

Roschel Maharaj, BSc
Environmental Assessment Practitioner



P.O. Box 2311, Westville, 3630
Tel | 031 262 8327 Fax | 086 726 3619 Cell | 063 062 7725



Environmental & Engineering Consultants
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Tel: 031 262 8327
Fax: 086 726 3619

Newspaper Advertisements

“Hope Springs” at Life Mount Edgcombe Hospital

It was the arising after the long winter of depression. Spring brings rebirth and growth, so it was the ideal day to launch our Garden of Hope on Tuesday, 1 September 2020.

The past few months have been one of the most challenging life experiences and we wanted to create a special environment to remember our courageous management of this pandemic. The Garden of Hope includes special succulent plants, to honour our healthcare workers that survived the corona virus and in memory of those we unfortunately lost in the battle.

Our hope is that this picturesque garden serves as a reminder that together we are stronger and can conquer anything. Life Mount Edgcombe Hospital – making life better for the community we serve.



Greenbury Secondary School students making a difference



Photo: Shoba Champamoni: Youth Services Director and Rohan Sukhnanan: President of Interact Club of Greenbury Secondary.



Photo: Rohan flanked by helper and recipients Lucas and Shamla.

President Rohan Shekhar Sukhnanan of the Interact Club of Greenbury Secondary School initiated and coordinated a hamper drive project, under the guidance of Youth Services Director, Mrs S. Champamoni during the lockdown! Many hours were dedicated to networking and hosting meetings via whatsapp with Interact members.

The Interact Club has sponsored an amount of R5000 to the Rotary Children's home in Phoenix. A total of 50 hampers were packaged for the indigent learners of Greenbury Secondary School and families in the surrounding areas.

DON'T IGNORE YOUR SYMPTOMS...

Making life better

Life Mount Edgcombe Hospital confirms that it will be resuming necessary patient admissions following the relaxation of the hard lockdown that served to manage the spread of COVID-19. We welcome the relaxation of the regulations to Level Two and the opportunity to gradually resume certain services for our patients in a safe manner. We have set up screening areas at each hospital to ascertain whether individuals may require COVID-19 testing.

It is important for the public to not ignore any medical emergency symptoms or neglect their chronic conditions and general health. All referring general practitioners to Life Mount Edgcombe Hospital are open for consultations and we urge the community to visit their local general practitioner to manage and monitor chronic medical conditions as well as general consultations to remain healthy. Early detection can improve chances of recovery.

The emergency unit at Life Mount Edgcombe Hospital is open 24 hours a day, 7 days a week to treat urgent medical emergencies. Seeking quick treatment during a medical emergency can significantly impact the chances of recovery.

“We are working closely with our general practitioners and specialists to ensure our patients receive the quality care that they may require during these unprecedented times”, says Stacey Naidoo – hospital manager at Life Mount Edgcombe Hospital.

We assure the public that the safety of our employees, patients and doctors is a priority. All patients coming to the emergency unit are routinely screened for COVID-19 symptoms and are provided a mask to help maintain the health and safety of our patients and caregivers and prevent the spread of the virus. In addition, emergency unit nurses, doctors and staff all wear appropriate personal protective equipment (PPE) and follow stringent clinical and infection prevention protocols that are aligned to the National Institute of Communicable Diseases’ (NICD) guidelines.

Life Mount Edgcombe Hospital | Media advertorial

The Life Healthcare *Symptom Checker* app is also available to help individuals understand COVID-19 infection risk factors and if testing may be required. *The Symptom Checker* app is available online, together with a decision tree at <https://www.lifehealthcare.co.za/covid-19-coronavirus/support-and-self-care/> - you can also contact Life Mount Edgcombe Hospital on 031 537 4000 if you require any further information.

www.lifehealthcare.co.za

#strongertogether

PUBLIC PARTICIPATION PROCESS

NOTICE TO UNDERTAKE A BASIC ASSESSMENT PROCESS FOR THE PROPOSED DEMOLISHING AND DEVELOPMENT OF RESIDENTIAL/ SERVICED APARTMENTS SITUATED AT 49 CASUARINA ROAD, TONGAAT WITHIN THE ETHEKWINI MUNICIPALITY, KWAZULU-NATAL

Notice is hereby given in terms of the NEMA Regulations, as promulgated in GNR 326 (07 April 2017), of intent to lodge an Application for Environmental Authorisation with the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (DEDTEA) by Casuarina 5153 Properties (Pty) Ltd for the demolishing and development of residential/ serviced apartments that is located within an urban area and approximately 100m from the High-Water Mark (HWM) of the sea.

Project Outline: Casuarina 5153 Properties (Pty) Ltd proposes the demolishing and development of residential/ serviced apartments situated at 49 Casuarina Road, Tongaat Beach, within the eThekweni Municipality. The development includes a multi-storey building with a maximum of 200 apartments and associated parking blocks. The extent of the proposed new development will be 4781.07m² at ground level. The proposed development will entail moving, removing and excavation of soil of more than 5m³ from a distance of 100m inland of the High-Water Mark (HWM) of the sea.

Therefore, an Environmental Authorisation is needed from the KZN Department of Economic Development, Tourism and Environmental Affairs. The Draft BAR and the relevant components for the application processes are available on request from 1World Consultants (Pty) Ltd.

PROCESS FOR INCLUSION IN THE PUBLIC PARTICIPATION PROCESS

1World Consultants (Pty) Ltd, the independent Environmental Assessment Practitioner (EAP) have been appointed by Arup (Pty) Ltd, to undertake the required Basic Assessment process and the associated Public Participation Process for the proposed project.

- Interested and Affected Parties are invited to register via email by submitting their name, contact information and interest in the project to the environmental consultant within 30 days of this advertisement publication, for inclusion in the Participation Process.
- Copies of all documents and reports are available for review and comment, upon request from the EAP.

EAP Details:
 Roschel Maharaj, B.Sc.
 Address | P.O. Box 2311, Westville, 3630
 Email | roschel@1world.co.za
 Tel | 031 262 8327





Environmental & Engineering Consultants

Postal Address: P.O Box 2311, Westville, 3630

Tel: 031 262 8327

Fax: 086 726 3619

Site Notice Boards and Photographs

NOTICE OF APPLICATION FOR ENVIRONMENTAL AUTHORISATION FOR THE BASIC ASSESSMENT (BA) PROCESS

FOR THE PROPOSED DEMOLISHING AND DEVELOPMENT OF RESIDENTIAL/ SERVICED APARTMENTS SITUATED AT 49 CASUARINA ROAD, TONGAAT WITHIN THE ETHEKWINI MUNICIPALITY, KWAZULU-NATAL

Notice is hereby given in terms of the NEMA Regulations, as promulgated in GNR 326 (07 April 2017), of intent to lodge an Application for Environmental Authorisation with the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA) by Casuarina 5153 Properties (Pty) Ltd for the demolishing and development of residential/ serviced apartments that is located within an urban area and approximately 100m from the High-Water Mark (HWM) of the sea.



Project Details: Casuarina 5153 Properties (Pty) Ltd proposes the demolishing and development of residential/ serviced apartments situated at 49 Casuarina Road, Tongaat Beach, within the eThekweni Municipality. The development includes a multi-storey building with a maximum of 206 apartments and associated parking blocks. The extent of the proposed new development will be 4781.07sqm at ground level. The proposed development will entail moving, removing and excavation of soil of more than 5m³ from a distance of 100m inland of the High-Water Mark (HWM) of the sea.

Public Participation Process: Interested and Affected Parties must register via email or fax by submitting their name, contact information and interest in the project using the contact details for Roschel Maharaj below.

Roschel Maharaj (Environmental Assessment Practitioner)

Postal: P.O. Box 2311, Westville, 3630

Email: roschel@1world.co.za

Tel: 031 262 8327

1world
consultants

Date of this Notice: September 2020

Proof of Site Notice Boards



Frame 1: Site Notice Board 1, Established at the Casuarina Road T-Junction within Residential Area



Frame 2: Site Notice Board 1, Established at the T-Junction Leading to Beach Area (Red Arrow)



Frame 3: Site Notice Board 2, Established Along Casuarina Main Road



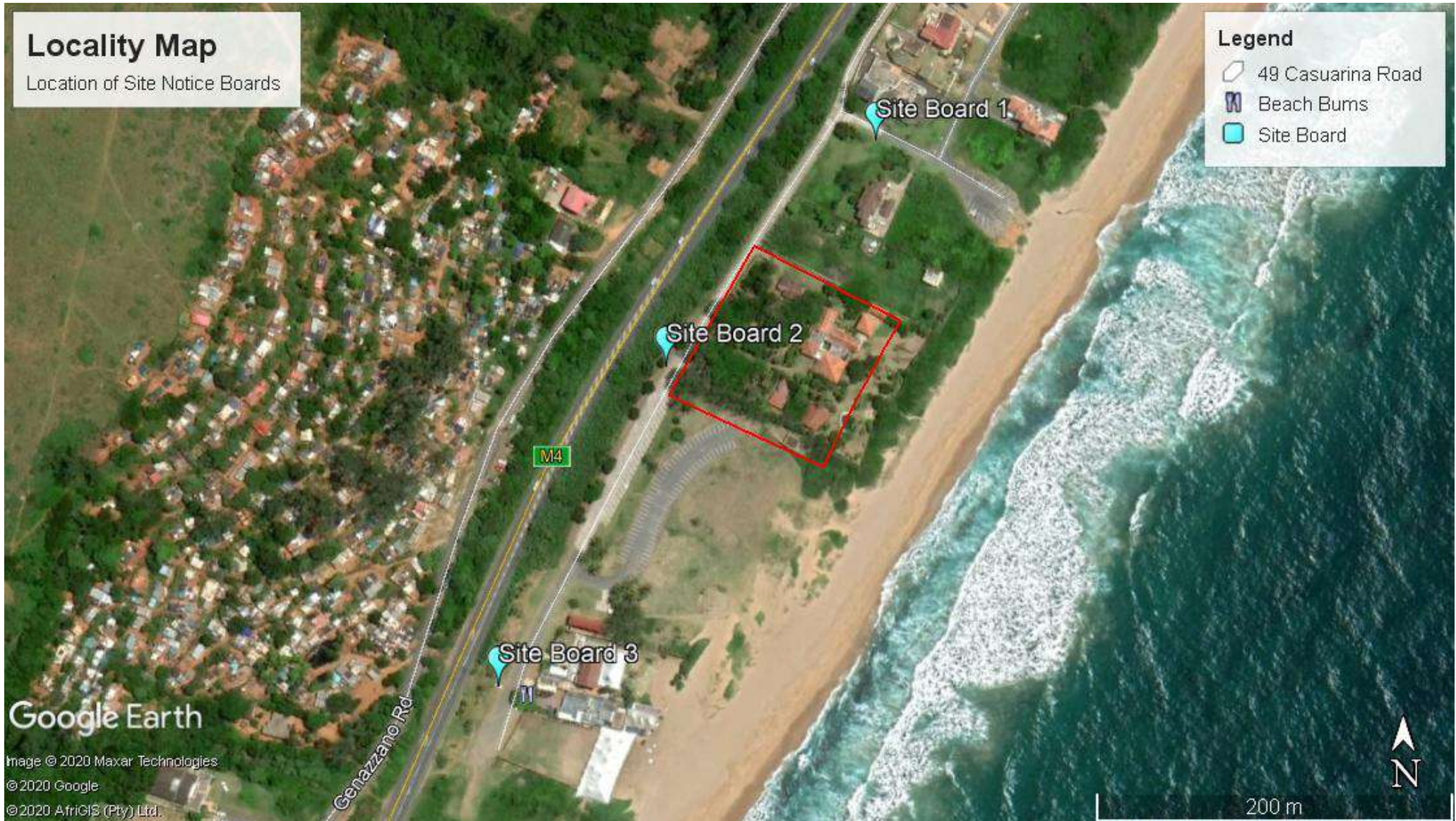
Frame 4: Site Notice Board 2, Established Along Main Casuarina Road, Directly Opposite Project Site



Frame 5: Site Notice Board 3, Established at the Dead End of Casuarina Road



Frame 6: Site Notice Board 3, Established Opposite Beach Bums



Frame 7: Locality Map Indicating Location of Site Notice Boards

Comments and Responses Report on BID

**PROPOSED DEVELOPMENT OF RESIDENTIAL / SERVICED APARTMENTS SITUATED AT 49 CASUARINA ROAD,
 TONGAAT, ETHEKWINI METROPOLITAN MUNICIPALITY
 COMMENTS AND RESPONSES REPORT**

| COMMENTS AND RESPONSES REPORT: COMMENT RECEIVED ON THE BID & HIA REPORT | | | |
|--|-----------------------|---|---|
| ORGANISATION | CONTACT PERSON | COMMENT RECEIVED | EAP RESPONSE |
| Commission on Restitution of Land Rights | Lynn Boucher | <p>(01 June 2020)</p> <p>Dear Sir/Madam</p> <p><u>REQUEST INFORMATION ON PROPERTY: LAND CLAIM</u></p> <p>We acknowledge receipt of your enquiry received on 3 April 2020 and advise that our records indicate that no claims for restitution in terms of the provisions of the Restitution of Land Rights Act, 22 of 1994 (as amended) have been lodged in respect of the properties described as:</p> <ol style="list-style-type: none"> 1. Erf Farm No. 1/620; 2. Erf Farm No. 1/614; 3. Erf Farm No. R/614; 4. Erf Farm No. 612; and 5. Erf Farm No. 613. <p>Whilst great care is taken to verify the accuracy of the information regarding all claims, the Regional Land Claims Commission will not be held responsible for any damage or loss suffered as a result of information furnished in this regard as there are claims lodged with the Commission which are not yet captured in our database as they are not yet published in the relevant government gazette.</p> | <p>(10 September 2020)</p> <p>Our Ref : ENV19001 Attention: Lynn Boucher</p> <p><u>RE: REQUEST INFORMATION ON PROPERTY: LAND CLAIM</u></p> <p>Your comments dated 01 June 2020 on the Background Information Document provided to your department by 1World Consultants (Pty) Ltd for the proposed Casuarina Road project refers.</p> <p>1World acknowledges that no claim for restitution in terms of the provisions of the Restitution of Land Rights Act, 22 of 1994 (as amended) has been lodged in respect of the properties described as:</p> <ol style="list-style-type: none"> 6. Erf Farm No. 1/620; 7. Erf Farm No. 1/614; 8. Erf Farm No. R/614; 9. Erf Farm No. 612; and 10. Erf Farm No. 613. <p>Should you have any further queries please feel free to contact 1World using the details provided above.</p> |
| KwaZulu-Natal AMAFA and Research Institute | Bernadet Pawandiwa | <p>(06 June 2019)</p> <p>Our Ref: SAH19/ 13664 CaseID: 13664</p> | <p>(31 July 2020)</p> <p>Our Ref : ENV19001 Your Ref: SAH19/ 13664 Attention: Bernadet Pawandiwa</p> |

**PROPOSED DEVELOPMENT OF RESIDENTIAL / SERVICED APARTMENTS SITUATED AT 49 CASUARINA ROAD,
 TONGAAT, ETHEKWINI METROPOLITAN MUNICIPALITY
 COMMENTS AND RESPONSES REPORT**

| | | |
|--|--|--|
| | <p>IN TERMS OF SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999) AND SECTION 41 OF THE KWAZULU-NATAL AMAFA AND RESEARCH INSTITUTE ACT (ACT 05 OF 2018)</p> <p>RE: The applicant, Mr Anant Singh, proposes to construct a new residential and hotel development at 49 Casuarina Road, Tongaat, eThekwini Municipality. The development includes the following:</p> <ul style="list-style-type: none"> • A maximum 308 residential apartment and hotel block with associated parking; • Potential widening of a very small portion (approx. 200m) of Casuarina road by 1m to create easy vehicle movement in either direction, and • On-site waste water treatment. <p>Thank you for the opportunity to comment. The application has been considered by the Provincial Heritage Authority, the KwaZulu Natal Amafa and Research Institute (formerly Amafa aKwaZulu Natali, Heritage KwaZulu Natal, Erfenis KwaZulu Natal).</p> <p>The heritage report by Jean Beater on the proposed development indicates presence of a shell midden as well as some structures that are presumed to be over 60 years on sections of the proposed development footprint. A heritage study highlighting the age of the structures and the conservation worthy of some structures on the site that are presumed to be over 60 years, should be conducted by a specialist in architectural heritage. A revised Heritage study incorporating the results of the architectural study should be submitted to the Institute for further evaluation and decision.</p> <p>The Study should cover:</p> <ul style="list-style-type: none"> • Identification of all heritage resources in the development area and its surroundings -50m. | <p><u>RE: PROPOSED RESIDENTIAL/HOTEL DEVELOPMENT, 49 CASUARINA ROAD, TONGAAT</u></p> <p>Your comments dated 06 June 2019 on the Heritage Impact Assessment provided to your department by 1World Consultants (Pty) Ltd for the proposed Casuarina Road Development refers.</p> <p>The Architect is currently undertaking research to confirm the age of the identified buildings as per the HIA report. It is the Clients responsibility to present this information and comply with AMAFA requirements prior to undertaking any construction activities.</p> <p>Should you have any further queries please feel free to contact 1World using the details provided above.</p> |
|--|--|--|

**PROPOSED DEVELOPMENT OF RESIDENTIAL / SERVICED APARTMENTS SITUATED AT 49 CASUARINA ROAD,
 TONGAAT, ETHEKWINI METROPOLITAN MUNICIPALITY
 COMMENTS AND RESPONSES REPORT**

| | | | |
|--|--|--|--|
| | | <ul style="list-style-type: none"> • Assessment of the impact of the development on such heritage. • Evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development. • Results of consultation with communities affected by the proposed development and other interested and affected parties regarding the impact of the development on heritage resources. • Consideration of alternatives if heritage resources are affected by the development. • Mitigation plans for any adverse effects during and after completion of the project. • Table of all heritage resources identified. This should show Heritage resource type, description, location, significance and reasons for this rating. <p>Please download our list of Heritage Practitioners from our website www.heritagekzn.co.za.</p> <p>Should you have any further queries, please contact the designated official using the case number quoted above in the case header.</p> <p>Failure to comply with the requirements of the National Heritage Resources Act and the KwaZulu Natal Amafa and Research Institute Act could lead to legal action being instituted against the applicant. Should you have any further queries, please contact the designated official using the case number quoted above in the case header.</p> | |
|--|--|--|--|

Proof of Comment and Response Letters on BID



OFFICE OF THE REGIONAL LAND CLAIMS COMMISSIONER: KWAZULU-NATAL

139 Langalibalele Street, PIETERMARITZBURG, 3200, Private Bag X 9120, PIETERMARITZBURG, 3200
Tel: (033) 341 2600 | Fax: (033) 342 2881

Your Ref:

Enquiries: Lynn Boucher

1World Consultants
P O Box 2311
WESTVILLE
3630

Dear Sir/Madam

REQUEST INFORMATION ON PROPERTY: LAND CLAIM

We acknowledge receipt of your enquiry received on 3 April 2020 and advise that our records indicate that no claims for restitution in terms of the provisions of the Restitution of Land Rights Act, 22 of 1994 (as amended) have been lodged in respect of the properties described as:

1. **Erf Farm No. 1/620;**
2. **Erf Farm No. 1/614;**
3. **Erf Farm No. R/614;**
4. **Erf Farm No. 612; and**
5. **Erf Farm No. 613.**

Whilst great care is taken to verify the accuracy of the information regarding all claims, the Regional Land Claims Commission will not be held responsible for any damage or loss suffered as a result of information furnished in this regard as there are claims lodged with the Commission which are not yet captured in our database as they are not yet published in the relevant government gazette.

Regards

MR N. P. MDLULI
MANAGER: INFORMATION AND RECORDS MANAGEMENT
DATE: 1 June 2020

[10 September 2020]

Our Ref : ENV19001
Attention: Lynn Boucher

RE: REQUEST INFORMATION ON PROPERTY: LAND CLAIM

Your comments dated 01 June 2020 on the Background Information Document provided to your department by 1World Consultants (Pty) Ltd for the proposed Casuarina Road project refers.

1World acknowledges that no claim for restitution in terms of the provisions of the Restitution of Land Rights Act, 22 of 1994 (as amended) has been lodged in respect of the properties described as:

- Erf Farm No. 1/620;
- Erf Farm No. 1/614;
- Erf Farm No. R/614;
- Erf Farm No. 612; and
- Erf Farm No. 613.

Should you have any further queries please feel free to contact 1World using the details provided above.

For 1World Consultants:



Fatima Peer B.Sc. (Hons) Pr. Sci. Nat.



**Proposed residential/hotel development, 49 Casuarine Road, Tongaat
Our Ref: SAH19/ 13664**

Enquiries: Bernadet Pawandiwa
Tel: 033 394 6543
Email: bernadetp@amafapmb.co.za
CaseID: 13664

Date: Thursday June 06, 2019.

Page No: 1

INTERIM COMMENT

**IN TERMS OF SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)
AND SECTION 41 OF THE KWAZULU-NATAL AMAFA AND RESEARCH INSTITUTE ACT (ACT 05 OF
2018)**

**Attention: 1World Consultants (Pty) Ltd
181 Winchester Drive,
Reservoir Hills,
Durban,
4091.**

RE: The applicant, Mr Anant Singh, proposes to construct a new residential and hotel development at 49 Casuarina Road, Tongaat, eThekweni Municipality. The development includes the following: • A maximum 308 residential apartment and hotel block with associated parking; • Potential widening of a very small portion (approx. 200m) of Casuarina road by 1m to create easy vehicle movement in either direction, and • On-site waste water treatment.

Thank you for the opportunity to comment. The application has been considered by the Provincial Heritage Authority, the KwaZulu Natal Amafa and Research Institute (formerly Amafa aKwaZulu Natali, Heritage KwaZulu Natal, Erfenis KwaZulu Natal).

The heritage report by Jean Beater on the proposed development indicates presence of a shell midden as well as some structures that are presumed to be over 60 years on sections of the proposed development footprint. A heritage study highlighting the age of the structures and the conservation worthy of some structures on the site that are presumed to be over 60 years, should be conducted by a specialist in architectural heritage. A revised Heritage study incorporating the results of the architectural study should be submitted to the Institute for further evaluation and decision.

The Study should cover:

- Identification of all heritage resources in the development area and its surroundings -50m
- Assessment of the impact of the development on such heritage
- Evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development
- Results of consultation with communities affected by the proposed development and other interested and affected parties regarding the impact of the development on heritage resources.
- Consideration of alternatives if heritage resources are affected by the development
- Mitigation plans for any adverse effects during and after completion of the project
- Table of all heritage resources identified .This should show Heritage resource type, description, location, significance and reasons for this rating.

Please download our list of Heritage Practitioners from our website www.heritagekzn.co.za.

Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Failure to comply with the requirements of the National Heritage Resources Act and the KwaZulu Natal Amafa and Research Institute Act could lead to legal action being instituted against the applicant. Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Yours faithfully



Bernadet Pawandiwa
Senior Heritage Officer
KwaZulu Natal Amafa and Research Institute

Terms & Conditions:

1. This approval does not exonerate the applicant from obtaining local authority approval or any other necessary approval for proposed work.
2. If any heritage resources, including graves or human remains, are encountered they must be reported to the Institute immediately.
3. The Institute reserves the right to request additional information and/ withdraw the letter of decision as required.

[31 July 2020]

Our Ref : ENV19001
Your Ref: SAH19/ 13664
Attention: Bernadet Pawandiwa

RE: PROPOSED RESIDENTIAL/HOTEL DEVELOPMENT, 49 CASUARINA ROAD, TONGAAT

Your comments dated 06 June 2019 on the Heritage Impact Assessment provided to your department by 1World Consultants (Pty) Ltd for the proposed Casuarina Road Development refers.

The Architect is currently undertaking research to confirm the age of the identified buildings as per the HIA report. It is the Clients responsibility to present this information and comply with AMAFA requirements prior to undertaking any construction activities.

Should you have any further queries please feel free to contact 1World using the details provided above.

For 1World Consultants:



Fatima Peer B.Sc. (Hons) Pr. Sci. Nat.

Appendix E



Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Biodiversity Baseline and Impact Report



Biodiversity Baseline & Impact Report - Proposed Residential/Hotel Development

Tongaat, KwaZulu Natal

March 2019

CLIENT



Prepared by:

The Biodiversity Company

420 Vale Ave. Ferndale, 2194


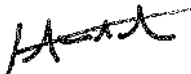



Cell: +27 81 319 1225

Fax: +27 86 527 1965

info@thebiodiversitycompany.com

www.thebiodiversitycompany.com



| | | |
|-----------------|---|---|
| Report Name | Biodiversity Baseline & Impact Report - Proposed Residential/Hotel Development | |
| Submitted to |  | |
| Report Reviewer | Andrew Husted |  |
| Report Reviewer | Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant. | |
| Report Reviewer | Michael Adams |  |
| Report Reviewer | Michael Adams is Cert Sci Nat registered (118544) and is an experienced natural scientist with a specialisation in herpetofauna. He has over 10 years of experience working with reptiles and amphibians as a consultant and through various conservation initiatives. | |
| Report Writer | Martinus Erasmus |  |
| Report Writer | Martinus Erasmus (Cand Sci Nat) obtained his B-Tech degree in Nature Conservation in 2016 at the Tshwane University of Technology. Martinus has been conducting basic assessments and assisting specialists in field during his studies since 2015. | |
| Report Writer | Lindi Steyn |  |
| Report Writer | Lindi Steyn has a PhD in Biodiversity and Conservation from the University of Johannesburg. She specialises in avifauna and has worked in this specialisation since 2013. | |
| Declaration | The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science. | |



DECLARATION

I, Martinus Erasmus, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Martinus Erasmus

Terrestrial Ecologist

The Biodiversity Company

March 2019

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1 Introduction

The Biodiversity Company (TBC) was appointed to conduct a terrestrial ecology baseline and impact (risk) assessment for the proposed residential/hotel development located in the town of Tongaat within the eThekweni Municipality, Durban, South Africa.

A wet season terrestrial biodiversity survey was conducted on the 7th of February 2019 by a terrestrial ecologist. The survey primarily focussed on the development footprint area, referred to as the project area herein. Furthermore, the identification and description of any sensitive receptors were recorded across the project area, and the manner in which these sensitive receptors may be affected by the activity was also investigated.

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP), enabling informed decision making as to the ecological viability of the proposed development and to provide an opinion on the whether any environmental authorisation process or licensing is required for the proposed development.

This assessment is in accordance with the 2014 EIA Regulations (No. R. 982-985, Department of Environmental Affairs, 4 December 2014) emanating from Chapter 5 of the National Environmental Management Act (Act No. 107 of 1998).

2 Project Area

The proposed development is situated in Tongaat, on Casuarina Road that runs parallel to the M4 motorway in the KwaZulu-Natal province, South Africa. The land use surrounding the project area consists predominantly of planted agriculture (specifically sugarcane plantations), urban developments and some natural coastal forest areas. The Indian Ocean is found to the east of the project area (Figure 1).



Figure 1: The general location of the project area

3 Scope of Work

The Terms of Reference (ToR) included the following:

- Desktop description of the baseline receiving environment specific to the field of expertise (general surrounding area as well as site specific environment);
- Identification and description of any sensitive receptors in terms of relevant specialist disciplines (biodiversity) that occur in the study area, and the manner in which these sensitive receptors may be affected by the activity;
- Identify 'significant' ecological, botanical and faunal features within the proposed development areas;
- Identification of conservation significant habitats around the project area which might be impacted by the proposed development;
- Site visit to verify desktop information;
- Screening to identify any critical issues (potential fatal flaws) that may result in project delays or rejection of the application; and
- Provide a map to identifying sensitive receptors in the study area, based on available maps, database information & site visit verification.

4 Limitations

The following limitations should be noted for the study:

- As per the scope of work, the fieldwork component of the assessment comprised of one assessment only, which was conducted during the wet season. This study has not assessed any temporal trends for the respective seasons; and
- Despite these limitations, a comprehensive desktop study was conducted, in conjunction with the detailed results from the surveys, and as such there is a high confidence in the information provided.

5 Methodologies

5.1 Geographic Information Systems Mapping

Existing data layers were incorporated into a Geographic Information Systems (GIS) to establish how the proposed the mining operation interact with these important entities. Emphasis was placed around the following spatial datasets:

- Vegetation Map of South Africa, Lesotho and Swaziland (Mucina *et al.*, 2007);
- Important Bird Areas 2015 – BirdLife South Africa (vector geospatial dataset); and
- Department of Environmental Affairs (DEA) National Landcover 2015 (DEA, 2015).

Field surveys were conducted to confirm (or refute) the presence of species identified in the desktop assessment. The specialist disciplines completed for this study included:

- Botanical;
- Fauna (mammals and avifauna); and
- Herpetology (reptiles and amphibians).

Brief descriptions of the standardised methodologies applied in each of the specialist disciplines are provided below. More detailed descriptions of survey methodologies are available upon request.

5.2 Botanical Assessment

The botanical study encompassed an assessment of all the vegetation units and habitat types within the Project area. The focus was on an ecological habitat assessment of habitat types as well as identification for any Red Data species within the known distribution of the Project area. The methodology included the following survey techniques:

- Timed meanders;
- Sensitivity analysis based on structural and species diversity; and
- Identification of floral red-data species.

5.3 Literature study

A literature review was conducted as part of the desktop study to identify the potential habitats present within the Project area. The SANBI provides an electronic database system, namely the Botanical Database of Southern Africa (BODATSA), to access distribution records on southern African plants. This is a new database which replaces the old Plants of Southern Africa (POSA) database. The POSA database provided distribution data of flora at the quarter degree square (QDS) resolution.

The Red List of South African Plants website (SANBI, 2016) was utilized to provide the most current account of the national status of flora. Relevant field guides and texts consulted for identification purposes in the field during the surveys included the following:

- Field Guide to the Wild Flowers of the Highveld (Van Wyk & Malan, 1997);
- A Field Guide to Wild Flowers (Pooley, 1998);
- Guide to Grasses of Southern Africa (Van Oudtshoorn, 1999);
- Orchids of South Africa (Johnson & Bytebier, 2015);
- Guide to the Aloes of South Africa (Van Wyk & Smith, 2014);
- Medicinal Plants of South Africa (Van Wyk *et al.*, 2013);
- Freshwater Life: A field guide to the plants and animals of southern Africa (Griffiths & Day, 2016); and

- Identification Guide to Southern African Grasses. An identification manual with keys, descriptions and distributions. (Fish *et al.*, 2015).

Additional information regarding ecosystems, vegetation types, and species of conservation concern (SCC) included the following sources:

- The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2012);
- Grassland Ecosystem Guidelines: landscape interpretation for planners and managers (SANBI, 2013); and
- Red List of South African Plants (Raimondo *et al.*, 2009; SANBI, 2016).

5.4 Faunal Assessment (Mammals & Avifauna)

The faunal desktop assessment included the following:

- Compilation of expected species lists;
- Compilation of identified species lists;
- Identification of any Red Data or species of conservation concern (SCC) present or potentially occurring in the area; and
- Emphasis was placed on the probability of occurrence of species of provincial, national and international conservation importance.

The field survey component of the study utilised a variety of sampling techniques including, but not limited to, the following:

- Visual observations;
- Identification of tracks and signs; and
- Utilization of local knowledge.

Habitat types sampled included pristine, disturbed and semi-disturbed zones, drainage lines and wetlands.

Mammal distribution data were obtained from the following information sources:

- The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005);
- Bats of Southern and Central Africa (Monadjem *et al.*, 2010);
- The 2016 Red List of Mammals of South Africa, Lesotho and Swaziland (www.ewt.org.za);
- Animal Demography Unit (ADU) - MammalMap Category (mammalmap.adu.org.za);
- A Field Guide to the Tracks and Signs of Southern, Central and East African Wildlife (Stuart & Stuart, 2013); and
- The Smaller Mammals of KwaZulu-Natal (Taylor, 1998).

5.5 Herpetology (Reptiles & Amphibians)

A herpetofauna assessment of the Project area was also conducted. The herpetological field survey comprised the following techniques:

- Diurnal hand searches - are used for reptile species that shelter in or under particular microhabitats (typically rocks, exfoliating rock outcrops, fallen timber, leaf litter, bark etc.);
- Visual searches - typically undertaken for species whose behaviour involves surface activity or for species that are difficult to detect by hand-searches or pitfall trapping. May include walking transects or using binoculars to view the species from a distance without the animal being disturbed;
- Amphibians – many of the survey techniques listed above will be able to detect species of amphibians. Over and above these techniques, vocalisation sampling techniques are often the best to detect the presence of amphibians as each species has a distinct call;
- Opportunistic sampling - reptiles, especially snakes, are incredibly illusive and difficult to observe. Consequently, all possible opportunities to observe reptiles are taken in order to augment the standard sampling procedures described above. This will include talking to local people and staff at the site and reviewing photographs of reptiles and amphibians that the other biodiversity specialists may come across while on site.

Herpetofauna distributional data was obtained from the following information sources:

- South African Reptile Conservation Assessment (SARCA) (sarca.adu.org);
- A Guide to the Reptiles of Southern Africa (Alexander & Marais, 2007);
- Field guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
- Atlas and Red list of Reptiles of South Africa, Lesotho and Swaziland (Bates et al., 2014);
- A Complete Guide to the Frogs of Southern Africa (du Preez & Carruthers, 2009);
- Animal Demography Unit (ADU) - FrogMAP (frogmap.adu.org.za);
- Atlas and Red Data Book of Frogs of South Africa, Lesotho and Swaziland (Mintner et al., 2004); and
- Ensuring a future for South Africa's frogs (Measey, 2011).

5.6 Wet Season Fieldwork

The wet season fieldwork and sample sites were placed within targeted areas (i.e. target sites) perceived as ecologically sensitive based on the preliminary interpretation of satellite imagery and GIS analysis (which included the latest applicable biodiversity datasets) available prior to the fieldwork.

The focus of the fieldwork was therefore to maximise coverage and navigate to each target site in the field in order to perform a vegetation and ecological habitat assessment at each

sample site. Emphasis was placed on sensitive habitats, especially those overlapping with proposed development areas.

5.7 Key Legislative Requirements

The legislation, policies and guidelines listed below are applicable to the current project in terms of biodiversity and ecological support systems (Table 1). The list below, although extensive, may not be exhaustive and other legislation, policies and guidelines may apply in addition to those listed below.

Explanation of certain documents, organisations or legislation is provided (below Table 1) where these have a high degree of relevance to the project and/or are referred to in this assessment.

Table 1: A list of key legislative requirements relevant to biodiversity and conservation in KwaZulu-Natal

| | |
|----------------------|--|
| INTERNATIONAL | <ul style="list-style-type: none"> Convention on Biological Diversity (CBD, 1993) The Convention on Wetlands (RAMSAR Convention, 1971) The United Nations Framework Convention on Climate Change (UNFCCC, 1994) The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973) The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979) |
| NATIONAL | <ul style="list-style-type: none"> Constitution of the Republic of South Africa (Act No. 108 of 2006) The National Environmental Management Act (NEMA) (Act No. 107 of 1998) The National Environmental Management Protected Areas Act (Act No. 57 of 2003) The National Environmental Management Biodiversity Act (Act No. 10 of 2004) The National Environmental Management: Waste Act, 2008 (Act 59 of 2008); The Environment Conservation Act (Act No. 73 of 1989) and associated EIA Regulations National Environmental Management Air Quality Act (No. 39 of 2004) National Protected Areas Expansion Strategy (NPAES) Environmental Conservation Act (Act No. 73 of 1983) Natural Scientific Professions Act (Act No. 27 of 2003) National Biodiversity Framework (NBF, 2009) National Forest Act (Act No. 84 of 1998) National Veld and Forest Fire Act (101 of 1998) National Water Act, 1998 (Act 36 of 1998) National Freshwater Ecosystem Priority Areas (NFEPAs) National Spatial Biodiversity Assessment (NSBA) World Heritage Convention Act (Act No. 49 of 1999) National Heritage Resources Act, 1999 (Act 25 of 1999) Municipal Systems Act (Act No. 32 of 2000) Alien and Invasive Species Regulations, 2014 South Africa's National Biodiversity Strategy and Action Plan (NBSAP) Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) Sustainable Utilisation of Agricultural Resources (Draft Legislation). White Paper on Biodiversity |

| | |
|-------------------|---|
| PROVINCIAL | <p>KwaZulu-Natal Environmental, Biodiversity and Protected Areas Management Bill, 2014</p> <p>KwaZulu-Natal Nature Conservation Management Act (No. 9 of 1997)</p> <p>KwaZulu-Natal Nature Conservation Management Amendment Act (No. 5 of 1999)</p> <p>KwaZulu-Natal Planning and Development Act (No. 6 of 2008)</p> <p>Local Government Municipal System's Act (No 32 of 2000)</p> |
|-------------------|---|

International Legislation and Policy

- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival; and
- The IUCN (World Conservation Union). The IUCN's mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

National Level

- Constitution of the Republic of South Africa (Act 108 of 1996). The Bill of Rights, in the Constitution of South Africa states that everyone has a right to a nonthreatening environment and requires that reasonable measures be applied to protect the environment. This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development;
- The National Environmental Management: Biodiversity Act (NEM:BA) No. 10 of 2004: specifically, the management and conservation of biological diversity within the RSA and of the components of such biological diversity;
- National Forests Act, 1998 (Act 84 of 1998), specifically with reference to Protected Tree species;
- National Biodiversity Assessment (NBA): The National Biodiversity Assessment (NBA) was completed as a collaboration between the South African National Biodiversity Institute (SANBI), the Department of Environmental Affairs (DEA) and other stakeholders, including scientists and biodiversity management experts throughout the country over a three-year period (Driver *et al.*, 2012). The purpose of the NBA is to assess the state of South Africa's biodiversity with a view to understanding trends over time and informing policy and decision-making across a range of sectors (Driver *et al.*, 2012).

Provincial and Municipal Level

In addition to national legislation, South Africa's nine provinces have their own provincial biodiversity legislation, as nature conservation is a concurrent function of national and provincial government in terms of the Constitution (Act 108 of 1996).

The KwaZulu-Natal Environmental, Biodiversity and Protected Areas Management Bill (2014)

The KwaZulu-Natal Environmental, Biodiversity and Protected Areas Management Bill (2014) hereafter referred to as KZNEBPA, was used to evaluate species conservation status on a Provincial scale.

The KZNEBPA (2014) defines which species are to be protected and managed in terms of human use such as collecting, fishing, hunting, capture, transport and trade. It deals with rare and endangered species within the KZN Province and the powers needed to protect them from exploitation and damage.

KZNEBPA Categories:

- Schedule 3 – KwaZulu-Natal Protected Animal Species: A list of protected animal species, including a listing of certain prohibited and restricted activities with respect to such species;
- Schedule 4 – Restricted Use of Protected Animal Species: Schedule 4 lists the restricted use of protected animal species and provides for certain prohibited and restricted activities in such respect;
- Schedule 7 – KwaZulu-Natal Threatened Plant Species: Schedule 7 lists the threatened plant species and provides for certain prohibited and restricted activities with respect to such species; and
- Schedule 8 – KwaZulu-Natal Protected Plant Species: Schedule 8 lists the protected plant species and provides for certain prohibited and restricted activities with respect to such species.

In addition to the legal requirements, the following National and Regional reviews, reports and guidelines were taken into consideration:

- Guidelines for Biodiversity Impact Assessments in KZN (2013);
- Implementation Manual for Freshwater Ecosystem Priority Areas (Driver *et al.*, 2011);
- Ezemvelo KZN Wildlife Strategy (2009 – 2014); and
- KwaZulu-Natal Systematic Conservation Plan (KZNSCP, 2012).

6 Project Area

6.1 General Land Use

The land uses surrounding the project area consist predominantly of planted agriculture (specifically sugarcane plantations), urban developments and some natural coastal forest areas. The Indian Ocean is found to the east of the project area (Figure 1). The project area itself is a residential development where the historic natural habitat has previously been modified.

Additionally, the following infrastructure exists within the project area and surrounds:

- Secondary roads (M4) and directly adjacent to Casuarina road;
- Extensive sugarcane plantations;
- Telephone lines and Eskom electrical infrastructure; and
- Urban (high density) and semi-urban development.

The landcover data in Figure 2 gives a general description of the area and might not be as accurate as ground truthing. It does however still give a good representation of the general land uses in the area. In this case it is residential developments and natural areas (Thicket and Bushland).

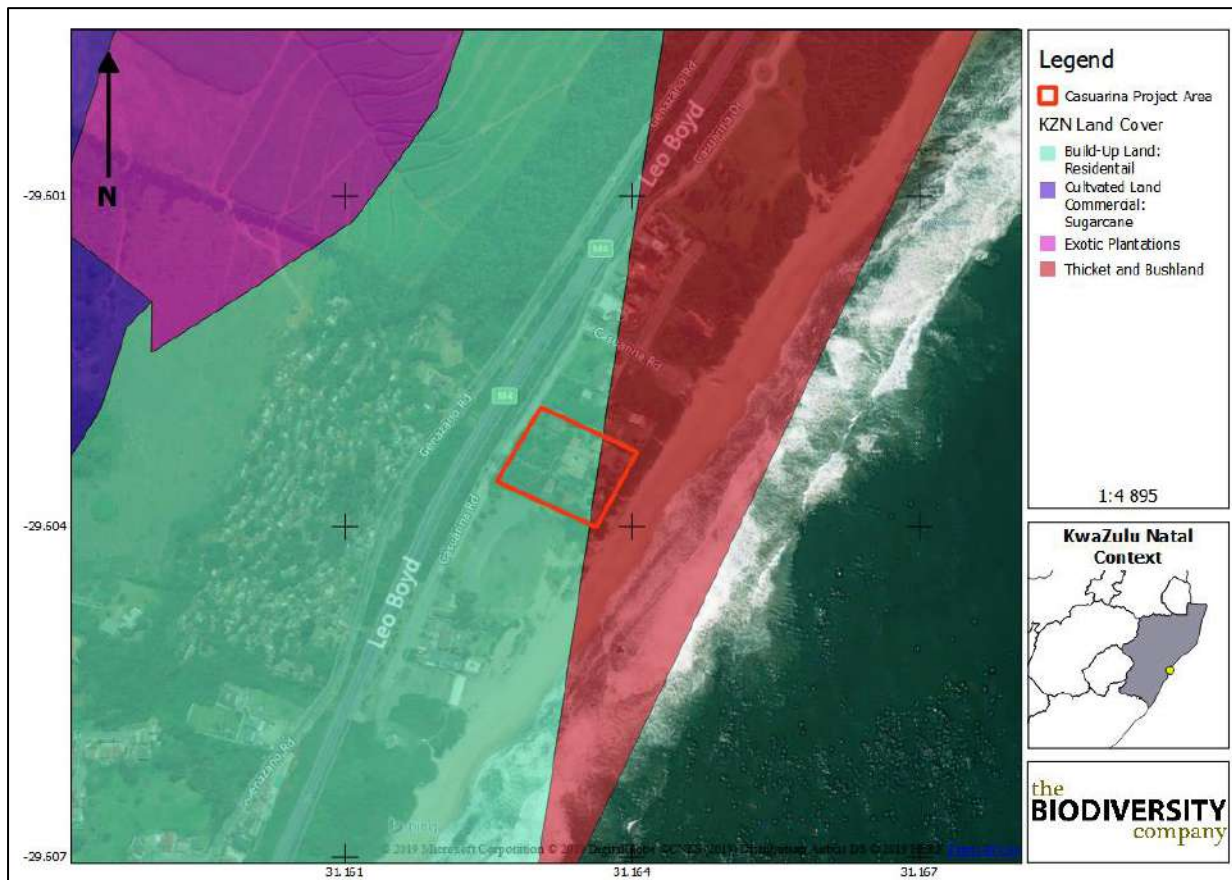


Figure 2: The project area superimposed over the provincial landcover data (KZN Landcover, 2015)

6.2 KwaZulu-Natal Biodiversity Sector Plan

6.2.1 Aim and Objectives

The aim of a Biodiversity Sector Plan is to:

- Identify and map critical biodiversity assets in KwaZulu-Natal District Municipalities; and

- Provide associated management guidelines which aim to maintain the integrity of these biodiversity features.

The objectives of the Biodiversity Sector Plan are to:

- Ensure aquatic and terrestrial biodiversity targets are met at the District level;
- Conserve representative samples of biodiversity pattern;
- Conserve the ecological and evolutionary processes that allow biodiversity to persist over time; and
- Serve as a first step towards the development of a Bioregional Plan.

The Purpose of the BSP:

The key purpose of this BSP is to assist and guide land use planners and managers within various district and local municipalities, to account for biodiversity conservation priorities in all land use planning and management decisions, thereby promoting sustainable development and the protection of biodiversity, and in turn the protection of ecological infrastructure and associated ecosystem services.

Critical Biodiversity Areas

The KZN BSP also provides a spatial representation of land and coastal marine area required to ensure the persistence and conservation of biodiversity within KZN, reflected as **Critical Biodiversity Areas (CBA)** and **Ecological Support Areas (ESA)**.

A CBA is considered a significant and ecologically sensitive area and needs to be kept in a pristine or near-natural state to ensure the continued functioning of ecosystems. A CBA represents the best choice for achieving biodiversity targets. ESAs are not essential for achieving targets, but they play a vital role in the continued functioning of ecosystems.

Based on this assessment it can be concluded that the proposed development is somewhat likely to impact on a CBA: Irreplaceable (Figure 3) as the main project area does intersect marginally with a CBA in the southern corner.

According to the conservation plan, 'local corridors' have also been identified to ensure uninhibited movement of wildlife between landscapes and important biodiversity areas (including PAs, CBAs and stewardship sites). Based on the spatial file for the KZN C-Plan it can be concluded that the proposed development will not impact on a 'local corridor' as no corridor is found in close proximity to the project area.



Figure 3: The project area superimposed on the KZN BSP (2014)

6.3 National Biodiversity Assessment

The two headline indicators assessed in the NBA are ecosystem threat status and ecosystem protection level (Driver *et al.*, 2012).

6.3.1 Ecosystem Threat Status

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Driver *et al.*, 2012).

Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition (Driver *et al.*, 2012).

The proposed project was superimposed on the terrestrial ecosystem threat status (Figure 4). As seen in Figure 4 the project area falls entirely within one ecosystem, which is listed as EN.



Figure 4: The project area showing the ecosystem threat status of the associated terrestrial ecosystems (NBA, 2012)

6.3.2 Ecosystem Protection Level

Ecosystem protection level tells us whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as not protected, poorly protected, moderately protected or well protected, based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Driver *et al.*, 2012).

The project area was superimposed on the ecosystem protection level map to assess the protection status of terrestrial ecosystems associated with the development (Figure 5). Based on Figure 5 the terrestrial ecosystems associated with the proposed project area are rated as *hardly protected*.



Figure 5: The Project area showing the level of protection of terrestrial ecosystems (NBA, 2012)

6.4 Protected Areas

Figure 6 shows the location of formally protected areas in relation to the project area. Formally protected areas refer to areas protected either by national or provincial legislation. Based on the SANBI (2010) Protected Areas Map and the National Protected Areas Expansion Strategy (NPAES) the Project area does not overlap with any formally or informally protected area (Figure 6).

Based on the above information and the location of the proposed development, the project area is not expected to have an impact on any formally protected areas. The closest formally protected area is the Umhlanga Lagoon Nature Reserve which is 14.49 km south-west of the project area.

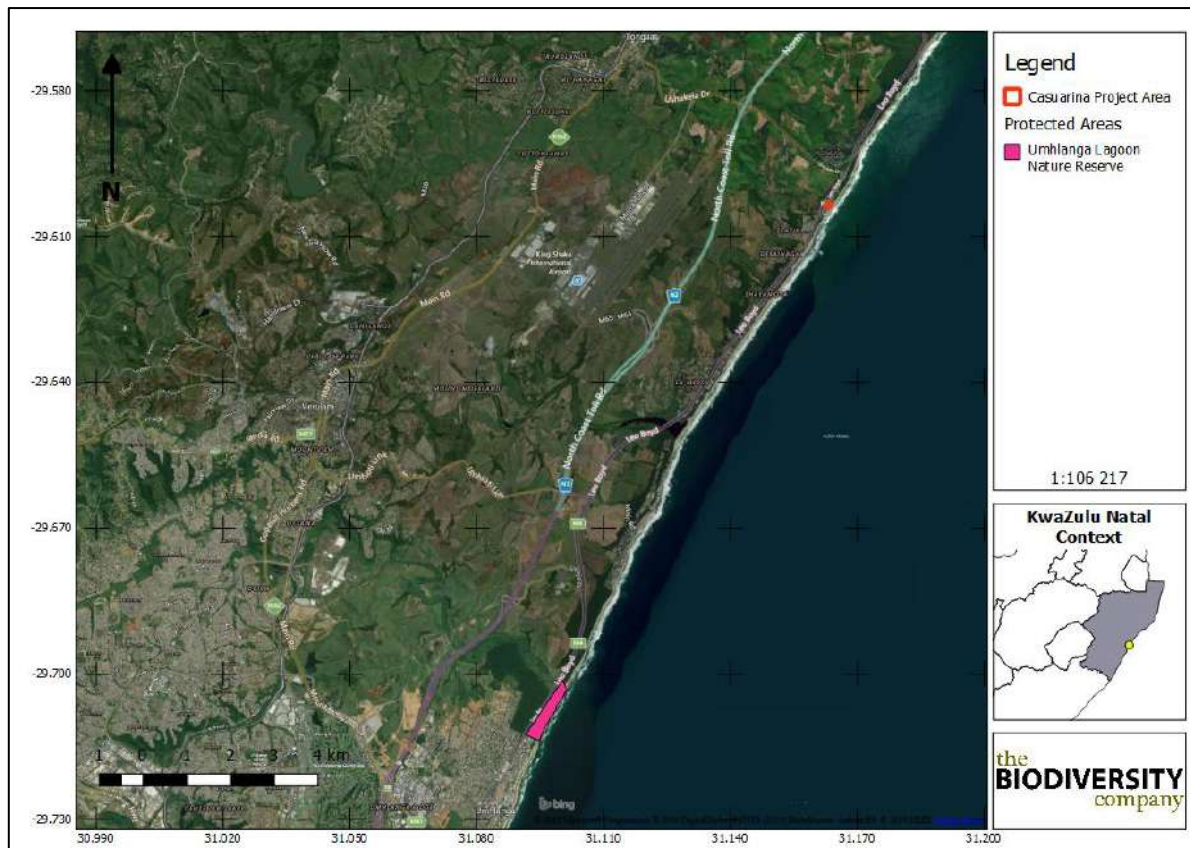


Figure 6: The Project area in relation to the formally protected areas (NPAES, 2011)

6.5 National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has recently categorised its river systems according to set ecological criteria (i.e. ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.*, 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act (NEM:BA) biodiversity goals (Nel *et al.*, 2011). The NFEPA status mapping is depicted in Figure 7.

Based on this figure, the project area does not overlap with any wetlands, FEPA or non-FEPA. The closest river to the project area is a non-FEPA river that can be found approximately 4.5 km North-east of the project area.

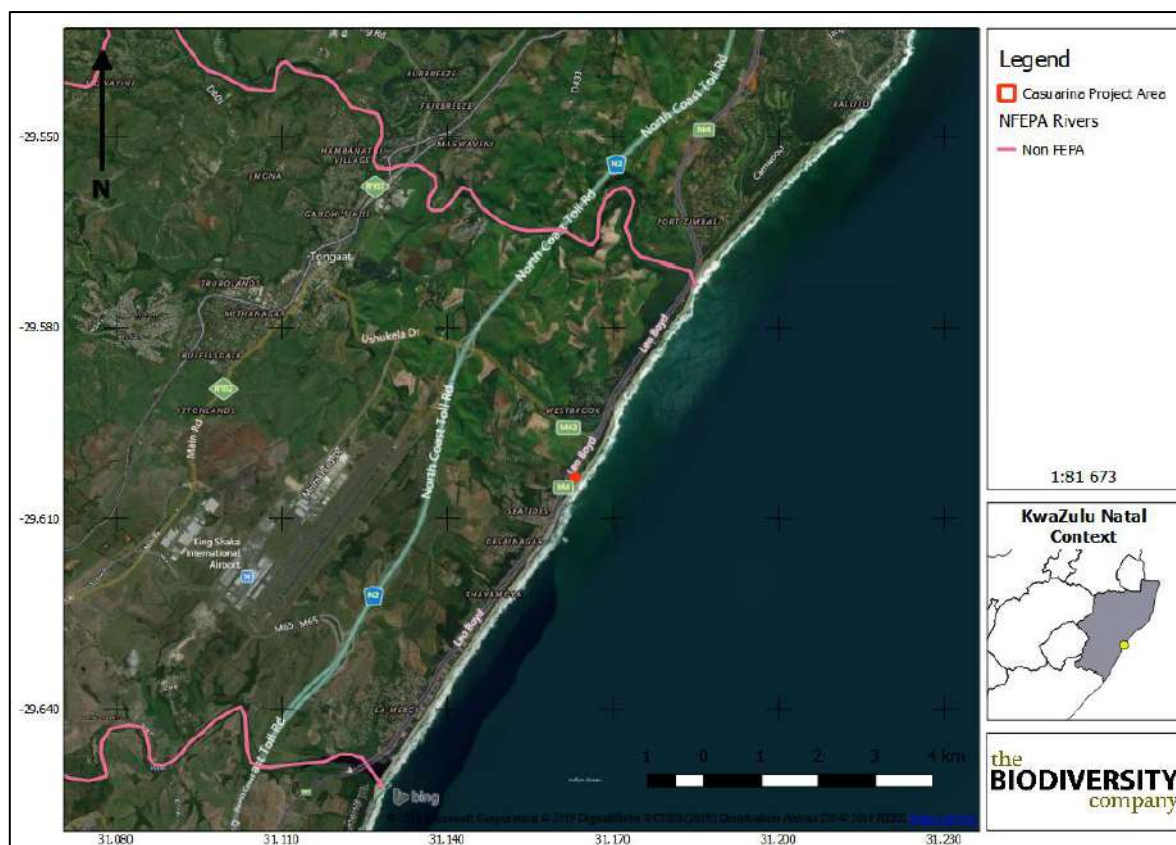


Figure 7: The project area in relation to the National Freshwater Ecosystem Priority Areas (2011)

7 Results & Discussion

7.1 Desktop Assessment

7.1.1 Vegetation Assessment

7.1.1.1 Vegetation Types

The project area is situated in the Indian Ocean Coastal Belt Biome. This biome occurs as an almost 800 km long coastal strip between the South African border with Mozambique as far south as the mouth of the Great Kei River.

This high-level vegetation unit comprises a dominant forest cover interrupted by edaphically or hydrologically controlled areas of grassland, with at least a significant part of the biome being open to dense savanna vegetation, interspersed with many areas of forest and grassland (SANBI, 2016). The overwhelmingly large extent of transformation of the coastal belt outside the existing strips and patches of embedded forest represents significant loss of evidence of its prior condition.

This biome is made up of a number of smaller vegetation units. The majority of the project area is situated within the KwaZulu-Natal Coastal Belt Grassland vegetation type, while the eastern edge falls in the Northern Coastal Forest vegetation type (Figure 8).

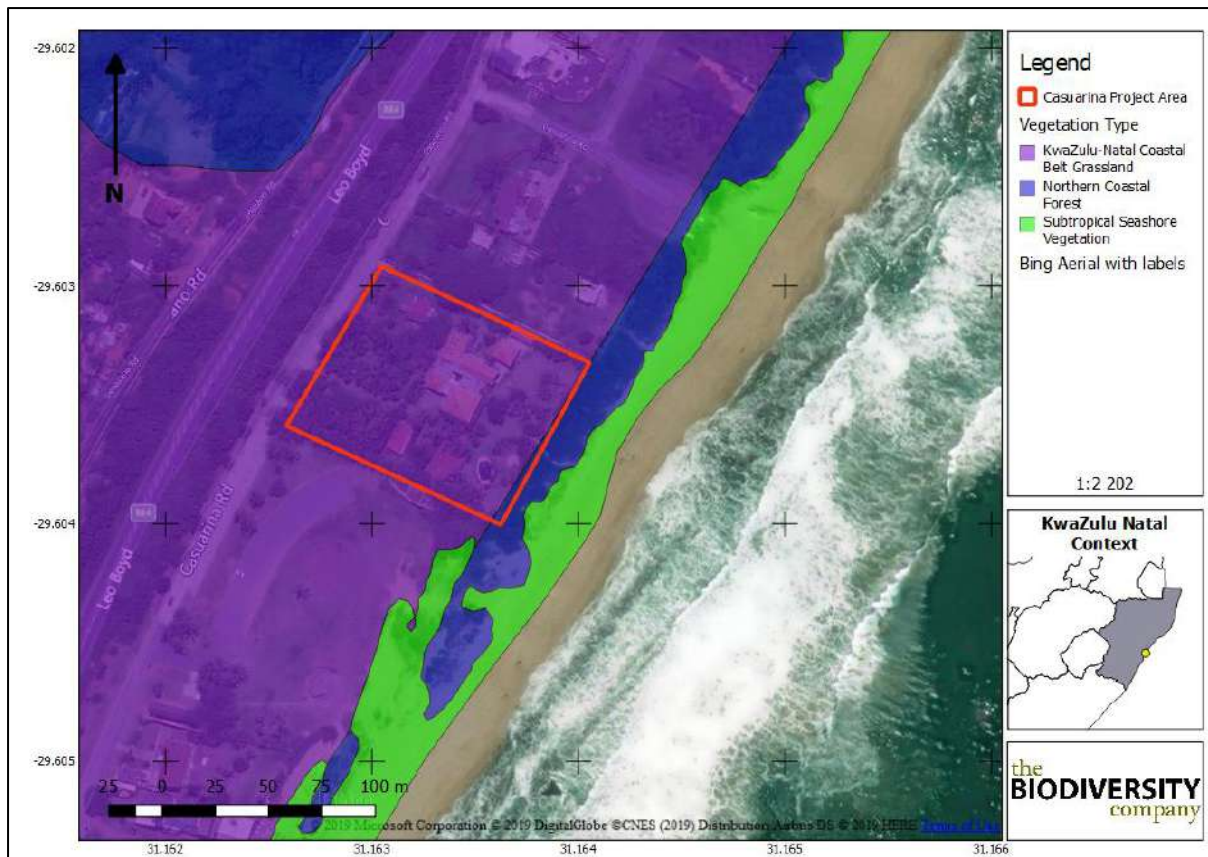


Figure 8: The project area showing the vegetation type based on the Vegetation Map of South Africa, Lesotho & Swaziland (BGIS, 2017)

7.1.1.2 KwaZulu-Natal Coastal Belt Grassland

The distribution of this vegetation type is in a long coastal strip along the KwaZulu-Natal coast, from near Mtunzini in the north, via Durban to Margate and just short of Port Edward in the south. Altitude ranges from about 20–450 m above sea level.

The KwaZulu-Natal Coastal Belt Grassland consists of highly dissected undulating coastal plains which presumably used to be covered to a great extent with various types of subtropical coastal forest. Some primary grassland dominated by *Themeda triandra* still occurs in hilly, high-rainfall areas where pressure from natural fire and grazing regimes prevailed. At present the KwaZulu-Natal Coastal Belt is affected by an intricate mosaic of very extensive sugarcane fields, timber plantations and coastal holiday resorts, with interspersed secondary *Aristida* grasslands, thickets and patches of coastal thornveld (Mucina & Rutherford, 2006).

7.1.1.3 Important Plant Taxa

Important plant taxa are those species that have a high abundance, a frequent occurrence or are prominent in the landscape within a particular vegetation type (Mucina & Rutherford, 2006).

The following species are important in the **KwaZulu-Natal Coastal Belt Grassland** vegetation type:

Small Trees & Tall Shrubs: *Bridelia micrantha*, *Phoenix reclinata*, *Syzygium cordatum*, *Acacia natalitia*, *Albizia adianthifolia* and *Antidesma venosum*.

Woody Climbers: *Abrus laevigatus*, *Asparagus racemosus* and *Smilax anceps*.

Low Shrubs: *Clutia pulchella*, *Gnidia kraussiana*, *Phyllanthus glaucophyllus* and *Tephrosia polystachya*.

Graminoids: *Aristida junciformis* subsp. *galpinii*, *Digitaria eriantha*, *Panicum maximum*, *Themeda triandra*, *Alloteropsis semialata* subsp. *eckloniana*, *Cymbopogon caesius*, *C. nardus*, *Eragrostis curvula*, *Eulalia villosa*, *Hyparrhenia filipendula* and *Melinis repens*.

Herbs: : *Berkheya speciosa* subsp. *speciosa*, *Cyanotis speciosa*, *Senecio glaberrimus*, *Alepidea longifolia*, *Centella glabrata*, *Cephalaria oblongifolia*, *Chamaecrista mimosoides*, *Conostomium natalense*, *Crotalaria lanceolata*, *Dissotis canescens*, *Eriosema squarrosum*, *Gerbera ambigua*, *Hebenstretia comosa*, *Helichrysum cymosum* subsp. *cymosum*, *H. pallidum*, *Hibiscus pedunculatus*, *Hybanthus capensis*, *Indigofera hilaris*, *Pentanisia prunelloides* subsp. *latifolia*, *Senecio albanensis*, *S. bupleuroides*, *S. coronatus*, *S. rhyncholaenus*, *Sisyranthus imberbis*, *Stachys aethiopica*, *S. nigricans*, *Vernonia galpinii* and *V. oligocephala*.

Geophytic Herbs: *Bulbine asphodeloides*, *Disa polygonoides*, *Hypoxis filiformis*, *Ledebouria floribunda*, *Pachycarpus asperifolius*, *Schizocarphus nervosus* and *Tritonia disticha*.

7.1.1.4 Biogeographically Important Taxa

Graminoids: *Cyperus natalensis* and *Eragrostis lappula*.

Herbs: *Helichrysum longifolium*, *Selago tarachodes*, *Senecio dregeanus* and *Sphenostylis angustifolia*.

Geophytic Herbs: *Kniphofia gracilis*, *K. littoralis*, *K. rooperi*, *Pachystigma venosum* and *Zeuxine africana*.

Low Shrubs: *Helichrysum kraussii*, *Agathisanthemum bojeri* and *Desmodium dregeanum*.

Megaherb: *Strelitzia nicolai*.

Geoxylic Suffrutices: *Ancylobotrys petersiana*, *Eugenia albanensis* and *Salacia kraussii*.

Small Trees & Tall Shrubs: *Anastrabe integerrima* and *Vachellia nilotica* subsp. *kraussiana*.

7.1.1.5 Endemic Taxa

Herb: *Vernonia africana* (extinct).

Geophytic Herb: *Kniphofia pauciflora*.

Low Shrub: *Barleria natalensis* (extinct).

7.1.1.6 Conservation Status

The vegetation type is listed as Endangered (Mucina & Rutherford, 2006). The conservation target is at 25%. Only a very small part of this vegetation type is statutorily conserved in Ngoye, Mbumbazi and Vernon Crookes Nature Reserves. About 50% is transformed for cultivation,

by urban sprawl and for road-building. Alien or invasive species found in this vegetation type include *Chromolaena odorata*, *Lantana camara*, *Melia azedarach* and *Solanum mauritianum*.

7.1.1.7 Plant Species of Conservation Concern

Based on the Plants of Southern Africa (BODATSA-POSA, 2016) database, 747 plant species are expected to occur in the project areas vicinity. Figure 9 shows the extent of the grid that was used to compile the expected species list based on the Plants of Southern Africa (BODATSA-POSA, 2016) database. The list of expected plant species is provided in Appendix A.

Of the 747-plant species, five (5) species are listed as being Species of Conservation Concern (SCC) (Table 2).

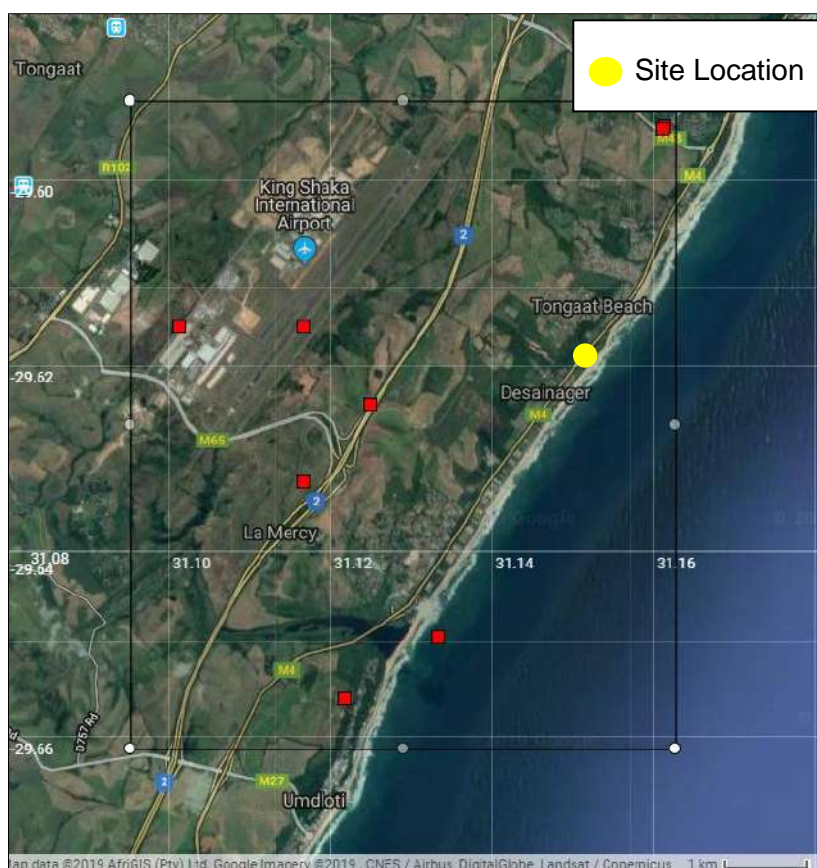


Figure 9: Map showing the grid drawn to compile an expected species list (BODATSA-POSA, 2016)

Table 2: Plant Species of Conservation Concern (SCC) expected to occur in the project area (BODATSA-POSA, 2018)

| Family | Taxon | Author | IUCN | Ecology |
|---------------|------------------------------------|----------------------|------|---------------------|
| Apocynaceae | <i>Brachystelma sandersonii</i> | (Oliv.) N.E.Br. | VU | Indigenous; Endemic |
| Asteraceae | <i>Cineraria pinnata</i> | O.Hoffm. ex Schinz | NT | Indigenous; Endemic |
| Fabaceae | <i>Crotalaria dura subsp. dura</i> | J.M.Wood & M.S.Evans | NT | Indigenous; Endemic |
| Asphodelaceae | <i>Kniphofia littoralis</i> | Codd | NT | Indigenous; Endemic |
| Fabaceae | <i>Lotononis dichiloides</i> | Sond. | CR | Indigenous; Endemic |

Brachystelma sandersonii is VU according to the Red List of South African Plants (SANBI, 2017). This endemic species can be found from Port Shepstone to St Lucia. This coastal species can be found in the coastal grasslands at 10-200m above sea level. The population is threatened by alien invasive species and extensive sugarcane plantations.

Cineraria pinnata is listed as NT according to the Red List of South African Plants (SANBI, 2017). This species is found in the coastal grasslands from Kosi bay to Maputo. This species is threatened by crop cultivation.

Crotalaria dura subsp. *dura* is categorised as NT by the Red List of South African Plants (SANBI, 2017). This endemic species occurs in the midland's grasslands on Natal Group Sandstone. Habitat loss to forestry, sugarcane cultivation and urbanization is seen as its greatest threats.

Kniphofia littoralis is listed as NT according to the Red List of South African Plants (SANBI, 2017). This endemic species is found in coastal grasslands in moist depressions. The ongoing habitat loss to agriculture, forestry and urban expansion is resulting in the number declines of this species.

Lotononis dichiloides is categorised as CR according to the Red List of South African Plants (SANBI, 2017). This endemic species is found in the Durban area in the grasslands where it is threatened by habitat loss and degradation.

7.1.2 Faunal Assessment

7.1.2.1 Avifauna

Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 361 bird species are expected to occur in the vicinity of the Project area (pentads 2935_3015; 2930_3100, 3930_3105; 2930_3110; 2935_3100; 2935_3110; 2940_3100; 2940_3105). The full list of potential bird species is provided in Appendix B.

Of the expected bird species, thirty (30) species are listed as SCC either on a regional (26) or global scale (16) (Table 3).

The SCC include the following:

- Seven (7) species that are listed as EN on a regional basis;
- Thirteen (13) species that are listed as VU on a regional basis; and
- Six (6) species that are listed as NT on a regional basis.

Table 3: List of bird species of regional or global conservation importance that are expected to occur in pentads 2935_3015; 2930_3100, 3930_3105; 2930_3110; 2935_3100; 2935_3110; 2940_3100; 2940_3105 (SABAP2, 2018, ESKOM, 2014; IUCN, 2018)

| Species | Common Name | Conservation Status | | Likelihood of Occurrence |
|-----------------------------------|--------------------------------|------------------------|-------------|--------------------------|
| | | Regional (SANBI, 2016) | IUCN (2017) | |
| <i>Alcedo semitorquata</i> | Kingfisher, Half-collared | NT | LC | Low |
| <i>Balearica regulorum</i> | Crane, Grey Crowned | EN | EN | Low |
| <i>Calidris ferruginea</i> | Sandpiper, Curlew | LC | NT | Moderate |
| <i>Ciconia episcopus</i> | Stork, Woolly-necked | Unlisted | VU | Moderate |
| <i>Ciconia nigra</i> | Stork, Black | VU | LC | Low |
| <i>Coracias garrulus</i> | Roller, European | NT | LC | Low |
| <i>Falco biarmicus</i> | Falcon, Lanner | VU | LC | Moderate |
| <i>Geokichla guttata</i> | Ground Thrush, Spotted | EN | EN | Low |
| <i>Geronticus calvus</i> | Ibis, Southern Bald | VU | VU | Low |
| <i>Haematopus moquini</i> | Oystercatcher, African Black | LC | NT | Low |
| <i>Lioptilus nigricapillus</i> | Blackcap, Bush | VU | NT | Moderate |
| <i>Microparra capensis</i> | Jacana, Lesser | VU | LC | Low |
| <i>Morus capensis</i> | Gannet, Cape | VU | VU | Low |
| <i>Mycteria ibis</i> | Stork, Yellow-billed | EN | LC | Low |
| <i>Nettapus auritus</i> | Goose, African Pygmy | VU | LC | Low |
| <i>Pelecanus onocrotalus</i> | Pelican, Great White | VU | LC | Low |
| <i>Pelecanus rufescens</i> | Pelican, Pink-backed | VU | LC | Low |
| <i>Phalacrocorax capensis</i> | Cormorant, Cape | EN | EN | Low |
| <i>Phoenicopterus ruber</i> | Flamingo, Greater | NT | LC | Low |
| <i>Podica senegalensis</i> | Finfoot, African | VU | LC | Low |
| <i>Polemaetus bellicosus</i> | Eagle, Martial | EN | VU | Moderate |
| <i>Procellaria aequinoctialis</i> | Petrel, White-chinned | VU | VU | Low |
| <i>Puffinus griseus</i> | Shearwater, Sooty | LC | NT | Moderate |
| <i>Rostratula benghalensis</i> | Painted-snipe, Greater | NT | LC | Low |
| <i>Spermestes fringilloides</i> | Mannikin, Magpie | NT | LC | Low |
| <i>Stephanoaetus coronatus</i> | Eagle, African Crowned | VU | NT | High |
| <i>Sterna caspia</i> | Tern, Caspian | VU | LC | Low |
| <i>Terathopius ecaudatus</i> | Bateleur | EN | NT | Low |
| <i>Thalassarche carteri</i> | Albatross, Indian Yellow-nosed | EN | EN | Low |
| <i>Thalassarche cauta</i> | Albatross, Shy | NT | NT | Low |

Alcedo semitorquata (Half-collared Kingfisher) is listed as NT on a regional scale and occurs across a large range. This species generally prefers narrow rivers, streams, and estuaries with dense vegetation onshore, but it may also move into coastal lagoons and lakes. It mainly feeds on fish (IUCN, 2017). Due to the lack of suitable water source habitats the likelihood of occurrence is rated as low.

Balearica regulorum (Grey Crowned Crane) is listed as EN both globally and regionally. Populations of this species have declined, largely owing to direct poisoning, power-line collisions and loss of their grassland breeding habitats owing to afforestation, mining, agriculture and development (IUCN, 2017). They breed in natural grass and sedge-dominated habitats, preferring secluded grasslands at high elevations where the vegetation is thick and short. Due to the lack of open grassland areas and extensive wetlands within the project site the likelihood of occurrence is rated as low.

Calidris ferruginea (Curlew Sandpiper) is migratory species which breeds on slightly elevated areas in the lowlands of the high Arctic and may be seen in parts of South Africa during winter. During winter, the species occurs at the coast, but also inland on the muddy edges of marshes, large rivers and lakes (both saline and freshwater), irrigated land, flooded areas, dams and saltpans (IUCN, 2017). Due to the proximity to the coast the likelihood of occurrence is rated as moderate.

Ciconia episcopus (Woolly-necked Stork) is categorised as VU on a global scale. A major threat to this species in South East Asia is hunting, it also threatened by severe habitat loss and fragmentation, particularly that of lowland forests with tall trees used for nesting although much suitable habitat remains that is not inhabited. Due to the presence of forest habitat on the edge of the project area the likelihood of occurrence is rated as moderate.

Ciconia nigra (Black Stork) is native to South Africa, and inhabits old, undisturbed, open forests. They are known to forage in shallow streams, pools, marshes swampy patches, damp meadows, flood-plains, pools in dry riverbeds and occasionally grasslands, especially where there are stands of reeds or long grass (IUCN, 2017). It is unlikely that this species would occur in the project area due to the lack of foraging habitat.

Coracias garrulous (European Roller) is a winter migrant from most of South-central Europe and Asia occurring throughout sub-Saharan Africa (IUCN, 2017). The European Roller has a preference for bushy plains and dry savannah areas (IUCN, 2017). There is a low chance of this species occurring in the project area as suitable habitat is not present.

Falco biarmicus (Lanner Falcon) is native to South Africa and inhabits a wide variety of habitats, from lowland deserts to forested mountains (IUCN, 2017). They may occur in groups up to 20 individuals but have also been observed solitary. Their diet is mainly composed of small birds such as pigeons and francolins. The likelihood of incidental records of this species in the project area is rated as moderate due to the presence of many bird species on which Lanner Falcons may predate.

Geokichla guttata (Spotted Ground Thrush) is categorised as EN both regionally and globally. This enigmatic species has a very small and severely fragmented population which is presumed to be undergoing a continuing decline because of destruction and degradation of its habitat. The likelihood of occurring in the area is rated as low due to the absence of suitable ground cover for the species to forage under.

Geronticus calvus (Southern Bald Ibis) is listed as VU on a regional basis and prefers high rainfall (>700 mm p.a.), sour and alpine grasslands, with an absence of trees and a short, dense grass sward and also occurs in lightly wooded and relatively arid country. It forages on recently burned ground, also using unburnt natural grassland, cultivated pastures, reaped maize fields and ploughed areas. It has a varied diet, mainly consisting of insects and other

terrestrial invertebrates (IUCN, 2017). It has high nesting success on safe, undisturbed cliffs. The likelihood of the species occurring in the project area is low due to the absence of suitable foraging habitat.

Haematopus moquini (African Black Oystercatcher) is listed as NT on a global scale. Near-threatened, due to its small population size, low reproductive rate and susceptibility to human disturbance, especially urban development and use of offroad vehicles on beaches (destroying nests). Adults are largely sedentary and territorial, generally breeding on sandy beaches and islands, often heading to more rocky areas of the coastline in the non-breeding season (Hockey *et al.*, 2005). The likelihood of the species occurring in the project area is low due to the forest area separating the project area and the coastline.

Lioptilus nigricapillus (Bush Blackcap) is categorised as VU on a regional and NT on a international scale. This species has a small population, which is threatened by afforestation of its habitat and is inferred to be in decline. This species prefers major stands of mature forest in ravines fringed with thickets of *Leucosidea* and *Buddleia*. This habitat is often surrounded by grassland, or cultivated land which may prove to be beneficial for the species. The likelihood of occurrence in the project area is listed as moderate as some forest habitat occur in close proximity to the project area.

Microparra capensis (Lesser Jacana) is listed as VU on a regional scale and LC on a global scale. This species shows a preference for shallow water around the edges of permanent and seasonally flooded wetlands, with areas of sparse sedge (IUCN, 2017). Its likelihood of occurrence in the project area is rated as low due to the absence of suitable water sources.

Morus capensis (Cape Gannet) is listed as VU on a regional scale and as EN on a global scale. This species has undergone a large population reduction over the past three generations and is projected to continue to decline rapidly over the next three generations. The species is a marine species that during the non-breeding season can be found as far as 120km inland. The likelihood of this species being present in the project site is rated as low due to the absence of suitable water habitat.

Mycteria ibis (Yellow-billed Stork) is listed as EN on a regional scale and LC on a global scale. This species is migratory and has a large distributional range which includes much of sub-Saharan Africa. It is typically associated with freshwater ecosystems, especially wetlands and the margins of lakes and dams (IUCN, 2017). The absence of water bodies decreases the likelihood of occurrence.

Nettapus auritus (African Pygmy Goose) is listed as vulnerable in South Africa. They are threatened by habitat degradation such as the destruction of aquatic plant communities through the introduction of exotic fish (e.g. cichlids *Tilapia* spp.), siltation, pollution (e.g. herbicides), drainage and tourist water-sports (which destroy lily beds). The likelihood of occurring in the project areas is rated as low due to the absence of water bodies.

Pelecanus onocrotalus (Great White Pelican) is listed as vulnerable in South Africa as its breeding attempts regularly fail due to human disturbance, such as fishing activities and nest robbing. They prefer shallow lakes, estuaries, flood plain pans, dams, sheltered coastal bays and lagoons. The likelihood of occurring in the project site is rated as low due to the absence of suitable habitat.

Pelecanus rufescens (Pink-backed Pelican) is listed as VU on a regional scale. This species is threatened by habitat loss in KwaZulu-Natal, as many suitable pans and flood-plains are being altered through drainage and cultivation (Barnes 2000). Due to the lack of suitable water sources in the project area and the proximity to urbanization the likelihood of occurrence is rated as low.

Phalacrocorax capensis (Cape Cormorant) is endemic to the southwestern coast of Africa, but during the non-breeding season they spread inland and up the east coast of South Africa. The IUCN as well as Birdlife South Africa lists these birds as EN, and the main cause of the decline is as a result of the decline of the epipelagic fish stock, oil spills and avian cholera. Due to the lack of suitable habitat and proximity of the urban area, the likelihood of occurrence is rated as low.

Phoenicopterus roseus (Greater Flamingo) is listed as NT on a regional scale only. This species breed on large undisturbed alkaline and saline lakes, salt pans or coastal lagoons, usually far out from the shore after seasonal rains have provided the flooding necessary to isolate remote breeding sites from terrestrial predators and the soft muddy material for nest building (IUCN, 2017). Due to the absence of its preferred habitat within the project area, combined the proximity of the urban area, the likelihood of occurrence is rated as low.

Podica senegalensis (African Finfoot) occurs in forest and wooded savanna along permanent streams with thick growths of *Syzygium guineense*, along secluded reaches of thickly wooded rivers and on the edges of pools, lakes and dams with well-vegetated banks on the edges of dense papyrus beds far from the shore. It is rarely found away from shoreline vegetation and generally avoids stagnant or fast-flowing water (IUCN, 2017). Occurrence is unlikely due to the absence of suitable flowing natural water sources in the project area.

Polemaetus bellicosus (Martial Eagle) is listed as EN on a regional scale and VU on a global scale. This species has an extensive range across much of sub-Saharan Africa, but populations are declining due to deliberate and incidental poisoning, habitat loss, reduction in available prey, pollution and collisions with power lines (IUCN, 2017). It inhabits open woodland, wooded savanna, bushy grassland, thorn-bush and, in southern Africa, more open country and even sub-desert (IUCN, 2017). Due to the presence of large trees in the project area the likelihood of occurrence is rated as moderate.

Procellaria aequinoctialis (White-chinned Petrel) is categorised as VU both regionally and globally. This species is threatened by long-lined fishing and rats that are known to destroy its nests and prey on its young in its nests on rocky cliffs. The likelihood of occurrence is rated as low due to the lack of suitable habitat.

Puffinus griseus (Sooty Shearwater) is listed as LC on a regional scale and as NT on a global scale. This species is classified as NT because although it has a very large global population it is thought to have undergone a moderately rapid decline owing to the impact of fisheries, the harvesting of its young and possibly climate change. It nests on islands and headlands in large colonies. Burrows are dug for breeding under tussock grass, low scrub and on the Snares Islands under *Olearia* forest. Birds typically do not return to their natal colonies until age four. The likelihood of the species occurring in the project area is rated as moderate due to the proximity of the project area to the ocean.

Rostratula benghalensis (Greater Painted-snipe) shows a preference for recently flooded areas in shallow lowland freshwater temporary or permanent wetland, it has a wide range of these freshwater habitats which they occur in, in this case, sewage pools, reservoirs, mudflats overgrown with marsh grass which does not exist within the project area, thus the likelihood of occurrence is low.

Spermestes fringilloides (Magpie Mannikin) is listed as NT on a regional scale. The decline is partly due to its dependence on bamboo for food which is not common in KwaZulu-Natal. It generally prefers seeds taken directly from grasses, especially bamboo, supplemented with insects. The likelihood of occurrence in the project area is rated as low due to the absence of bamboo in the project area.

Stephanoaetus coronatus (African Crowned Eagle) inhabits forest, woodland, savanna and shrubland, as well as some modified habitats, such as plantations and secondary growth, and can persist in small forest fragments including urban greenspace forests (IUCN, 2017). The species has shown high resilience to heavy deforestation and degradation in some areas. The likelihood of occurrence is rated as high due to the forest margin of the project area.

Sterna caspia (Caspian Tern) is native to South Africa and are known to occur in inland freshwater systems such as large rivers, creeks, floodlands, reservoirs and sewage ponds. Habitat suitability was found to be low and thus the likelihood of occurrence is low.

Terathopius ecaudatus (Bateleur) is categorised as EN on a regional scale and NT on an international scale. This species prefer open grassland and savanna, it is not found in thick forested areas. The likelihood of finding this predatory bird in the project area is rated as low due to the proximity to urbanization.

Thalassarche carteri (Indian Yellow-nosed Albatross) is listed as EN on a regional scale and on a global scale. It breeds on slopes or cliffs, typically in bare, rocky areas but sometimes in tussock-grass and ferns. The Amsterdam population declined due to the outbreak of two diseases in the early 1980s (avian cholera and *Erysipelothrix rhusiopathidae*) that were thought to have been introduced to the island via poultry kept at the French military base. The diseases mainly affect young chicks, but adults may also be affected. The likelihood of the species occurring in the project area is rated as low due to suitable breeding habitats.

Thalassarche cauta (Shy Albatross) is listed as NT species on a regional scale and on a global scale. Shy Albatross breeds annually in colonies. Nests are a mound of soil, grass and roots, and are located on rock islands. Avian pox virus has been recorded in chicks on Albatross Island (Tasmania) and has the potential to impact population trends through negative impacts to breeding success. The likelihood of the species occurring in the project area is rated as low due to the absence of rocky breeding areas for the birds and the level of development in the project area.

7.1.2.1.1 Important Bird and Biodiversity Areas

Important Bird and Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other nature as identified by BirdLife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife, 2017).

According to Birdlife International (2017), the selection of Important Bird and Biodiversity Areas (IBAs) is achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The criteria ensure that the sites selected as IBAs have true significance for the international conservation of bird populations and provide a common currency that all IBAs adhere to, thus creating consistency among, and enabling comparability between, sites at national, continental and global levels.

The project area is situated 7.8 kilometres south west of the Mount Moreland IBA (Figure 10). This IBA was established in 2007 when the Victoria wetland, Mount Moreland, managed by the Mount Moreland Conservancy was declared an IBA as it hosts a roost of over 1% of the world's migratory barn swallows (South Africa's largest barn swallow roost). Estimates of the number of Barn Swallows using the roost at any given time vary from 1.5 million to the more popular 3 million.

Furthermore, a resident population of African Marsh Harrier (*Circus ranivorus*) regularly hunt swallows as they come in to roost. Other species such as Lanner Falcon (*Falco biarmicus*) and Sooty Falcon (*Falco concolor*) have also been recorded hunting over the wetland.

Based on the proximity of the project area to the IBA it is unlikely that the development would affect the IBA and the species found in that area.

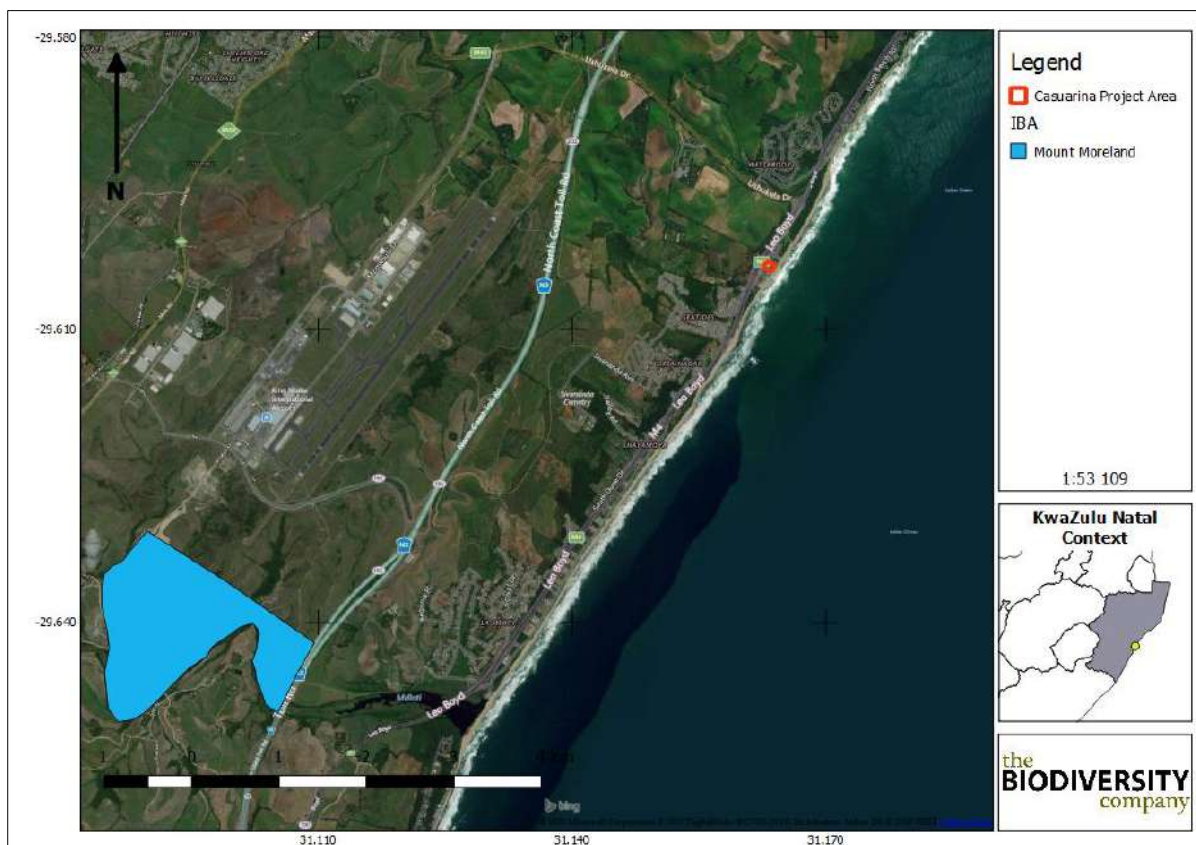


Figure 10: The project area in relation to the Mount Moreland IBA (Birdlife, 2017)

7.1.2.2 Mammals

The IUCN Red List Spatial Data (IUCN, 2018) lists 84 mammal species that could be expected to occur within the project area (Appendix C). Of these species, 5 are medium to large conservation dependant species, such *Ceratotherium simum* (Southern White Rhinoceros) and *Equus quagga* (Plains Zebra) that, in South Africa, are generally restricted to protected areas such as game reserves. These species are not expected to occur in the project area and are removed from the expected SCC list. They are however still included in Appendix C.

Of the remaining 79 small to medium sized mammal species, fourteen (14) are listed as being of conservation concern on a regional or global basis (Table 4).

The list of potential species includes:

- Five (5) that are listed as VU on a regional basis; and
- Seven (7) that are listed as NT on a regional scale (Table 4).

Table 4: List of mammal species of conservation concern that may occur in the Project area as well as their global and regional conservation statuses (IUCN, 2017; SANBI, 2016).

| Species | Common Name | Conservation Status | | Likelihood of Occurrence |
|--------------------------------|---------------------------------|------------------------|-------------|--------------------------|
| | | Regional (SANBI, 2016) | IUCN (2017) | |
| <i>Cephalophus natalensis</i> | Natal Red Duiker | NT | LC | Moderate |
| <i>Crocidura maquassiensis</i> | Makwassie Musk Shrew | VU | LC | Low |
| <i>Crocidura mariquensis</i> | Swamp Musk Shrew | NT | LC | Moderate |
| <i>Dasymys incommutus</i> | African Marsh rat | NT | LC | Moderate |
| <i>Eidolon helvum</i> | African Straw-colored Fruit Bat | LC | NT | Moderate |
| <i>Leptailurus serval</i> | Serval | NT | LC | Low |
| <i>Myosorex sclateri</i> | Sclater's Shrew | VU | NT | Moderate |
| <i>Otomops martiensseni</i> | Large-eared Free-tailed Bat | LC | NT | Low |
| <i>Otomys laminatus</i> | Laminated Vlei Rat | NT | LC | Low |
| <i>Panthera pardus</i> | Leopard | VU | VU | Low |
| <i>Philantomba monticola</i> | Blue Duiker | VU | LC | Moderate |
| <i>Poecilogale albinucha</i> | African Striped Weasel | NT | LC | Low |
| <i>Rhinolophus swinnyi</i> | Swinny's horseshoe bat | VU | LC | Low |
| <i>Scotoecus albobfuscus</i> | Thomas' House Bat | NT | DD | Moderate |

Cephalophus natalensis (Natal Red-Duiker) is categorised as NT on a regional scale. Inhabits evergreen forest, tropical/subtropical forest patches, coastal scrub, and riverine thickets. Natal Red Duiker have disappeared from large parts of their former range, largely as a result of the loss of suitable habitat in the face of expanding human settlement and agriculture, as well as hunting. The likelihood of occurrence in the project area is rated as moderate due to the forest edge of the project area.

Crocidura mariquensis (Swamp Musk Shrew) has very specific habitat requirements. It occurs in close proximity to open water with a distinct preference for marshy ponds, and riverine and semi-aquatic vegetation such as reed beds (IUCN, 2017). It is considered to be common in

suitable habitats. Due to the absence of these habitats in the project area the likelihood of occurrence is rated as low.

Crocidura maquassiensis (Maquassie Musk Shrew) is listed as VU on a regional basis and is known to be found in rocky, mountain habitats. It may tolerate a wider range of habitats and individuals have been collected in Kwa-Zulu Natal from a garden, and in mixed bracken and grassland alongside a river at 1,500 m (IUCN, 2017). There is a moderate chance of occurrence of this species in the project area due to its high adaptability.

Dasymys incomtus (African Marsh Rat) is listed as NT on a regional scale and LC on a global scale. This species has a wide distributional range that includes Central Africa, East Africa and parts of Southern Africa. This species has been recorded from a wide variety of habitats, including forest and savanna habitats, wetlands and grasslands (IUCN, 2017). Based on the presence of forest habitat on the edge of the project area the likelihood of occurrence is rated as moderate.

Eidolon helvum (African Straw-coloured Fruit Bat) is listed as LC on a regional scale and NT on a global scale. This species has been recorded from a very wide range of habitats across the lowland rainforest and savanna zones of Africa (IUCN, 2017). Although considered to be widespread and abundant across its range, certain populations are decreasing due to severe deforestation, hunting for food and medicinal use (IUCN, 2017). This species is known to form large roosts and colonies numbering in the thousands to even millions of individuals (IUCN, 2017). No colonies of this species are known to occur in the project area or in the immediate vicinity and, although individuals may occasionally be recorded, it is not expected to be resident within the project area and therefore its likelihood of occurrence is rated as moderate.

Leptailurus serval (Serval) occurs widely through sub-Saharan Africa and is commonly recorded from most major national parks and reserves (IUCN, 2017). The Serval's status outside reserves is not certain, but they are inconspicuous and may be common in suitable habitat as they are tolerant of farming practices provided there is cover and food available. In sub-Saharan Africa, they are found in habitat with well-watered savanna long-grass environments and are particularly associated with reedbeds and other riparian vegetation types. Due to the absence of natural grassland areas in the project area and human disturbance, the likelihood of occurrence for this species is rated as low.

Myosorex sclateri (Sclaters Forest Shrew) is listed VU on a regional based and NT on a global scale. This Kwa-Zulu Natal endemic species is restricted to moist lowland subtropical, scarp and coastal forests. The main threat to this species is the degradation of suitable forest habitats. The likelihood of occurrence is rated as moderate as forest habitat exist in the project area but water sources are limited.

Otomops martiensseni (Large-eared Free-tailed Bat) is NT on an international scale. Its natural habitats are subtropical or tropical dry forests, subtropical or tropical moist lowland forests, subtropical or tropical moist montanes, dry savanna, arable land, and plantations. The likelihood of occurrence is rated as low due to the proximity to urbanization.

Otomys laminatus (Laminated Vlei Rat) is listed as NT on a regional basis. It inhabits moist habitats such as bogs, swamps, marshes, and moist grassland and shrubland areas. The likelihood of finding this species in the project area is rated as low due to the absence of suitable habitats.

Panthera pardus (Leopard) has a wide distributional range across Africa and Asia, but populations have become reduced and isolated, and they are now extirpated from large portions of their historic range (IUCN, 2017). Impacts that have contributed to the decline in populations of this species include continued persecution by farmers, habitat fragmentation, increased illegal wildlife trade, excessive harvesting for ceremonial use of skins, prey base declines and poorly managed trophy hunting (IUCN, 2017). Although known to occur and persist outside of formally protected areas, the densities in these areas are considered to be low. The likelihood of occurrence in the project area which is in such close proximity to an urban area, and where they are likely to be persecuted, is regarded as low

In South Africa, *Philantomba monticola* (Blue Duiker) is mainly confined to the evergreen forest and thickets along the coast from northern KwaZulu-Natal to the eastern Western Cape province (IUCN, 2017). Due to the forest habitat on the edge of the project area the likelihood of occurrence is rated as moderate.

Poecilogale albinucha (African Striped Weasel) is usually associated with savanna habitats, although it probably has a wider habitat tolerance (IUCN, 2017). Due to its secretive nature, it is often overlooked in many areas where it does occur. There is insufficient habitat for this species in the project area and as such the likelihood of occurrence is rated as low.

Rhinolophus swinnyi (Swinny's Horseshoe Bat) has been recorded from eastern parts of South Africa where suitable habitat includes moist montane rainforest, and dry and moist savanna. On a population level, they are dependent on caves, mines and similar habitats for roosting (IUCN, 2017). The likelihood of occurrence of this species in the project area is rated as low due to the proximity of the urban area and lack of suitable habitat and roosting locations.

Scotoecus albobfuscus (Thomas' House Bat) is categorised as NT in South Africa. It is associated with low-lying, humid savannahs of the coastal plains of Mozambique and northern KwaZulu-Natal, where large rivers or wetlands occur. It has been recorded from Dune Forest in KwaZulu-Natal and may occur in mangrove forests (IUCN, 2017). The likelihood of occurrence in the project site is rated as moderate because of the presence of the forest habitat on the edge of the project area.

KZNEBPA Mammals

Certain mammal species may not be protected under NEMBA or IUCN regulations but KZNEBPA has specific provincial regulations relating to some of these species which need to be adhered to.

Vervet Monkeys are protected under Schedule 3 of the KZNEBPA and appear in Appendix II of CITES. Vervet monkeys are being forced into smaller pockets of vegetation as a direct result of the destruction of their natural habitat, resulting in conflict with humans.

African Wild Cats, Banded Mongooses, Chacma Baboons, Greater Galago's, Natal Red Rock Rabbit and Striped Polecats are provincially protected species (Schedule 3 of the KZNEBPA, 2014). Hunting, and the possession, breeding, selling, making available for sale or otherwise trade in, buying, receiving, giving or donating, or accepting as a gift, or in any way acquiring or disposing of, capturing, collecting, immobilizing, killing, translocating, releasing, displaying, importing or keep in captivity or exporting is prohibited.

Similarly, Geoffroy's Horseshoe bat, the Lesser Long-fingered bat, Sundevall's Leaf-nosed bat and Temminck's Myotis are provincially protected (Schedule 3, KZNEBPA, 2014) from hunting and killing by fumigation, damaging communal breeding or roosting sites; possession, breeding, selling, making available for sale or otherwise trade in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of, capturing, collecting, immobilizing, killing, translocating, releasing, displaying, importing or keep in captivity or exporting.

7.1.2.3 Herpetofauna (Reptiles & Amphibians)

7.1.2.3.1 Reptiles

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the ReptileMap database provided by the Animal Demography Unit (ADU, 2017) 48 reptile species are expected to occur in the Project area (Appendix D). Six (6) reptile species of conservation concern are expected to be present in the project area (Table 5).

Table 5: Expected reptile species of conservation concern that may occur in the project area

| Species | Common Name | Conservation Status | | Likelihood of Occurrence |
|-------------------------------|--------------------------|------------------------|-------------|--------------------------|
| | | Regional (SANBI, 2016) | IUCN (2017) | |
| <i>Bradypodion caffer</i> | Pondo Dwarf Chameleon | EN | EN | Low |
| <i>Bradypodion kentanicum</i> | Kentani Dwarf Chameleon | VU | VU | Low |
| <i>Caretta caretta</i> | Loggerhead Turtle | VU | VU | Low |
| <i>Crocodylus niloticus</i> | Nile Crocodile | VU | LC | Low |
| <i>Eretmochelys imbricata</i> | Hawksbill Sea Turtle | CR | CR | Low |
| <i>Pelusios rhodesianus</i> | Variable Hinged Terrapin | VU | LC | Low |

Bradypodion caffer (Pondo Dwarf Chameleon) is EN both globally and regionally. This species is found in coastal forests where they are generally found high up in trees but also lower in shrubs. The likelihood of occurrence is low due to the level of urbanization in the project area.

Bradypodion kentanicum (Kentani Dwarf Chameleon) is listed as VU both globally and locally. This species is found in the trees and bushes of coastal scarp forest, and inland from the coastal belt in grassy savanna. The likelihood of occurrence is rated as low due to the proximity to humans.

Caretta caretta (Loggerhead Sea Turtle) is listed as EN both regionally and internationally. This turtle is found in the Atlantic, Pacific and Indian oceans as well as the Mediterranean seas. This species is protected by CITES Appendix 1. The likelihood of occurrence of this species in the project area is low as there is a forest section separating the ocean and the project area.

Crocodylus niloticus (Nile Crocodile) is listed as VU on a regional basis. Based on the lack of suitable rivers and the close proximity of the urban area which will cause the species to be persecuted, the likelihood of occurrence of Nile crocodile is considered to be low.

Eretmochelys imbricata (Hawkbill Sea Turtle) is categorised as CR both regionally and globally. This species is found in tropical reefs of the Indian, Pacific and Atlantic oceans. It is threatened by pollution and destruction of its nesting sites and being hunted for its shell. The likelihood of occurrence is low due to the forest section separating the ocean and the project area.

Pelusios rhodesianus (Variable Hinged Terrapin) is listed as VU on a regional scale. This moderate-sized species inhabits weedy shallow dams and backwaters from Lake Victoria south to KwaZulu-Natal, South Africa. The populations in the main part of the species' range seem to be in good shape and the construction of storage dams provides additional suitable habitats for *P. rhodesianus*. However, some of the peripheral southern populations in South Africa (KwaZulu-Natal) are threatened or extinct. The likelihood of occurrence in the project site is rated as low due to the absence of suitable water sources for this species.

KZNEBPA Listings

Rock Monitor Lizards (*Varanus exanthematicus*) and Water Monitor Lizards (*Varanus niloticus*) are listed 'Least Concern', but they are protected under Schedule 3 of the KZNEBPA and appear on Appendix II of CITES. Water Monitors are found usually close to, or in water, but they can also be found some distance away from water when foraging.

7.1.2.3.2 Amphibians

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the AmphibianMap database provided by the Animal Demography Unit (ADU, 2018) 40 amphibian species are expected to occur in the project area (Appendix E).

Four (4) amphibian species of conservation concern could be present in the project area according to the above-mentioned sources (Table 6).

Table 6: Amphibian species of conservation concern which may occur in the project area

| Species | Common Name | Conservation Status | | Likelihood of Occurrence |
|----------------------------------|---------------------------|------------------------|-------------|--------------------------|
| | | Regional (SANBI, 2016) | IUCN (2017) | |
| <i>Afrivalus spinifrons</i> | Natal Leaf-folding Frog | VU | LC | Low |
| <i>Hemismus guttatus</i> | Spotted Shovel-nosed Frog | VU | VU | Low |
| <i>Hyperolius pickersgilli</i> | Pickersgill's Reed Frog | EN | EN | Low |
| <i>Natalobatrachus bonebergi</i> | Kloof Frog | EN | EN | Low |

Afrivalus spinifrons (Natal Leaf-folding Frog) is endemic to South Africa and occurs in two subspecies: *Afrivalus spinifrons spinifrons* and *A. s. intermedius*. The *Afrivalus spinifrons spinifrons* occurs at low to intermediate altitudes (below 700 masl) in KwaZulu-Natal; the latter occurs at altitudes up to 1,500 masl in western KwaZulu-Natal, between the midlands and foothills of the Drakensberg, and in the Eastern Cape Province (IUCN, 2017). These species inhabit Coastal Bushveld-Grassland and Moist Upland Grassland in KwaZulu-Natal and the Eastern Cape Provinces and has also been found in degraded forest habitats. *Afrivalus spinifrons spinifrons* breeds in standing water (including dams and ponds), sedge beds and grassy wetlands. *Afrivalus spinifrons intermedius* occurs in marshes, dams, floodplains and riverbanks and females and juveniles of the subspecies can be found sunbathing in arum lilies

during the day (IUCN, 2017). Both subspecies have a low likelihood of occurring within the project area as no suitable habitat is present.

Hemismus guttatus (Spotted Shovel-nosed Frog) is categorised as VU on both a regional and an international scale. This species *Hemismus guttatus* is endemic to south-eastern South Africa in the southern KwaZulu-Natal Province highlands. Threats to this species are: afforestation, inappropriate fire regimes, cattle trampling, overgrazing and associated eutrophication of breeding sites, the spread of alien plants that lower the water table (leading to drying out of breeding sites), dam construction and urbanisation. It occurs in grassland and breeds in upland bogs, grassy wetlands and marshes. Eggs are laid in a nest in the ground near water. The likelihood of occurrence in the project area is rated as low due to the absence of suitable breeding habitat.

Hyperolius pickersgilli (Pickersgill Reed Frog) is listed as EN both regionally and globally. This small frog only occurs in a few isolated wetlands around Durban. Much of its original range has been destroyed due to human encroachment and impacts to wetlands. This species has not been recorded in the project area and no suitable water wetlands are found in the project area.

Natalobatrachus bonebergi (Kloof Frog) is EN on a regional-and global basis. The species a habitat specialist, inhabiting rocky streams in dense scarp and gallery forests, where it is usually found close to water, and does not occur in open areas (IUCN, 2017). The species is a semi-arboreal specialist, requiring clear shallow streams with overhanging vegetation and large rocks for egg clump attachment. Due to these special habitat requirements, and the likelihood of these habitats occurring close to the project area being low, the likelihood of occurrence was rated as very low.

8 Field Survey

The field survey for the project area (flora and fauna (mammals, avifauna, amphibians and reptiles)) was conducted on the 7th of February 2019. During the surveys the floral and faunal communities in the project area were assessed. The project area was ground-truthed on foot, which included spot checks in pre-selected areas to validate desktop data. Photographs were recorded during the site visits and some are provided under the Results section in this report. All site photographs are available on request.

8.1 Vegetation Assessment

The vegetation assessment was conducted throughout the extent of the project area and the following habitat was identified based on the results of the fieldwork (Figure 11):

The area within the project area has been extensively transformed (purple). The homestead with associated infrastructure including the garden and the maintenance thereof has had a negative effect on the ecological state of the area (Figure 15). Even though it may seem as if many indigenous plant species were recorded, most of them have been introduced into the area for aesthetic reasons. The coconut as well as the screw pines trees could have potentially been transported via sea in the past and germinated within the area due to the close proximity of the seashore but are not considered indigenous.



Figure 11: The habitats identified during the fieldwork

A total of 34 tree, shrub and herbaceous plant species were recorded in the project area during the field assessment (Table 7 and Figure 12). Alien/Exotic/Invader plant species appear in blue text, NEMBA Category 1 Plants in green text.

Table 7: Trees, shrubs and weeds recorded at the proposed project area

| Species | Threat status (SANBI, 2017) | SA Endemic | NEMBA Category |
|---------------------------------|-----------------------------|------------|--------------------|
| <i>Agave sisalana</i> | | | NEMBA Category 2 |
| <i>Ageratum houstonianum</i> | | | NEMBA Category 1b. |
| <i>Alsophila dregei</i> | LC | No | |
| <i>Brachylaena discolor</i> | LC | No | |
| <i>Cannabis sativa</i> | | | Not Indigenous |
| <i>Carissa bispinosa</i> | LC | No | |
| <i>Carissa macrocarpa</i> | LC | No | |
| <i>Casuarina cunninghamiana</i> | | | NEMBA Category 2 |
| <i>Catharanthus roseus</i> | | | NEMBA Category 1b. |
| <i>Cocos sp</i> | | | Not Indigenous |
| <i>Cynodon dactylon</i> | | | NEMBA Category 2 |
| <i>Dactyloctenium australe</i> | LC | No | |
| <i>Dietes grandiflora</i> | LC | Yes | |

| | | | |
|--------------------------------------|----|-----|---|
| <i>Dracaena aletriformis</i> | LC | No | |
| <i>Duranta erecta</i> | | | Not Indigenous; Garden Plant |
| <i>Erythrina lysistemon</i> | LC | No | |
| <i>Euphorbia tirucalli</i> | LC | No | |
| <i>Ficus sur</i> | LC | No | |
| <i>Hibiscus rosa-sinensis</i> | | | Not Indigenous; Garden Plant |
| <i>Hibiscus tiliaceus</i> | LC | No | |
| <i>Kniphofia sp</i> | | | |
| <i>Monstera deliciosa</i> | | | Not Indigenous |
| <i>Pandanus utilis</i> | | | Not Indigenous; Garden Plant |
| <i>Persea americana</i> | | | Not Indigenous |
| <i>Phoenix reclinata</i> | LC | No | |
| <i>Plumeria alba</i> | | | Not Indigenous; Garden Plant |
| <i>Richardia brasiliensis</i> | | | Not Indigenous; Naturalised |
| <i>Sansevieria pearsonii</i> | LC | No | |
| <i>Setaria megaphylla</i> | LC | No | |
| <i>Sideroxylon inerme*</i> | LC | No | |
| <i>Strelitzia nicolai</i> | LC | No | |
| <i>Strelitzia reginae</i> | LC | Yes | |
| <i>Syzygium cordatum</i> | LC | No | |
| <i>Vachellia xanthophloea</i> | LC | No | |

*Protected Tree Nationally



Figure 12: Some of the flora species recorded in the project area: A) Forget-Me-Not-Tree (*Duranta erecta*), B) Large-Leaved Dragon Tree (*Dracaena alectrifomis*), C) *Carissa macrocarpa* (Big Num-Num), D) Red-faced Hibiscus (*Hibiscus rosa-sinensis*, E) , F) White Frangipani (*Plumeria alba*), G) Wild Banana (*Strelitzia nicolai*) and H) Screwpine (*Pandanus utilis*)

8.1.1 Protected Tree species

According to the list of protected tree species under the National Forests Act, 1998 (Act NO.84 of 2014) in terms of section 15 (1) of the Forests Act,1998 (DAFF,2014), no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a license or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. Contravention of this declaration is regarded as a first category offence.

Eight (8) individual trees of White Milkwood (*Sideroxylon inerme*) were observed within the property (Figure 11). The option is to either apply for a relocation or destruction permit OR plan the development in order to avoid the trees currently present.

8.1.2 Alien and Invasive Plants

Declared weeds and invader plant species have the tendency to dominate or replace the canopy or herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of these systems. Therefore, it is important that these plants are controlled and eradicated by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species.

The National Environmental Management: Biodiversity Act (NEMBA) is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 78 of 2014). The Alien and Invasive Species Regulations were published in the Government Gazette No. 37886, 1 August 2014. The legislation calls for the removal and / or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse.

Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA):

- Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as

Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.

- Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Note that according to the regulations, a person who has under his or her control a category 1b listed invasive species must immediately:

- Notify the competent authority in writing
- Take steps to manage the listed invasive species in compliance with:
 - Section 75 of the Act;
 - The relevant invasive species management programme developed in terms of regulation 4; and
 - Any directive issued in terms of section 73(3) of the Act.

Eleven (11) Category 1b invasive plant species were recorded within the project area and must therefore be removed by implementing an alien invasive plant management programme in compliance of section 75 of the Act as stated above. The NEMBA listed species identified within the Project area are marked in green (Table 7).

8.2 Fauna

8.2.1 Avifauna

Ten (10) bird species were recorded in the project area during the February 2019 survey based on either direct observations, vocalisations, or the presence of visual tracks & signs (Table 8) (Figure 13).

Based on the type of project area i.e., residential development a low number of birds were expected. No avifaunal SCC were recorded during the survey.

Table 8: A list of avifaunal species recorded for the project area

| Species | Common Name | Conservation Status | |
|-------------------------------|----------------------------|------------------------|-------------|
| | | Regional (SANBI, 2016) | IUCN (2017) |
| <i>Acridotheres tristis</i> | Myna, Common | Unlisted | LC |
| <i>Crithagra mozambicus</i> | Canary, Yellow-fronted | Unlisted | LC |
| <i>Lybius torquatus</i> | Barbet, Black-collared | Unlisted | LC |
| <i>Melaenornis pammelaina</i> | Flycatcher, Southern Black | Unlisted | LC |
| <i>Motacilla capensis</i> | Wagtail, Cape | Unlisted | LC |
| <i>Onychognathus morio</i> | Starling, Red-winged | Unlisted | LC |
| <i>Ploceus velatus</i> | Masked-weaver, Southern | Unlisted | LC |
| <i>Spermestes cucullatus</i> | Mannikin, Bronze | Unlisted | Unlisted |
| <i>Stactolaema leucotis</i> | Barbet, White-eared | Unlisted | LC |
| <i>Streptopelia capicola</i> | Turtle-dove, Cape | Unlisted | LC |



Figure 13: Some of the avifaunal species recorded within the project area: A) White-eared Barbet (*Stactolaema leucotis*), B) Red-winged Starling (*Onychognathus morio*), C) Cape Turtle Dove (*Streptopelia capicola*), D) Common Myna (*Acridotheres tristis*), E) Black-collared Barbet (*Lybius torquatus*), F) Southern Masked Weaver (*Ploceus velatus*), G) Yellow-fronted Canary (*Crithagra mozambicus*) and H) Bronze Mannikin (*Spermestes cucullatus*)

8.2.2 Mammals

Overall, mammal diversity in the project area was low, with no mammals observed during the survey. This is understandable due to the nature of the project area that consists of a residential development with manicured gardens.

8.2.3 Herpetofauna (Reptiles & Amphibians)

Herpetofauna diversity was also low. No reptiles or amphibians were observed in the project area. The likelihood of pesticide use in these gardens are high and as such chance of herpetofauna occurring is low.

9 Habitat Sensitivity Mapping

As per the terms of reference for the project, a GIS sensitivity map is required in order to identify sensitive features in terms of the relevant specialist discipline/s within the project area. Site sensitivities were classified and mapped.

The sensitivity scores identified during the field survey for each habitat were then visually mapped (Figure 14).

Areas that were classified as having low or low-moderate sensitivities are those areas which were deemed by the specialists to have been most impacted upon and/or were modified from their original condition due to factors such as human activity and/or presence of alien invasive species.

In this case the entire project area is regarded to have a low sensitivity due to nature of area being entirely transformed. It must be mentioned that the sensitivity only applied to the project area provided, areas such as the coastal forest and the seashore vegetation as in (Figure 8) are regarded as having a high sensitivity and shouldn't be impacted on in any way during construction.

It is important to note that this map does not replace any local, provincial or government legislation relating to these areas or the land use capabilities or sensitivities of these environments.



Figure 14: Habitat sensitivity map of the project area

10 Impact Assessment

10.1 Methodology

Potential impacts were evaluated against the data captured during the desktop-and field assessment to identify relevance to the study area. The relevant impacts associated with the proposed development were then subjected to a prescribed impact assessment methodology.

10.2 Current Impacts

During the field survey, the current impacts that are having a negative impact on the area were identified, and are listed below and can be seen in Figure 15;

- Presence of alien and invasive plant species;
- Existing boundary wall;
- Existing infrastructure and urbanisation;
- Manicured gardens with its associated human presence;
- Secondary road with the associated noise disturbance, road mortalities and litter; and
- Telephone lines and power lines within the vicinity of the project area.



Figure 15: Collage of the current impacts within the project area; A) Boundary walls, B) Manicured gardens with human presence, C and D) Residential buildings

The potential impacts associated with the various project stages are discussed below.

10.3 Construction Phase

The following potential impacts were considered on terrestrial vegetation communities, even though the area has been degraded extensively and no natural vegetations remain, a local impact was considered in order to provide mitigation:

- Potential loss and fragmentation of the vegetation community (including portions of an Endangered vegetation type and a protected tree species).

Potential impacts on faunal communities include:

- Displacement of faunal community (including threatened or protected species) due to habitat loss, disturbance (noise, dust and vibrations) and/or direct mortalities.

10.4 Operational Phase

The operational phase refers to when construction is completed, and the hotel is functional, in this case, infringement into the surrounding sensitive areas (coastline) were also taken into consideration:

The following potential impacts were considered on terrestrial vegetation communities:

- Continued encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species; and
- Increased human presence in the adjacent forest area, leading to trampling of natural vegetation

Potential impacts on faunal communities include:

- Continued displacement and fragmentation of the faunal community (including threatened or protected species) due to ongoing anthropogenic disturbances and habitat degradation (litter, road mortalities, poaching).

11 Assessment of Significance

11.1 Construction Phase

Table 9 shows the significance of potential impacts associated with the development on vegetation and faunal communities before the implementation of mitigation measures. Due to disturbed nature of the project area and the developments that are currently present in the project area as well as the absence of sensitive species the risk on pre-mitigations is rated as low. (Table 9).

The implementation of an alien plant removal and management plan (suggested as a mitigation measure) reduced the impact on the vegetation community to slightly detrimental.

11.2 Operational Phase

Table 9 also shows the significance of potential operational phase impacts on vegetation and faunal communities before the implementation of mitigation measures. The significance of increase human presence into the surrounding forest areas was rated as moderately high prior to mitigations (Table 9). Implementation of mitigation measures such as demarcation of the area and installing of no entry signs reduced the significance of the impact to low.

The significance of operational phase impacts on terrestrial fauna communities was rated as moderate prior to mitigation and low post mitigation. This impact was attributed to the expected continued loss and fragmentation of the vegetation community (some of which is classed as a CBA adjacent to the project area, and the loss of the faunal community which it supports unless definitive measures are taken).

Table 9: Assessment of significance of potential construction impacts on vegetation and faunal communities associated with the proposed hotel development pre- and post-mitigation:

| Impact | Prior to mitigation | | | | | | Post mitigation | | | | | |
|--|---------------------|----------------------|--------------------|--------------------------------------|-----------------------|--------------|--------------------|-------------------|--------------------|--------------------------------------|-----------------------|-----------------------------|
| | Duration of Impact | Spatial Scope | Severity of Impact | Sensitivity of Receiving Environment | Probability of Impact | Significance | Duration of Impact | Spatial Scope | Severity of Impact | Sensitivity of Receiving Environment | Probability of Impact | Significance |
| Further loss and fragmentation of the vegetation community (including portions of an Endangered vegetation type and a protected tree species). | 5 | 2 | 3 | 1 | 3 | | 5 | 1 | 2 | 1 | 2 | |
| | Permanent | Development specific | Significant | Ecology not sensitive | Likely | Low | Permanent | Activity specific | Small | Ecology not sensitive | Likely | Slightly detrimental |
| Displacement of faunal community due to habitat loss, disturbance (noise, dust and vibration) and/or direct mortalities. | 5 | 3 | 3 | 1 | 3 | | 5 | 1 | 2 | 1 | 3 | |
| | Permanent | Local | Significant | Ecology not sensitive | Likely | Low | Permanent | Activity specific | Small | Ecology not sensitive | Likely | Slightly detrimental |

Table 10: Assessment of significance of potential operational impacts on terrestrial biodiversity associated with the proposed hotel development pre- and post- mitigation:

| Impact | Prior to mitigation | | | | | | Post mitigation | | | | | |
|--|---------------------|----------------------|--------------------|--------------------------------------|-----------------------|-----------------|--------------------|-------------------|--------------------|--------------------------------------|-----------------------|--------------|
| | Duration of Impact | Spatial Scope | Severity of Impact | Sensitivity of Receiving Environment | Probability of Impact | Significance | Duration of Impact | Spatial Scope | Severity of Impact | Sensitivity of Receiving Environment | Probability of Impact | Significance |
| Continued encroachment and displacement of an indigenous and Endangered vegetation community by alien invasive plant species; | 5 | 3 | 3 | 1 | 3 | | 5 | 1 | 2 | 1 | 3 | |
| | Permanent | Development specific | Small | Ecology not sensitive | Likely | Low | Permanent | Activity specific | Small | Ecology not sensitive | Likely | Low |
| Increased human presence in the adjacent coastal and forest area, leading to trampling of natural vegetation | 5 | 3 | 3 | 4 | 4 | | 5 | 1 | 2 | 1 | 3 | |
| | Permanent | Local | Likely | Ecology highly sensitive | Highly Likely | Moderately High | Permanent | Activity Specific | Small | Ecology not sensitive | Likely | Low |
| Continued displacement and fragmentation of the faunal community (including threatened or protected species) due to ongoing anthropogenic disturbances and habitat degradation (litter, road mortalities, poaching). | 5 | 3 | 3 | 3 | 3 | | 5 | 1 | 2 | 1 | 3 | |
| | Permanent | Local | Likely | Ecology Moderately Sensitive | Likely | Moderate | Permanent | Activity Specific | Small | Ecology not sensitive | Likely | Low |

12 Mitigation Measures

12.1 Objectives

The focus of mitigation measures should be to reduce the significance of potential impacts associated with the development and thereby to:

- Prevent the further loss and fragmentation of this EN vegetation type and ensure that the development does encroach onto adjacent areas that are natural; and
- Prevent the loss of the faunal community (including potentially occurring species of conservation concern) associated with this vegetation community and the coastal habitat.

12.1.1 Mitigation Measures for Impacts on Vegetation Communities & CBAs

Due to the project area being in such close proximity to the forested area and the likelihood of SCC occurring in this area it is recommended that the area be demarcated and that no personnel or guests be allowed in to this area.

Recommended mitigation measures include the following:

- Development is only allowed within the project area. As far as possible, the proposed developments should be placed in areas that have already been disturbed, and no further loss of secondary vegetation should be permitted. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon, laydown areas and ablutions can be in the parking area to the east of the project area, and access to the area should only be done from the parking area;
- Areas of indigenous vegetation, even secondary communities, which were mainly found toward the coastline should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste;
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation, the gardens of the new complex must try and use indigenous species and trees that represent what is located within the area. This will reduce the likelihood of encroachment by alien invasive plant species; and
- The White Milkwood (*Sideroxylon inerme*) trees found within the project area, depending on the layout of the infrastructure, should rather be left undisturbed and implemented in the garden plan, if possible. Otherwise the trees should be relocated to the nearby CBA if a permit can be acquired.

12.1.2 Mitigation Measures for Impacts on Faunal Communities

Recommended mitigation and rehabilitation measures for faunal community's hinge largely on protecting their habitats and ensuring it remains intact. The movement of fauna is random and unexpected, a chance of coming across a faunal species is always plausible, even if the area is transformed.



The following measures are recommended:

- If any faunal SCC species are recorded during construction, activities should temporarily cease, and allow the species to either move off, or be relocated safely;
- Prior and during vegetation clearance, the project area should be walked and any larger fauna species noted should be given the opportunity to move away from the construction machinery;
- Fauna species such as frogs and reptiles that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified ECO trained in the handling and relocation of animals;
- Fencing should be erected around the project area to prevent workers and members of the public from entering the surrounding forest and coastal portions. This fence should have small openings to allow wildlife to pass through;
- During the construction phase noise must be kept to a minimum to reduce the impact of the development on the fauna residing on the site;
 - Furthermore, during the operational phase, noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species;
- The intentional killing of any animals including snakes, insects, lizards, birds or other animals should be strictly prohibited.

13 Conclusion

The completion of a study, in conjunction with the detailed results from the survey means that there is a high confidence in the information provided. The survey which was completed, and the corresponding studies resulted in good site coverage, assessing the all the habitats and ecosystems, obtaining a general species (fauna and flora) overview and observing the major current impacts.

It is clear from the regional ecological overview, as well as the baseline data collected to date that the project area has been altered both historically and at present. This is predominantly due to the residential developments and associated human activity and secondary road.

The remaining natural habitats, such as the adjacent forest habitats exhibited a healthy balance between various common canopy species and associated herbaceous plants. These natural areas are an important habitat for various fauna and flora and all effort must be taken to avoid these areas.

Careful consideration must be afforded each of the mitigation measures provided in this report. In the event that environmental authorisation is issued for this project, proven ecological (or environmental) controls and mitigation measures must be entrenched in the management framework.

The following further conclusions were reached based on the results of this assessment:

- According to the NBA terrestrial ecosystem threat status', the project area falls entirely within one ecosystem, which is listed as Endangered and as 'hardly protected';
- According to the KZN Conservation Plan it can be concluded that the proposed development is not likely to impact on a CBA: Irreplaceable;
- Based on the SANBI (2010) Protected Areas Map and the National Protected Areas Expansion Strategy (NPAES) the project area does not overlap with any formally or informally protected areas;
- The project area is situated within the KwaZulu Natal Coastal Belt Grassland vegetation type. This vegetation type is listed as Endangered;
- Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 361 bird species are expected to occur in the vicinity of the Project area. Of these, thirty (30) species are listed as species of conservation concern;
- The faunal diversity is considered low in the project area due to the developed nature of the project area and the high human presence in the project area;
- Eight (8) individual trees of White Milkwood (*Sideroxylon inerme*) was observed within the property and appropriate mitigation measures need to be applied; and
- It is recommended that the adjacent forest area (Critical Biodiversity Area) be treated as highly sensitive and be seen as a 'no-go' area.

14 Impact Statement

An impact statement is required as per the NEMA regulations with regards to the proposed development.

Considering the above-mentioned conclusions, it is the opinion of the specialists that the project (as is), can be authorised. The area has previously been disturbed and further development will not have an extensive impact on the fauna and flora in the areas should the adjacent forest area (Critical Biodiversity Area) be maintained as a "no-go" area. To limit the impact on the surrounding areas strict mitigation measures will need to be adhered to.

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APPENDIX A: *Floral species expected to occur in the project area*

| Family | Taxon | Author | IUCN | Ecology |
|----------------|---|--|------|---|
| Cyperaceae | <i>Abildgaardia ovata</i> | (Burm.f.) Kral | LC | Indigenous |
| Fabaceae | <i>Abrus precatorius subsp. africanus</i> | L. | LC | Indigenous |
| Malvaceae | <i>Abutilon grantii</i> | A.Meeuse | LC | Indigenous |
| Malvaceae | <i>Abutilon mauritianum</i> | (Jacq.) Medik. | LC | Indigenous |
| Malvaceae | <i>Abutilon sonneratianum</i> | (Cav.) Sweet | LC | Indigenous |
| Fabaceae | <i>Acacia sp.</i> | | | |
| Euphorbiaceae | <i>Acalypha ecklonii</i> | Baill. | LC | Indigenous; Endemic |
| Euphorbiaceae | <i>Acalypha glabrata var. glabrata</i> | Thunb. | LC | Indigenous |
| Euphorbiaceae | <i>Acalypha glabrata var. pilosa</i> | Thunb. | LC | Indigenous |
| Euphorbiaceae | <i>Acalypha villicaulis</i> | Hochst. | LC | Indigenous |
| Amaranthaceae | <i>Achyranthes aspera var. aspera</i> | L. | | Not- Indigenous; Naturalised |
| Amaranthaceae | <i>Achyranthes aspera var. sicula</i> | L. | | Not- Indigenous; Naturalised |
| Amaranthaceae | <i>Achyropsis avicularis</i> | (E.Mey. ex Moq.) T.Cooke & C.H.Wright | LC | Indigenous; Endemic |
| Amaranthaceae | <i>Achyropsis leptostachya</i> | (E.Mey. ex Meisn.) Baker & C.B.Clarke | LC | Indigenous |
| Apocynaceae | <i>Acokanthera oblongifolia</i> | (Hochst.) Codd | LC | Indigenous |
| Apocynaceae | <i>Acokanthera oppositifolia</i> | (Lam.) Codd | LC | Indigenous |
| Malpighiaceae | <i>Acridocarpus natalitius var. natalitius</i> | A.Juss. | NE | Indigenous |
| Orchidaceae | <i>Acrolophia cochlearis</i> | (Lindl.) Schltr. & Bolus | LC | Indigenous; Endemic |
| Pteridaceae | <i>Acrostichum aureum</i> | L. | LC | Indigenous |
| Passifloraceae | <i>Adenia gummifera var. gummifera</i> | (Harv.) Harms | LC | Indigenous |
| Pteridaceae | <i>Adiantum capillus-veneris</i> | L. | LC | Indigenous |
| Amaranthaceae | <i>Aerva lanata</i> | (L.) Juss. ex Schult. | LC | Indigenous |
| Fabaceae | <i>Aeschynomene uniflora var. uniflora</i> | E.Mey. | LC | Indigenous |
| Rubiaceae | <i>Afrocanthium mundianum</i> | (Cham. & Schltdl.) Lantz | LC | Indigenous |
| Agavaceae | <i>Agave vivipara var. vivipara</i> | L. | | Not- Indigenous; Naturalised |
| Loranthaceae | <i>Agelanthus kraussianus</i> | (Meisn.) Polhill & Wiens | | Indigenous; Endemic |
| Asteraceae | <i>Ageratum houstonianum</i> | Mill. | | Not- Indigenous; Naturalised; Invasive |
| Aizoaceae | <i>Aizoon canariense</i> | L. | LC | Indigenous |
| Fabaceae | <i>Albizia adianthifolia var. adianthifolia</i> | (Schumach.) W.Wight | LC | Indigenous |
| Hyacinthaceae | <i>Albuca crinifolia</i> | Baker | | Indigenous |
| Hyacinthaceae | <i>Albuca nelsonii</i> | N.E.Br. | | Indigenous |
| Hyacinthaceae | <i>Albuca setosa</i> | Jacq. | | Indigenous |
| Hyacinthaceae | <i>Albuca sp.</i> | | | |
| Orobanchaceae | <i>Alectra orobanchoides</i> | Benth. | LC | Indigenous |
| Orobanchaceae | <i>Alectra sessiliflora</i> | (Vahl) Kuntze | LC | Indigenous |

| | | | | |
|-----------------|--|----------------------|----|---|
| Celastraceae | <i>Allocassine laurifolia</i> | (Harv.) N.Robson | LC | Indigenous |
| Sapindaceae | <i>Allophylus africanus var. africanus</i> | P.Beauv. | | Indigenous |
| Sapindaceae | <i>Allophylus natalensis</i> | (Sond.) De Winter | | Indigenous |
| Asphodelaceae | <i>Aloe candelabrum</i> | A.Berger | | Indigenous; Endemic |
| Asphodelaceae | <i>Aloe pluridens</i> | Haw. | LC | Indigenous; Endemic |
| Amaranthaceae | <i>Alternanthera sessilis</i> | (L.) DC. | | Not- Indigenous; Naturalised; Invasive |
| Amaranthaceae | <i>Amaranthus dubius</i> | Mart. ex Thell. | | Not- Indigenous; Naturalised |
| Amaranthaceae | <i>Amaranthus spinosus</i> | L. | | Not- Indigenous; Naturalised |
| Amaranthaceae | <i>Amaranthus thunbergii</i> | Moq. | LC | Indigenous |
| Asteraceae | <i>Ambrosia artemisiifolia</i> | L. | | Not- Indigenous; Naturalised |
| Asteraceae | <i>Ambrosia psilostachya</i> | DC. | | Not- Indigenous; Naturalised |
| Poaceae | <i>Andropogon gayanus var. polycladus</i> | Kunth | LC | Indigenous |
| Commelinaceae | <i>Aneilema aequinoctiale</i> | (P.Beauv.) Loudon | LC | Indigenous |
| Commelinaceae | <i>Aneilema dregeanum</i> | Kunth | LC | Indigenous |
| Asteraceae | <i>Anisochaeta mikanioides</i> | DC. | LC | Indigenous; Endemic |
| Rubiaceae | <i>Anthospermum herbaceum</i> | L.f. | LC | Indigenous |
| Rubiaceae | <i>Anthospermum littoreum</i> | L.Bolus | LC | Indigenous; Endemic |
| Polygonaceae | <i>Antigonon leptopus</i> | Hook. & Arn. | | Not- Indigenous; Naturalised; Invasive |
| Icacinales | <i>Apodytes dimidiata subsp. dimidiata</i> | E.Mey. ex Arn. | LC | Indigenous |
| Aponogetonaceae | <i>Aponogeton natalensis</i> | Oliv. | LC | Indigenous; Endemic |
| Papaveraceae | <i>Argemone ochroleuca subsp. ochroleuca</i> | Sweet | | Not- Indigenous; Naturalised; Invasive |
| Fabaceae | <i>Argyrolobium rupestre subsp. rupestre</i> | (E.Mey.) Walp. | LC | Indigenous |
| Fabaceae | <i>Argyrolobium sp.</i> | | | |
| Iridaceae | <i>Aristea abyssinica</i> | Pax | LC | Indigenous |
| Iridaceae | <i>Aristea compressa</i> | Buchinger ex Baker | LC | Indigenous |
| Poaceae | <i>Aristida bipartita</i> | (Nees) Trin. & Rupr. | LC | Indigenous |
| Poaceae | <i>Arundo donax</i> | L. | NE | Not- Indigenous; Naturalised; Invasive |
| Apocynaceae | <i>Asclepias brevicuspis</i> | (E.Mey.) Schltr. | LC | Indigenous; Endemic |
| Apocynaceae | <i>Asclepias peltigera</i> | (E.Mey.) Schltr. | LC | Indigenous; Endemic |

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|------------------|--|---------------------------------|----|------------------------|
| Fabaceae | <i>Aspalathus spinosa subsp. spinosa</i> | L. | LC | Indigenous; Endemic |
| Asparagaceae | <i>Asparagus africanus</i> | Lam. | LC | Indigenous |
| Asparagaceae | <i>Asparagus falcatus</i> | L. | LC | Indigenous |
| Asparagaceae | <i>Asparagus plumosus</i> | Baker | LC | Indigenous |
| Asteraceae | <i>Aspilia natalensis</i> | (Sond.) Wild | LC | Indigenous |
| Aspleniaceae | <i>Asplenium gemmiferum</i> | Schrad. | LC | Indigenous |
| Aspleniaceae | <i>Asplenium inaequilaterale</i> | Bory ex Willd. | LC | Indigenous |
| Aspleniaceae | <i>Asplenium prionitis</i> | Kunze | LC | Indigenous |
| Acanthaceae | <i>Asystasia gangetica subsp. micrantha</i> | (L.) T.Anderson | | Indigenous |
| Asteraceae | <i>Baccharoides adoensis</i> | (Sch.Bip. ex Walp.) H.Rob. | | Indigenous |
| Fabaceae | <i>Baphia racemosa</i> | (Hochst.) Baker | LC | Indigenous; Endemic |
| Acanthaceae | <i>Barleria gueinzii</i> | Sond. | | Indigenous |
| Lecythidaceae | <i>Barringtonia racemosa</i> | (L.) Spreng. | LC | Indigenous |
| Asparagaceae | <i>Behnia reticulata</i> | (Thunb.) Didr. | LC | Indigenous |
| Asteraceae | <i>Berkheya speciosa subsp. speciosa</i> | (DC.) O.Hoffm. | LC | Indigenous |
| Melianthaceae | <i>Bersama lucens</i> | (Hochst.) Szyszyl. | LC | Indigenous |
| Blechnaceae | <i>Blechnum punctulatum var. krebsii</i> | Sw. | | Indigenous; Endemic |
| Poaceae | <i>Bothriochloa bladhii</i> | (Retz.) S.T.Blake | LC | Indigenous |
| Poaceae | <i>Bothriochloa insculpta</i> | (Hochst. ex A.Rich.) A.Camus | LC | Indigenous |
| Poaceae | <i>Brachiaria chusqueoides</i> | (Hack.) Clayton | LC | Indigenous |
| Poaceae | <i>Brachiaria eruciformis</i> | (Sm.) Griseb. | LC | Indigenous |
| Asteraceae | <i>Brachylaena discolor</i> | DC. | LC | Indigenous |
| Apocynaceae | <i>Brachystelma sandersonii</i> | (Oliv.) N.E.Br. | VU | Indigenous; Endemic |
| Phyllanthaceae | <i>Bridelia micrantha</i> | (Hochst.) Baill. | LC | Indigenous |
| Bryaceae | <i>Bryum apiculatum</i> | Schwagr. | | Indigenous |
| Bryaceae | <i>Bryum argenteum</i> | Hedw. | | Indigenous |
| Scrophulariaceae | <i>Buddleja dysophylla</i> | (Benth.) Radlk. | LC | Indigenous |
| Scrophulariaceae | <i>Buddleja saligna</i> | Willd. | LC | Indigenous |
| Cyperaceae | <i>Bulbostylis boeckeleriana</i> | (Schweinf.) Beetle | LC | Indigenous |
| Cyperaceae | <i>Bulbostylis hispidula</i> | (Vahl) R.W.Haines | | Indigenous |
| Cyperaceae | <i>Bulbostylis hispidula subsp. pyriformis</i> | (Vahl) R.W.Haines | LC | Indigenous |
| Rubiaceae | <i>Burchellia bubalina</i> | (L.f.) Sims | LC | Indigenous |
| Buxaceae | <i>Buxus natalensis</i> | (Oliv.) Hutch. | | Indigenous; Endemic |
| Asteraceae | <i>Callilepis sp.</i> | | | |
| Fabaceae | <i>Calpurnia aurea subsp. aurea</i> | (Aiton) Benth. | LC | Indigenous |
| Fabaceae | <i>Canavalia bonariensis</i> | Lindl. | LC | Indigenous |
| Fabaceae | <i>Canavalia rosea</i> | (Sw.) DC. | LC | Indigenous |
| Rubiaceae | <i>Canthium ciliatum</i> | (Klotzsch) Kuntze | LC | Indigenous |
| Rubiaceae | <i>Canthium inerme</i> | (L.f.) Kuntze | LC | Indigenous |
| Rubiaceae | <i>Canthium sp.</i> | | | |
| Capparaceae | <i>Capparis brassii</i> | DC. | LC | Indigenous |
| Capparaceae | <i>Capparis fascicularis var. fascicularis</i> | DC. | LC | Indigenous |

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|------------------|--|----------------------|----|---------------------------------------|
| Capparaceae | <i>Capparis sepiaria</i> var. <i>citrifolia</i> | L. | LC | Indigenous |
| Capparaceae | <i>Capparis tomentosa</i> | Lam. | LC | Indigenous |
| Sapindaceae | <i>Cardiospermum grandiflorum</i> | Sw. | | Not-Indigenous; Naturalised; Invasive |
| Sapindaceae | <i>Cardiospermum halicacabum</i> var. <i>halicacabum</i> | L. | | Indigenous |
| Cyperaceae | <i>Carex spartea</i> | Wahlenb. | | Indigenous |
| Apocynaceae | <i>Carissa bispinosa</i> | (L.) Desf. ex Brenan | LC | Indigenous |
| Apocynaceae | <i>Carissa macrocarpa</i> | (Eckl.) A.DC. | LC | Indigenous |
| Aizoaceae | <i>Carpobrotus dimidiatus</i> | (Haw.) L.Bolus | LC | Indigenous |
| Rhizophoraceae | <i>Cassipourea malosana</i> | (Baker) Alston | LC | Indigenous |
| Casuarinaceae | <i>Casuarina equisetifolia</i> | L. | NE | Not-Indigenous; Naturalised; Invasive |
| Rubiaceae | <i>Catunaregam obovata</i> | (Hochst.) A.E.Gonç. | LC | Indigenous |
| Euphorbiaceae | <i>Cavacoa aurea</i> | (Cavaco) J.Leonard | LC | Indigenous |
| Amaranthaceae | <i>Celosia trigyna</i> | L. | LC | Indigenous |
| Cannabaceae | <i>Celtis africana</i> | Burm.f. | LC | Indigenous |
| Cannabaceae | <i>Celtis gomphophylla</i> | Baker | LC | Indigenous |
| Apiaceae | <i>Centella asiatica</i> | (L.) Urb. | LC | Indigenous |
| Pedaliaceae | <i>Ceratotheca triloba</i> | (Bernh.) Hook.f. | LC | Indigenous |
| Apocynaceae | <i>Ceropegia linearis</i> subsp. <i>linearis</i> | E.Mey. | LC | Indigenous |
| Solanaceae | <i>Cestrum laevigatum</i> | Schtdl. | | Not-Indigenous; Naturalised; Invasive |
| Scrophulariaceae | <i>Chaenostoma floribundum</i> | Benth. | LC | Indigenous |
| Cannabaceae | <i>Chaetachme aristata</i> | Planch. | LC | Indigenous |
| Fabaceae | <i>Chamaecrista mimosoides</i> | (L.) Greene | LC | Indigenous |
| Pteridaceae | <i>Cheilanthes buchananii</i> | (Baker) Domin | | Indigenous |
| Pteridaceae | <i>Cheilanthes hirta</i> | Sw. | | Indigenous |
| Pteridaceae | <i>Cheilanthes inaequalis</i> | (Kunze) Mett. | LC | Indigenous |
| Pteridaceae | <i>Cheilanthes viridis</i> var. <i>viridis</i> | (Forssk.) Sw. | LC | Indigenous |
| Amaranthaceae | <i>Chenopodium murale</i> var. <i>murale</i> | L. | | Not-Indigenous; Naturalised |
| Oleaceae | <i>Chionanthus peglerae</i> | (C.H.Wright) Stearn | LC | Indigenous; Endemic |
| Gentianaceae | <i>Chironia baccifera</i> | L. | LC | Indigenous; Endemic |
| Gentianaceae | <i>Chironia palustris</i> subsp. <i>rosacea</i> | Burch. | LC | Indigenous |
| Poaceae | <i>Chloris gayana</i> | Kunth | LC | Indigenous |
| Poaceae | <i>Chloris pycnothrix</i> | Trin. | LC | Indigenous |
| Agavaceae | <i>Chlorophytum galpinii</i> | (Baker) Kativu | | Indigenous |
| Agavaceae | <i>Chlorophytum modestum</i> | Baker | | Indigenous; Endemic |
| Agavaceae | <i>Chlorophytum saundersiae</i> | (Baker) Nordal | | Indigenous; Endemic |

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|----------------|--|-------------------------------|----|---|
| Asteraceae | <i>Chromolaena odorata</i> | (L.) R.M.King & H.Rob. | | Not-Indigenous; Naturalised; Invasive |
| Asteraceae | <i>Cineraria pinnata</i> | O.Hoffm. ex Schinz | NT | Indigenous; Endemic |
| Asteraceae | <i>Cirsium vulgare</i> | (Savi) Ten. | | Not-Indigenous; Naturalised; Invasive |
| Menispermaceae | <i>Cissampelos torulosa</i> | E.Mey. ex Harv. | LC | Indigenous |
| Vitaceae | <i>Cissus sp.</i> | | | |
| Rutaceae | <i>Clausena anisata var. anisata</i> | (Willd.) Hook.f. ex Benth. | LC | Indigenous |
| Euphorbiaceae | <i>Clutia disceptata</i> | Prain | LC | Indigenous; Endemic |
| Euphorbiaceae | <i>Clutia monticola var. monticola</i> | S.Moore | LC | Indigenous |
| Cucurbitaceae | <i>Coccinia mackenii</i> | Naudin ex C.Huber | LC | Indigenous |
| Cucurbitaceae | <i>Coccinia rehmannii</i> | Cogn. | LC | Indigenous |
| Rubiaceae | <i>Cordia rudis</i> | (E.Mey. ex Harv.) Verdc. | LC | Indigenous |
| Malvaceae | <i>Cola natalensis</i> | Oliv. | LC | Indigenous |
| Colchicaceae | <i>Colchicum decipiens</i> | (N.E.Br.) J.C.Manning & Vinn. | | Indigenous; Endemic |
| Commelinaceae | <i>Coleotrype natalensis</i> | C.B.Clarke | LC | Indigenous |
| Combretaceae | <i>Combretum kraussii</i> | Hochst. | LC | Indigenous |
| Commelinaceae | <i>Commelina benghalensis</i> | L. | LC | Indigenous |
| Commelinaceae | <i>Commelina diffusa subsp. diffusa</i> | Burm.f. | LC | Indigenous |
| Commelinaceae | <i>Commelina erecta</i> | L. | LC | Indigenous |
| Nyctaginaceae | <i>Commicarpus chinensis subsp. natalensis</i> | (L.) Heimerl | LC | Indigenous |
| Asteraceae | <i>Conyza canadensis</i> | (L.) Cronquist | | Not-Indigenous; Naturalised |
| Asteraceae | <i>Conyza scabrida</i> | DC. | | Indigenous |
| Asteraceae | <i>Conyza sumatrensis var. sumatrensis</i> | (Retz.) E.Walker | | Not-Indigenous; Naturalised |
| Malvaceae | <i>Corchorus trilocularis</i> | L. | NE | Not-Indigenous; Cultivated; Naturalised |
| Boraginaceae | <i>Cordia caffra</i> | Sond. | LC | Indigenous |
| Brassicaceae | <i>Coronopus didymus</i> | (L.) Sm. | | Not-Indigenous; Naturalised |
| Asteraceae | <i>Cotula nigellifolia var. nigellifolia</i> | (DC.) K.Bremer & Humphries | LC | Indigenous; Endemic |
| Acanthaceae | <i>Crabbea nana</i> | Nees | | Indigenous |
| Crassulaceae | <i>Crassula natans var. natans</i> | Thunb. | | Indigenous |
| Crassulaceae | <i>Crassula sarmentosa var. integrifolia</i> | Harv. | LC | Indigenous; Endemic |
| Amaryllidaceae | <i>Crinum macowanii</i> | Baker | LC | Indigenous |
| Fabaceae | <i>Crotalaria dura subsp. dura</i> | J.M.Wood & M.S.Evans | NT | Indigenous; Endemic |

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|----------------|---|---------------------------------------|----|---------------------------------------|
| Fabaceae | <i>Crotalaria lanceolata subsp. lanceolata</i> | E.Mey. | LC | Indigenous |
| Fabaceae | <i>Crotalaria vasculosa</i> | Wall. ex Benth. | LC | Indigenous |
| Fabaceae | <i>Crotalaria virgulata subsp. grantiana</i> | Klotzsch | LC | Indigenous |
| Euphorbiaceae | <i>Croton sylvaticus</i> | Hochst. | LC | Indigenous |
| Apocynaceae | <i>Cryptolepis capensis</i> | Schltr. | LC | Indigenous |
| Apocynaceae | <i>Cryptolepis oblongifolia</i> | (Meisn.) Schltr. | LC | Indigenous |
| Cucurbitaceae | <i>Cucumis maderaspatanus</i> | L. | LC | Indigenous |
| Convolvulaceae | <i>Cuscuta campestris</i> | Yunck. | | Not-Indigenous; Naturalised; Invasive |
| Araliaceae | <i>Cussonia nicholsonii</i> | Strey | | Indigenous; Endemic |
| Araliaceae | <i>Cussonia spicata</i> | Thunb. | | Indigenous |
| Araliaceae | <i>Cussonia zuluensis</i> | Strey | | Indigenous |
| Apiaceae | <i>Cyclospermum leptophyllum</i> | (Pers.) Sprague ex Britton & P.Wilson | | Not-Indigenous; Naturalised |
| Poaceae | <i>Cymbopogon caesius</i> | (Hook. & Arn.) Stapf | LC | Indigenous |
| Apocynaceae | <i>Cynanchum ellipticum</i> | (Harv.) R.A.Dyer | LC | Indigenous |
| Apocynaceae | <i>Cynanchum schistoglossum</i> | Schltr. | LC | Indigenous |
| Poaceae | <i>Cynodon dactylon</i> | (L.) Pers. | LC | Indigenous |
| Cyperaceae | <i>Cyperus albostriatus</i> | Schrad. | LC | Indigenous |
| Cyperaceae | <i>Cyperus austro-africanus</i> | C.Archer & Goetgh. | LC | Indigenous |
| Cyperaceae | <i>Cyperus compressus</i> | L. | LC | Indigenous |
| Cyperaceae | <i>Cyperus congestus</i> | Vahl | LC | Indigenous |
| Cyperaceae | <i>Cyperus cyperoides subsp. cyperoides</i> | (L.) Kuntze | LC | Indigenous |
| Cyperaceae | <i>Cyperus difformis</i> | L. | LC | Indigenous |
| Cyperaceae | <i>Cyperus distans</i> | L.f. | LC | Indigenous |
| Cyperaceae | <i>Cyperus dives</i> | Delile | LC | Indigenous |
| Cyperaceae | <i>Cyperus dubius var. dubius</i> | Rottb. | | Indigenous |
| Cyperaceae | <i>Cyperus esculentus var. esculentus</i> | L. | LC | Indigenous |
| Cyperaceae | <i>Cyperus macrocarpus</i> | (Kunth) Boeck. | LC | Indigenous |
| Cyperaceae | <i>Cyperus natalensis</i> | Hochst. | LC | Indigenous |
| Cyperaceae | <i>Cyperus pseudovestitus</i> | (C.B.Clarke) Kuk. | LC | Indigenous |
| Cyperaceae | <i>Cyperus rotundus subsp. rotundus</i> | L. | LC | Indigenous |
| Cyperaceae | <i>Cyperus rotundus subsp. tuberosus</i> | L. | LC | Indigenous |
| Cyperaceae | <i>Cyperus sexangularis</i> | Nees | LC | Indigenous |
| Cyperaceae | <i>Cyperus solidus</i> | Kunth | LC | Indigenous |
| Cyperaceae | <i>Cyperus sphaerospermus</i> | Schrad. | LC | Indigenous |
| Cyperaceae | <i>Cyperus textilis</i> | Thunb. | LC | Indigenous; Endemic |
| Cyperaceae | <i>Cyperus vorsteri</i> | K.L.Wilson | LC | Indigenous; Endemic |
| Vitaceae | <i>Cyphostemma cirrhosum subsp. transvaalense</i> | (Thunb.) Desc. ex Wild & R.B.Drumm. | | Indigenous |
| Vitaceae | <i>Cyphostemma hypoleucum</i> | (Harv.) Desc. ex Wild & R.B.Drumm. | | Indigenous |
| Orchidaceae | <i>Cyrtorchis arcuata subsp. arcuata</i> | (Lindl.) Schltr. | LC | Indigenous |
| Poaceae | <i>Dactyloctenium australe</i> | Steud. | LC | Indigenous |

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|-----------------|---|--------------------------------|----|--------------------------------|
| Fabaceae | <i>Dalbergia armata</i> | E.Mey. | LC | Indigenous |
| Fabaceae | <i>Dalbergia obovata</i> | E.Mey. | LC | Indigenous |
| Euphorbiaceae | <i>Dalechampia capensis</i> | A.Spreng. | LC | Indigenous |
| Euphorbiaceae | <i>Dalechampia scandens var. natalensis</i> | L. | LC | Indigenous |
| Sapindaceae | <i>Deinbollia oblongifolia</i> | (E.Mey. ex Arn.) Radlk. | | Indigenous |
| Fabaceae | <i>Desmodium incanum</i> | DC. | NE | Not-Indigenous; Naturalised |
| Fabaceae | <i>Desmodium setigerum</i> | (E.Mey.) Benth. ex Harv. | LC | Indigenous |
| Caryophyllaceae | <i>Dianthus mooiensis subsp. kirkii</i> | F.N.Williams | | Indigenous |
| Fabaceae | <i>Dichrostachys cinerea subsp. africana</i> | (L.) Wight & Arn. | NE | Indigenous |
| Fabaceae | <i>Dichrostachys cinerea subsp. nyassana</i> | (L.) Wight & Arn. | LC | Indigenous |
| Acanthaceae | <i>Dicliptera heterostegia</i> | Nees | | Indigenous |
| Urticaceae | <i>Didymodoxa caffra</i> | (Thunb.) Friis & Wilmot-Dea | | Indigenous |
| Urticaceae | <i>Didymodoxa capensis var. integrifolia</i> | (L.f.) Friis & Wilmot- Dea | | Indigenous; Endemic |
| Iridaceae | <i>Dietes iridioides</i> | (L.) Sweet ex Klatt | LC | Indigenous |
| Poaceae | <i>Digitaria ciliaris</i> | (Retz.) Koeler | NE | Not-Indigenous; Naturalised |
| Poaceae | <i>Digitaria diversinervis</i> | (Nees) Stapf | LC | Indigenous; Endemic |
| Poaceae | <i>Digitaria longiflora</i> | (Retz.) Pers. | LC | Indigenous |
| Poaceae | <i>Digitaria natalensis</i> | Stent | LC | Indigenous |
| Poaceae | <i>Digitaria nuda</i> | Schumach. | NE | Not-Indigenous; Naturalised |
| Poaceae | <i>Digitaria ternata</i> | (A.Rich.) Stapf | LC | Indigenous |
| Asteraceae | <i>Dimorphotheca fruticosa</i> | (L.) Less. | LC | Indigenous; Endemic |
| Poaceae | <i>Dinebra retroflexa var. condensata</i> | (Vahl) Panz. | LC | Indigenous |
| Dioscoreaceae | <i>Dioscorea cotinifolia</i> | Kunth | LC | Indigenous |
| Dioscoreaceae | <i>Dioscorea sp.</i> | | | |
| Ebenaceae | <i>Diospyros natalensis subsp. natalensis</i> | (Harv.) Brenan | | Indigenous |
| Ebenaceae | <i>Diospyros villosa var. villosa</i> | (L.) De Winter | | Indigenous; Endemic |
| Hyacinthaceae | <i>Dipcadi viride</i> | (L.) Moench | | Indigenous |
| Orchidaceae | <i>Disperis disaeformis</i> | Schltr. | LC | Indigenous; Endemic |
| Orchidaceae | <i>Disperis woodii</i> | Bolus | LC | Indigenous; Endemic |
| Melastomataceae | <i>Dissotis princeps var. princeps</i> | (Kunth) Triana | LC | Indigenous |
| Asteraceae | <i>Distephanus angulifolius</i> | (DC.) H.Rob. & B.Kahn | | Indigenous |
| Asteraceae | <i>Distephanus anisochaetoides</i> | (Sond.) H.Rob. & B.Kahn | | Indigenous |
| Asteraceae | <i>Distephanus divaricatus</i> | (Steetz) H.Rob. & B.Kahn | | Indigenous |
| Asteraceae | <i>Distephanus inhacensis</i> | (G.V.Pope) Boon & Glen | | Indigenous |
| Malvaceae | <i>Dombeya rotundifolia var. rotundifolia</i> | (Hochst.) Planch. | LC | Indigenous |

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|------------------|--|-----------------------------------|----|---|
| Malvaceae | <i>Dombeya tiliacea</i> | (Endl.) Planch. | LC | Indigenous; Endemic |
| Salicaceae | <i>Dovyalis longispina</i> | (Harv.) Warb. | LC | Indigenous |
| Salicaceae | <i>Dovyalis rhamnoides</i> | (Burch. ex DC.) Burch. & Harv. | LC | Indigenous |
| Urticaceae | <i>Droguetia ambigua</i> | Wedd. | | Indigenous; Endemic |
| Urticaceae | <i>Droguetia iners subsp. iners</i> | (Forssk.) Schweinf. | | Indigenous |
| Putranjivaceae | <i>Drypetes arguta</i> | (Mull.Arg.) Hutch. | LC | Indigenous |
| Putranjivaceae | <i>Drypetes natalensis var. natalensis</i> | (Harv.) Hutch. | LC | Indigenous |
| Acanthaceae | <i>Dyschoriste depressa</i> | (L.) Nees | | Indigenous |
| Amaranthaceae | <i>Dysphania ambrosioides</i> | (L.) Mosyakin | | Not- Indigenous; Naturalised; Invasive |
| Poaceae | <i>Echinochloa colona</i> | (L.) Link | LC | Indigenous |
| Poaceae | <i>Echinochloa pyramidalis</i> | (Lam.) Hitchc. & Chase | LC | Indigenous |
| Hydrocharitaceae | <i>Egeria densa</i> | Planch. | | Not- Indigenous; Naturalised; Invasive |
| Boraginaceae | <i>Ehretia rigida subsp. nervifolia</i> | (Thunb.) Druce | LC | Indigenous |
| Pontederiaceae | <i>Eichhornia crassipes</i> | (Mart.) Solms | | Not- Indigenous; Naturalised; Invasive |
| Meliaceae | <i>Ekebergia capensis</i> | Sparm. | LC | Indigenous |
| Celastraceae | <i>Elaeodendron croceum</i> | (Thunb.) DC. | LC | Indigenous |
| Dryopteridaceae | <i>Elaphoglossum acrostichoides</i> | (Hook. & Grev.) Schelpe | LC | Indigenous |
| Cyperaceae | <i>Eleocharis caduca</i> | (Delile) Schult. | LC | Indigenous |
| Cyperaceae | <i>Eleocharis limosa</i> | (Schrad.) Schult. | LC | Indigenous |
| Fabaceae | <i>Elephantorrhiza elephantina</i> | (Burch.) Skeels | LC | Indigenous |
| Poaceae | <i>Eleusine coracana subsp. africana</i> | (L.) Gaertn. | LC | Indigenous |
| Poaceae | <i>Eleusine indica</i> | (L.) Gaertn. | LC | Indigenous |
| Myrsinaceae | <i>Embelia ruminata</i> | (E.Mey. ex A.DC.) Mez | LC | Indigenous; Endemic |
| Polygonaceae | <i>Emex australis</i> | Steinh. | LC | Indigenous |
| Lamiaceae | <i>Endostemon obtusifolius</i> | (E.Mey. ex Benth.) N.E.Br. | LC | Indigenous |
| Poaceae | <i>Eragrostis capensis</i> | (Thunb.) Trin. | LC | Indigenous |
| Poaceae | <i>Eragrostis chloromelas</i> | Steud. | LC | Indigenous |
| Poaceae | <i>Eragrostis cilianensis</i> | (All.) Vignolo ex Janch. | LC | Indigenous |
| Poaceae | <i>Eragrostis ciliaris</i> | (L.) R.Br. | LC | Indigenous |
| Poaceae | <i>Eragrostis curvula</i> | (Schrad.) Nees | LC | Indigenous |
| Loranthaceae | <i>Erianthemum dregei</i> | (Eckl. & Zeyh.) Tiegh. | LC | Indigenous |
| Ericaceae | <i>Erica cerinthoides var. cerinthoides</i> | L. | NE | Indigenous |
| Poaceae | <i>Eriochloa meyeriana subsp. meyeriana</i> | (Nees) Pilg. | LC | Indigenous |
| Fabaceae | <i>Eriosema cordatum</i> | E.Mey. | LC | Indigenous |
| Fabaceae | <i>Eriosema parviflorum subsp. parviflorum</i> | E.Mey. | LC | Indigenous |

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|-----------------|--|----------------------------------|----|------------------------------------|
| Fabaceae | <i>Eriosema preptum</i> | C.H.Stirt. | LC | Indigenous; Endemic |
| Fabaceae | <i>Erythrina latissima</i> | E.Mey. | LC | Indigenous |
| Euphorbiaceae | <i>Erythrococca berberidea</i> | Prain | LC | Indigenous |
| Euphorbiaceae | <i>Erythrococca natalensis</i> | Prain | LC | Indigenous |
| Erythroxylaceae | <i>Erythroxyllum emarginatum</i> | Thonn. | LC | Indigenous |
| Ebenaceae | <i>Euclea natalensis subsp. natalensis</i> | A.DC. | LC | Indigenous |
| Ebenaceae | <i>Euclea natalensis subsp. rotundifolia</i> | A.DC. | LC | Indigenous |
| Myrtaceae | <i>Eugenia capensis subsp. capensis</i> | (Eckl. & Zeyh.) Sond. | LC | Indigenous |
| Myrtaceae | <i>Eugenia natalitia</i> | Sond. | LC | Indigenous |
| Orchidaceae | <i>Eulophia cucullata</i> | (Afzel. ex Sw.) Steud. | LC | Indigenous |
| Orchidaceae | <i>Eulophia hians var. nutans</i> | Spreng. | LC | Indigenous |
| Orchidaceae | <i>Eulophia speciosa</i> | (R.Br. ex Lindl.) Bolus | LC | Indigenous |
| Orchidaceae | <i>Eulophia streptopetala</i> | Lindl. | LC | Indigenous |
| Orchidaceae | <i>Eulophia tenella</i> | Rchb.f. | LC | Indigenous |
| Euphorbiaceae | <i>Euphorbia cupularis</i> | Boiss. | LC | Indigenous |
| Euphorbiaceae | <i>Euphorbia grandidens</i> | Haw. | LC | Indigenous |
| Euphorbiaceae | <i>Euphorbia heterophylla</i> | L. | NE | Not- Indigenous; Naturalised |
| Euphorbiaceae | <i>Euphorbia hypericifolia</i> | L. | | Not- Indigenous; Naturalised |
| Euphorbiaceae | <i>Euphorbia indica</i> | Lam. | NE | Not- Indigenous; Naturalised |
| Euphorbiaceae | <i>Euphorbia ingens</i> | E.Mey. ex Boiss. | LC | Indigenous |
| Euphorbiaceae | <i>Euphorbia prostrata</i> | Aiton | NE | Not- Indigenous; Naturalised |
| Convolvulaceae | <i>Falkia oblonga</i> | Bernh. ex C.Krauss | | Indigenous |
| Asteraceae | <i>Felicia erigeroides</i> | DC. | LC | Indigenous; Endemic |
| Moraceae | <i>Ficus burtt-davyi</i> | Hutch. | LC | Indigenous |
| Moraceae | <i>Ficus capreifolia</i> | Delile | LC | Indigenous |
| Moraceae | <i>Ficus glumosa</i> | Delile | LC | Indigenous |
| Moraceae | <i>Ficus natalensis subsp. natalensis</i> | Hochst. | LC | Indigenous |
| Moraceae | <i>Ficus polita subsp. polita</i> | Vahl | LC | Indigenous |
| Moraceae | <i>Ficus thonningii</i> | Blume | | Indigenous |
| Moraceae | <i>Ficus trichopoda</i> | Baker | LC | Indigenous |
| Cyperaceae | <i>Fimbristylis ferruginea</i> | (L.) Vahl | LC | Indigenous |
| Fissidentaceae | <i>Fissidens borgenii</i> | Hampe | | Indigenous |
| Fissidentaceae | <i>Fissidens ovatus</i> | Brid. | | Indigenous |
| Fissidentaceae | <i>Fissidens submarginatus</i> | Bruch | | Indigenous |
| Flagellariaceae | <i>Flagellaria guineensis</i> | Schumach. | LC | Indigenous |
| Iridaceae | <i>Freesia laxa subsp. laxa</i> | (Thunb.) Goldblatt & J.C.Manning | LC | Indigenous |
| Cyperaceae | <i>Fuirena pubescens var. pubescens</i> | (Poir.) Kunth | LC | Indigenous |
| Funariaceae | <i>Funaria sp.</i> | | | |
| Asteraceae | <i>Gamochoeta subfalcata</i> | (Cabrera) Cabrera | | Not- Indigenous; Naturalised |

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|------------------|---|------------------------------------|----|-----------------------------|
| Rubiaceae | <i>Gardenia volkensii subsp. volkensii</i> | K.Schum. | NE | Indigenous |
| Geraniaceae | <i>Geranium flanaganii</i> | R.Knuth | LC | Indigenous |
| Asteraceae | <i>Gerbera piloselloides</i> | (L.) Cass. | LC | Indigenous |
| Iridaceae | <i>Gladiolus dalenii subsp. dalenii</i> | Van Geel | LC | Indigenous |
| Iridaceae | <i>Gladiolus papilio</i> | Hook.f. | LC | Indigenous |
| Colchicaceae | <i>Gloriosa superba</i> | L. | | Indigenous |
| Asteraceae | <i>Gnaphalium sp.</i> | | | |
| Apocynaceae | <i>Gomphocarpus physocarpus</i> | E.Mey. | LC | Indigenous |
| Malvaceae | <i>Grewia caffra</i> | Meisn. | LC | Indigenous |
| Malvaceae | <i>Grewia occidentalis var. occidentalis</i> | L. | LC | Indigenous |
| Fabaceae | <i>Guilandina bonduc</i> | L. | | Indigenous |
| Amaranthaceae | <i>Guilleminea densa</i> | (Willd. ex Roem. & Schult.) Moq. | | Not-Indigenous; Naturalised |
| Asteraceae | <i>Gymnanthemum capensis</i> | (A.Spreng.) J.C.Manning & Swelank. | | Indigenous |
| Celastraceae | <i>Gymnosporia arenicola</i> | Jordaan | LC | Indigenous |
| Celastraceae | <i>Gymnosporia buxifolia</i> | (L.) Szyszyl. | LC | Indigenous |
| Celastraceae | <i>Gymnosporia heterophylla</i> | (Eckl. & Zeyh.) Loes. | LC | Indigenous |
| Celastraceae | <i>Gymnosporia maranguensis</i> | (Loes.) Loes. | LC | Indigenous |
| Celastraceae | <i>Gymnosporia senegalensis</i> | (Lam.) Loes. | LC | Indigenous |
| Orchidaceae | <i>Habenaria pseudociliosa</i> | Schelpex J.C.Manning | LC | Indigenous |
| Amaryllidaceae | <i>Haemanthus albiflos</i> | Jacq. | LC | Indigenous; Endemic |
| Asteraceae | <i>Helianthus argophyllus</i> | Torr. & A.Gray | | Not-Indigenous; Naturalised |
| Asteraceae | <i>Helichrysum asperum var. comosum</i> | (Thunb.) Hilliard & B.L.Burt | LC | Indigenous; Endemic |
| Asteraceae | <i>Helichrysum aureonitens</i> | Sch.Bip. | LC | Indigenous |
| Asteraceae | <i>Helichrysum aureum var. monocephalum</i> | (Houtt.) Merr. | NE | Indigenous |
| Asteraceae | <i>Helichrysum cymosum subsp. cymosum</i> | (L.) D.Don | LC | Indigenous; Endemic |
| Asteraceae | <i>Helichrysum griseum</i> | Sond. | LC | Indigenous; Endemic |
| Asteraceae | <i>Helichrysum kraussii</i> | Sch.Bip. | LC | Indigenous |
| Asteraceae | <i>Helichrysum lepidissimum</i> | S.Moore | LC | Indigenous |
| Asteraceae | <i>Helichrysum longifolium</i> | DC. | LC | Indigenous |
| Asteraceae | <i>Helichrysum nudifolium var. oxyphyllum</i> | (L.) Less. | LC | Indigenous |
| Asteraceae | <i>Helichrysum panduratum var. panduratum</i> | O.Hoffm. | LC | Indigenous; Endemic |
| Brassicaceae | <i>Heliophila rigidiuscula</i> | Sond. | LC | Indigenous |
| Brassicaceae | <i>Heliophila scandens</i> | Harv. | LC | Indigenous; Endemic |
| Brassicaceae | <i>Heliophila subulata</i> | Burch. ex DC. | LC | Indigenous; Endemic |
| Poaceae | <i>Hemarthria altissima</i> | (Poir.) Stapf & C.E.Hubb. | LC | Indigenous |
| Heteropyxidaceae | <i>Heteropyxis natalensis</i> | Harv. | LC | Indigenous |
| Convolvulaceae | <i>Hewittia malabarica</i> | (L.) Suresh | LC | Indigenous |

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|----------------|---|-------------------------------------|----|---|
| Malvaceae | <i>Hibiscus calyphyllus</i> | Cav. | LC | Indigenous |
| Malvaceae | <i>Hibiscus diversifolius</i> subsp. <i>diversifolius</i> | Jacq. | LC | Indigenous |
| Malvaceae | <i>Hibiscus engleri</i> | K.Schum. | LC | Indigenous |
| Malvaceae | <i>Hibiscus fuscus</i> | Garcke | LC | Indigenous |
| Malvaceae | <i>Hibiscus pusillus</i> | Thunb. | LC | Indigenous |
| Malvaceae | <i>Hibiscus surattensis</i> | L. | LC | Indigenous |
| Malvaceae | <i>Hibiscus trionum</i> | L. | | Not-Indigenous; Naturalised |
| Malvaceae | <i>Hibiscus vitifolius</i> | L. | | Indigenous |
| Malvaceae | <i>Hibiscus vitifolius</i> subsp. <i>vitifolius</i> | L. | LC | Indigenous |
| Petiveriaceae | <i>Hillieria latifolia</i> | (Lam.) H.Walter | LC | Indigenous |
| Asteraceae | <i>Hilliardiella capensis</i> | (Houtt.) H.Rob., Skvarla & V.A.Funk | | Indigenous |
| Sapindaceae | <i>Hippobromus pauciflorus</i> | (L.f.) Radlk. | | Indigenous |
| Araliaceae | <i>Hydrocotyle bonariensis</i> | Lam. | LC | Indigenous |
| Poaceae | <i>Hyparrhenia filipendula</i> var. <i>filipendula</i> | (Hochst.) Stapf | LC | Indigenous |
| Poaceae | <i>Hyparrhenia hirta</i> | (L.) Stapf | LC | Indigenous |
| Acanthaceae | <i>Hypoestes aristata</i> var. <i>aristata</i> | (Vahl) Sol. ex Roem. & Schult. | | Indigenous |
| Acanthaceae | <i>Hypoestes forskalii</i> | (Vahl) R.Br. | | Indigenous |
| Hypoxidaceae | <i>Hypoxis angustifolia</i> var. <i>angustifolia</i> | Lam. | LC | Indigenous |
| Hypoxidaceae | <i>Hypoxis hemerocallidea</i> | Fisch., C.A.Mey. & Ave-Lall. | LC | Indigenous |
| Hypoxidaceae | <i>Hypoxis</i> sp. | | | |
| Poaceae | <i>Imperata cylindrica</i> | (L.) Raeusch. | LC | Indigenous |
| Fabaceae | <i>Indigofera crebra</i> | N.E.Br. | LC | Indigenous |
| Fabaceae | <i>Indigofera hendecaphylla</i> | Jacq. | LC | Indigenous |
| Fabaceae | <i>Indigofera hilaris</i> var. <i>hilaris</i> | Eckl. & Zeyh. | LC | Indigenous |
| Fabaceae | <i>Indigofera inhambanensis</i> | Klotzsch | LC | Indigenous |
| Fabaceae | <i>Indigofera tristis</i> | E.Mey. | LC | Indigenous |
| Convolvulaceae | <i>Ipomoea alba</i> | L. | | Not-Indigenous; Naturalised; Invasive |
| Convolvulaceae | <i>Ipomoea albivenia</i> | (Lindl.) Sweet | LC | Indigenous |
| Convolvulaceae | <i>Ipomoea crassipes</i> var. <i>crassipes</i> | Hook. | LC | Indigenous |
| Convolvulaceae | <i>Ipomoea ficifolia</i> | Lindl. | LC | Indigenous |
| Convolvulaceae | <i>Ipomoea indica</i> | (Burm.f.) Merr. | | Not-Indigenous; Naturalised; Invasive |
| Convolvulaceae | <i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> | (L.) R.Br. | LC | Indigenous |
| Acanthaceae | <i>Isoglossa woodii</i> | C.B.Clarke | | Indigenous; Endemic |
| Cyperaceae | <i>Isolepis prolifera</i> | (Rottb.) R.Br. | LC | Indigenous |
| Oleaceae | <i>Jasminum streptopus</i> var. <i>streptopus</i> | E.Mey. | LC | Indigenous |
| Euphorbiaceae | <i>Jatropha curcas</i> | L. | NE | Not-Indigenous; Cultivated; Naturalised; Invasive |

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|----------------|--|-----------------------------|----|--|
| Juncaceae | <i>Juncus lomatophyllus</i> | Spreng. | LC | Indigenous |
| Acanthaceae | <i>Justicia betonica</i> | L. | | Indigenous |
| Acanthaceae | <i>Justicia campylostemon</i> | (Nees) T.Anderson | | Indigenous |
| Acanthaceae | <i>Justicia flava</i> | (Vahl) Vahl | | Indigenous |
| Acanthaceae | <i>Justicia petiolaris subsp. petiolaris</i> | (Nees) T.Anderson | | Indigenous |
| Crassulaceae | <i>Kalanchoe rotundifolia</i> | (Haw.) Haw. | | Indigenous |
| Bignoniaceae | <i>Kigelia africana</i> | (Lam.) Benth. | LC | Indigenous |
| Asphodelaceae | <i>Kniphofia littoralis</i> | Codd | NT | Indigenous; Endemic |
| Rubiaceae | <i>Kohautia amatymbica</i> | Eckl. & Zeyh. | LC | Indigenous |
| Rubiaceae | <i>Kraussia floribunda</i> | Harv. | LC | Indigenous |
| Cyperaceae | <i>Kyllinga elatior</i> | Kunth | LC | Indigenous |
| Cyperaceae | <i>Kyllinga melanosperma</i> | Nees | LC | Indigenous |
| Apocynaceae | <i>Landolphia kirkii</i> | Dyer ex Hook.f. | LC | Indigenous |
| Verbenaceae | <i>Lantana camara</i> | L. | | Not-Indigenous; Cultivated; Naturalised; Invasive |
| Verbenaceae | <i>Lantana rugosa</i> | Thunb. | | Indigenous |
| Urticaceae | <i>Laportea grossa</i> | (Wedd.) Chew | | Indigenous; Endemic |
| Thymelaeaceae | <i>Lasiosiphon kraussianus</i> | (Meisn.) Meisn. | | Indigenous |
| Asteraceae | <i>Launaea sarmentosa</i> | (Willd.) Sch.Bip. ex Kuntze | LC | Indigenous |
| Celastraceae | <i>Lauridia tetragona</i> | (L.f.) R.H.Archer | LC | Indigenous |
| Hyacinthaceae | <i>Ledebouria petiolata</i> | J.C.Manning & Goldblatt | | Indigenous |
| Hyacinthaceae | <i>Ledebouria sp.</i> | | | |
| Brassicaceae | <i>Lepidium bonariense</i> | L. | | Not-Indigenous; Naturalised |
| Polypodiaceae | <i>Lepisorus schraderi</i> | (Mett.) Ching | LC | Indigenous |
| Limeaceae | <i>Limeum viscosum subsp. viscosum</i> | (J.Gay) Fenzl | NE | Indigenous |
| Limeaceae | <i>Limeum viscosum subsp. viscosum</i> | (J.Gay) Fenzl | NE | Indigenous |
| Plantaginaceae | <i>Linaria vulgaris</i> | Mill. | NE | Not-Indigenous; Naturalised; Invasive |
| Linderniaceae | <i>Lindernia parviflora</i> | (Roxb.) Haines | LC | Indigenous |
| Lindsaeaceae | <i>Lindsaea ensifolia</i> | Sw. | | Indigenous |
| Cyperaceae | <i>Lipocarpa chinensis</i> | (Osbeck) J.Kern | LC | Indigenous |
| Lobeliaceae | <i>Lobelia anceps</i> | L.f. | LC | Indigenous |
| Fabaceae | <i>Lotononis dichiloides</i> | Sond. | CR | Indigenous; Endemic |
| Polypodiaceae | <i>Loxogramme abyssinica</i> | (Baker) M.G.Price | LC | Indigenous |
| Onagraceae | <i>Ludwigia octovalvis</i> | (Jacq.) P.H.Raven | LC | Indigenous |
| Solanaceae | <i>Lycium acutifolium</i> | E.Mey. ex Dunal | LC | Indigenous; Endemic |
| Fabaceae | <i>Macrotyloma axillare var. axillare</i> | (E.Mey.) Verdc. | LC | Indigenous |
| Capparaceae | <i>Maerua cafra</i> | (DC.) Pax | LC | Indigenous |
| Capparaceae | <i>Maerua nervosa</i> | (Hochst.) Oliv. | LC | Indigenous; Endemic |

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|------------------|--|----------------------------|----|---------------------------------------|
| Capparaceae | <i>Maerua racemulosa</i> | (A.DC.) Gilg & Gilg-Ben. | LC | Indigenous |
| Capparaceae | <i>Maerua rosmarinoides</i> | (Sond.) Gilg & Gilg-Ben. | LC | Indigenous |
| Celastraceae | <i>Maytenus acuminata var. acuminata</i> | (L.f.) Loes. | LC | Indigenous |
| Celastraceae | <i>Maytenus procumbens</i> | (L.f.) Loes. | LC | Indigenous |
| Celastraceae | <i>Maytenus undata</i> | (Thunb.) Blakelock | LC | Indigenous |
| Dryopteridaceae | <i>Megalastrum lanuginosum</i> | (Willd. ex Kaulf.) Holttum | | Indigenous |
| Asteraceae | <i>Melanthera biflora</i> | (L.) Wild | | Not-Indigenous; Naturalised |
| Poaceae | <i>Melinis repens subsp. repens</i> | (Willd.) Zizka | LC | Indigenous |
| Aizoaceae | <i>Mesembryanthemum cordifolium</i> | L.f. | | Indigenous; Endemic |
| Asteraceae | <i>Microglossa mespilifolia</i> | (Less.) B.L.Rob. | LC | Indigenous; Endemic |
| Polypodiaceae | <i>Microgramma mauritiana</i> | (Willd.) Tardieu | LC | Indigenous |
| Polypodiaceae | <i>Microsorium punctatum</i> | (L.) Copel. | LC | Indigenous |
| Polypodiaceae | <i>Microsorium scolopendria</i> | (Burm.f.) Copel. | LC | Indigenous |
| Fabaceae | <i>Millettia grandis</i> | (E.Mey.) Skeels | LC | Indigenous; Endemic |
| Fabaceae | <i>Mimosa pudica var. hispida</i> | L. | NE | Not-Indigenous; Naturalised |
| Sapotaceae | <i>Mimusops caffra</i> | E.Mey. ex A.DC. | LC | Indigenous |
| Sapotaceae | <i>Mimusops obovata</i> | Nees ex Sond. | LC | Indigenous |
| Rubiaceae | <i>Mitriostigma axillare</i> | Hochst. | LC | Indigenous; Endemic |
| Rubiaceae | <i>Mitriostigma sp.</i> | | | |
| Cucurbitaceae | <i>Momordica balsamina</i> | L. | LC | Indigenous |
| Annonaceae | <i>Monanthes affra</i> | (Sond.) Verdc. | | Indigenous |
| Geraniaceae | <i>Monsonia praemorsa</i> | E.Mey. ex R.Knuth | LC | Indigenous; Endemic |
| Iridaceae | <i>Moraea spathulata</i> | (L.f.) Klatt | LC | Indigenous |
| Myricaceae | <i>Morella brevifolia</i> | (E.Mey. ex C.DC.) Killick | | Indigenous; Endemic |
| Fabaceae | <i>Mucuna gigantea subsp. gigantea</i> | (Willd.) DC. | LC | Indigenous |
| Orchidaceae | <i>Mystacidium capense</i> | (L.f.) Schltr. | LC | Indigenous |
| Orchidaceae | <i>Mystacidium gracile</i> | Harv. | LC | Indigenous |
| Orchidaceae | <i>Mystacidium pusillum</i> | Harv. | LC | Indigenous; Endemic |
| Scrophulariaceae | <i>Nemesia denticulata</i> | (Benth.) Grant ex Fourc. | LC | Indigenous; Endemic |
| Fabaceae | <i>Neonotonia wightii</i> | (Wight ex Arn.) J.A.Lackey | LC | Indigenous |
| Lythraceae | <i>Nesaea radicans var. floribunda</i> | Guill. & Perr. | | Indigenous |
| Asteraceae | <i>Nidorella auriculata</i> | DC. | LC | Indigenous |
| Alliaceae | <i>Nothoscordum gracile</i> | (Aiton) Stearn | | Not-Indigenous; Naturalised; Invasive |
| Nymphaeaceae | <i>Nymphaea lotus</i> | L. | | Indigenous |
| Nymphaeaceae | <i>Nymphaea mexicana</i> | Zucc. | | Not-Indigenous; Cultivated; |

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|-----------------|--|-------------------------------|----|---|
| | | | | Naturalised; Invasive |
| Ochnaceae | <i>Ochna natalitia</i> | (Meisn.) Walp. | LC | Indigenous |
| Ochnaceae | <i>Ochna serrulata</i> | (Hochst.) Walp. | LC | Indigenous |
| Lamiaceae | <i>Ocimum obovatum subsp. obovatum</i> | E.Mey. ex Benth. | NE | Indigenous |
| Gigaspermaceae | <i>Oedipodiella australis</i> | (Wager & Dixon) Dixon | | Indigenous |
| Onagraceae | <i>Oenothera drummondii subsp. drummondii</i> | Hook. | | Not- Indigenous; Naturalised; Invasive |
| Rubiaceae | <i>Oldenlandia corymbosa var. caespitosa</i> | L. | LC | Indigenous |
| Oleaceae | <i>Olea capensis subsp. enervis</i> | L. | LC | Indigenous |
| Oleaceae | <i>Olea woodiana subsp. woodiana</i> | Knobl. | LC | Indigenous |
| Loranthaceae | <i>Oncocalyx bolusii</i> | (Sprague) Wiens & Polhill | | Indigenous |
| Ophioglossaceae | <i>Ophioglossum reticulatum</i> | L. | LC | Indigenous |
| Poaceae | <i>Oplismenus undulatifolius</i> | (Ard.) Roem. & Schult. | LC | Indigenous |
| Hyacinthaceae | <i>Ornithogalum tenuifolium subsp. tenuifolium</i> | F.Delaroche | | Indigenous |
| Orchidaceae | <i>Orthochilus ensatus</i> | (Lindl.) Bytebier | | Indigenous |
| Orchidaceae | <i>Orthochilus odontoglossus</i> | (Rchb.f.) Bytebier | | Indigenous |
| Lamiaceae | <i>Orthosiphon suffrutescens</i> | (Thonn.) J.K.Morton | LC | Indigenous |
| Asteraceae | <i>Osteospermum grandidentatum</i> | DC. | LC | Indigenous |
| Asteraceae | <i>Osteospermum moniliferum subsp. rotundatum</i> | L. | LC | Indigenous |
| Santalaceae | <i>Osyridicarpus schimperianus</i> | (Hochst. ex A.Rich.) A.DC. | LC | Indigenous |
| Oxalidaceae | <i>Oxalis corniculata</i> | L. | | Not- Indigenous; Naturalised; Invasive |
| Oxalidaceae | <i>Oxalis semiloba subsp. semiloba</i> | Sond. | LC | Indigenous |
| Polygonaceae | <i>Oxygonum dregeanum subsp. dregeanum</i> | Meisn. | LC | Indigenous; Endemic |
| Apocynaceae | <i>Pachycarpus asperifolius</i> | Meisn. | LC | Indigenous |
| Rubiaceae | <i>Pachystigma latifolium</i> | Sond. | LC | Indigenous |
| Poaceae | <i>Panicum aequinerve</i> | Nees | LC | Indigenous |
| Poaceae | <i>Panicum deustum</i> | Thunb. | LC | Indigenous |
| Poaceae | <i>Panicum laticomum</i> | Nees | LC | Indigenous |
| Poaceae | <i>Panicum maximum</i> | Jacq. | LC | Indigenous |
| Asteraceae | <i>Parthenium hysterophorus</i> | L. | | Not- Indigenous; Naturalised; Invasive |
| Asteraceae | <i>Parthenium sp.</i> | | | |
| Poaceae | <i>Paspalum distichum</i> | L. | LC | Indigenous |
| Poaceae | <i>Paspalum scrobiculatum</i> | L. | LC | Indigenous |
| Poaceae | <i>Paspalum urvillei</i> | Steud. | NE | Not- Indigenous; Naturalised |
| Rubiaceae | <i>Pavetta capensis subsp. komghensis</i> | (Houtt.) Bremek. | LC | Indigenous; Endemic |
| Rubiaceae | <i>Pavetta galpinii</i> | Bremek. | LC | Indigenous |

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|------------------|--|-----------------------------------|----|--|
| Rubiaceae | <i>Pavetta revoluta</i> | Hochst. | LC | Indigenous |
| Malvaceae | <i>Pavonia burchellii</i> | (DC.) R.A.Dyer | LC | Indigenous |
| Malvaceae | <i>Pavonia dregei</i> | Garcke | LC | Indigenous; Endemic |
| Thymelaeaceae | <i>Peddiea africana</i> | Harv. | LC | Indigenous |
| Loranthaceae | <i>Pedistylis galpinii</i> | (Schinz ex Sprague) Wiens | LC | Indigenous |
| Geraniaceae | <i>Pelargonium alchemilloides</i> | (L.) L'Her. | LC | Indigenous |
| Geraniaceae | <i>Pelargonium pulverulentum</i> | Colvill ex Sweet | LC | Indigenous; Endemic |
| Poaceae | <i>Pennisetum unisetum</i> | (Nees) Benth. | LC | Indigenous |
| Rubiaceae | <i>Pentanisia prunelloides subsp. prunelloides</i> | (Klotzsch ex Eckl. & Zeyh.) Walp. | LC | Indigenous |
| Polygonaceae | <i>Persicaria decipiens</i> | (R.Br.) K.L.Wilson | LC | Indigenous |
| Polygonaceae | <i>Persicaria lapathifolia</i> | (L.) Delarbre | | Not-Indigenous; Naturalised |
| Poaceae | <i>Phalaris aquatica</i> | L. | NE | Not-Indigenous; Naturalised |
| Acanthaceae | <i>Phaulopsis imbricata subsp. imbricata</i> | (Forssk.) Sweet | | Indigenous |
| Bartramiaceae | <i>Philonotis hastata</i> | (Duby) Wijk & Margad. | | Indigenous |
| Poaceae | <i>Phragmites australis</i> | (Cav.) Steud. | LC | Indigenous |
| Verbenaceae | <i>Phyla nodiflora var. nodiflora</i> | (L.) Greene | | Not-Indigenous; Naturalised |
| Phyllanthaceae | <i>Phyllanthus fraternus</i> | G.L.Webster | NE | Not-Indigenous; Naturalised |
| Phyllanthaceae | <i>Phyllanthus parvulus var. garipensis</i> | Sond. | LC | Indigenous |
| Solanaceae | <i>Physalis viscosa</i> | L. | | Not-Indigenous; Naturalised; Invasive |
| Phytolaccaceae | <i>Phytolacca dodecandra</i> | L'Her. | LC | Indigenous |
| Phytolaccaceae | <i>Phytolacca heptandra</i> | Retz. | LC | Indigenous |
| Nyctaginaceae | <i>Pisonia aculeata</i> | L. | LC | Indigenous |
| Araceae | <i>Pistia stratiotes</i> | L. | | Not-Indigenous; Cultivated; Naturalised; Invasive |
| Plantaginaceae | <i>Plantago major</i> | L. | | Not-Indigenous; Naturalised |
| Lamiaceae | <i>Plectranthus petiolaris</i> | E.Mey. ex Benth. | LC | Indigenous; Endemic |
| Lamiaceae | <i>Plectranthus verticillatus</i> | (L.f.) Druce | LC | Indigenous |
| Plumbaginaceae | <i>Plumbago zeylanica</i> | L. | | Not-Indigenous; Naturalised |
| Thelypteridaceae | <i>Pneumatopteris unita</i> | (Kunze) Holttum | LC | Indigenous |
| Polygalaceae | <i>Polygala serpentaria</i> | Eckl. & Zeyh. | LC | Indigenous |
| Pontederiaceae | <i>Pontederia cordata</i> | L. | | Not-Indigenous; Naturalised |

| | | | | |
|------------------|--|---|----|---------------------------------------|
| Potamogetonaceae | <i>Potamogeton crispus</i> | L. | LC | Indigenous |
| Potamogetonaceae | <i>Potamogeton octandrus</i> | Poir. | LC | Indigenous |
| Potamogetonaceae | <i>Potamogeton pectinatus</i> | L. | LC | Indigenous |
| Potamogetonaceae | <i>Potamogeton pusillus</i> | L. | LC | Indigenous |
| Celastraceae | <i>Pristimera bojeri</i> | (Tul.) N.Halle | | Indigenous |
| Verbenaceae | <i>Priva adhaerens</i> | (Forssk.) Chiov. | | Indigenous |
| Verbenaceae | <i>Priva flabelliformis</i> | (Moldenke) R.Fern. | | Indigenous |
| Verbenaceae | <i>Priva meyeri var. meyeri</i> | Jaub. & Spach | | Indigenous |
| Poaceae | <i>Prospytochloa prehensilis</i> | (Nees) Schweick. | LC | Indigenous |
| Proteaceae | <i>Protea caffra subsp. caffra</i> | Meisn. | LC | Indigenous |
| Proteaceae | <i>Protea roupelliae</i> | Meisn. | | Indigenous |
| Proteaceae | <i>Protea roupelliae subsp. roupelliae</i> | Meisn. | LC | Indigenous |
| Proteaceae | <i>Protea welwitschii</i> | Engl. | LC | Indigenous |
| Anacardiaceae | <i>Protorhus longifolia</i> | (Bernh.) Engl. | LC | Indigenous |
| Poaceae | <i>Pseudechinolaena polystachya</i> | (Kunth) Stapf | LC | Indigenous |
| Asteraceae | <i>Pseudopegolettia thodei</i> | (E.Phillips) H.Rob., Skvarla & V.A.Funk | | Indigenous; Endemic |
| Myrtaceae | <i>Psidium guajava</i> | L. | | Not-Indigenous; Naturalised; Invasive |
| Amaranthaceae | <i>Psilotrichum scleranthum</i> | Thwaites | LC | Indigenous |
| Rubiaceae | <i>Psychotria capensis subsp. capensis</i> | (Eckl.) Vatke | NE | Indigenous |
| Rubiaceae | <i>Psydrax obovata subsp. obovata</i> | (Eckl. & Zeyh.) Bridson | LC | Indigenous |
| Celastraceae | <i>Pterocelastrus echinatus</i> | N.E.Br. | LC | Indigenous |
| Amaranthaceae | <i>Pupalia lappacea var. lappacea</i> | (L.) A.Juss. | LC | Indigenous |
| Celastraceae | <i>Putterlickia verrucosa</i> | (E.Mey. ex Sond.) Szyszyl. | LC | Indigenous |
| Cyperaceae | <i>Pycreus mundii</i> | Nees | LC | Indigenous |
| Cyperaceae | <i>Pycreus nitidus</i> | (Lam.) J.Raynal | LC | Indigenous |
| Cyperaceae | <i>Pycreus polystachyos var. polystachyos</i> | (Rottb.) P.Beauv. | LC | Indigenous |
| Icacinaceae | <i>Pyrenacantha scandens</i> | Planch. ex Harv. | LC | Indigenous |
| Combretaceae | <i>Quisqualis parviflora</i> | Gerrard ex Sond. | LC | Indigenous; Endemic |
| Ranunculaceae | <i>Ranunculus multifidus</i> | Forssk. | LC | Indigenous |
| Apocynaceae | <i>Raphionacme galpinii</i> | Schltr. | LC | Indigenous |
| Achariaceae | <i>Rawsonia lucida</i> | Harv. & Sond. | LC | Indigenous |
| Vitaceae | <i>Rhoicissus digitata</i> | (L.f.) Gilg & M.Brandt | | Indigenous |
| Vitaceae | <i>Rhoicissus revoilii</i> | Planch. | | Indigenous |
| Vitaceae | <i>Rhoicissus rhomboidea</i> | (E.Mey. ex Harv.) Planch. | | Indigenous |
| Vitaceae | <i>Rhoicissus tomentosa</i> | (Lam.) Wild & R.B.Drumm. | | Indigenous |
| Vitaceae | <i>Rhoicissus tridentata subsp. cuneifolia</i> | (L.f.) Wild & R.B.Drumm. | | Indigenous |
| Fabaceae | <i>Rhynchosia caribaea</i> | (Jacq.) DC. | LC | Indigenous |
| Fabaceae | <i>Rhynchosia harveyi</i> | Eckl. & Zeyh. | LC | Indigenous; Endemic |

| | | | | |
|-----------------|---|----------------------------------|----|---|
| Fabaceae | <i>Rhynchosia minima var. prostrata</i> | (L.) DC. | NE | Indigenous |
| Fabaceae | <i>Rhynchosia nervosa var. nervosa</i> | Benth. ex Harv. | LC | Indigenous |
| Fabaceae | <i>Rhynchosia sordida</i> | (E.Mey.) Schinz | LC | Indigenous |
| Fabaceae | <i>Rhynchosia sp.</i> | | | |
| Fabaceae | <i>Rhynchosia totta var. totta</i> | (Thunb.) DC. | LC | Indigenous |
| Aneuraceae | <i>Riccardia compacta</i> | (Steph.) S.W.Arnell | | Indigenous |
| Ricciaceae | <i>Riccia stricta</i> | (Lindenb.) Perold | | Indigenous |
| Rubiaceae | <i>Richardia brasiliensis</i> | Gomes | NE | Not-Indigenous; Naturalised |
| Euphorbiaceae | <i>Ricinus communis</i> | L. | | Not-Indigenous; Naturalised; Invasive |
| Apocynaceae | <i>Riocreuxia torulosa</i> | Decne. | | Indigenous |
| Petiveriaceae | <i>Rivina humilis</i> | L. | | Not-Indigenous; Naturalised; Invasive |
| Lamiaceae | <i>Rothea caerulea</i> | (N.E.Br.) P.P.J.Herman & Retief | | Indigenous; Endemic |
| Lamiaceae | <i>Rothea cuneiformis</i> | (Moldenke) P.P.J.Herman & Retief | | Indigenous; Endemic |
| Lamiaceae | <i>Rothea myricoides</i> | (Hochst.) Steane & Mabb. | | Indigenous |
| Rubiaceae | <i>Rothmannia globosa</i> | (Hochst.) Keay | LC | Indigenous |
| Poaceae | <i>Rottboellia cochinchinensis</i> | (Lour.) Clayton | LC | Indigenous |
| Rubiaceae | <i>Rubia cordifolia subsp. conotricha</i> | L. | LC | Indigenous |
| Rosaceae | <i>Rubus rigidus</i> | Sm. | LC | Indigenous |
| Rosaceae | <i>Rubus rosifolius</i> | Sm. | | Not-Indigenous; Naturalised |
| Polygonaceae | <i>Rumex acetosella subsp. angiocarpus</i> | L. | | Not-Indigenous; Naturalised |
| Polygonaceae | <i>Rumex rhodesius</i> | Rech.f. | LC | Indigenous |
| Polygonaceae | <i>Rumex sagittatus</i> | Thunb. | LC | Indigenous |
| Polygonaceae | <i>Rumex woodii</i> | N.E.Br. | LC | Indigenous |
| Poaceae | <i>Sacciolepis curvata</i> | (L.) Chase | LC | Indigenous |
| Theophrastaceae | <i>Samolus valerandi</i> | L. | LC | Indigenous |
| Orchidaceae | <i>Satyrium hallackii subsp. ocellatum</i> | Bolus | LC | Indigenous |
| Dipsacaceae | <i>Scabiosa columbaria</i> | L. | LC | Indigenous |
| Amaryllidaceae | <i>Scadoxus membranaceus</i> | (Baker) Friis & Nordal | LC | Indigenous; Endemic |
| Amaryllidaceae | <i>Scadoxus multiflorus subsp. katharinae</i> | (Martyn) Raf. | LC | Indigenous |
| Amaryllidaceae | <i>Scadoxus puniceus</i> | (L.) Friis & Nordal | LC | Indigenous |
| Goodeniaceae | <i>Scaevola plumieri</i> | (L.) Vahl | | Indigenous |
| Anacardiaceae | <i>Schinus terebinthifolius</i> | Raddi | NE | Not-Indigenous; Cultivated; Naturalised; Invasive |
| Asteraceae | <i>Schistostephium rotundifolium</i> | (DC.) Fenzl ex Harv. | LC | Indigenous |

| | | | | |
|------------------|---|------------------------------------|----|-----------------------------|
| Apocynaceae | <i>Schizoglossum cordifolium</i> | E.Mey. | LC | Indigenous |
| Cyperaceae | <i>Schoenoplectus scirpoides</i> | (Schrad.) Browning | LC | Indigenous |
| Fabaceae | <i>Schotia brachypetala</i> | Sond. | LC | Indigenous |
| Oleaceae | <i>Schrebera alata</i> | (Hochst.) Welw. | LC | Indigenous |
| Euphorbiaceae | <i>Sclerocroton integerrimus</i> | Hochst. | | Indigenous |
| Salicaceae | <i>Scolopia mundii</i> | (Eckl. & Zeyh.) Warb. | LC | Indigenous |
| Salicaceae | <i>Scolopia zeyheri</i> | (Nees) Harv. | LC | Indigenous |
| Plantaginaceae | <i>Scoparia dulcis</i> | L. | NE | Not-Indigenous; Naturalised |
| Rhamnaceae | <i>Scutia myrtina</i> | (Burm.f.) Kurz | LC | Indigenous |
| Anacardiaceae | <i>Searsia chirindensis</i> | (Baker f.) Moffett | | Indigenous |
| Anacardiaceae | <i>Searsia dentata</i> | (Thunb.) F.A.Barkley | | Indigenous |
| Anacardiaceae | <i>Searsia natalensis</i> | (Bernh. ex C.Krauss) F.A.Barkley | | Indigenous |
| Anacardiaceae | <i>Searsia nebulosa forma nebulosa</i> | (Schonland) Moffett | | Indigenous; Endemic |
| Anacardiaceae | <i>Searsia pallens</i> | (Eckl. & Zeyh.) Moffett | | Indigenous |
| Anacardiaceae | <i>Searsia pyroides var. integrifolia</i> | (Burch.) Moffett | | Indigenous |
| Gentianaceae | <i>Sebaea filiformis</i> | Schinz | LC | Indigenous |
| Gentianaceae | <i>Sebaea sedoides var. schoenlandii</i> | Gilg | LC | Indigenous |
| Apocynaceae | <i>Secamone alpini</i> | Schult. | LC | Indigenous |
| Apocynaceae | <i>Secamone filiformis</i> | (L.f.) J.H.Ross | LC | Indigenous |
| Apocynaceae | <i>Secamone gerrardii</i> | Harv. ex Benth. | LC | Indigenous |
| Scrophulariaceae | <i>Selago peduncularis</i> | E.Mey. | LC | Indigenous; Endemic |
| Scrophulariaceae | <i>Selago tarachodes</i> | Hilliard | LC | Indigenous; Endemic |
| Asteraceae | <i>Senecio bupleuroides</i> | DC. | LC | Indigenous |
| Asteraceae | <i>Senecio chrysocoma</i> | Meerb. | LC | Indigenous; Endemic |
| Asteraceae | <i>Senecio coronatus</i> | (Thunb.) Harv. | LC | Indigenous |
| Asteraceae | <i>Senecio inaequidens</i> | DC. | LC | Indigenous |
| Asteraceae | <i>Senecio inornatus</i> | DC. | LC | Indigenous |
| Asteraceae | <i>Senecio madagascariensis</i> | Poir. | LC | Indigenous |
| Asteraceae | <i>Senecio oxyodontus</i> | DC. | LC | Indigenous; Endemic |
| Asteraceae | <i>Senecio pleistocephalus</i> | S.Moore | LC | Indigenous |
| Asteraceae | <i>Senecio polyanthemoides</i> | Sch.Bip. | LC | Indigenous |
| Asteraceae | <i>Senecio pterophorus</i> | DC. | LC | Indigenous |
| Asteraceae | <i>Senecio scoparius</i> | Harv. | LC | Indigenous |
| Asteraceae | <i>Senecio sp.</i> | | | |
| Asteraceae | <i>Senecio tamoides</i> | DC. | LC | Indigenous |
| Asteraceae | <i>Senecio variabilis</i> | Sch.Bip. | LC | Indigenous; Endemic |
| Fabaceae | <i>Senegalia ataxacantha</i> | (DC.) Kyal. & Boatwr. | LC | Indigenous |
| Fabaceae | <i>Senegalia kraussiana</i> | (Meisn. ex Benth.) Kyal. & Boatwr. | LC | Indigenous |
| Fabaceae | <i>Senegalia schweinfurthii var. schweinfurthii</i> | (Brenan & Exell) Seigler & Ebinger | LC | Indigenous |
| Fabaceae | <i>Senna hirsuta</i> | (L.) H.S.Irwin & Barneby | NE | Not-Indigenous; |

| | | | | |
|----------------|--|---|----|---|
| | | | | Naturalised; Invasive |
| Fabaceae | <i>Senna occidentalis</i> | (L.) Link | NE | Not- Indigenous; Naturalised; Invasive |
| Fabaceae | <i>Senna pendula var. glabrata</i> | (Willd.) H.S.Irwin & Barneby | NE | Not- Indigenous; Naturalised; Invasive |
| Fabaceae | <i>Sesbania bispinosa var. bispinosa</i> | (Jacq.) W.Wight | NE | Not- Indigenous; Naturalised |
| Poaceae | <i>Setaria incrassata</i> | (Hochst.) Hack. | LC | Indigenous |
| Poaceae | <i>Setaria lindenbergiana</i> | (Nees) Stapf | LC | Indigenous |
| Poaceae | <i>Setaria megaphylla</i> | (Steud.) T.Durand & Schinz | LC | Indigenous |
| Poaceae | <i>Setaria plicatilis</i> | (Hochst.) Hack. ex Engl. | LC | Indigenous |
| Poaceae | <i>Setaria sphacelata var. sphacelata</i> | (Schumach.) Stapf & C.E.Hubb. ex M.B.Moss | LC | Indigenous |
| Poaceae | <i>Setaria verticillata</i> | (L.) P.Beauv. | LC | Indigenous |
| Malvaceae | <i>Sida acuta subsp. acuta</i> | Burm.f. | LC | Indigenous |
| Malvaceae | <i>Sida rhombifolia</i> | L. | | Indigenous |
| Malvaceae | <i>Sida rhombifolia subsp. rhombifolia</i> | L. | LC | Indigenous |
| Sapotaceae | <i>Sideroxylon inerme subsp. inerme</i> | L. | LC | Indigenous |
| Apocynaceae | <i>Sisyranthus imberbis</i> | Harv. | LC | Indigenous |
| Apocynaceae | <i>Sisyranthus saundersiae</i> | N.E.Br. | LC | Indigenous; Endemic |
| Smilacaceae | <i>Smilax anceps</i> | Willd. | | Indigenous |
| Solanaceae | <i>Solanum aculeatissimum</i> | Jacq. | | Not- Indigenous; Naturalised |
| Solanaceae | <i>Solanum africanum</i> | Mill. | LC | Indigenous; Endemic |
| Solanaceae | <i>Solanum dasyphyllum</i> | Schumach. & Thonn. | | Indigenous |
| Solanaceae | <i>Solanum mauritianum</i> | Scop. | | Not- Indigenous; Naturalised; Invasive |
| Solanaceae | <i>Solanum umtuma</i> | Voronts. & S.Knapp | LC | Indigenous; Endemic |
| Asteraceae | <i>Sonchus dregeanus</i> | DC. | LC | Indigenous |
| Poaceae | <i>Sorghum bicolor subsp. arundinaceum</i> | (L.) Moench | LC | Indigenous |
| Rubiaceae | <i>Spermacoce natalensis</i> | Hochst. | LC | Indigenous |
| Araceae | <i>Spirodela punctata</i> | (G.Mey.) C.H.Thomps. | | Indigenous |
| Euphorbiaceae | <i>Spirostachys africana</i> | Sond. | LC | Indigenous |
| Poaceae | <i>Sporobolus pyramidalis</i> | P.Beauv. | LC | Indigenous |
| Poaceae | <i>Sporobolus virginicus</i> | (L.) Kunth | LC | Indigenous |
| Lamiaceae | <i>Stachys aethiopica</i> | L. | LC | Indigenous |
| Lamiaceae | <i>Stachys natalensis var. natalensis</i> | Hochst. | LC | Indigenous |
| Blechnaceae | <i>Stenochlaena tenuifolia</i> | (Desv.) T.Moore | | Indigenous |
| Poaceae | <i>Stenotaphrum secundatum</i> | (Walter) Kuntze | LC | Indigenous |
| Strelitziaceae | <i>Strelitzia reginae</i> | Banks | | Indigenous |

| | | | | |
|----------------|---|--------------------------------|----|--|
| Gesneriaceae | <i>Streptocarpus gardenii</i> | Hook. | LC | Indigenous; Endemic |
| Loganiaceae | <i>Strychnos decussata</i> | (Pappe) Gilg | LC | Indigenous |
| Loganiaceae | <i>Strychnos gerrardii</i> | N.E.Br. | LC | Indigenous |
| Loganiaceae | <i>Strychnos henningsii</i> | Gilg | LC | Indigenous |
| Loganiaceae | <i>Strychnos madagascariensis</i> | Poir. | LC | Indigenous |
| Loganiaceae | <i>Strychnos usambarensis</i> | Gilg | LC | Indigenous |
| Araceae | <i>Stylochaeton natalensis</i> | Schott | LC | Indigenous |
| Fabaceae | <i>Stylosanthes fruticosa</i> | (Retz.) Alston | LC | Indigenous |
| Euphorbiaceae | <i>Suregada africana</i> | (Sond.) Kuntze | LC | Indigenous |
| Myrtaceae | <i>Syzygium cumini</i> | (L.) Skeels | | Not- Indigenous; Cultivated; Naturalised; Invasive |
| Bignoniaceae | <i>Tecomaria capensis</i> | (Thunb.) Spach | LC | Indigenous |
| Fabaceae | <i>Tephrosia macropoda</i> var. <i>macropoda</i> | (E.Mey.) Harv. | LC | Indigenous |
| Fabaceae | <i>Tephrosia polystachya</i> var. <i>hirta</i> | E.Mey. | LC | Indigenous |
| Fabaceae | <i>Tephrosia purpurea</i> subsp. <i>canescens</i> | (L.) Pers. | LC | Indigenous |
| Fabaceae | <i>Teramnus labialis</i> subsp. <i>labialis</i> | (L.f.) Spreng. | LC | Indigenous |
| Pilotrichaceae | <i>Thamniopsis utacamundiana</i> | (Mont.) W.R.Buck | | Indigenous |
| Poaceae | <i>Themeda triandra</i> | Forssk. | LC | Indigenous |
| Santalaceae | <i>Thesium</i> sp. | | | |
| Acanthaceae | <i>Thunbergia dregeana</i> | Nees | LC | Indigenous |
| Menispermaceae | <i>Tinospora caffra</i> | (Miers) Troupin | LC | Indigenous |
| Asteraceae | <i>Tithonia diversifolia</i> | (Hemsl.) A.Gray | | Not- Indigenous; Naturalised; Invasive |
| Commelinaceae | <i>Tradescantia fluminensis</i> | Vell. | | Not- Indigenous; Cultivated; Naturalised; Invasive |
| Euphorbiaceae | <i>Tragia glabrata</i> var. <i>glabrata</i> | (Mull.Arg.) Pax & K.Hoffm. | LC | Indigenous |
| Cannabaceae | <i>Trema orientalis</i> | (L.) Blume | LC | Indigenous |
| Rubiaceae | <i>Tricalysia capensis</i> var. <i>capensis</i> | (Meisn. ex Hochst.) Sim | LC | Indigenous |
| Meliaceae | <i>Trichilia emetica</i> subsp. <i>emetica</i> | Vahl | LC | Indigenous |
| Asteraceae | <i>Tridax procumbens</i> | L. | | Not- Indigenous; Naturalised |
| Juncaginaceae | <i>Triglochin striata</i> | Ruiz & Pav. | | Indigenous |
| Poaceae | <i>Tristachya leucothrix</i> | Trin. ex Nees | LC | Indigenous |
| Iridaceae | <i>Tritonia gladiolaris</i> | (Lam.) Goldblatt & J.C.Manning | LC | Indigenous |
| Malvaceae | <i>Triumfetta pilosa</i> var. <i>effusa</i> | Roth | NE | Indigenous |
| Malvaceae | <i>Triumfetta rhomboidea</i> var. <i>rhomboidea</i> | Jacq. | LC | Indigenous |
| Meliaceae | <i>Turraea floribunda</i> | Hochst. | LC | Indigenous |
| Meliaceae | <i>Turraea obtusifolia</i> | Hochst. | LC | Indigenous |
| Typhaceae | <i>Typha capensis</i> | (Rohrb.) N.E.Br. | | Indigenous |

| | | | | |
|------------------|---|----------------------------|----|---------------------------------------|
| Malvaceae | <i>Urena lobata subsp. lobata</i> | L. | | Not-Indigenous; Naturalised |
| Urticaceae | <i>Urera trinervis</i> | (Hochst.) Friis & Immelman | | Indigenous |
| Poaceae | <i>Urochloa panicoides</i> | P.Beauv. | LC | Indigenous |
| Lentibulariaceae | <i>Utricularia livida</i> | E.Mey. | LC | Indigenous |
| Annonaceae | <i>Uvaria caffra</i> | E.Mey. ex Sond. | | Indigenous |
| Fabaceae | <i>Vachellia gerrardii subsp. gerrardii</i> | (Benth.) P.J.H.Hurter | | Indigenous |
| Fabaceae | <i>Vachellia karroo</i> | (Hayne) Banfi & Galasso | LC | Indigenous |
| Fabaceae | <i>Vachellia robusta subsp. clavigera</i> | (Burch.) Kyal. & Boatwr. | LC | Indigenous |
| Rubiaceae | <i>Vangueria infausta subsp. infausta</i> | Burch. | LC | Indigenous |
| Rubiaceae | <i>Vangueria lasiantha</i> | (Sond.) Sond. | LC | Indigenous |
| Rubiaceae | <i>Vangueria randii subsp. chartacea</i> | S.Moore | LC | Indigenous |
| Rutaceae | <i>Vepris lanceolata</i> | (Lam.) G.Don | LC | Indigenous |
| Rutaceae | <i>Vepris reflexa</i> | I.Verd. | LC | Indigenous |
| Rutaceae | <i>Vepris trichocarpa</i> | (Engl.) Mziray | | Indigenous |
| Verbenaceae | <i>Verbena bonariensis</i> | L. | | Not-Indigenous; Naturalised; Invasive |
| Asteraceae | <i>Vernonella africana</i> | Sond. | EX | Indigenous; Endemic |
| Fabaceae | <i>Vigna luteola var. luteola</i> | (Jacq.) Benth. | LC | Indigenous |
| Fabaceae | <i>Vigna sp.</i> | | | |
| Fabaceae | <i>Vigna unguiculata subsp. protracta</i> | (L.) Walp. | LC | Indigenous |
| Fabaceae | <i>Vigna unguiculata subsp. tenuis</i> | (L.) Walp. | NE | Indigenous |
| Fabaceae | <i>Vigna unguiculata subsp. tenuis</i> | (L.) Walp. | NE | Indigenous; Endemic |
| Fabaceae | <i>Vigna unguiculata subsp. unguiculata</i> | (L.) Walp. | NE | Indigenous |
| Fabaceae | <i>Vigna vexillata var. vexillata</i> | (L.) A.Rich. | LC | Indigenous |
| Santalaceae | <i>Viscum obovatum</i> | Harv. | | Indigenous |
| Santalaceae | <i>Viscum sp.</i> | | | |
| Lamiaceae | <i>Vitex trifolia</i> | L. | | Not-Indigenous; Naturalised; Invasive |
| Lamiaceae | <i>Volkameria glabra</i> | (E.Mey.) Mabb. & Y.W.Yuan | LC | Indigenous |
| Campanulaceae | <i>Wahlenbergia grandiflora</i> | Brehmer | LC | Indigenous |
| Campanulaceae | <i>Wahlenbergia undulata</i> | (L.f.) A.DC. | LC | Indigenous |
| Malvaceae | <i>Waltheria indica</i> | L. | LC | Indigenous |
| Araceae | <i>Wolffia arrhiza</i> | (L.) Horkel ex Wimm. | | Indigenous |
| Achariaceae | <i>Xylothea kraussiana</i> | Hochst. | LC | Indigenous |
| Xyridaceae | <i>Xyris anceps var. anceps</i> | Lam. | | Indigenous |
| Apocynaceae | <i>Xysmalobium orbiculare</i> | (E.Mey.) D.Dietr. | LC | Indigenous |
| Rutaceae | <i>Zanthoxylum capense</i> | (Thunb.) Harv. | LC | Indigenous |
| Rhamnaceae | <i>Ziziphus mucronata subsp. mucronata</i> | Willd. | | Indigenous |
| Fabaceae | <i>Zornia capensis subsp. capensis</i> | Pers. | LC | Indigenous |

APPENDIX B: Avifaunal species expected to occur in the project area

| Species | Common Name | Conservation Status | |
|------------------------------------|---------------------------|------------------------|-------------|
| | | Regional (SANBI, 2016) | IUCN (2017) |
| <i>Accipiter melanoleucus</i> | Sparrowhawk, Black | Unlisted | LC |
| <i>Accipiter minullus</i> | Sparrowhawk, Little | Unlisted | LC |
| <i>Accipiter tachiro</i> | Goshawk, African | Unlisted | LC |
| <i>Acridotheres tristis</i> | Myna, Common | Unlisted | LC |
| <i>Acrocephalus arundinaceus</i> | Reed-warbler, Great | Unlisted | LC |
| <i>Acrocephalus baeticatus</i> | Reed-warbler, African | Unlisted | Unlisted |
| <i>Acrocephalus gracilirostris</i> | Swamp-warbler, Lesser | Unlisted | LC |
| <i>Acrocephalus palustris</i> | Warbler, Marsh | Unlisted | LC |
| <i>Acrocephalus schoenobaenus</i> | Warbler, Sedge | Unlisted | LC |
| <i>Actitis hypoleucos</i> | Sandpiper, Common | Unlisted | LC |
| <i>Actophilornis africanus</i> | Jacana, African | Unlisted | LC |
| <i>Agapornis roseicollis</i> | Lovebird, Rosy-faced | Unlisted | LC |
| <i>Alcedo cristata</i> | Kingfisher, Malachite | Unlisted | Unlisted |
| <i>Alcedo semitorquata</i> | Kingfisher, Half-collared | NT | LC |
| <i>Alopochen aegyptiacus</i> | Goose, Egyptian | Unlisted | LC |
| <i>Amadina erythrocephala</i> | Finch, Red-headed | Unlisted | LC |
| <i>Amandava subflava</i> | Waxbill, Orange-breasted | Unlisted | Unlisted |
| <i>Amaurornis flavirostris</i> | Crake, Black | Unlisted | LC |
| <i>Amblyospiza albifrons</i> | Weaver, Thick-billed | Unlisted | LC |
| <i>Anas capensis</i> | Teal, Cape | Unlisted | LC |
| <i>Anas erythrorhyncha</i> | Teal, Red-billed | Unlisted | LC |
| <i>Anas hottentota</i> | Teal, Hottentot | Unlisted | LC |
| <i>Anas smithii</i> | Shoveler, Cape | Unlisted | LC |
| <i>Anas sparsa</i> | Duck, African Black | Unlisted | LC |
| <i>Anas undulata</i> | Duck, Yellow-billed | Unlisted | LC |
| <i>Anastomus lamelligerus</i> | Openbill, African | Unlisted | LC |
| <i>Andropadus importunus</i> | Greenbul, Sombre | Unlisted | LC |
| <i>Anhinga rufa</i> | Darter, African | Unlisted | LC |
| <i>Anthus cinnamomeus</i> | Pipit, African | Unlisted | LC |
| <i>Anthus leucophrys</i> | Pipit, Plain-backed | Unlisted | LC |
| <i>Apalis flavida</i> | Apalis, Yellow-breasted | Unlisted | LC |
| <i>Apalis thoracica</i> | Apalis, Bar-throated | Unlisted | LC |
| <i>Apaloderma narina</i> | Trogon, Narina | Unlisted | LC |
| <i>Aplopelia larvata</i> | Dove, Lemon | Unlisted | LC |
| <i>Apus affinis</i> | Swift, Little | Unlisted | LC |
| <i>Apus apus</i> | Swift, Common | Unlisted | LC |
| <i>Apus barbatus</i> | Swift, African Black | Unlisted | LC |
| <i>Apus caffer</i> | Swift, White-rumped | Unlisted | LC |
| <i>Apus horus</i> | Swift, Horus | Unlisted | LC |
| <i>Aquila pennatus</i> | Eagle, Booted | Unlisted | LC |
| <i>Aquila wahlbergi</i> | Eagle, Wahlberg's | Unlisted | LC |

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| <i>Ardea cinerea</i> | Heron, Grey | Unlisted | LC |
| <i>Ardea goliath</i> | Heron, Goliath | Unlisted | LC |
| <i>Ardea melanocephala</i> | Heron, Black-headed | Unlisted | LC |
| <i>Ardea purpurea</i> | Heron, Purple | Unlisted | LC |
| <i>Ardeola ralloides</i> | Heron, Squacco | Unlisted | LC |
| <i>Arenaria interpres</i> | Turnstone, Ruddy | Unlisted | LC |
| <i>Balearica regulorum</i> | Crane, Grey Crowned | EN | EN |
| <i>Batis capensis</i> | Batis, Cape | Unlisted | LC |
| <i>Batis molitor</i> | Batis, Chinspot | Unlisted | LC |
| <i>Bostrychia hagedash</i> | Ibis, Hadedda | Unlisted | LC |
| <i>Bradypterus baboecala</i> | Rush-warbler, Little | Unlisted | LC |
| <i>Bradypterus barratti</i> | Warbler, Barratt's | Unlisted | LC |
| <i>Bubo africanus</i> | Eagle-owl, Spotted | Unlisted | LC |
| <i>Bubulcus ibis</i> | Egret, Cattle | Unlisted | LC |
| <i>Burhinus capensis</i> | Thick-knee, Spotted | Unlisted | LC |
| <i>Burhinus vermiculatus</i> | Thick-knee, Water | Unlisted | LC |
| <i>Buteo rufofuscus</i> | Buzzard, Jackal | Unlisted | LC |
| <i>Buteo vulpinus</i> | Buzzard, Common | Unlisted | Unlisted |
| <i>Butorides striata</i> | Heron, Green-backed | Unlisted | LC |
| <i>Bycanistes bucinator</i> | Hornbill, Trumpeter | Unlisted | LC |
| <i>Calidris alba</i> | Sanderling | Unlisted | LC |
| <i>Calidris ferruginea</i> | Sandpiper, Curlew | LC | NT |
| <i>Calidris minuta</i> | Stint, Little | LC | LC |
| <i>Camaroptera brachyura</i> | Camaroptera, Green-backed | Unlisted | LC |
| <i>Campephaga flava</i> | Cuckoo-shrike, Black | Unlisted | LC |
| <i>Campethera abingoni</i> | Woodpecker, Golden-tailed | Unlisted | LC |
| <i>Caprimulgus europaeus</i> | Nightjar, European | Unlisted | LC |
| <i>Caprimulgus pectoralis</i> | Nightjar, Fiery-necked | Unlisted | LC |
| <i>Catharacta antarctica</i> | Brown Skua | Unlisted | LC |
| <i>Centropus burchellii</i> | Coucal, Burchell's | Unlisted | Unlisted |
| <i>Centropus superciliosus</i> | Coucal, White-browed | Unlisted | LC |
| <i>Cercomela familiaris</i> | Chat, Familiar | Unlisted | LC |
| <i>Cercotrichas leucophrys</i> | Scrub-robin, White-browed | Unlisted | LC |
| <i>Cercotrichas signata</i> | Scrub Robin, Brown | Unlisted | LC |
| <i>Ceryle rudis</i> | Kingfisher, Pied | Unlisted | LC |
| <i>Ceuthmochares australis</i> | Malkoha, Green | Unlisted | LC |
| <i>Chalcomitra amethystina</i> | Sunbird, Amethyst | Unlisted | LC |
| <i>Chalcomitra senegalensis</i> | Sunbird, Scarlet-chested | Unlisted | LC |
| <i>Charadrius hiaticula</i> | Plover, Common Ringed | Unlisted | LC |
| <i>Charadrius marginatus</i> | Plover, White-fronted | Unlisted | LC |
| <i>Charadrius mongolus</i> | Plover, Lesser Sand | Unlisted | LC |
| <i>Charadrius pecuarius</i> | Plover, Kittlitz's | Unlisted | LC |
| <i>Charadrius tricollaris</i> | Plover, Three-banded | Unlisted | LC |
| <i>Chlidonias hybrida</i> | Tern, Whiskered | Unlisted | LC |
| <i>Chlidonias leucopterus</i> | Tern, White-winged | Unlisted | LC |

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| <i>Chlorocichla flaviventris</i> | Greenbul, Yellow-bellied | Unlisted | LC |
| <i>Chloropeta natalensis</i> | Warbler, Dark-capped Yellow | Unlisted | LC |
| <i>Chrysococcyx caprius</i> | Cuckoo, Diderick | Unlisted | LC |
| <i>Chrysococcyx cupreus</i> | Cuckoo, African Emerald | Unlisted | LC |
| <i>Chrysococcyx klaas</i> | Cuckoo, Klaas's | Unlisted | LC |
| <i>Ciconia episcopus</i> | Stork, Woolly-necked | Unlisted | VU |
| <i>Ciconia nigra</i> | Stork, Black | VU | LC |
| <i>Cinnyricinclus leucogaster</i> | Starling, Violet-backed | Unlisted | LC |
| <i>Cinnyris afer</i> | Sunbird, Greater Double-collared | Unlisted | LC |
| <i>Cinnyris bifasciatus</i> | Sunbird, Purple-banded | Unlisted | LC |
| <i>Cinnyris talatala</i> | Sunbird, White-bellied | Unlisted | LC |
| <i>Circaetus cinereus</i> | Snake-eagle, Brown | Unlisted | LC |
| <i>Circaetus pectoralis</i> | Snake-eagle, Black-chested | Unlisted | LC |
| <i>Circus ranivorus</i> | Marsh-harrier, African | EN | LC |
| <i>Cisticola aberrans</i> | Cisticola, Lazy | Unlisted | LC |
| <i>Cisticola ayresii</i> | Cisticola, Wing-snapping | Unlisted | LC |
| <i>Cisticola chiniana</i> | Cisticola, Rattling | Unlisted | LC |
| <i>Cisticola erythropus</i> | Cisticola, Red-faced | Unlisted | LC |
| <i>Cisticola fulvicapilla</i> | Neddicky, Neddicky | Unlisted | LC |
| <i>Cisticola galactotes</i> | Cisticola, Rufous-winged | Unlisted | LC |
| <i>Cisticola juncidis</i> | Cisticola, Zitting | Unlisted | LC |
| <i>Cisticola lais</i> | Cisticola, Wailing | Unlisted | LC |
| <i>Cisticola natalensis</i> | Cisticola, Croaking | Unlisted | LC |
| <i>Cisticola tinniens</i> | Cisticola, Levallant's | Unlisted | LC |
| <i>Colius striatus</i> | Mousebird, Speckled | Unlisted | LC |
| <i>Columba guinea</i> | Pigeon, Speckled | Unlisted | LC |
| <i>Columba livia</i> | Dove, Rock | Unlisted | LC |
| <i>Coracias garrulus</i> | Roller, European | NT | LC |
| <i>Corvus albicollis</i> | Raven, White-necked | Unlisted | LC |
| <i>Corvus albus</i> | Crow, Pied | Unlisted | LC |
| <i>Corvus capensis</i> | Crow, Cape | Unlisted | LC |
| <i>Corvus splendens</i> | Crow, House | Unlisted | LC |
| <i>Cossypha caffra</i> | Robin-chat, Cape | Unlisted | LC |
| <i>Cossypha dichroa</i> | Robin-Chat, Chorister | Unlisted | LC |
| <i>Cossypha heuglini</i> | Robin-Chat, White-browed | Unlisted | LC |
| <i>Cossypha natalensis</i> | Robin-chat, Red-capped | Unlisted | LC |
| <i>Coturnix coturnix</i> | Quail, Common | Unlisted | LC |
| <i>Creatophora cinerea</i> | Starling, Wattled | Unlisted | LC |
| <i>Crecopsis egregia</i> | Crake, African | Unlisted | LC |
| <i>Crex crex</i> | Crake, Corn | Unlisted | LC |
| <i>Crithagra gularis</i> | Seed-eater, Streaky-headed | Unlisted | LC |
| <i>Crithagra mozambicus</i> | Canary, Yellow-fronted | Unlisted | LC |
| <i>Crithagra scotops</i> | Canary, Forest | Unlisted | LC |
| <i>Crithagra sulphurata</i> | Canary, Brimstone | Unlisted | Unlisted |
| <i>Cuculus clamosus</i> | Cuckoo, Black | Unlisted | LC |

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|---------------------------------|------------------------------|----------|----------|
| <i>Cuculus gularis</i> | Cuckoo, African | Unlisted | LC |
| <i>Cuculus solitarius</i> | Cuckoo, Red-chested | Unlisted | LC |
| <i>Cyanomitra olivacea</i> | Sunbird, Olive | Unlisted | LC |
| <i>Cyanomitra veroxii</i> | Sunbird, Grey | LC | Unlisted |
| <i>Cypsiurus parvus</i> | Palm-swift, African | Unlisted | LC |
| <i>Delichon urbicum</i> | House-martin, Common | Unlisted | LC |
| <i>Dendrocygna bicolor</i> | Duck, Fulvous | Unlisted | LC |
| <i>Dendrocygna viduata</i> | Duck, White-faced Whistling | Unlisted | LC |
| <i>Dendropicos fuscescens</i> | Woodpecker, Cardinal | Unlisted | LC |
| <i>Dicrurus adsimilis</i> | Drongo, Fork-tailed | Unlisted | LC |
| <i>Dicrurus ludwigii</i> | Drongo, Square-tailed | Unlisted | LC |
| <i>Dryoscopus cubla</i> | Puffback, Black-backed | Unlisted | LC |
| <i>Egretta alba</i> | Egret, Great | Unlisted | LC |
| <i>Egretta ardesiaca</i> | Heron, Black | Unlisted | LC |
| <i>Egretta garzetta</i> | Egret, Little | Unlisted | LC |
| <i>Egretta intermedia</i> | Egret, Yellow-billed | Unlisted | LC |
| <i>Elanus caeruleus</i> | Kite, Black-shouldered | Unlisted | LC |
| <i>Emberiza flaviventris</i> | Bunting, Golden-breasted | Unlisted | LC |
| <i>Emberiza tahapisi</i> | Bunting, Cinnamon-breasted | Unlisted | LC |
| <i>Estrilda astrild</i> | Waxbill, Common | Unlisted | LC |
| <i>Estrilda perreini</i> | Waxbill, Grey | Unlisted | LC |
| <i>Euplectes albonotatus</i> | Widowbird, White-winged | Unlisted | LC |
| <i>Euplectes ardens</i> | Widowbird, Red-collared | Unlisted | LC |
| <i>Euplectes axillaris</i> | Widowbird, Fan-tailed | Unlisted | LC |
| <i>Euplectes orix</i> | Bishop, Southern Red | Unlisted | LC |
| <i>Euplectes progne</i> | Widowbird, Long-tailed | Unlisted | LC |
| <i>Falco biarmicus</i> | Falcon, Lanner | VU | LC |
| <i>Falco peregrinus</i> | Falcon, Peregrine | Unlisted | LC |
| <i>Falco subbuteo</i> | Hobby, Eurasian | Unlisted | LC |
| <i>Fregata minor</i> | Frigatebird, Great | Unlisted | LC |
| <i>Fulica cristata</i> | Coot, Red-knobbed | Unlisted | LC |
| <i>Gallinago nigripennis</i> | Snipe, African | Unlisted | LC |
| <i>Gallinula chloropus</i> | Moorhen, Common | Unlisted | LC |
| <i>Gallirex porphyreolophus</i> | Turaco, Purple-crested | Unlisted | LC |
| <i>Geokichla guttata</i> | Ground Thrush, Spotted | EN | EN |
| <i>Geronticus calvus</i> | Ibis, Southern Bald | VU | VU |
| <i>Glareola pratincola</i> | Pratincole, Collared | Unlisted | LC |
| <i>Guttera edouardi</i> | Guineafowl, Crested | Unlisted | LC |
| <i>Gypohierax angolensis</i> | Vulture, Palm-nut | Unlisted | LC |
| <i>Haematopus moquini</i> | Oystercatcher, African Black | LC | NT |
| <i>Halcyon albiventris</i> | Kingfisher, Brown-hooded | Unlisted | LC |
| <i>Haliaeetus vocifer</i> | Fish-eagle, African | Unlisted | LC |
| <i>Hedydipna collaris</i> | Sunbird, Collared | Unlisted | LC |
| <i>Himantopus himantopus</i> | Stilt, Black-winged | Unlisted | LC |
| <i>Hirundo abyssinica</i> | Swallow, Lesser Striped | Unlisted | LC |

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| <i>Hirundo albigularis</i> | Swallow, White-throated | Unlisted | LC |
| <i>Hirundo cucullata</i> | Swallow, Greater Striped | Unlisted | LC |
| <i>Hirundo fuligula</i> | Martin, Rock | Unlisted | Unlisted |
| <i>Hirundo rustica</i> | Swallow, Barn | Unlisted | LC |
| <i>Hirundo smithii</i> | Swallow, Wire-tailed | Unlisted | LC |
| <i>Indicator indicator</i> | Honeyguide, Greater | Unlisted | LC |
| <i>Indicator minor</i> | Honeyguide, Lesser | Unlisted | LC |
| <i>Indicator variegatus</i> | Honeyguide, Scaly-throated | Unlisted | LC |
| <i>Ispidina picta</i> | Pygmy-Kingfisher, African | Unlisted | LC |
| <i>Ixobrychus minutus</i> | Bittern, Little | Unlisted | LC |
| <i>Jynx ruficollis</i> | Wryneck, Red-throated | Unlisted | LC |
| <i>Lagonosticta rubricata</i> | Firefinch, African | Unlisted | LC |
| <i>Lagonosticta senegala</i> | Firefinch, Red-billed | Unlisted | LC |
| <i>Lamprotornis corruscus</i> | Starling, Black-bellied | Unlisted | LC |
| <i>Lamprotornis nitens</i> | Starling, Cape Glossy | Unlisted | LC |
| <i>Laniarius ferrugineus</i> | Boubou, Southern | Unlisted | LC |
| <i>Lanius collaris</i> | Fiscal, Common (Southern) | Unlisted | LC |
| <i>Lanius collurio</i> | Shrike, Red-backed | Unlisted | LC |
| <i>Lanius minor</i> | Shrike, Lesser Grey | Unlisted | LC |
| <i>Larus cirrocephalus</i> | Gull, Grey-headed | Unlisted | LC |
| <i>Larus dominicanus</i> | Gull, Kelp | Unlisted | LC |
| <i>Lioptilus nigricapillus</i> | Blackcap, Bush | VU | NT |
| <i>Lissotis melanogaster</i> | Bustard, Black-bellied | Unlisted | LC |
| <i>Lophaetus occipitalis</i> | Eagle, Long-crested | Unlisted | LC |
| <i>Lybius torquatus</i> | Barbet, Black-collared | Unlisted | LC |
| <i>Macronyx capensis</i> | Longclaw, Cape | Unlisted | LC |
| <i>Macronyx croceus</i> | Longclaw, Yellow-throated | Unlisted | LC |
| <i>Malaconotus blanchoti</i> | Bush-shrike, Grey-headed | Unlisted | LC |
| <i>Mandingoa nitidula</i> | Twinspot, Green | Unlisted | LC |
| <i>Megaceryle maximus</i> | Kingfisher, Giant | Unlisted | Unlisted |
| <i>Melaenornis pammelaina</i> | Flycatcher, Southern Black | Unlisted | LC |
| <i>Merops apiaster</i> | Bee-eater, European | Unlisted | LC |
| <i>Merops bullockoides</i> | Bee-eater, White-fronted | Unlisted | LC |
| <i>Merops hirundineus</i> | Bee-eater, Swallow-tailed | Unlisted | LC |
| <i>Merops persicus</i> | Bee-eater, Blue-cheeked | Unlisted | LC |
| <i>Merops pusillus</i> | Bee-eater, Little | Unlisted | LC |
| <i>Microparra capensis</i> | Jacana, Lesser | VU | LC |
| <i>Milvus aegyptius</i> | Kite, Yellow-billed | Unlisted | Unlisted |
| <i>Milvus migrans</i> | Kite, Black | Unlisted | LC |
| <i>Mirafra africana</i> | Lark, Rufous-naped | Unlisted | LC |
| <i>Morus capensis</i> | Gannet, Cape | VU | VU |
| <i>Motacilla aguimp</i> | Wagtail, African Pied | Unlisted | LC |
| <i>Motacilla capensis</i> | Wagtail, Cape | Unlisted | LC |
| <i>Motacilla clara</i> | Wagtail, Mountain | Unlisted | LC |
| <i>Muscicapa adusta</i> | Flycatcher, African Dusky | Unlisted | LC |

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| <i>Muscicapa caerulescens</i> | Flycatcher, Ashy | Unlisted | LC |
| <i>Muscicapa striata</i> | Flycatcher, Spotted | Unlisted | LC |
| <i>Mycteria ibis</i> | Stork, Yellow-billed | EN | LC |
| <i>Nectarinia famosa</i> | Sunbird, Malachite | Unlisted | LC |
| <i>Nettapus auritus</i> | Goose, African Pygmy | VU | LC |
| <i>Nilaus afer</i> | Brubru | Unlisted | LC |
| <i>Numenius phaeopus</i> | Whimbrel, Common | Unlisted | LC |
| <i>Numida meleagris</i> | Guineafowl, Helmeted | Unlisted | LC |
| <i>Nycticorax nycticorax</i> | Night-Heron, Black-crowned | Unlisted | LC |
| <i>Oena capensis</i> | Dove, Namaqua | Unlisted | LC |
| <i>Onychognathus morio</i> | Starling, Red-winged | Unlisted | LC |
| <i>Oriolus larvatus</i> | Oriole, Black-headed | Unlisted | LC |
| <i>Oriolus oriolus</i> | Oriole, Eurasian Golden | Unlisted | LC |
| <i>Pandion haliaetus</i> | Osprey, Osprey | Unlisted | LC |
| <i>Parus niger</i> | Tit, Southern Black | Unlisted | Unlisted |
| <i>Passer diffusus</i> | Sparrow, Southern Grey-headed | Unlisted | LC |
| <i>Passer domesticus</i> | Sparrow, House | Unlisted | LC |
| <i>Passer melanurus</i> | Sparrow, Cape | Unlisted | LC |
| <i>Pelecanus onocrotalus</i> | Pelican, Great White | VU | LC |
| <i>Pelecanus rufescens</i> | Pelican, Pink-backed | VU | LC |
| <i>Pernis apivorus</i> | Honey-buzzard, European | Unlisted | LC |
| <i>Petronia supercilialis</i> | Petronia, Yellow-throated | Unlisted | LC |
| <i>Phalacrocorax africanus</i> | Cormorant, Reed | Unlisted | LC |
| <i>Phalacrocorax capensis</i> | Cormorant, Cape | EN | EN |
| <i>Phalacrocorax carbo</i> | Cormorant, White-breasted | LC | LC |
| <i>Philomachus pugnax</i> | Ruff | Unlisted | LC |
| <i>Phoenicopterus ruber</i> | Flamingo, Greater | NT | LC |
| <i>Phoeniculus purpureus</i> | Wood-hoopoe, Green | Unlisted | LC |
| <i>Phyllastrephus terrestris</i> | Brownbul, Terrestrial | Unlisted | LC |
| <i>Phylloscopus ruficapilla</i> | Warbler, Yellow-throated Woodland | Unlisted | LC |
| <i>Phylloscopus trochilus</i> | Warbler, Willow | Unlisted | LC |
| <i>Platalea alba</i> | Spoonbill, African | Unlisted | LC |
| <i>Platysteira peltata</i> | Wattle-eye, Black-throated | LC | LC |
| <i>Plectropterus gambensis</i> | Goose, Spur-winged | Unlisted | LC |
| <i>Plegadis falcinellus</i> | Ibis, Glossy | Unlisted | LC |
| <i>Ploceus bicolor</i> | Weaver, Dark-backed | Unlisted | LC |
| <i>Ploceus capensis</i> | Weaver, Cape | Unlisted | LC |
| <i>Ploceus cucullatus</i> | Weaver, Village | Unlisted | LC |
| <i>Ploceus intermedius</i> | Masked-weaver, Lesser | Unlisted | LC |
| <i>Ploceus ocularis</i> | Weaver, Spectacled | Unlisted | LC |
| <i>Ploceus subaureus</i> | Weaver, Yellow | Unlisted | LC |
| <i>Ploceus velatus</i> | Southern Masked-weaver, Southern | Unlisted | LC |
| <i>Ploceus xanthops</i> | Weaver, African (Holub's) Golden | Unlisted | LC |
| <i>Ploceus xanthopterus</i> | Weaver, Southern Brown- throated | Unlisted | LC |

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| <i>Pluvialis squatarola</i> | Plover, Grey | Unlisted | LC |
| <i>Podica senegalensis</i> | Finfoot, African | VU | LC |
| <i>Pogoniulus bilineatus</i> | Tinkerbird, Yellow-rumped | Unlisted | LC |
| <i>Pogoniulus pusillus</i> | Tinkerbird, Red-fronted | Unlisted | LC |
| <i>Polemaetus bellicosus</i> | Eagle, Martial | EN | VU |
| <i>Polyboroides typus</i> | Harrier-Hawk, African | Unlisted | LC |
| <i>Porphyrio madagascariensis</i> | Swamphen, African Purple | Unlisted | Unlisted |
| <i>Porzana pusilla</i> | Crake, Baillon's | Unlisted | LC |
| <i>Prinia subflava</i> | Prinia, Tawny-flanked | Unlisted | LC |
| <i>Procellaria aequinoctialis</i> | Petrel, White-chinned | VU | VU |
| <i>Prodotiscus regulus</i> | Honeybird, Brown-backed | Unlisted | LC |
| <i>Psalidoprocne holomelaena</i> | Saw-wing, Black (Southern race) | Unlisted | Unlisted |
| <i>Psittacula krameri</i> | Parakeet, Rose-ringed | Unlisted | LC |
| <i>Psophocichla litsipsirupa</i> | Thrush, Groundscraper | Unlisted | Unlisted |
| <i>Pternistis natalensis</i> | Spurfowl, Natal | Unlisted | LC |
| <i>Puffinus griseus</i> | Shearwater, Sooty | LC | NT |
| <i>Pycnonotus tricolor</i> | Bulbul, Dark-capped | Unlisted | Unlisted |
| <i>Quelea erythroptus</i> | Quelea, Red-headed | Unlisted | LC |
| <i>Quelea quelea</i> | Quelea, Red-billed | Unlisted | LC |
| <i>Rallus caerulescens</i> | Rail, African | Unlisted | LC |
| <i>Recurvirostra avosetta</i> | Avocet, Pied | Unlisted | LC |
| <i>Riparia cincta</i> | Martin, Banded | Unlisted | LC |
| <i>Riparia paludicola</i> | Martin, Brown-throated | Unlisted | LC |
| <i>Riparia riparia</i> | Martin, Sand | Unlisted | LC |
| <i>Rostratula benghalensis</i> | Painted-snipe, Greater | NT | LC |
| <i>Sarothrura elegans</i> | Flufftail, Buff-spotted | Unlisted | LC |
| <i>Sarothrura rufa</i> | Flufftail, Red-chested | Unlisted | LC |
| <i>Saxicola torquatus</i> | Stonechat, African | Unlisted | LC |
| <i>Schoenicola brevirostris</i> | Warbler, Broad-tailed | LC | LC |
| <i>Scleroptila shelleyi</i> | Francolin, Shelley's | Unlisted | LC |
| <i>Scopus umbretta</i> | Hamerkop, Hamerkop | Unlisted | LC |
| <i>Serinus canicollis</i> | Canary, Cape | Unlisted | LC |
| <i>Sigelus silens</i> | Flycatcher, Fiscal | Unlisted | LC |
| <i>Spermestes cucullatus</i> | Mannikin, Bronze | Unlisted | Unlisted |
| <i>Spermestes fringilloides</i> | Mannikin, Magpie | NT | LC |
| <i>Spermestes nigriceps</i> | Brown Backed Munia | Unlisted | LC |
| <i>Sphenoeacus afer</i> | Grassbird, Cape | Unlisted | LC |
| <i>Stactolaema leucotis</i> | Barbet, White-eared | Unlisted | LC |
| <i>Stephanoaetus coronatus</i> | Eagle, African Crowned | VU | NT |
| <i>Sterna albifrons</i> | Tern, Little | LC | LC |
| <i>Sterna bengalensis</i> | Lesser Crested Tern | LC | LC |
| <i>Sterna bergii</i> | Tern, Swift | LC | LC |
| <i>Sterna caspia</i> | Tern, Caspian | VU | LC |
| <i>Sterna hirundo</i> | Tern, Common | LC | LC |
| <i>Sterna paradisaea</i> | Tern, Arctic | LC | LC |

| | | | |
|-------------------------------------|----------------------------------|----------|----------|
| <i>Sterna sandvicensis</i> | Tern, Sandwich | LC | LC |
| <i>Streptopelia capicola</i> | Turtle-dove, Cape | Unlisted | LC |
| <i>Streptopelia semitorquata</i> | Dove, Red-eyed | Unlisted | LC |
| <i>Streptopelia senegalensis</i> | Dove, Laughing | Unlisted | LC |
| <i>Strix woodfordii</i> | Owl, African Wood | Unlisted | LC |
| <i>Sturnus vulgaris</i> | Starling, Common | Unlisted | LC |
| <i>Sylvia borin</i> | Warbler, Garden | Unlisted | LC |
| <i>Sylvietta rufescens</i> | Crombec, Long-billed | Unlisted | LC |
| <i>Tachybaptus ruficollis</i> | Grebe, Little | Unlisted | LC |
| <i>Tachymartitis melba</i> | Swift, Alpine | Unlisted | LC |
| <i>Tauraco corythaix</i> | Turaco, Knysna | Unlisted | LC |
| <i>Tchagra senegalus</i> | Tchagra, Black-crowned | Unlisted | LC |
| <i>Tchagra tchagra</i> | Tchagra, Southern | Unlisted | LC |
| <i>Telophorus olivaceus</i> | Bush-shrike, Olive | Unlisted | LC |
| <i>Telophorus quadricolor</i> | Bush-shrike, Gorgeous | Unlisted | LC |
| <i>Telophorus sulfureopectus</i> | Bush-shrike, Orange-breasted | Unlisted | LC |
| <i>Terathopius ecaudatus</i> | Bateleur, Bateleur | EN | NT |
| <i>Terpsiphone viridis</i> | Paradise-flycatcher, African | Unlisted | LC |
| <i>Thalassarche carteri</i> | Albatross, Indian Yellow-nosed | EN | EN |
| <i>Thalassarche cauta</i> | Albatross, Shy | NT | NT |
| <i>Thalassarche melanophris</i> | Albatross, Black-browed | LC | LC |
| <i>Thalassornis leuconotus</i> | Duck, White-backed | Unlisted | LC |
| <i>Thamnolaea cinnamomeiventris</i> | Cliff-chat, Mocking | Unlisted | LC |
| <i>Threskiornis aethiopicus</i> | Ibis, African Sacred | Unlisted | LC |
| <i>Tockus alboterminatus</i> | Hornbill, Crowned | Unlisted | LC |
| <i>Trachyphonus vaillantii</i> | Barbet, Crested | Unlisted | LC |
| <i>Treron calvus</i> | Green-pigeon, African | Unlisted | LC |
| <i>Tricholaema leucomelas</i> | Barbet, Acacia Pied | Unlisted | LC |
| <i>Tringa glareola</i> | Sandpiper, Wood | Unlisted | LC |
| <i>Tringa nebularia</i> | Greenshank, Common | Unlisted | LC |
| <i>Tringa stagnatilis</i> | Sandpiper, Marsh | Unlisted | LC |
| <i>Trochocercus cyanomelas</i> | Crested-Flycatcher, Blue-mantled | Unlisted | LC |
| <i>Turdus libonyanus</i> | Thrush, Kurrichane | Unlisted | Unlisted |
| <i>Turdus olivaceus</i> | Thrush, Olive | Unlisted | LC |
| <i>Turdus smithi</i> | Thrush, Karoo | Unlisted | LC |
| <i>Turnix sylvaticus</i> | Buttonquail, Kurrichane | Unlisted | LC |
| <i>Turtur chalcospilos</i> | Wood-dove, Emerald-spotted | Unlisted | LC |
| <i>Turtur tympanistris</i> | Dove, Tambourine | Unlisted | LC |
| <i>Tyto alba</i> | Owl, Barn | Unlisted | LC |
| <i>Upupa africana</i> | Hoopoe, African | Unlisted | LC |
| <i>Uraeginthus angolensis</i> | Waxbill, Blue | Unlisted | LC |
| <i>Urocolius indicus</i> | Mousebird, Red-faced | Unlisted | LC |
| <i>Vanellus armatus</i> | Lapwing, Blacksmith | Unlisted | LC |
| <i>Vanellus coronatus</i> | Lapwing, Crowned | Unlisted | LC |
| <i>Vanellus melanopterus</i> | Lapwing, Black-winged | Unlisted | LC |

| | | | |
|----------------------------|--------------------------|----------|----|
| <i>Vanellus senegallus</i> | Lapwing, African Wattled | Unlisted | LC |
| <i>Vidua chalybeata</i> | Indigobird, Village | Unlisted | LC |
| <i>Vidua funerea</i> | Indigobird, Dusky | Unlisted | LC |
| <i>Vidua macroura</i> | Whydah, Pin-tailed | Unlisted | LC |
| <i>Xenus cinereus</i> | Terek Sandpiper | Unlisted | LC |
| <i>Zosterops virens</i> | White-eye, Cape | Unlisted | LC |

APPENDIX C: Mammals species expected to occur in the project area

| Species | Common Name | Conservation Status | |
|----------------------------------|---------------------------------|------------------------|-------------|
| | | Regional (SANBI, 2016) | IUCN (2017) |
| <i>Aethomys ineptus</i> | Tete Veld Rat | LC | LC |
| <i>Aethomys namaquensis</i> | Namaqua rock rat | LC | LC |
| <i>Amblysomus hottentotus</i> | Hottentot's Golden Mole | LC | LC |
| <i>Aonyx capensis</i> | Cape Clawless Otter | NT | NT |
| <i>Atilax paludinosus</i> | Water Mongoose | LC | LC |
| <i>Canis mesomelas</i> | Black-backed Jackal | LC | LC |
| <i>Cephalophus natalensis</i> | Natal Red Duiker | NT | LC |
| <i>Ceratotherium simum</i> | White Rhinoceros | NT | NT |
| <i>Chaerephon pumilus</i> | Little Free-tailed Bat | LC | LC |
| <i>Chlorocebus pygerythrus</i> | Vervet Monkey | LC | LC |
| <i>Crocidura cyanea</i> | Reddish-grey Musk Shrew | LC | LC |
| <i>Crocidura flavescens</i> | Greater Red Musk Shrew | LC | LC |
| <i>Crocidura hirta</i> | Lesser Red Musk Shrew | LC | LC |
| <i>Crocidura maquassiensis</i> | Makwassie musk shrew | VU | LC |
| <i>Crocidura mariquensis</i> | Swamp Musk Shrew | NT | LC |
| <i>Cryptomys hottentotus</i> | Common Mole-rat | LC | LC |
| <i>Dasymys incomtus</i> | African Marsh rat | NT | LC |
| <i>Dendromus melanotis</i> | Grey Climbing Mouse | LC | LC |
| <i>Dendromus mesomelas</i> | Brant's Climbing Mouse | LC | LC |
| <i>Dendromus mystacalis</i> | Chestnut Climbing Mouse | LC | LC |
| <i>Diceros bicornis</i> | Black Rhinoceros | EN | CR |
| <i>Eidolon helvum</i> | African Straw-colored Fruit Bat | LC | NT |
| <i>Epomophorus crypturus</i> | Gambian epauletted fruit bat | LC | LC |
| <i>Epomophorus wahlbergi</i> | Wahlberg's epauletted fruit bat | LC | LC |
| <i>Equus quagga</i> | Plains Zebra | LC | NT |
| <i>Felis silvestris</i> | African Wildcat | LC | LC |
| <i>Glauconycteris variegata</i> | Butterfly Bat | LC | LC |
| <i>Grammomys dolichurus</i> | Woodland Mouse | LC | LC |
| <i>Graphiurus murinus</i> | Woodland Dormouse | LC | LC |
| <i>Herpestes ichneumon</i> | Large Grey Mongoose | LC | LC |
| <i>Herpestes sanguineus</i> | Slender Mongoose | LC | LC |
| <i>Hipposideros caffer</i> | Sundevall's Leaf-nosed Bat | LC | LC |
| <i>Hystrix africae australis</i> | Cape Porcupine | LC | LC |
| <i>Ichneumia albicauda</i> | White-tailed Mongoose | LC | LC |
| <i>Ictonyx striatus</i> | Striped Polecat | LC | LC |
| <i>Lemniscomys rosalia</i> | Single-striped Mouse | LC | LC |
| <i>Leptailurus serval</i> | Serval | NT | LC |
| <i>Lepus saxatilis</i> | Scrub Hare | LC | LC |
| <i>Lepus victoriae</i> | African Savanna Hare | LC | LC |
| <i>Mastomys natalensis</i> | Natal Multimammate Mouse | LC | LC |
| <i>Mellivora capensis</i> | Honey Badger | LC | LC |
| <i>Mus minutoides</i> | Pygmy Mouse | LC | LC |

| | | | |
|----------------------------------|-----------------------------|---------------------|----|
| <i>Mus musculus</i> | House Mouse | Unlisted | LC |
| <i>Myosorex sclateri</i> | Sclater's Shrew | VU | NT |
| <i>Myosorex varius</i> | Forest Shrew | LC | LC |
| <i>Myotis tricolor</i> | Temminck's Hairy Bat | LC | LC |
| <i>Myotis welwitschii</i> | Welwitsch's Hairy Bat | LC | LC |
| <i>Neoromicia capensis</i> | Cape Serotine Bat | LC | LC |
| <i>Neoromicia nana</i> | Banana Bat | LC | LC |
| <i>Neoromicia zuluensis</i> | Aloe Bat | LC | LC |
| <i>Nycteris thebaica</i> | Egyptian Slit-faced Bat | LC | LC |
| <i>Orycteropus afer</i> | Aardvark | LC | LC |
| <i>Otolemur crassicaudatus</i> | Thick-tailed Bushbaby | LC | LC |
| <i>Otomops martiensseni</i> | Large-eared Free-tailed Bat | LC | NT |
| <i>Otomys angoniensis</i> | Angoni Vlei Rat | LC | LC |
| <i>Otomys irroratus</i> | Vlei Rat (Fynbos type) | LC | LC |
| <i>Otomys laminatus</i> | Laminate Vlei Rat | NT | LC |
| <i>Panthera pardus</i> | Leopard | VU | VU |
| <i>Papio ursinus</i> | Chacma Baboon | LC | LC |
| <i>Phacochoerus africanus</i> | Common Warthog | LC | LC |
| <i>Philantomba monticola</i> | Blue Duiker | VU | LC |
| <i>Pipistrellus anchietae</i> | Anchieta's Bat | LC | LC |
| <i>Pipistrellus hesperidus</i> | African Pipistrelle | LC | LC |
| <i>Poecilogle albinucha</i> | African Striped Weasel | NT | LC |
| <i>Pronolagus crassicaudatus</i> | Natal Red Rock Rabbit | LC | LC |
| <i>Proteles cristata</i> | Aardwolf | LC | LC |
| <i>Rattus rattus</i> | House Rat | Exotic (Not listed) | LC |
| <i>Redunca arundinum</i> | Southern Reedbuck | LC | LC |
| <i>Rhodomys pumilio</i> | Xeric Four-striped Mouse | LC | LC |
| <i>Rhinolophus clivosus</i> | Geoffroy's Horseshoe Bat | LC | LC |
| <i>Rhinolophus landeri</i> | Lander's Horseshoe Bat | LC | LC |
| <i>Rhinolophus simulator</i> | Bushveld Horseshoe Bat | LC | LC |
| <i>Rhinolophus swinnyi</i> | Swinny's horseshoe bat | VU | LC |
| <i>Rousettus aegyptiacus</i> | Egyptian Fruit Bat | LC | LC |
| <i>Scotoecus albofuscus</i> | Thomas' House Bat | NT | DD |
| <i>Scotophilus dinganii</i> | Yellow House Bat | LC | LC |
| <i>Suncus infinitesimus</i> | Least Dwarf Shrew | LC | LC |
| <i>Suncus lixus</i> | Greater Dwarf Shrew | LC | LC |
| <i>Sylvicapra grimmia</i> | Common Duiker | LC | LC |
| <i>Tadarida aegyptiaca</i> | Egyptian Free-tailed Bat | LC | LC |
| <i>Taphozous mauritanus</i> | Mauritian Tomb Bat | LC | LC |
| <i>Thryonomys swinderianus</i> | Greater Cane Rat | LC | LC |
| <i>Tragelaphus oryx</i> | Common Eland | LC | LC |
| <i>Tragelaphus scriptus</i> | Cape Bushbuck | LC | LC |

APPENDIX D: Reptile species expected to occur within the project area

| Species | Common Name | Conservation Status | |
|--------------------------------------|------------------------------------|------------------------|-------------|
| | | Regional (SANBI, 2016) | IUCN (2017) |
| <i>Acontias plumbeus</i> | Giant Legless Skink | LC | LC |
| <i>Afroedura nivaria</i> | Drakensberg Flat Gecko | LC | LC |
| <i>Afroedura pondolia</i> | Pondo Flat Gecko | LC | LC |
| <i>Afrotyphlops bibronii</i> | Bibron's Blind Snake | LC | LC |
| <i>Agama atra</i> | Southern Rock Agama | LC | LC |
| <i>Amblyodipsas concolor</i> | Kwazulu-Natal Purple-Glossed Snake | LC | LC |
| <i>Aparallactus capensis</i> | Black-headed Centipede-eater | LC | LC |
| <i>Bitis arietans arietans</i> | Puff Adder | LC | Unlisted |
| <i>Boaedon capensis</i> | Brown House Snake | LC | LC |
| <i>Bradypodion caffer</i> | Pondo Dwarf Chameleon | EN | EN |
| <i>Bradypodion kentanicum</i> | Kentani Dwarf Chameleon | VU | VU |
| <i>Caretta caretta</i> | Loggerhead Turtle | VU | VU |
| <i>Causus rhombeatus</i> | Rhombic Night Adder | LC | LC |
| <i>Chamaeleo dilepis</i> | Common Flap-neck Chameleon | LC | LC |
| <i>Cordylus cordylus</i> | Cape Girdles Lizard | LC | LC |
| <i>Crocodylus niloticus</i> | Nile Crocodile | VU | LC |
| <i>Crotaphopeltis hotamboeia</i> | Red-lipped Snake | LC | Unlisted |
| <i>Dasypeltis inornata</i> | Southern Brown Egg-eater | LC | LC |
| <i>Dasypeltis scabra</i> | Rhombic Egg-eater | LC | LC |
| <i>Dendroaspis polylepis</i> | Black Mamba | LC | LC |
| <i>Dispholidus typus</i> | Boomslang | LC | Unlisted |
| <i>Duberria lutrix</i> | Common Slug-eater | LC | LC |
| <i>Eretmochelys imbricata</i> | Hawksbill Sea Turtle | CR | CR |
| <i>Gerrhosaurus flavigularis</i> | Yellow-throated Plated Lizard | LC | Unlisted |
| <i>Gonionotophis capensis</i> | Common File Snake | LC | LC |
| <i>Hemachatus haemachatus</i> | Rinkhals | LC | LC |
| <i>Hemidactylus mabouia</i> | Common Tropical House Gecko | LC | Unlisted |
| <i>Lamprophis aurora</i> | Aurora House Snake | LC | LC |
| <i>Leptotyphlops sylvicolus</i> | Forest Thread Snake | DD | DD |
| <i>Lycodonomorphus inornatus</i> | Olive House Snake | LC | LC |
| <i>Lycodonomorphus laevisissimus</i> | Dusky-bellied Water Snake | LC | LC |
| <i>Lycodonomorphus rufulus</i> | Brown Water Snake | LC | Unlisted |
| <i>Lycophidion capense capense</i> | Cape Wolf Snake | LC | Unlisted |
| <i>Nucras lalandii</i> | Delalande's Sandveld Lizard | LC | LC |
| <i>Pachydactylus maculatus</i> | Spotted Gecko | LC | LC |
| <i>Pachydactylus vansonii</i> | VAN Son's Gecko | LC | LC |
| <i>Panaspis wahlbergi</i> | Wahlberg's Snake-eyed Skink | LC | Unlisted |
| <i>Pelomedusa galeata</i> | South African Marsh Terrapin | Not evaluated | Unlisted |
| <i>Pelusios rhodesianus</i> | Variable Hinged Terrapin | VU | LC |
| <i>Philothamnus hoplogaster</i> | South Eastern Green Snake | LC | Unlisted |
| <i>Philothamnus semivariiegatus</i> | Spotted Bush Snake | LC | Unlisted |
| <i>Psammophis brevirostris</i> | Short-snouted Grass Snake | LC | Unlisted |
| <i>Psammophylax rhombeatus</i> | Spotted Grass Snake | LC | Unlisted |
| <i>Python natalensis</i> | Southern African Python | LC | Unlisted |
| <i>Tetradactylus africanus</i> | Eastern Long-tailed Seps | LC | LC |
| <i>Thelotornis capensis</i> | Southern Twig Snake | LC | LC |
| <i>Trachylepis varia</i> | Variable Skink | LC | LC |
| <i>Varanus niloticus</i> | Water Monitor | LC | Unlisted |

APPENDIX E: Amphibian species expected to occur within the project area

| Species | Common Name | Conservation Status | |
|------------------------------------|-----------------------------|------------------------|-------------|
| | | Regional (SANBI, 2016) | IUCN (2017) |
| <i>Afrivalus delicatus</i> | Delicate Leaf-folding Frog | LC | LC |
| <i>Afrivalus fornasinii</i> | Greater Leaf-folding Frog | LC | Unlisted |
| <i>Afrivalus spinifrons</i> | Natal Leaf-folding Frog | VU | LC |
| <i>Amietia angolensis</i> | Angola River Frog | LC | LC |
| <i>Amietia delalandii</i> | Delalande's River Frog | LC | Unlisted |
| <i>Arthroleptis wahlbergii</i> | Bush Squeaker | LC | LC |
| <i>Breviceps adspersus</i> | Bushveld Rain Frog | LC | LC |
| <i>Breviceps mossambicus</i> | Mozambique Rain Frog | LC | LC |
| <i>Breviceps verrucosus</i> | Plaintive Rain Frog | LC | LC |
| <i>Cacosternum boettgeri</i> | Common Caco | LC | LC |
| <i>Cacosternum nanum nanum</i> | Bronze Caco | LC | LC |
| <i>Cacosternum striatum</i> | Striped Caco | DD | LC |
| <i>Chiromantis xerampelina</i> | Southern Foam Nest Frog | LC | LC |
| <i>Hadromophryne natalensis</i> | Natal Ghost Frog | LC | LC |
| <i>Hemisus guttatus</i> | Spotted Shovel-nosed Frog | VU | VU |
| <i>Hyperolius argus</i> | Argus Reed Frog | LC | LC |
| <i>Hyperolius marmoratus</i> | Painted Reed Frog | LC | LC |
| <i>Hyperolius microps</i> | Sharp-headed Long Reed Frog | LC | Unlisted |
| <i>Hyperolius pickersgilli</i> | Pickersgill's Reed Frog | EN | EN |
| <i>Hyperolius poweri</i> | Power's Reed Frog | LC | LC |
| <i>Hyperolius pusillus</i> | Water Lily Frog | LC | LC |
| <i>Hyperolius semidiscus</i> | Yellowstriped Reed Frog | LC | LC |
| <i>Hyperolius tuberilinguis</i> | Tinker Reed Frog | LC | LC |
| <i>Kassina senegalensis</i> | Bubbling Kassina | LC | LC |
| <i>Leptopelis mossambicus</i> | Mozambique forest tree frog | LC | LC |
| <i>Leptopelis natalensis</i> | Natal Tree Frog | LC | LC |
| <i>Natalobatrachus bonebergi</i> | Kloof Frog | EN | EN |
| <i>Phrynobatrachus mababiensis</i> | Dwarf Puddle Frog | LC | LC |
| <i>Phrynobatrachus natalensis</i> | Snoring Puddle Frog | LC | LC |
| <i>Ptychadena oxyrhynchus</i> | Sharp-nosed Grass Frog | LC | LC |
| <i>Ptychadena porosissima</i> | Striped Grass Frog | LC | LC |
| <i>Schismaderma carens</i> | African Red Toad | LC | LC |
| <i>Sclerophrys capensis</i> | Raucous Toad | LC | LC |
| <i>Sclerophrys gutturalis</i> | Guttural Toad | LC | LC |
| <i>Semnodactylus wealii</i> | Rattling Frog | LC | LC |
| <i>Strongylopus fasciatus</i> | Striped Stream Frog | LC | LC |
| <i>Strongylopus grayii</i> | Clicking Stream Frog | LC | LC |
| <i>Tomopterna natalensis</i> | Natal Sand Frog | LC | LC |
| <i>Tomopterna tandyi</i> | Tandy's Sand Frog | LC | LC |
| <i>Xenopus laevis</i> | Common Platanna | LC | LC |



Heritage Impact Assessment

**PROPOSED RESIDENTIAL / HOTEL DEVELOPMENT,
49 CASUARINE ROAD, TONGAAT, KWAZULU-NATAL**

Phase 1 Heritage Impact Assessment

19 February 2019

**Client: 1World Consultants
Roschel Maharaj**

**Author: JLB Consulting
Jean Beater**

EXECUTIVE SUMMARY

The applicant proposes to construct a new residential and hotel development in Casuarina Road, Tongaat, eThekweni Municipality. The development includes the following:

- A maximum 308 residential apartment and hotel block with associated parking.
- Potential widening of a very small portion (approx. 200m) of Casuarina road by 1m to create easy vehicle movement in either direction, and
- On-site waste water treatment.

This report serves as the Phase 1 Heritage Impact Assessment for the proposed development.

The proposed project triggers section 41 (1)(c)(i) of the KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No 5 of 2018) which lists developments that may require an HIA. The relevant section of the Act refers to the following development/activity: “any development or other activity which will change the character of a site - exceeding 5000m² in extent. The proposed development is 0.54 Ha which is the equivalent of 5400m².

The proposed development will be located at 49 Casuarine Road, Tongaat in KwaZulu-Natal and will be situated on Farm No. 1/620, Farm No. 1/614, Farm No. R/614, Farm No. 612 and Farm No. 613. A site inspection of the project area was undertaken on 07 February 2019. Visibility was good as the property is currently used as a residence with landscaped lawns and gardens.

There are several structures on the proposed development area. The main residence and guest house was built in 1994. There are several other structures situated on the property, three of which could be older than 60 years. One is a house or residence, the second a car port which is currently used for the storage of wood and garden refuse and the purpose of the third structure is unknown. It may have been a guard house or a pump house. The three structures referred to are not in good condition with visible cracks in the house and trees growing into the structure of the carport as well in the third structure.

An inspection of the beach and dunes showed evidence of a shell midden located close to the path used by the applicant to access the beach. The midden consists of shells possibly of brown mussels, oysters and other shell species. Such middens are an indication of the presence of archaeological remains of early inhabitants of the area.

The South African Fossil Sensitivity Map indicates that the project area is situated in an area of very high fossil sensitivity. A desktop palaeontological assessment was undertaken in May 2016 of the property that occurs at the end of Casuarina Road adjacent to the Beach Bums Restaurant.

The fossil sensitivity for both properties is the same as the underlying geology is the same hence the results of the 2016 desktop assessment have been included in this report as they are applicable to the proposed residential and hotel development.

Both properties are underlain by Permian-aged rocks of the Vryheid Formation of the Ecca Group, Karoo Supergroup. The Permian aged Vryheid Formation is a thick sequence of sedimentary rocks dominated by light grey sandstones with interbedded grey shale and thick coal seams. Burial of vegetation in the swamps eventually formed coal which is mined at various localities in South Africa. Very rich assemblage of plant fossils, coal beds and significant trace fossils have been described from the Vryheid Formation. Trenching of more than 1.5m depth will expose bedrock of the Vryheid Formation during excavation for foundations and infrastructure. Management measures recommended in the 2016 study to avoid or minimise potential impacts have been included in this report.

The Built Environment section of Amafa, after perusing photographs of the structures that could be older than 60 years, stated that the windows of the house put the house between the late 1940's and pre 1960's. They also stated that there were features that do not tie in with that period such as the air vents which were required up to 1962. The 1942 and 1969 1:50000 topographical maps of the area were perused and two structures on or in the vicinity of the property under discussion were observed. It is possible that at least one of the structures is over 60 years, and possibly a second structure. It is therefore recommended that client obtain documentation that indicates the date of the structures in order to prove that they are not older than 60 years.

It is also recommended that no activity, developmental or otherwise, take place within 30 m of the beach due to the presence of shell middens that could be damaged by such activity. If development does take place in this area, then prior to any construction activity, the removal of vegetation from the dunes must be monitored by an archaeologist to prevent any damage to shell middens or any other archaeological remains that may be found in the dunes.

The proposed residential and hotel development may proceed once the age of the three structures identified and discussed in this report has been determined. If any of the structures are over 60 years, then application must be made to the KwaZulu-Natal Amafa and Research Institute according to the permit application process.

In addition, all recommendations and additional mitigation measures listed in this report must be implemented prior and during the construction of the proposed residential and hotel development.

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I, **Jean Lois Beater**, act as an independent specialist for this project and I do not have any vested interest either business, financial, personal or other, in the proposed activity other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014.

AUTHOR DETAILS

| Name | Qualification | Professional Registration |
|-------------|---|--|
| Jean Beater | MA (Heritage Studies) MSc (Environmental Management) | Member of the Association of South African Professional Archaeologists (No. 349) Member of IAIAAsa (No. 1538) |

1. INTRODUCTION

The applicant, Mr Anant Singh, proposes to construct a new residential and hotel development at 49 Casuarina Road, Tongaat, eThekweni Municipality. The development includes the following:

- A maximum 308 residential apartment and hotel block with associated parking;
- Potential widening of a very small portion (approx. 200m) of Casuarina road by 1m to create easy vehicle movement in either direction, and
- On-site waste water treatment.

This report serves as the Phase 1 Heritage Impact Assessment (HIA) for the proposed residential and hotel development.

2. LEGISLATIVE CONTEXT

The proposed project triggers section 41 (1)(c)(i) of the KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No 5 of 2018) which lists developments that may require an HIA. The relevant section of the Act refers to the following development/activity: *“any development or other activity which will change the character of a site - exceeding 5000m² in extent”*. The proposed development is 0.54 Ha which is the equivalent of 5400m².

The project may also impact on graves, protected structures, archaeological and palaeontological resources that are protected in terms of sections 37, 38, 39, and 40 of the KwaZulu-Natal Amafa and Research Institute Act, 2018.

In terms of Section 3 of the National Heritage Resources Act (NHRA), 1999 (Act 25 of 1999), heritage resources are described as follows:

- (a) places, buildings, structures and equipment of cultural significance;
- (b) places to which oral traditions are attached or which are associated with living heritage;
- (c) historical settlements and townscapes;
- (d) landscapes and natural features of cultural significance;
- (e) geological sites of scientific or cultural importance;
- (f) archaeological and paleontological sites;
- (g) graves and burial grounds, including—
 - (i) ancestral graves;
 - (ii) royal graves and graves of traditional leaders;
 - (iii) graves of victims of conflict;

- (iv) graves of individuals designated by the Minister by notice in the *Gazette*;
- (v) historical graves and cemeteries; and
- (vi) other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- (h) sites of significance relating to the history of slavery in South Africa;
- (i) movable objects, including:
 - (i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
 - (ii) objects to which oral traditions are attached or which are associated with living heritage;
 - (iii) ethnographic art and objects;
 - (iv) military objects;
 - (v) objects of decorative or fine art;
 - (vi) objects of scientific or technological interest; and
 - (vii) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

The Phase I HIA was undertaken to assess whether any heritage resources will be impacted by the proposed residential and hotel development.

3. LOCATION

The proposed development will be located at 49 Casuarine Road, Tongaat situated on the following erven: Farm No. 1/620, Farm No. 1/614, Farm No. R/614, Farm No. 612 and Farm No. 613. The centre of site is located at 29° 36' 12.42" S 31° 9' 47.96" E. See **Figures 1** and **2** below.

4. TERMS OF REFERENCE

Undertake a Phase 1 Heritage Impact Assessment (HIA) in order to determine the possible existence of heritage resources (as listed above in Chapter 2) in the project area that could be impacted by the proposed development. Provide mitigation measures to limit or avoid the impact of the construction of the project on heritage resources (if any).

Submit this HIA report to the heritage authority of KwaZulu-Natal, namely the KwaZulu-Natal Amafa and Research Institute for their consideration and comment.



Figure 1: Project area outlined in red within wider surrounding area



Figure 2: Closer image of project area outlined in red

5. METHODOLOGY

A survey of literature, including HIA reports deposited onto the SAHRIS database, was undertaken of the area in order to place the project in a historical context.

A site inspection of the project area was undertaken on 07 February 2019. Visibility was good as the property is currently used as a residence with landscaped lawns and gardens.

6. HISTORICAL BACKGROUND OF THE AREA

The proximity of the proposed development to the beach indicates probable occupation of the area by the very early inhabitants of KwaZulu-Natal. Anderson states that there are many archaeological sites in the surrounding area. Most of these sites are the result of systematic surveys. These sites include all types of Stone Age and Iron Age sites. There are six archaeological sites within the vicinity of the proposed area of development that consist of Late Stone Age shell middens and Early Iron age shell middens. A general rule of thumb for the coastal line is that any area within 1km of a beach rock outcrop will have a very high density of archaeological sites. The outcrops have shellfish that formed a large portion of past inhabitants diets. The shell middens alongside these outcrops can be food processing sites and/or living areas and are important when recreating the past (Anderson 2016:14).

Girls and Boys Town occupies the 100 year old Genazzano mission station which has assisted troubled children since 1978 (Showme 2009:1) It was started on 23 October 1895 when the first lot of ground was purchased by the Dominican Sisterhood of Oakford. The second lot was bought on 21 November 1912 by the same Sisterhood (CNC 1914: 184-1914/1510). The institution is situated about 1.5 km south of the proposed development.

In 1979, a South African fishing boat called Ocean Surf ran aground in the vicinity of the proposed development. Information is very scarce about the wreck but it is understood that it ran aground because of engine failure. Possibly one crew member drowned. According to an eyewitness, salvage workers cut the ship in half to try and remove it. The beach was strewn with big chunks of the ship for years and the mast of the ship lay where the parking lot is currently situated (Murugan, 2014:1).

7. RESULTS OF SITE INSPECTION

There are several structures on the proposed development area. The main residence and guest house was built in 1994 according to the architect working on the project. The residence is currently used by the applicant.



Figure 3: View of front of main residence

There are several other structures situated on the property, three of which could be older than 60 years. One is a house or residence, the second a car port which is currently used for the storage of wood and garden refuse and the purpose of the third structure is unknown. It may have been a guard house or a pump house.

The three structures referred to are not in good condition with visible cracks in the house and trees growing into the structure of the carport as well in the third structure. Wooden window frames, wooden supports and asbestos roofing are found in the structures.



Figure 4: Side of main residence



Figure 5: Back of old house



Figure 6: Side of house showing large crack



Figure 7: Wooden window frames



Figure 8: Interior of house showing scullery



Figure 9: Wooden pillar supporting asbestos roof



Figure 10: Car port



Figure 11: Tree growing out of car port



Figure 12: Old structure with tree



Figure 13: Interior of structure

An inspection of the beach and dunes showed evidence of a shell midden located close to the path used by the applicant to access the beach. The middens consists of shells possibly of brown mussels, oysters and other shell species. Such middens can extend inland for several meters and are an indication of the presence of archaeological remains of early inhabitants of the area.



Figure 14: Evidence of a shell midden

The South African Fossil Sensitivity Map indicates that the project area is situated in an area of very high fossil sensitivity as indicated by the red colour in **Figure 15** below with a very small overlap into high fossil sensitivity.

It should be noted that a desktop palaeontological assessment was undertaken in May 2016 of the property that occurs at the end of Casuarina Road adjacent to the Beach Bums Restaurant. The structure that used to be on the property was commonly referred to as “The (Westbrooke) Ghost House” (Anderson 2016:3). The fossil sensitivity for both properties is the same as the underlying geology is the same hence the results of the 2016 desktop assessment have been included in this report as they are applicable to the proposed residential and hotel development.

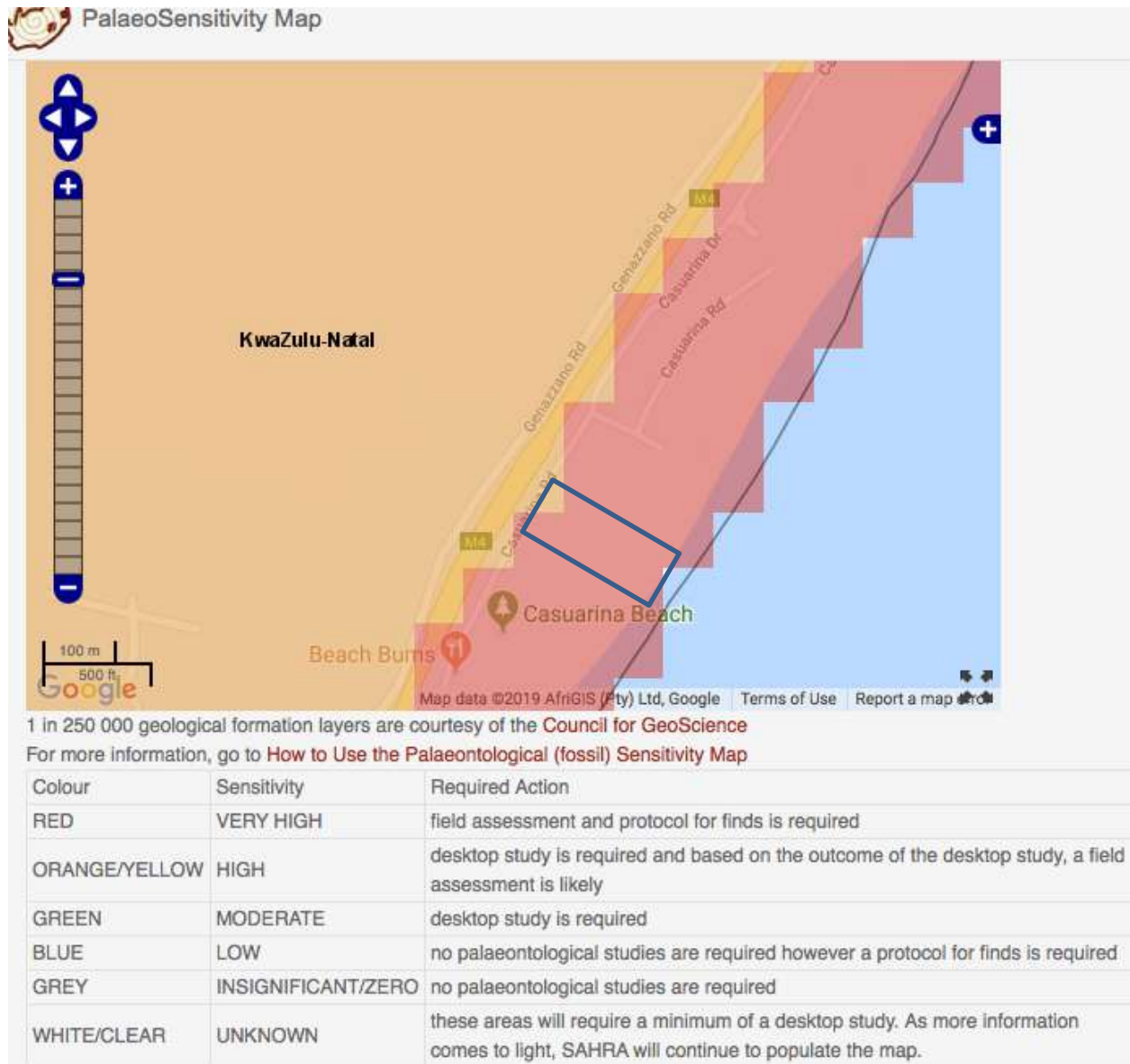


Figure 15: Fossil sensitivity of property to be developed outlined in blue

Both project areas are underlain by Permian-aged rocks of the Vryheid Formation of the Ecca Group, Karoo Supergroup that extends to the north and south of the project area (see **Figure 16** below). The Permian aged Vryheid Formation is a thick sequence of sedimentary rocks dominated by light grey sandstones with interbedded grey shale and thick coal seams. These sandstones were deposited along ancient sandy shorelines behind which lay vast swamplands. Burial of vegetation in the swamps eventually formed coal which is mined at various localities in South Africa. Very rich assemblage of plant fossils, coal beds and significant trace fossils have been described from the Vryheid Formation (Anderson 2016:38).

Although no vertebrate fossils have been recorded from the Vryheid Formation, invertebrate trace fossils have been described in some detail. It should be noted that the aquatic reptile, *Mesosaurus*, which is the earliest known reptile from the Karoo Basin, as well as fish

(*Palaeoniscus capensis*), have been recorded in equivalent-aged strata in the Whitehill Formation in the southern part of the basin that might be correlated with the mid-Vryheid Formation. Therefore, there is a possibility that *Mesosaurus* could be found in the Vryheid Formation (Anderson 2016:38-39).



Figure 16: Geology of larger area underlain by sedimentary rocks of the Vryheid Formation (Anderson:37)

The palaeontological sensitivity of the development is related to the specific geology that underlies the development footprints. Trenching of more than 1.5m depth will expose bedrock of the Vryheid Formation during excavation for foundations and infrastructure (Anderson 2016:39). Management measures recommended in the 2016 study to avoid or minimise potential impacts on sensitive fossil finds are provided in the Chapter below.

8. DISCUSSION AND RECOMMENDATIONS

The Built Environment section of Amafa, after perusing photographs of the structures that could be older than 60 years, stated that the windows of the house put the house between the late 1940's and pre 1960's. They also stated that there were features that do not tie in with that period such as the air vents which were required up to 1962. The Built Environment section advised that the applicant make application to Amafa for the demolition of the structures unless it is proven that the structures are not older than 60 years.

The 1942 1:50000 topographical map (2931CA) of the area shows one structure (see **Figure 17** below) on or in the vicinity of the property and the 1969 topographical map shows 2 structures (see **Figure 18**) on or in the vicinity of the property under discussion. No maps from the intervening years could be found. Therefore, at least one of the structures could be over 60 years and it is possible that a second structure could be over 60 years.

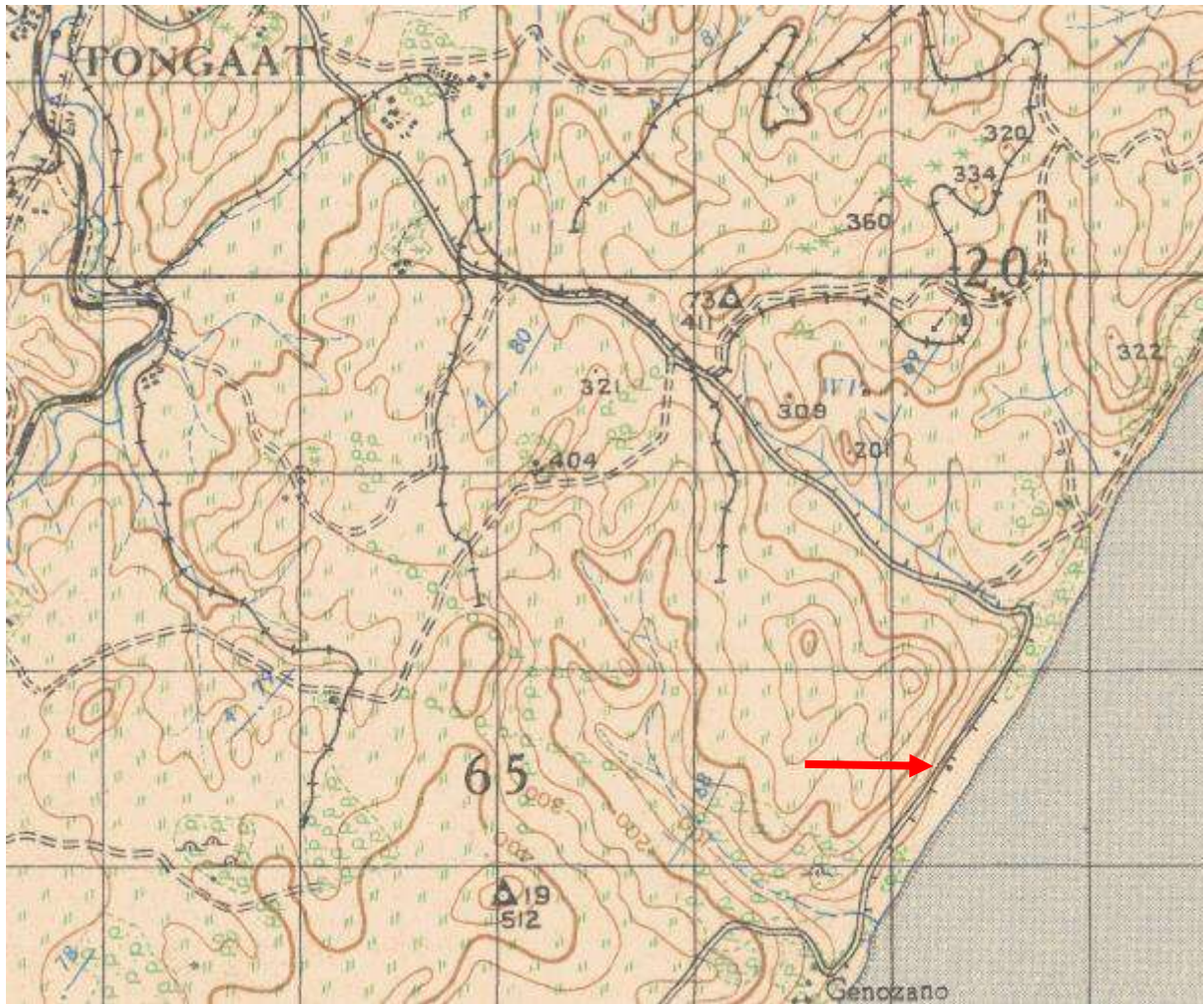


Figure 17: 1942 topographical map showing structure indicated with red arrow

According to section 37(1)(a) of the KwaZulu-Natal Amafa and Research Institute Act, no structure which is, or which may reasonably be expected to be older than 60 years, may be demolished, altered or added to without the prior written approval of the KwaZulu-Natal Amafa and Research Institute having been obtained on written application to the Institute.

It is therefore recommended that if the client does not want to apply for a permit to destroy the three structures, then the client should find documentation indicating the date of the three structures to prove that they are not older than 60 years.

It is also recommended that no activity, developmental or otherwise, take place within 30 m of the beach due to the presence of shell middens that could be damaged by such activity. If development does take place in this area, then prior to any construction activity, the removal of vegetation from the dunes must be monitored by an archaeologist to prevent any damage to shell middens or any other archaeological remains that may be found in the dunes.

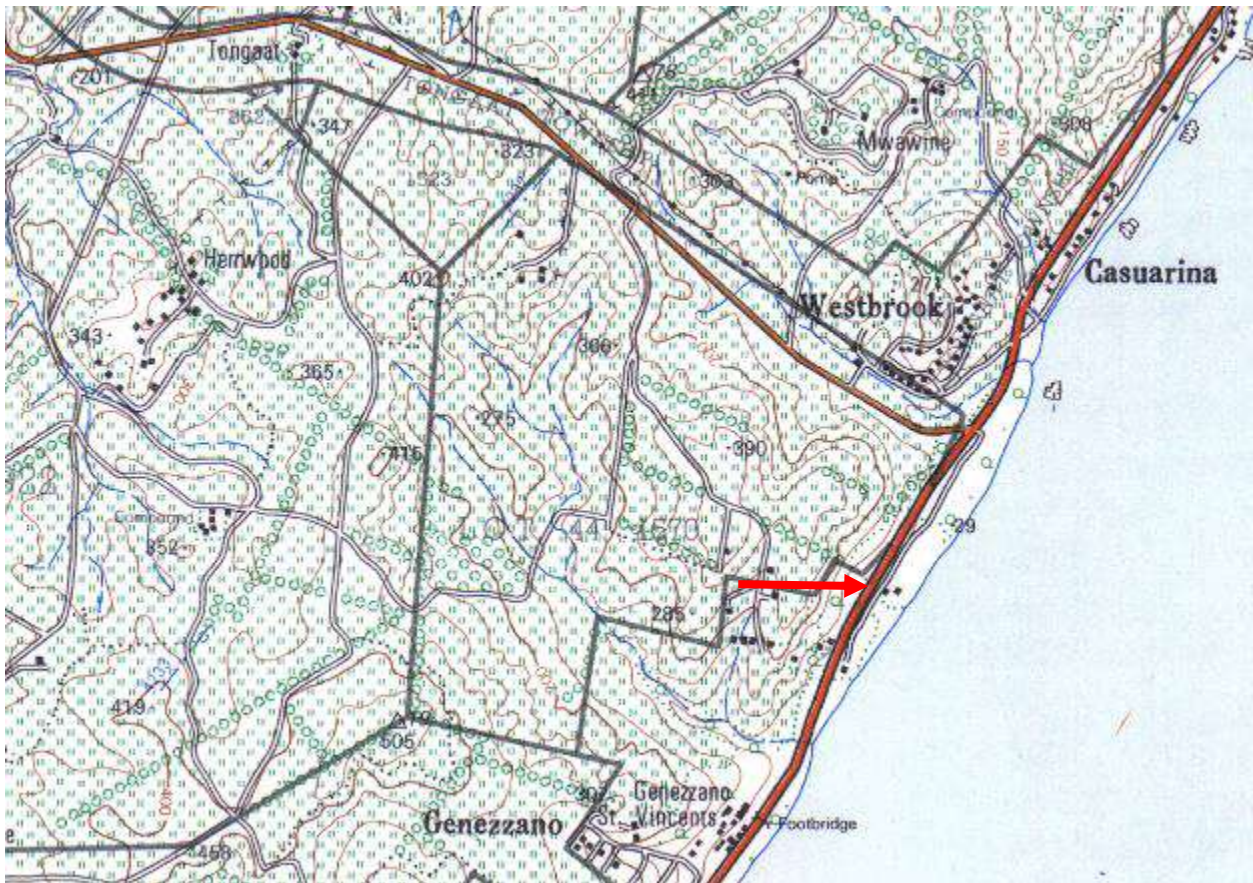


Figure 18: 1969 topographical map showing structures

Due to the property having a very high palaeontological sensitivity, the following is recommended:

- all areas where trenching or excavation for infrastructure will be deeper than 1.5m must be identified during geotechnical surveys. Where the trenches and excavations will reach this depth, a suitably qualified palaeontologist must be appointed to record and collect the fossils according to South African Heritage Resources Agency (SAHRA) and Amafa specifications as part of a Phase 1 palaeontological impact assessment during the initial stages of excavation.
- The ECO of the project must be informed of the fact that significant plant fossils may be found because the area is underlain the Vryheid Formation.
- These recommendations must form part of the EMP for the project.

9. CONCLUSION

The proposed residential / hotel development may only proceed once the age of the three structures identified and discussed in this report has been determined. If any of the structures are over 60 years, then application must be made to the KwaZulu-Natal Amafa and Research Institute according to the permit application process.

In addition, all recommendations listed above and the additional mitigation measures included in Chapter 10 must be implemented prior and during the construction of the proposed residential and hotel development.

10. MITIGATION MEASURES

- The construction team should be made aware that heritage resources, such as archaeological remains, usually occur below the ground surface level. Should any archaeological material and other heritage resources be accidentally unearthed during the course of construction, all such activities are to be halted immediately, and the Contractor will immediately inform the Project Manager. A registered heritage specialist must be called to site for inspection. Amafa must also be informed about the findings.
- The heritage specialist will assess the significance of the resource and provide guidance on the way forward.
- Written permission must be obtained from Amafa if heritage resources are to be removed, destroyed or altered.
- All heritage resources found in close proximity to the construction area to be protected by a 5m buffer in which no construction can take place. The buffer material (danger tape, fencing, etc.) must be highly visible to construction crews.
- Under no circumstances may any heritage material be destroyed or removed from site unless under direction of a heritage specialist.
- Should any recent remains be found on site that could potentially be human remains, the South African Police Service as well as Amafa must be contacted. No SAPS official may remove remains (recent or not) until the correct permit/s have been obtained..

11. REFERENCES

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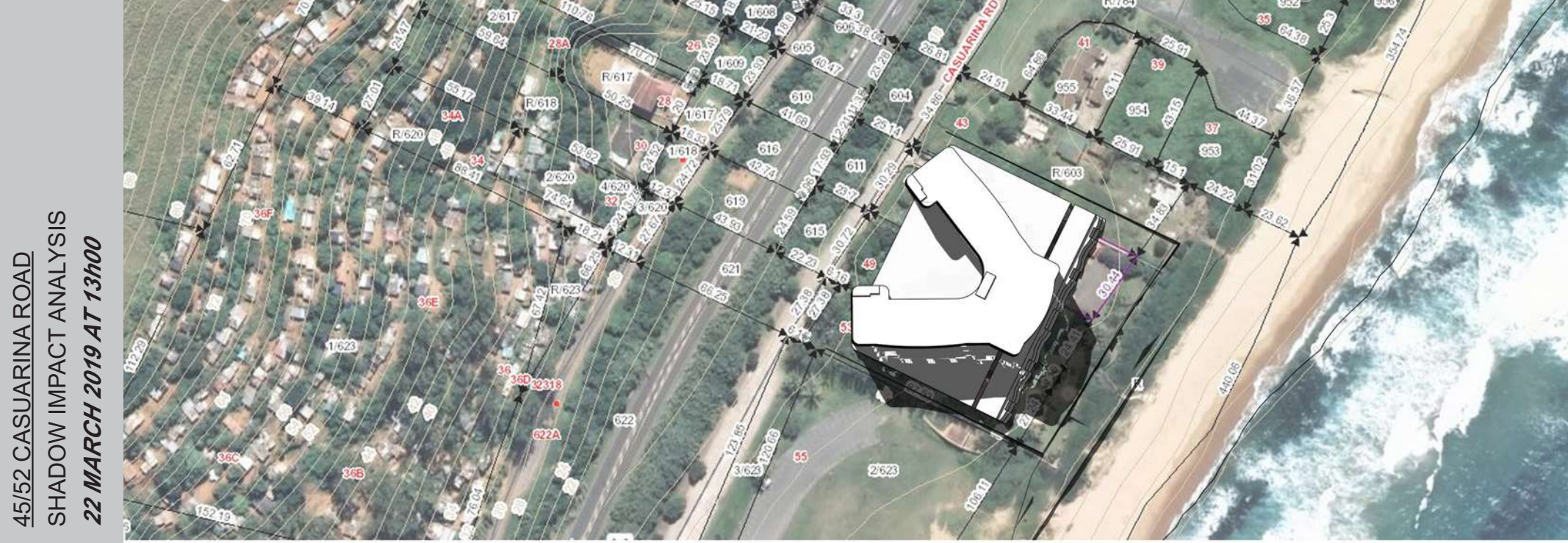
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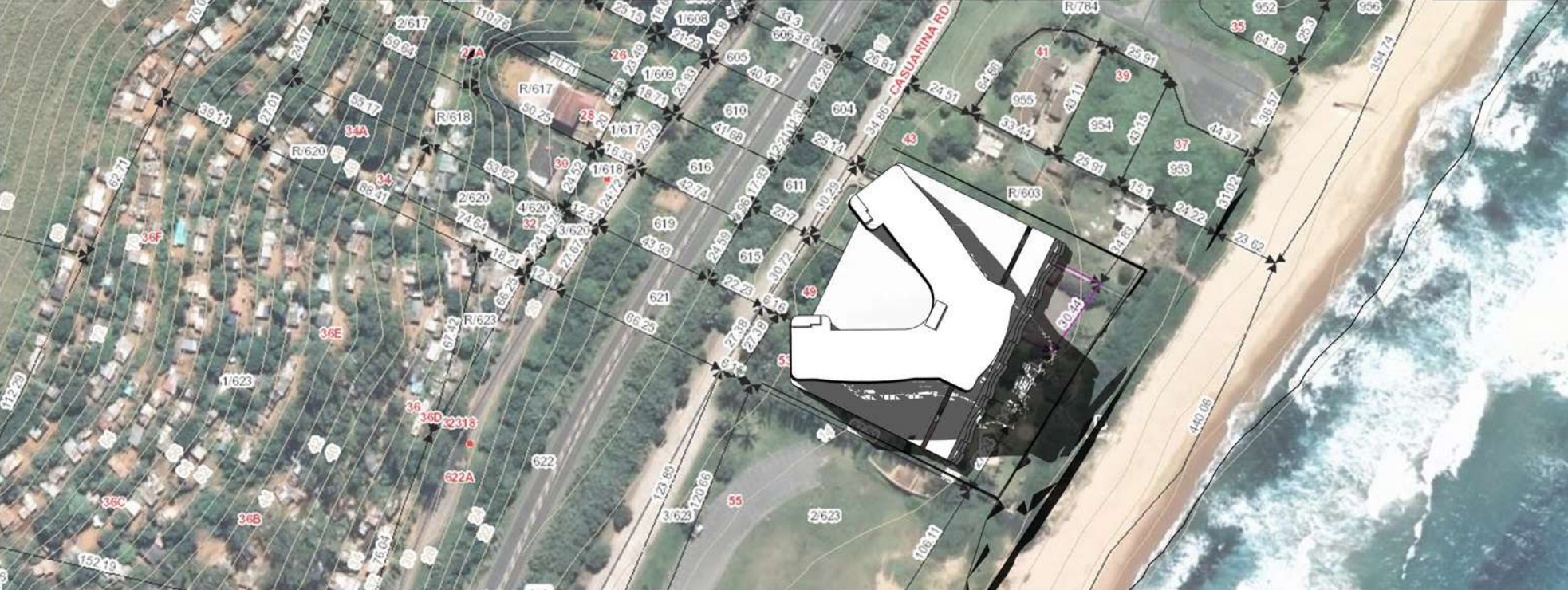
Shadow Impacts on Beaches and Residential Amenities



45/52 CASUARINA ROAD
SHADOW IMPACT ANALYSIS
22 MARCH 2019 AT 12h00



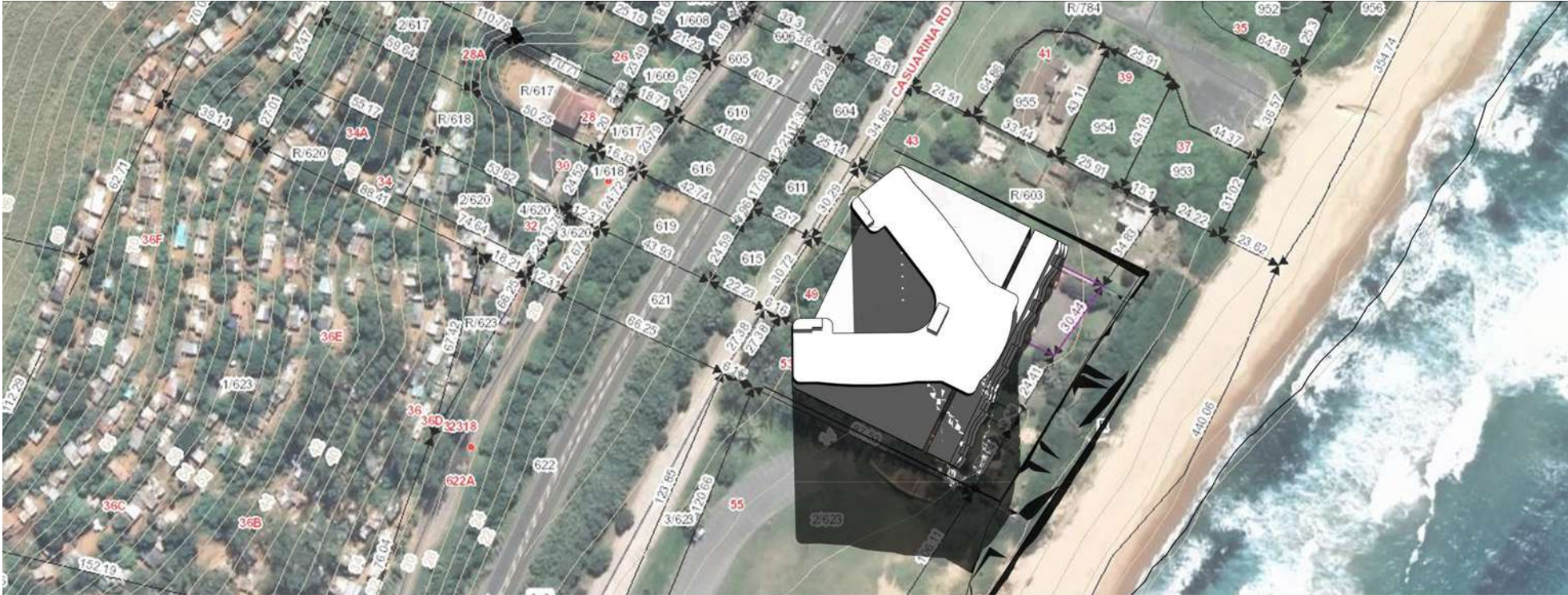
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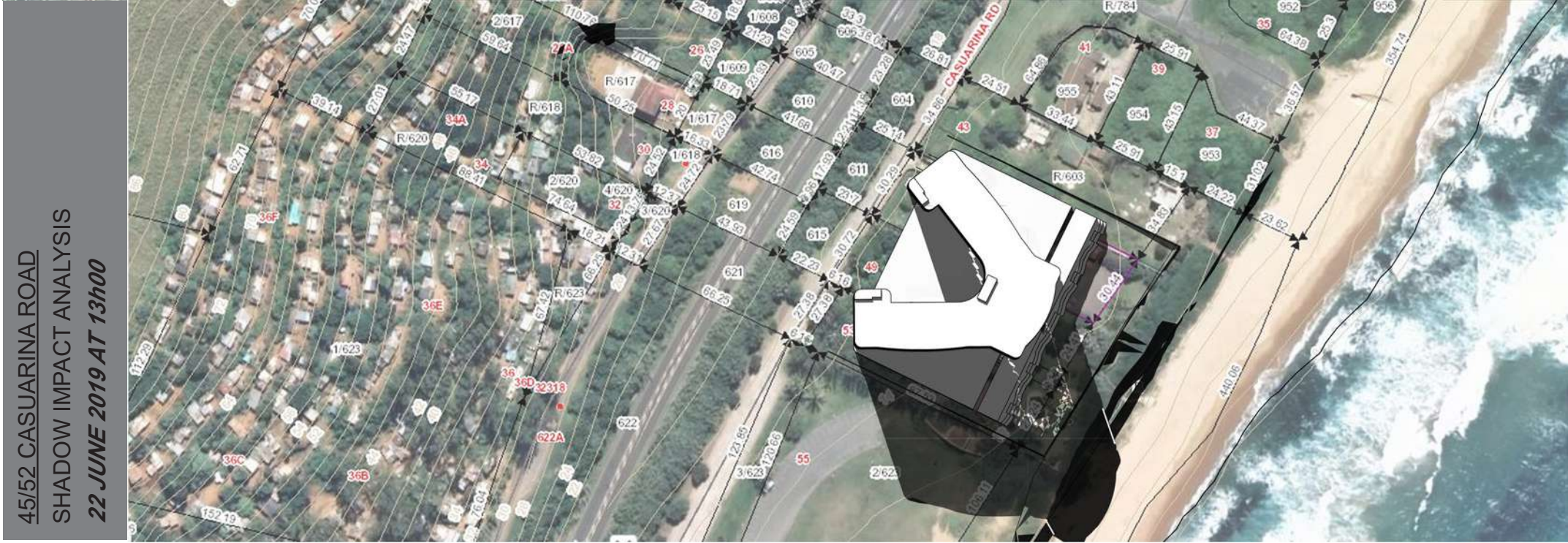
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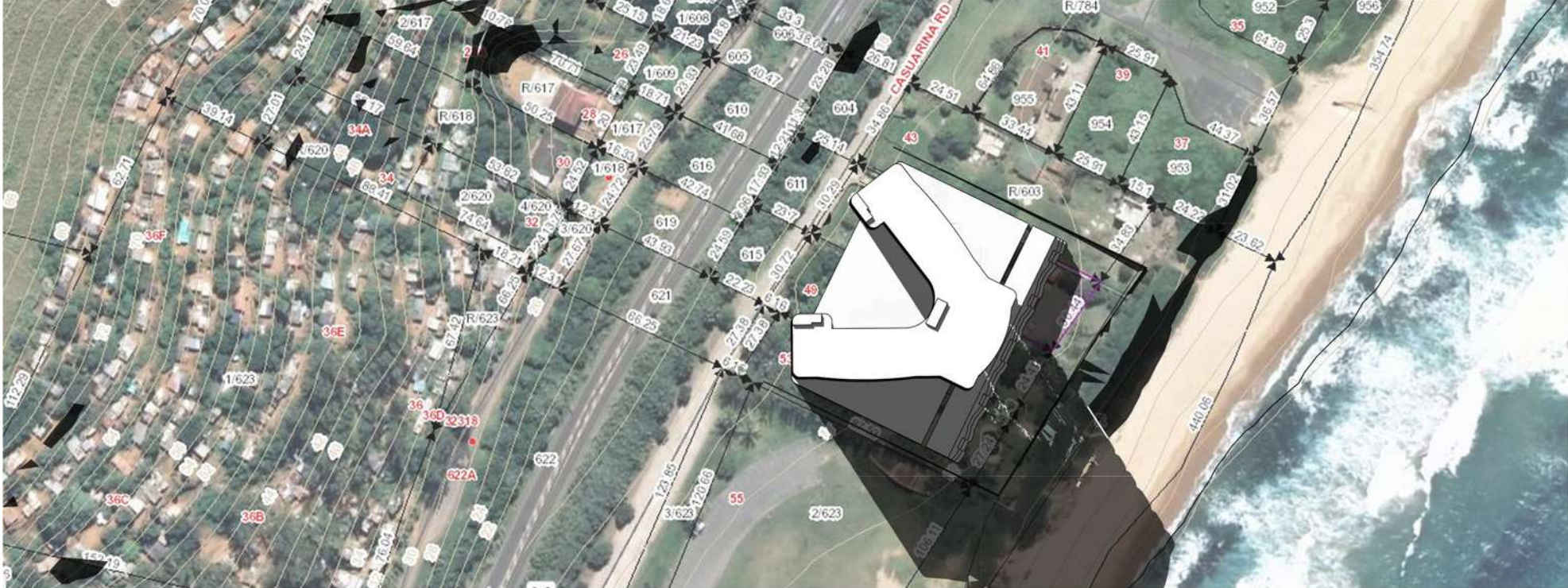
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22 MARCH 2019 AT 15h30



45/52 CASUARINA ROAD
SHADOW IMPACT ANALYSIS
22 JUNE 2019 AT 12h00



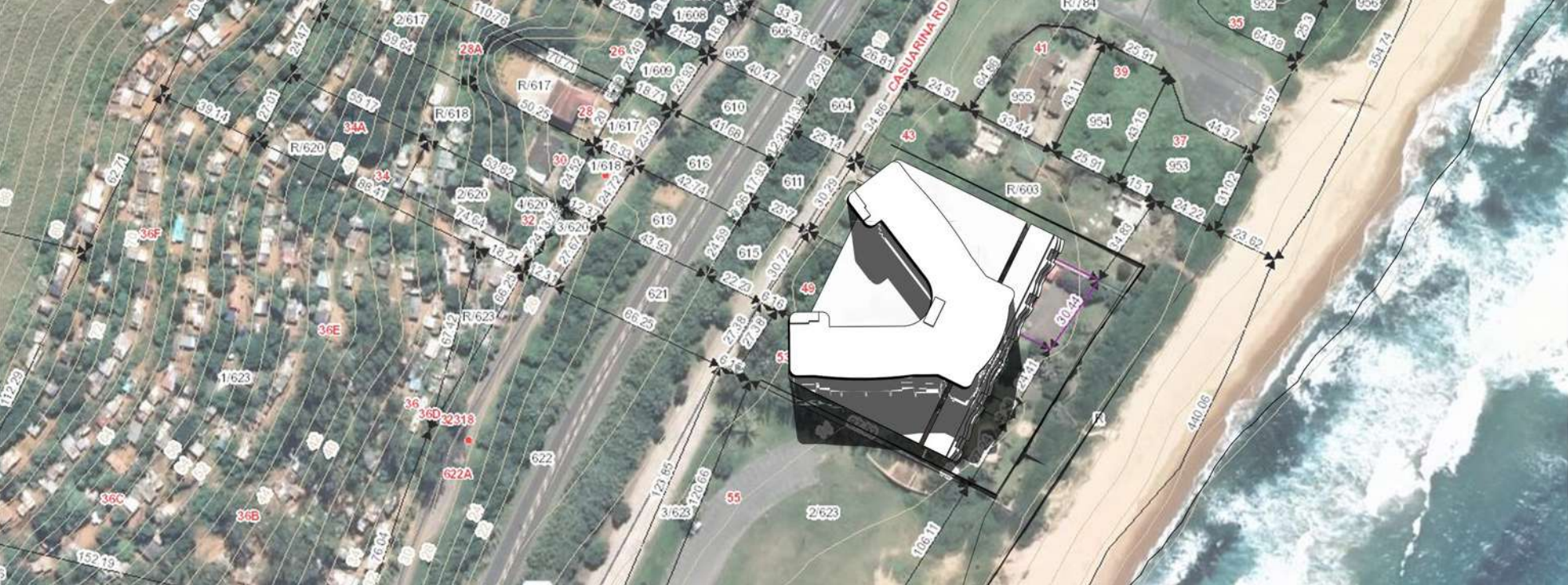
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45/52 CASUARINA ROAD
SHADOW IMPACT ANALYSIS
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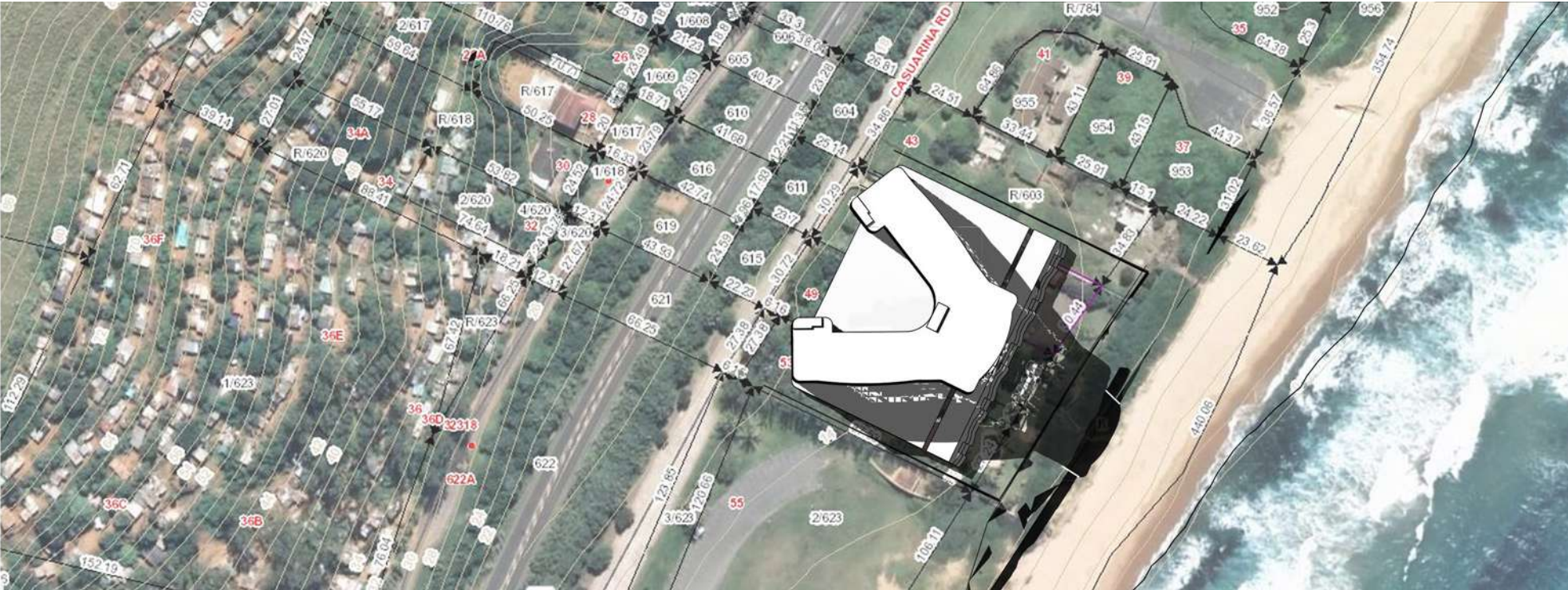
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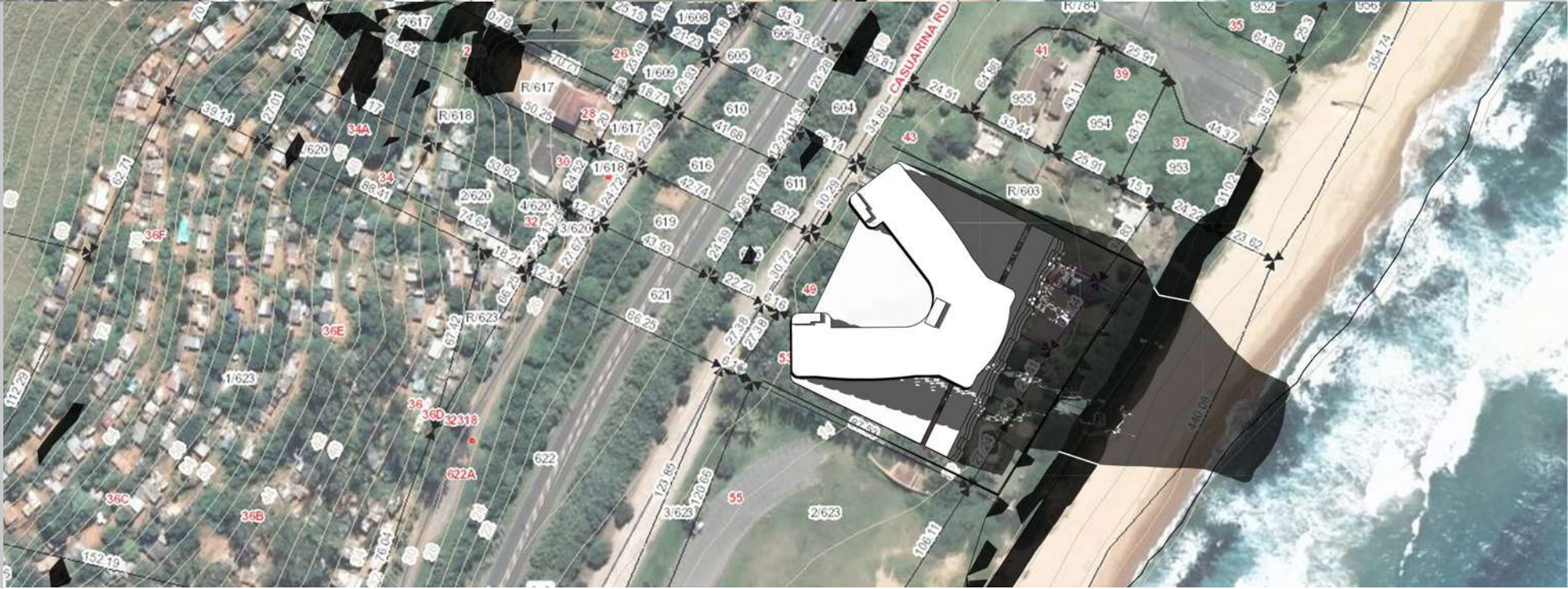
45/52 CASUARINA ROAD
SHADOW IMPACT ANALYSIS
22 SEPTEMBER 2019 AT 12h00



45/52 CASUARINA ROAD
SHADOW IMPACT ANALYSIS
22 SEPTEMBER 2019 AT 13h00



45/52 CASUARINA ROAD
SHADOW IMPACT ANALYSIS
22 SEPTEMBER 2019 AT 14h00



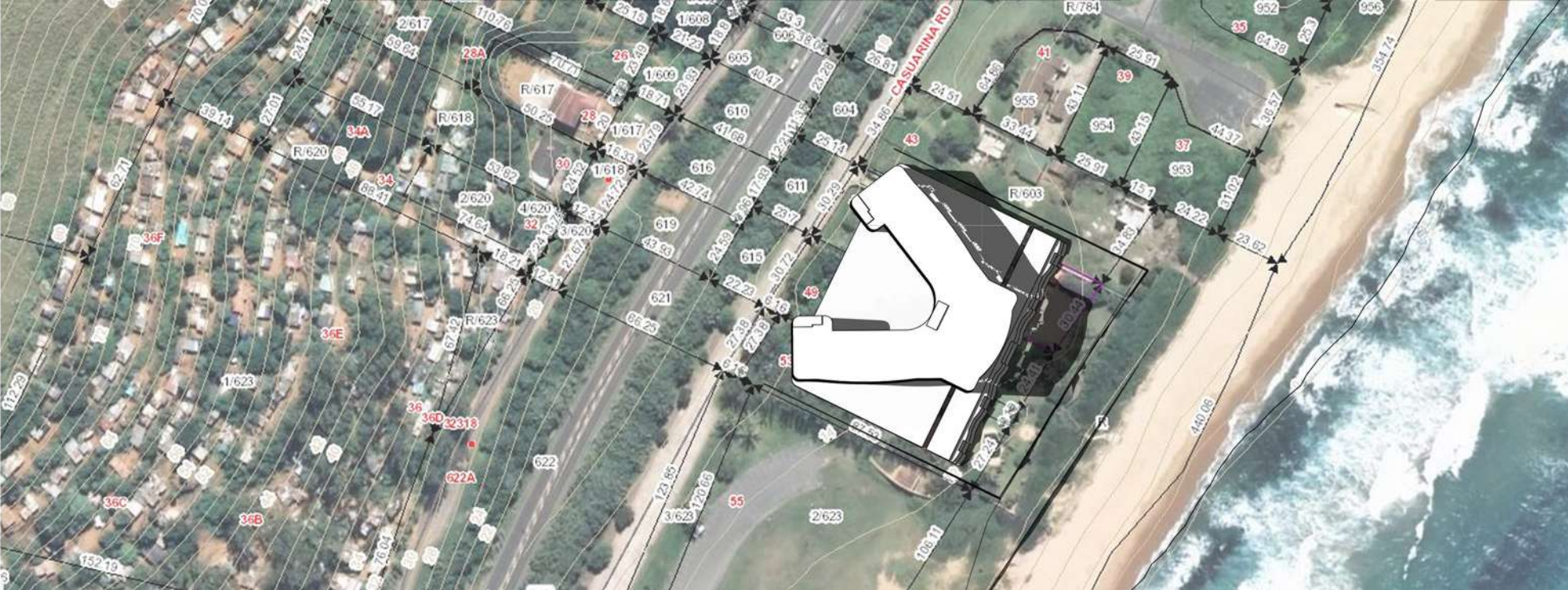
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22 SEPTEMBER 2019 AT 15h30



45/52 CASUARINA ROAD
SHADOW IMPACT ANALYSIS
22 DECEMBER 2019 AT 12h00



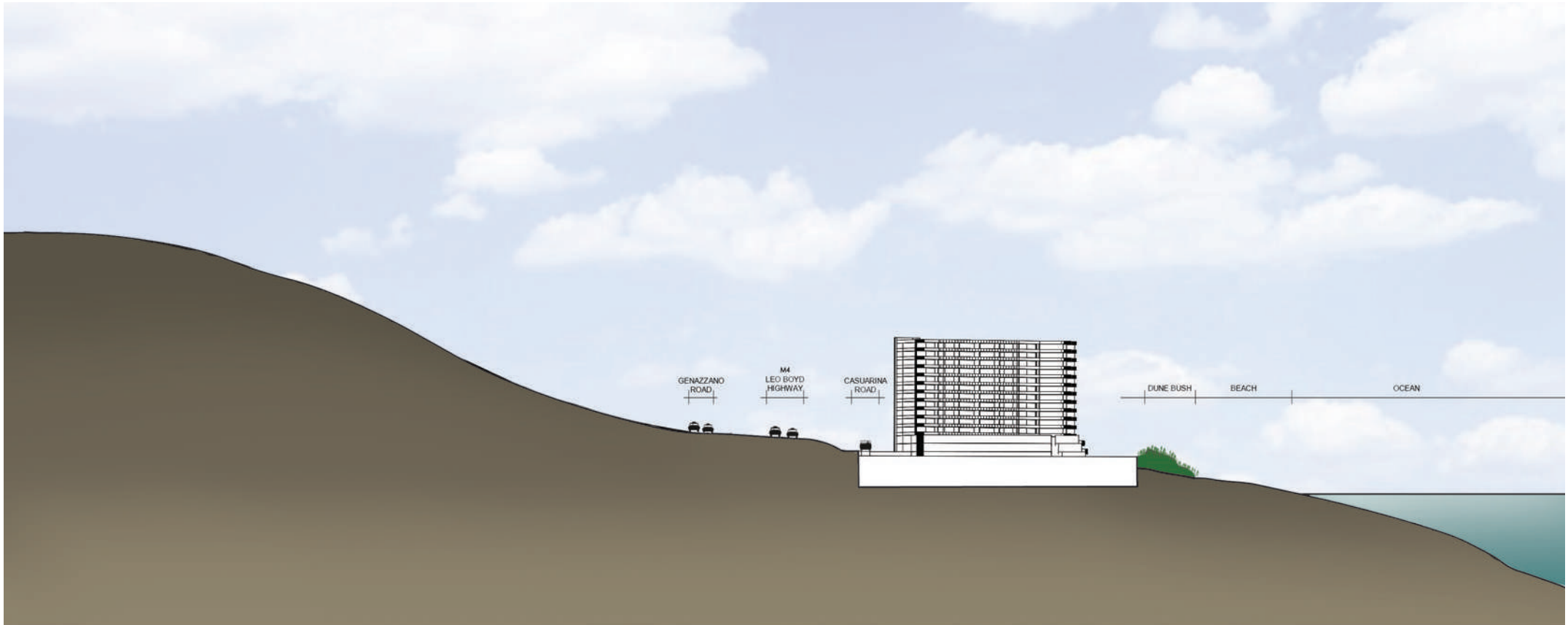
45/52 CASUARINA ROAD
SHADOW IMPACT ANALYSIS
22 DECEMBER 2019 AT 13h00



45/52 CASUARINA ROAD
SHADOW IMPACT ANALYSIS
22 DECEMBER 2019 AT 14h00



45/52 CASUARINA ROAD
SHADOW IMPACT ANALYSIS
22 DECEMBER 2019 AT 15h30



45/52 CASUARINA ROAD

LONGITUDINAL SECTION

Traffic Impact Assessment



transport

Department:
Transport
Province of KwaZulu-Natal

Inkosi Mhlabunzima Maphumulo House
Street Address: 224 Prince Alfred St,
Pietermaritzburg, 3200
Postal Address: Private Bag X9043,
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Cell: (27)76 981 2831
Email: Gugu.Ndlovu@kzntransport.gov.za

Enquiries: Ms G.P. Ndlovu
Reference: T10/2/297/542

TRANSPORTATION ENGINEERING SUB - DIRECTORATE

Arup (Pty) Ltd
Private Bag X504
NORTHWAY
4065

Your Reference: 265309
Date: 12 March 2020

ATTENTION: MOHAMED KAJEE

Dear Sir,

MAIN ROAD 398-2 (M4 HIGHWAY): TRAFFIC IMPACT ASSESSMENT REPORT NO. 265309 FOR THE PROPOSED REZONING FROM "SPECIAL RESIDENTIAL" TO "GENERAL RESIDENTIAL 2" FOR RESIDENTIAL DEVELOPMENT APPLICATION SITUATE ON THE CONSOLIDATED ERF 14674 TONGAAT: SITUATE IN THE ETHEKWINI METRO MUNICIPALITY: SITUATE IN THE ADMINISTRATIVE DISTRICT AND PROVINCE OF KWAZULU-NATAL

1. With reference to your Traffic Assessment Report No. 265309 in connection with the abovementioned proposed **REZONING FROM "SPECIAL RESIDENTIAL" TO "GENERAL RESIDENTIAL 2" RESIDENTIAL DEVELOPMENT APPLICATION**, I have to inform you that the Minister as the Controlling Authority as defined in the Kwazulu-Natal Roads Act No. 4 of 2001 has in terms of section 21 of the said Act, no objections to the application.
2. The Special Consent application for the planning of the proposed **DEVELOPMENT** may proceed in terms of the Spatial Planning and Land Use Management Act No 16 of 2013 read with chapter 4 of the eThekweni Metro Municipality Spatial Planning and Land Use Management By-laws.
3. **PLEASE NOTE:** Prior to any development taking place, in terms of sections 20 and 21 of the Kwazulu-Natal Provincial Road Act No. 4 of 2001 **5 copies a detailed to-scale site development plan showing the property boundary with co-ordinates, elevations and cross sections**, adhering to the following requirements are to be submitted to this Department for assessment and comment.
 - 3.1 Main Road 398-2 (M4) has an expropriated road reserve width of a minimum width of 80 meters. In terms of the Road Infrastructure Strategic Framework for South Africa (RISFSA) and the TRH 26 being the South African Road Classification and Access Management Manual (RCAM), this road is a mobility road, its classification is determined as follows:

Main Road 398-2 - RISFSA P and RCAM R3, a rural major arterial and district distributor.
 - 3.2 In terms of section 13 of the Kwazulu-Natal Provincial Roads Act No. 4 of 2001, no buildings or any structures whatsoever, other than a fence, hedge or a wall which does not rise higher than 2,1 meters above or below the surface of the land on which it stands, shall be erected on the land within a distance of 15 meters measured from the expropriated road reserve boundary of Main Road 398-2.

- 3.3 No internal service road or parking as required in the eThekweni Town Planning scheme, shall be erected on the land within a distance of 7,5 meters measured from the road reserve boundary of Main Road 398-2.
- 3.4 The road reserve boundary of Main Road 398-2 shall be determined in consultation with this Departments Road Information Services, Head Office (Tel: 033-355 8917)
- 3.5 The owner/s attention is drawn to the relevant stormwater clause contained in section 12 of the Kwazulu-Natal Provincial Roads Act No. 4 of 2001 and section 5 of the Roads Regulations, wherein it is advised that the disposal of stormwater emanating from the road reserve through the layout, or any stormwater emanating from the layout through the road reserve, **must be indicated on a detailed to-scale site development plan which is to be submitted to this Department for assessment and comments.** The implementation of stormwater disposal shall be undertaken in consultation with and to the satisfaction of this Departments Cost Centre Manager, Metro (Telephone: 031-4698900) during the further development of the property concerned.
4. On assessing the Traffic Impact Assessment Report (TIA) No. 265309 the analysis of all findings and recommendations made in the report regarding the necessary road improvements are acceptable to this Department and are to be implemented.
- 5.1 Subject to the eThekweni Municipal approval of the application, authority is hereby granted in terms of section 10 of the Provincial Roads Act No. 4 of 2001 for the use of the existing roundabout linking Main Road 398-2 to the Municipal Road namely, Casuarina Road, so as to serve the proposed development.
- 5.2 It is also advised that in term of section 10 (2) (d) of the said Roads Act, this Department reserves the right to amend or cancel the authorisation of access or service road.
6. Adequate parking facilities must be provided within the property itself and the proposed development must comply with the required number of parking bays prescribed for **"GENERAL RESIDENTIAL 2"** Gross Leasable Area (G.L.A) requirement.
7. All costs incurred, as a result of these requirements shall be borne entirely by the developer.
8. **Accordingly**, upon receipt of 5 copies of a detailed to-scale site development plan this Department will comment further.
9. This correspondence does not grant authorization or exemption from compliance with any other relevant and applicable legislation.

Yours faithfully,



f HEAD: TRANSPORT

GPN/mds/an

Ribdev.2020.Dbn_Metro_TIA_001

CC. Regional Manager: Durban
Cost Centre Manager: Metro

The intention of the developer is to construct 206 residential units on the site.

Therefore, the traffic analysis has been undertaken for the proposed 206-unit residential development.

3.1.5 Access Arrangement

It is proposed that the development takes access off Casuarina Drive, via the M4 highway, as illustrated in Figure 3.



Figure 3: Access Arrangement

Mr AH Singh

**45 – 53 Casuarina Drive |
Residential Development**

**Traffic Impact Assessment |
Rezoning Application**

eThekweni Municipality

ISSUE 1 | 16 April 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 265309

Arup (Pty) Ltd
Reg. No. 1994/004081/07 Registered Firm
Consulting Engineers South Africa



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Northway 4065
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Document Verification

ARUP

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|--|-------------|---|--|-----------------------|---------------|
| Job title | | 45 – 53 Casuarina Drive Residential Development | | Job number | |
| | | | | 265309 | |
| Document title | | Traffic Impact Assessment Rezoning Application | | File reference | |
| | | | | | |
| Document ref | | eThekweni Municipality | | | |
| Revision | Date | Filename | 49 Casuarina Residential TIA.docx | | |
| ISSUE 1 | 4 Nov 2019 | Description | Traffic Impact Assessment – Issue 1 | | |
| | | | Prepared by | Checked by | Approved by |
| | | Name | Kyle Mitchell | Mohamed Kajee | Mohamed Kajee |
| | | Signature | | | |
| ISSUE 2 | 28 Feb 2020 | Filename | 49 Casuarina Residential TIA.docx | | |
| | | Description | Road characteristics and Neighbouring Developments | | |
| | | | | | |
| | | Name | Kyle Mitchell | Mohamed Kajee | Mohamed Kajee |
| | | Signature | | | |
| ISSUE 3 | 16 Apr 2020 | Filename | 49 Casuarina Residential TIA.docx | | |
| | | Description | Upgrade of narrow portion of Casuarina Drive | | |
| | | | | | |
| | | Name | Kyle Mitchell | Mohamed Kajee | Mohamed Kajee |
| | | Signature | | | |
| | | Filename | | | |
| | | Description | | | |
| | | | Prepared by | Checked by | Approved by |
| | | Name | | | |
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Architect's Site Plan

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Traffic Road Layout and ROW Servitude

Appendix C

KZN DOT Responses

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Traffic Counts

Appendix E

Zoning Information

Appendix F

TIA Electronic Copy & Sidra Intersection 6 Files

1 ETA Checklist

| Content | Yes | No | N/A | Comment |
|---|------------|-----------|------------|----------------|
| 1. Traffic impact assessment cover | ✓ | | | |
| 2. Cover letter signed by ECSA registered professional | ✓ | | | |
| 3. Development Particulars | | | | |
| 3.1. Development description and reference name | ✓ | | | |
| 3.2. Location plan | ✓ | | | |
| 3.3. Land use rights existing and applied, including type and extent of rights, list of land uses under proposed zoning including town planning controls | ✓ | | | |
| 4. Study area | | | | |
| 4.1 Study area plan or map indicated | ✓ | | | |
| 5. Background information | | | | |
| 5.1. Listed information – transport facilities and planning | ✓ | | | |
| 5.2. Relevant information provided by municipality e.g. Framework plans, road classification traffic models, etc. | ✓ | | | |
| 5.3. Schematic diagram/s | ✓ | | | |
| 6. Site investigation | | | | |
| 6.1. Documented and photographic record (e.g. road conditions, geometrics, operations, transport facilities, etc) | ✓ | | | |
| 7. Traffic Demand Estimation | | | | |
| 7.1. Carried out for worst case trip demand land use under the proposed change in land use or extent as stipulated in the town planning application | ✓ | | | |
| 7.2. Assessment years | ✓ | | | |
| 7.3 Assessment hours | ✓ | | | |
| 7.4. Traffic counts not more than 2 years old – date and time | ✓ | | | |
| 7.5. Traffic growth rates | ✓ | | | |
| 7.6. Trip generation rates | ✓ | | | |
| 7.7. Modal split | ✓ | | | |
| 8. Traffic Assignment and Trip Distribution | | | | |
| 8.1. Manual assignment and trip distribution | ✓ | | | |
| 8.2. Simulation software trip distribution and assignment – software files must be provided | ✓ | | | |
| 8.3. Supporting information documented for traffic distribution and assignment | ✓ | | | |
| 8.4. Traffic Assignment and Trip Distribution diagrams | ✓ | | | |
| 9. Total traffic demand | Yes | No | N/A | Comment |
| 10. Demand side mitigation | ✓ | | | |
| 11. Proposed improvements | | | | |
| 11.1. New roads or widening or intersection improvements – TRL drawing and fatal flaw implementation screening checklist | ✓ | | | |
| 11.2. Traffic signals must meet ETA's Urban Traffic Control requirements warrant. In addition, a roundabout assessment comparison must be carried out | | | ✓ | |
| 11.3. Traffic management plans | | | ✓ | |
| 12. Traffic Impact Assessment | | | | |
| 12.1. Assessment based on worst case land use scenario | ✓ | | | |
| 12.2. Design year horizon assessment | | | | |
| 12.2.1. "Without" proposed mitigating measures | ✓ | | | |
| 12.2.2. "With" proposed mitigating measures | ✓ | | | |
| 12.3. Planning year horizon assessment | | | | |
| 12.3.1. "With" proposed mitigating measures | ✓ | | | |
| 13. Site Impact Assessment | | | ✓ | |
| 14. Road network, master planning and cost | | | | |
| 14.1. Any changes to road master planning | | | ✓ | |
| 14.2. Transport / Road services contribution | | | ✓ | |
| 14.3. Improvement costs | | | ✓ | |
| 14.4. Recommendations | ✓ | | | |
| 14.5. Traffic Road Layout Plans | ✓ | | | |
| 14.6. Eng. Drawings, Cost estimate, Financial guarantees, & Undertakings for new or existing road improvements | ✓ | | | |
| 15. Recommendations | | | | |
| 15.1. The change in land use for which approval is required. | ✓ | | | |
| 15.2. Proposed type and location of all erf accesses. | ✓ | | | |
| 15.3. The improvements, changes and mitigation measures that are required, subject thereto that these improvements or measures may be amended in subsequent investigations. | ✓ | | | |
| 15.4. Elements of the road network master plan that should be implemented in support of the development. | ✓ | | | |
| 15.5 Traffic management measures aimed at protecting residential or other sensitive areas. | ✓ | | | |
| 16. Appendix | | | | |
| 16.1. Relevant Traffic Impact Assessment Correspondence. Traffic Counts, analysis details, maps, plans, etc | ✓ | | | |

2 Letter Signed by ECSA Registered Professional

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11 November 2019

Dear Sir/Madam

Traffic Impact Assessment (TIA) for 49 Casuarina Drive, Tongaat.

The undersigned has been appointed as the registered professional for this Traffic Assessment and has applied due diligence to the content of this report and endeavoured to ensure that the report is free of technical errors and takes full responsibility for its contents.

Arup (Pty) Ltd also undertakes to attend any forum where the TIA is in dispute to report on matters that relate to the TIA. We understand and agree that the municipality shall not be liable to compensate us in this regard.

Yours sincerely,



Mohamed Kajee
Senior Transport and Traffic Engineer
Arup

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3 Development Details

3.1.1 Background

Arup (Pty) Ltd have been appointed by Mr AH Singh to undertake a Traffic Impact Assessment (TIA) for the proposed medium to high income residential development to be located in Westbrook, Kwa-Zulu Natal. This TIA will form part of the rezoning application.

3.1.2 Site Location

The proposed residential development is to be located on 45-53 Casuarina Drive, Westbrook which is approximately 40km north of the Durban CBD and approximately 10kms from King Shaka International Airport. The site location and locality plan can be seen in **Figures 1** and **2**, respectively.

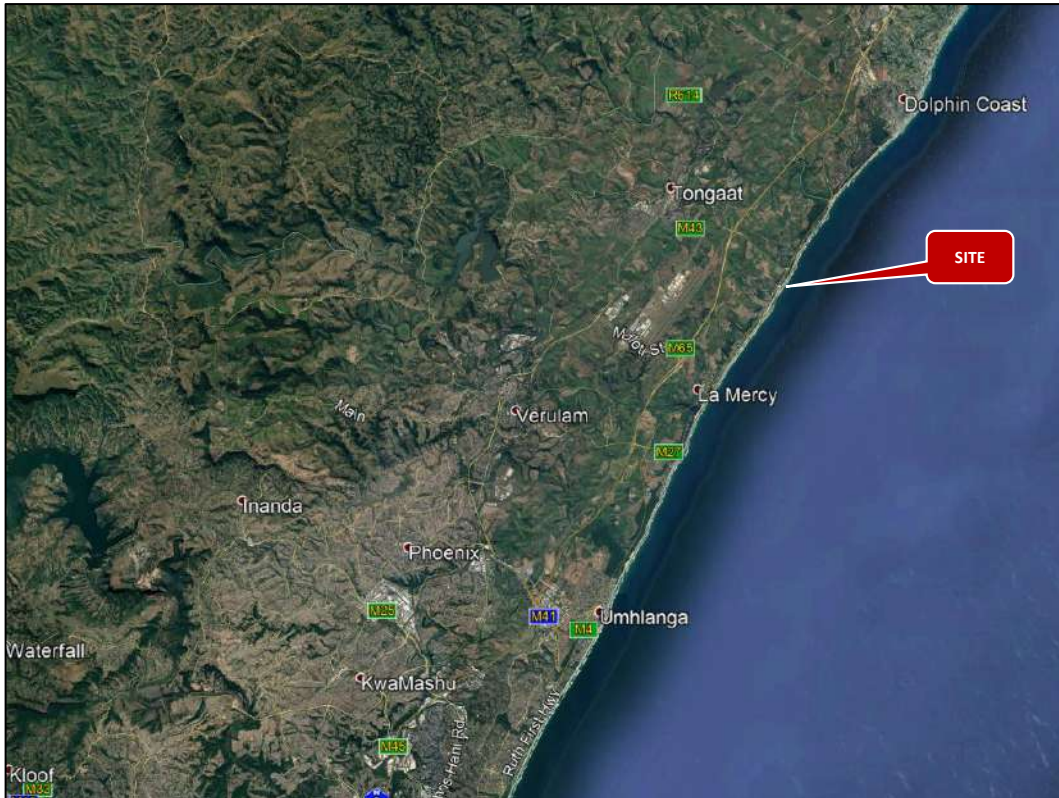


Figure 1: Site Location

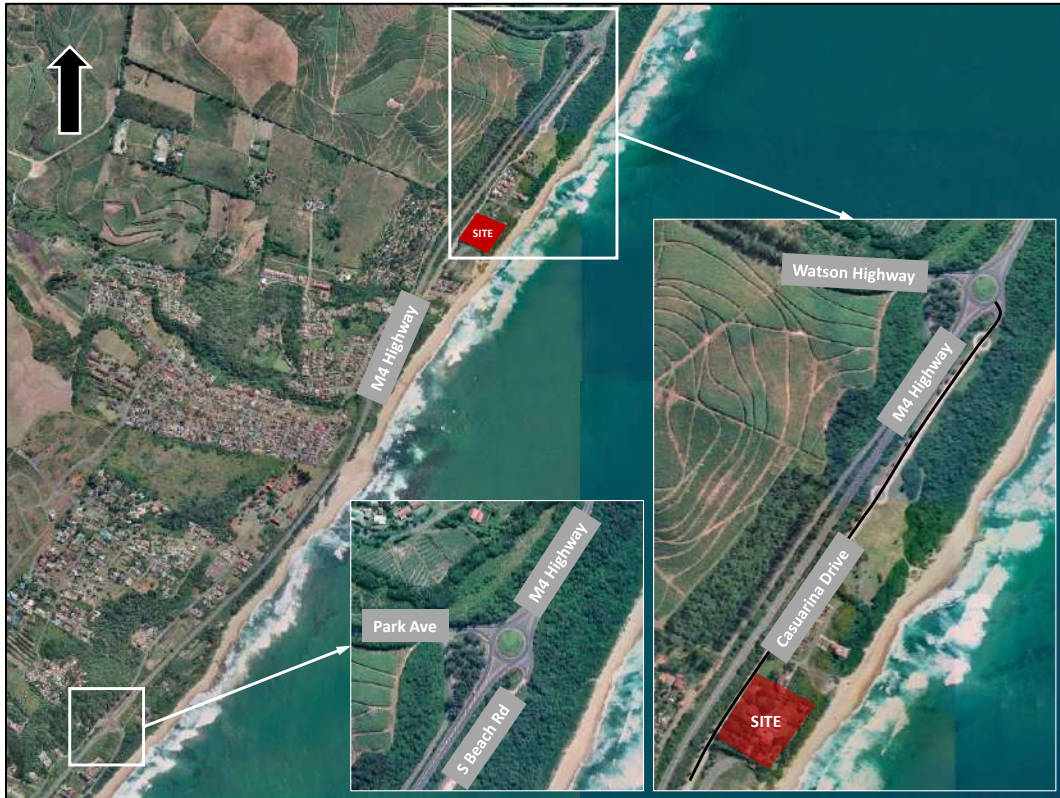


Figure 2: Locality Plan

3.1.3 Development Details

The proposed site currently comprises of separate residential dwelling units which are to be demolished. The developer intends re-zoning the 8 419m² site for the development of a residential development of approximately 12 629m² coverage. The development is to comprise of a 14-floor residential block with 206 units.

The Architect's site plan has been included in this report in **Appendix A**.

3.1.4 Existing and Proposed Rights

- in terms of Section 22 (2) of the Act for the consolidation of Erf 612 Tongaat, Erf 613 Tongaat, Sub 1 of Erf 614 Tongaat, the Remainder of Erf 614 Tongaat and Sub 1 of Erf 620 Tongaat, 45 - 53 Casuarina Road, Genezzano Beach, Tongaat to form proposed Erf 14674 Tongaat as shown on the Consolidation Diagram prepared by John Goosen, Land Surveyors, attached in Appendix 1,
- in terms of Section 28 of SPLUMA and Clauses 21 and 23 of the By-law for the rezoning of proposed Erf 14674 Tongaat from Special Residential to General Residential 2,
- in terms of Clause 5.2.2 of the North Scheme of the eThekweni Municipality (the "scheme") for special consent for increased coverage from 50% to 55.7% for the provision of covered parking and for increased floor area from an FAR of 1.1 to an FAR of 1.5 to accommodate additional floor area of 3368,5m² .
- in terms of Clause 5.3 for special consent to allow additional height up to a maximum of 11 floors, and

The intention of the developer is to construct 206 residential units on the site.

Therefore, the traffic analysis has been undertaken for the proposed 206-unit residential development.

3.1.5 Access Arrangement

It is proposed that the development takes access off Casuarina Drive, via the M4 highway, as illustrated in **Figure 3**.



Figure 3: Access Arrangement

4 Study Area

The extent of the study area selected as illustrated in **Figure 4** includes the following roads of significance:

- M4 Highway;
- Watson Highway;
- Casuarina Drive;
- Park Avenue;
- South Beach Road



Figure 4: Study Area

5 Background Information

5.1.1 Existing Road Network

Information regarding the class of road and number of lanes for roads of significance within the study area is illustrated in **Figures 5 and 6**. It should be noted that the data on the number of lanes contained in **Figure 6** as obtained from the eThekweni GIS does not reflect the number of lanes where localised road widenings occur. The information on the existing number of lanes in the vicinity of intersections can be found in the Sidra layouts provide in **Section 14.1** of this report.



Figure 5: Class of Roads [Source: eThekweni Municipality GIS Database]

The M4 Highway is a Class 2 road with 3 lanes (includes both directions) between the Watson Highway /M4 Highway roundabout and Park Avenue/ M4 highway roundabout. The M4 Highway comprises of sections with two lanes north bound and one lane southbound and vice versa, which widens or narrows at the roundabouts.

Casuarina Drive has one lane per direction and is a class 5 road. Casuarina Drive is less than 5m wide at certain portions as indicated in **section 6** of this report, site visit photographs. A portion of this road currently sits within Erf 612. In this regard, the developer wishes to register a Right of Way Servitude on his site in favour of the municipality to account for the road. It is the intention to register a 6.1m wide right of way road servitude along the north-western edge identified as A d1 G H. The registration of this ROW servitude is in favour of the municipality and is shown in **Appendix B**.



Figure 6: Number of Lanes [Source: eThekwini Municipality GIS Database]

5.1.2 Existing Intersection Controls

Based on the study area criteria as per Section 4.3.5 of the *ETA's Manual for Traffic Impact Assessments & Site Traffic Assessments*, it was determined that the following intersection(s) be analysed:

- The M4 Highway/ Watson Highway/ Casuarina Drive roundabout.
- The M4 Highway/ Park Avenue/ South Beach Road roundabout.

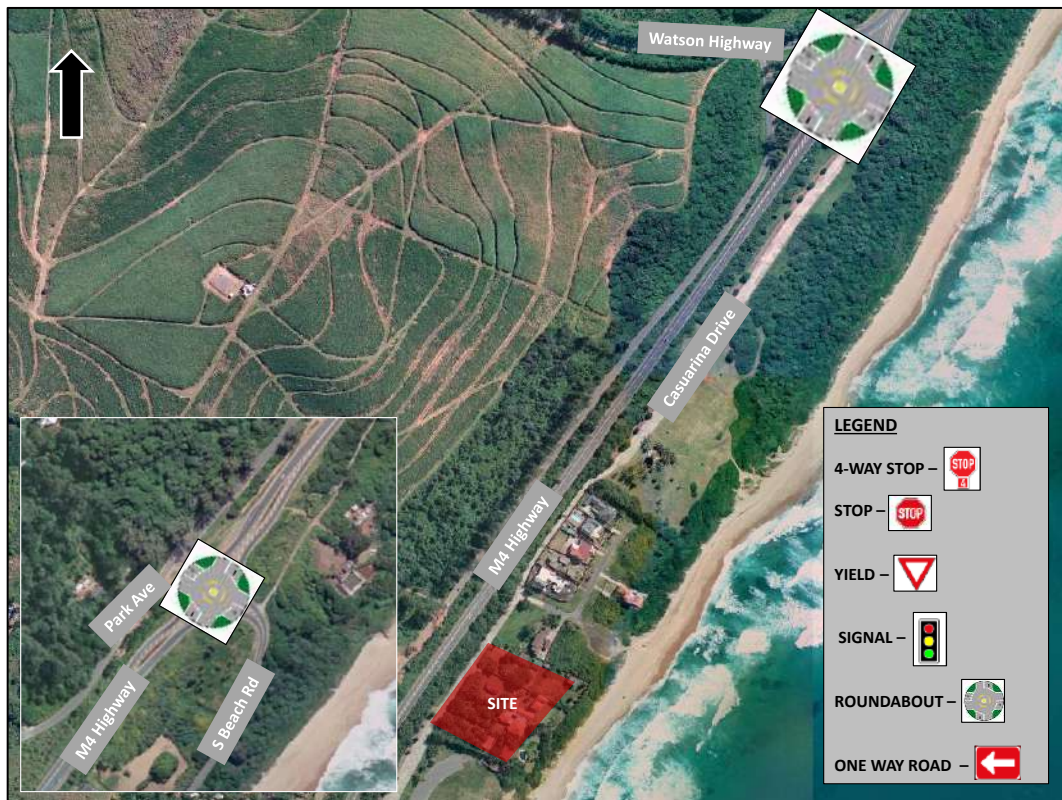


Figure 7: Intersection Locations & Current Traffic Control

5.1.3 Existing Public Transport, Pedestrian & Cycling Facilities

An assessment was undertaken to determine any existing public transport, pedestrian and cycling facilities located in the vicinity of the proposed development site as shown in **Figure 8** below.



Figure 8: Location of Existing Facilities

5.1.4 Planned Transportation Upgrades

No information was made available by the eThekweni Municipality with regards to any planned upgrades to transport facilities that would be likely to be implemented in the area during the time horizon for which this traffic assessment has been undertaken.

5.1.5 Review of Available Planning Documents

No information on the available planning documents has been provided by the eThekweni Municipality.

6 Site Investigation

On-site observations were undertaken to determine possible operational issues in the vicinity of the site, as illustrated in **Figure 9**. The following are some of the important on-site observations during the morning peak hour:

- Significant cyclist activity observed along the M4 highway.



Figure 9: Site Investigation

The following pictures were taken during site visit:



Photo 1: Casuarina Drive, narrow road section measuring less than 5m.



Photo 2: Casuarina Road, to possibly be utilised to redirect traffic off Casuarina Drive.



Photo 3: Intersection of Park Avenue/ M4 Highway



Photo 4: Looking from Casuarina Drive towards the M4 highway south bound.

7 Affected Planning/ Road Authorities

As per **Figure 10** below, Casuarina Drive, South Beach Road and Park Avenue fall under the control of the eThekweni Municipality. The M4 Highway belongs to the Kwa-Zulu Natal Department of Transport (KZN DOT). To this end, a copy of this TIA has been issued to KZN DOT for comment. The KZN DOT response is contained in **Appendix C**.



Figure 10: Road Ownership [Source: eThekweni Municipality GIS Database]

8 Traffic Demand Estimation

8.1.1 Trip Generation

The *ETA Manual for Traffic Impact Assessments and Site Traffic Assessments* recommends a rate of 1.3 trips/ unit for the AM and PM peak hours for residential dwelling units.

As per Table 5.11 of the *ETA Manual for Traffic Impact Assessments and Site Traffic Assessment*, the proposed site falls within Zone R49 Greater Tongaat where the average car ownership is 120 cars/ 1000. As per the Table on page 58 of the manual, the proposed site falls within the low vehicle ownership range. To this end, a **potential** low vehicle ownership reduction of 40% could be applicable to the base trip rate of 1.3 trips/ dwelling unit.

As per correspondence with ETA Strategic Planning Department, whilst the use of low vehicle car ownership reduction is more applicable to low income housing in this particular case the use of a trip rate of 1.3 trips/ dwelling unit is more suitable as this development is aimed at the middle to high income market.

To this end, a trip rate of 1.3 trips/ dwelling unit was used for analysis purposes.

Table 1: Trip Generation: Proposed Zoning - Residential

| Land Use | Dwelling Units | Trip Rate | | Trips Gen | | In: Out Split | | | |
|----------------------------|----------------|-----------|-----|-----------|-----|---------------|-----------|------------|-----------|
| | | AM | PM | AM | PM | AM | | PM | |
| | | | | | | In (25%) | Out (75%) | In (70%) | Out (30%) |
| Residential | 206 | 1.3 | 1.3 | 268 | 268 | 67 | 201 | 187 | 80 |
| Total per Peak Hour | | | | | | 268 | | 268 | |

The trip generation for the developer's intention of 206 medium density residential units is expected to generate 268 trips during both the AM (split 25:75) and PM (split 70:30) peak hours respectively.

8.1.2 Modal Split

The proposed development is aimed at catering for medium income residential. To this end, no reduction in trip generation for low level of vehicle ownership and proximity to public transport has been applied.

8.1.3 Assessment Years

According to the ETA Manual for TIA's & STA's, developments that generate less than 1000 peak hour passenger car trips will warrant the following assessment(s) to be undertaken:

- Design Horizon Year – 2024 plus development.

Due to the demand of the proposed development not exceeding 1000 peak hour passenger car trips, no planning horizon year assessment (i.e. 10, 15 or 20 years) was undertaken.

9 Trip Distribution & Assignment

The trip distribution and assignment was based on the inspection of the spatial location of residential development in the area, local knowledge and an assessment of traffic counts. The resulting trip distribution and assignment for the morning and afternoon peak hours is illustrated in **Figure 11**.

The AM and PM peak hour development traffic was then assigned to the road network as illustrated in **Figures 12 to 15**.

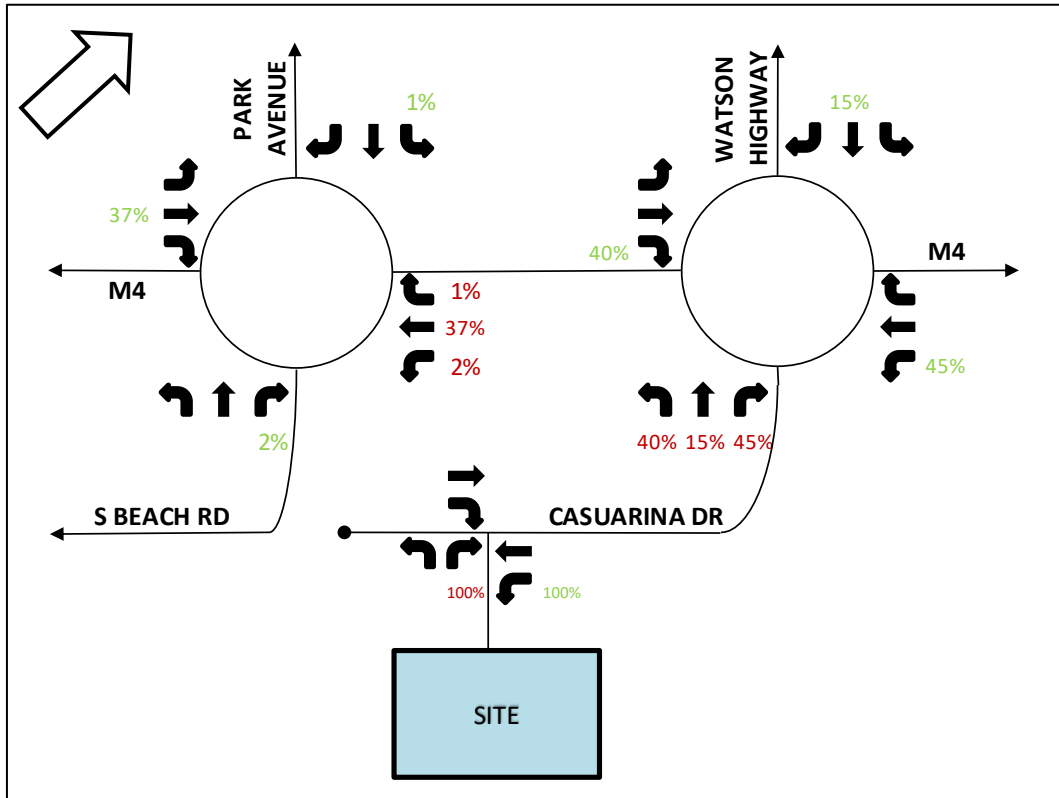


Figure 11: % Trip Distribution – AM and PM Peak hour

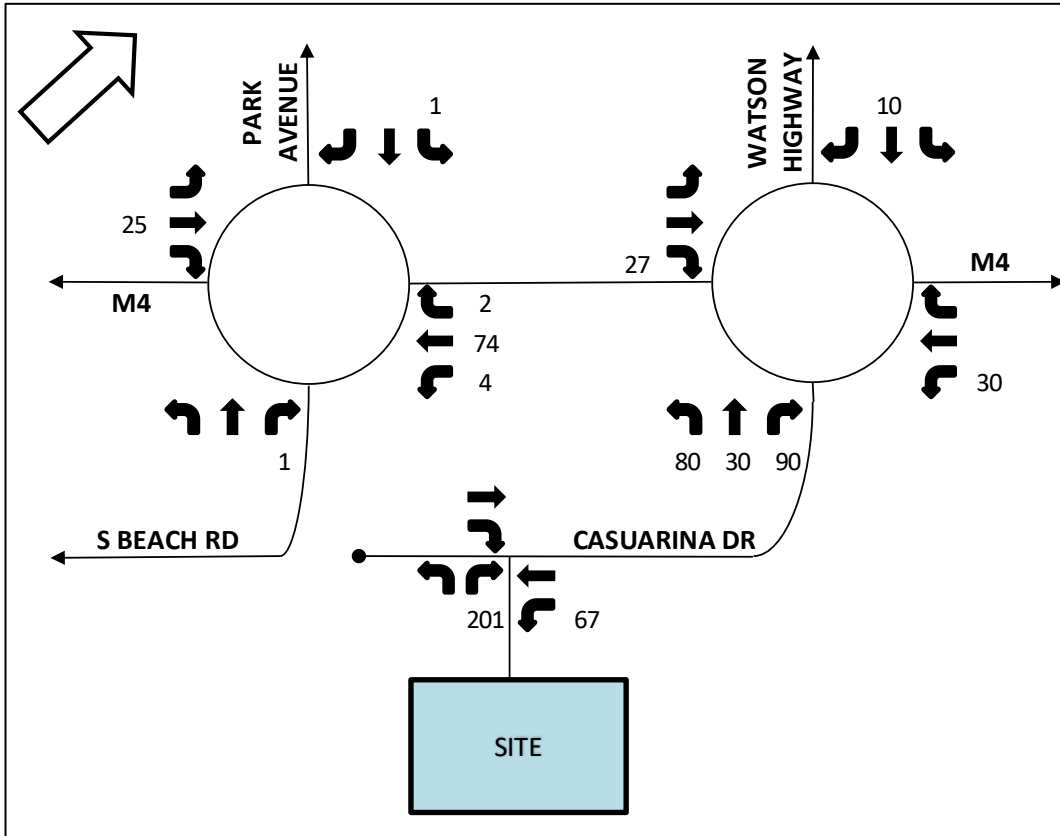


Figure 12: Development Traffic- AM Peak hour

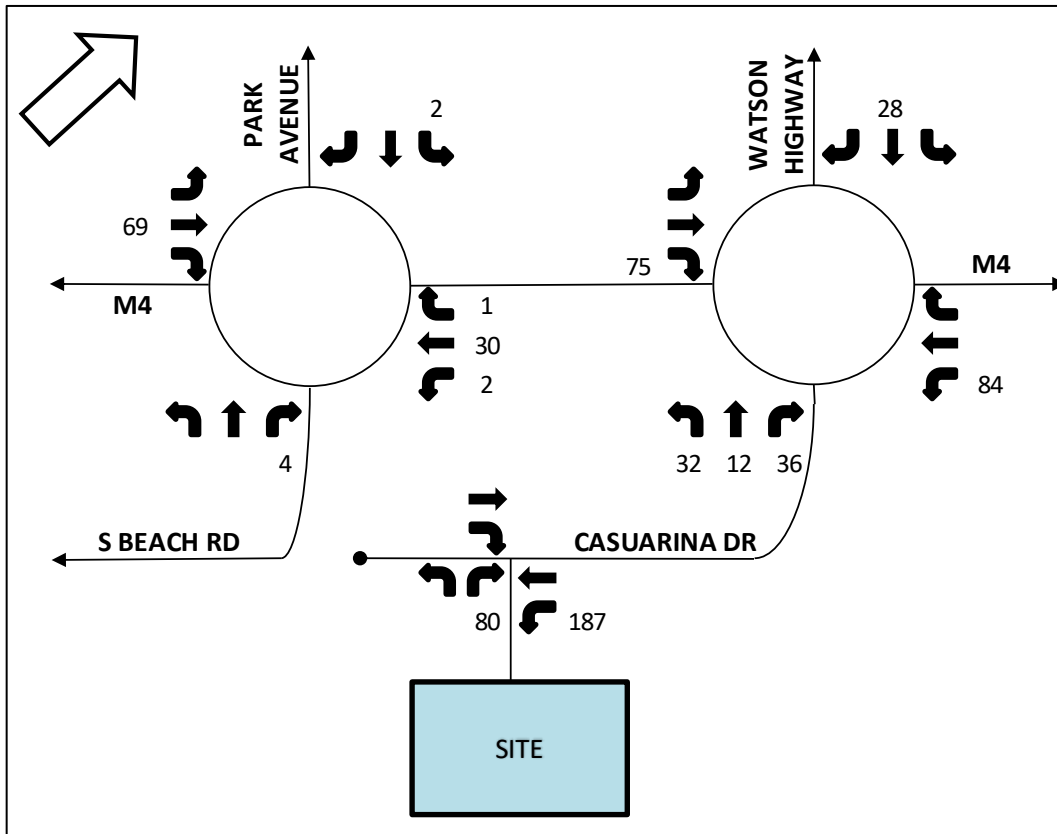


Figure 13: Development Traffic- PM Peak hour

10 Background Traffic Demand Estimation

10.1.1 Existing Traffic Volumes (2019)

To determine the existing traffic volumes at the intersections, classified traffic counts were obtained for the affected intersections as per details provided in **Table 2** below. The traffic counts were analysed, and it was determined that common peak hours for each intersection be used for analysis purposes in order to assess the worst case. The counts for 2019 were then estimated using a growth factor of 3%.

Table 2: Traffic Count List

| Intersection Name | Date of Survey & Day of Week | Duration of Survey | Peak Hours |
|--------------------------------------|------------------------------|----------------------------|---------------|
| M4 & Park Avenue & South Beach Road | 11/10/2018 Thursday | 06:00 – 09:00 (3 hours) | 07:00 - 08:00 |
| | | 15:00 – 18:00 (3 hours) | 16:15 - 17:15 |
| M4 & Ushukela Drive & Casuarina Road | 11/10/2018 Thursday | 06:00 – 09:00 (3 hours) | 07:00 - 08:00 |
| | | 15:00 – 18:00 (3 hours) | 16:15 - 17:15 |

10.1.2 Forecast Traffic Volumes (2024)

As per the ETA Manual for TIA's & STA's, a background growth rate of 3% was considered for an area experiencing average growth.

11 Neighbouring Developments

At the time of undertaking this TIA, two other known proposed developments in the study area have been identified. Both developments, La Mercy Coastlands Hotel and Seatides Residential, are yet to gain approval. However, to assess the worst case, the traffic generated by these developments have been considered in the analysis. The traffic generated by these developments during the morning and afternoon peak hours can be seen in **Figures 14 and 15**.

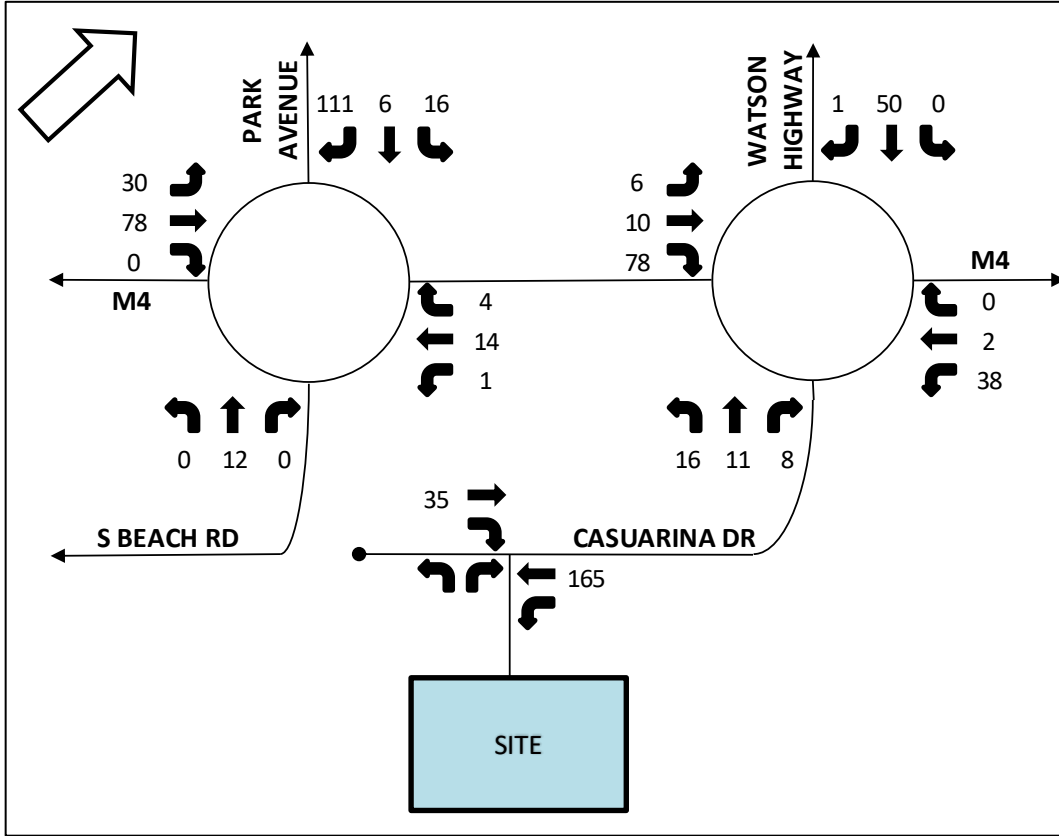


Figure 14: Proposed neighbouring developments 2024 AM traffic

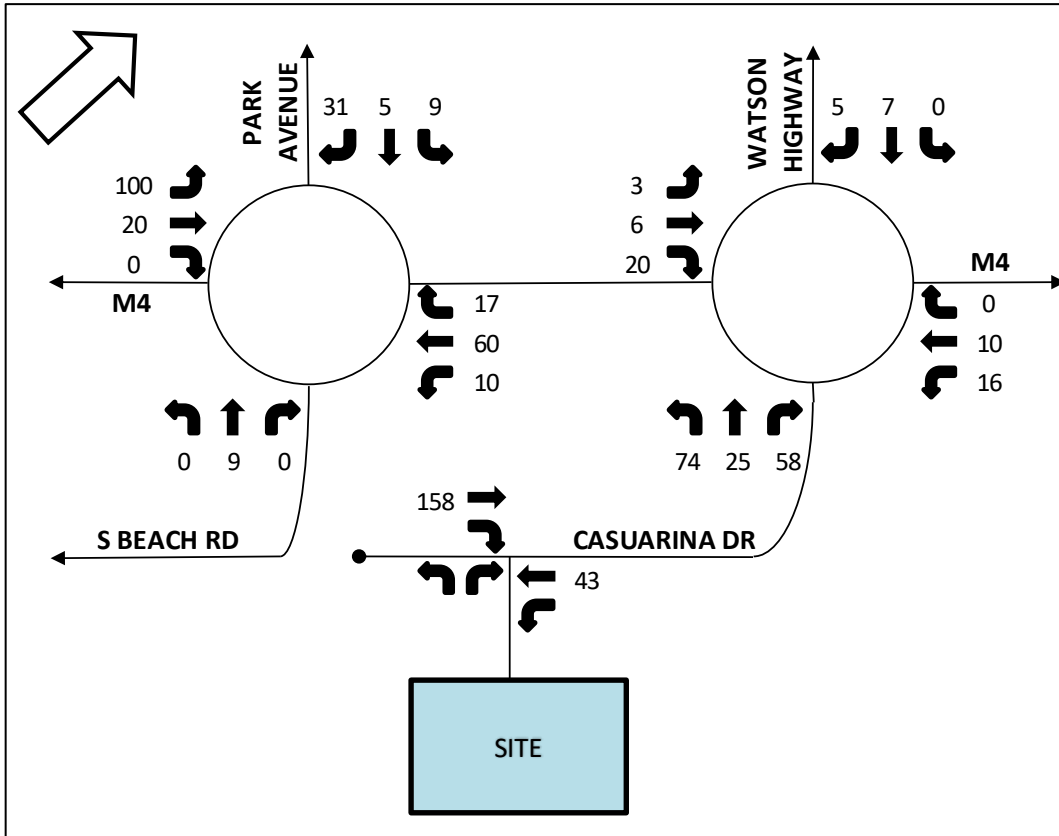


Figure 15: Proposed neighbouring developments 2024 PM traffic

12 Total Traffic Demand

The total traffic demand has been estimated for the following scenarios:

- 2019 existing volumes;
- 2019 existing plus development traffic;
- 2024 forecast volumes;
- 2024 forecast volumes plus development traffic;
- 2024 forecast volumes plus development traffic plus neighbouring developments traffic;

12.1.1 2019 Existing

The 2019 afternoon peak hour and morning peak hour traffic based on the traffic counts is illustrated in **Figures 16 & 17**.

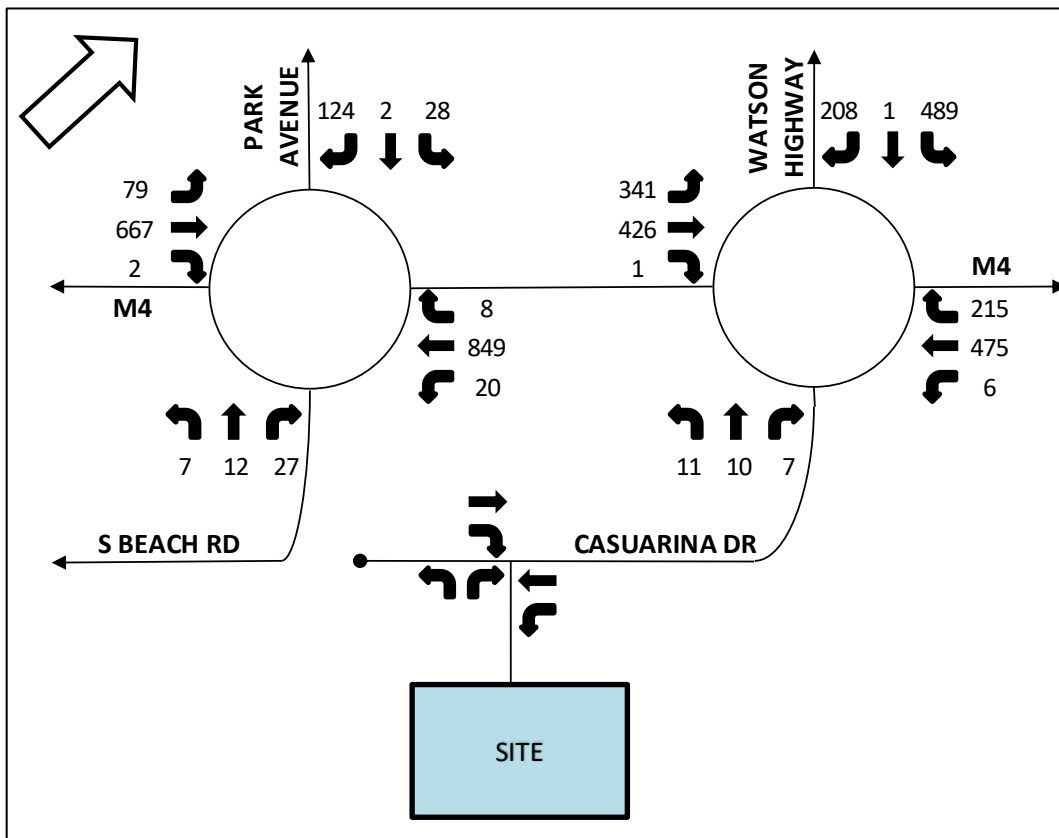


Figure 16: Existing 2019 AM Peak Hour Volumes

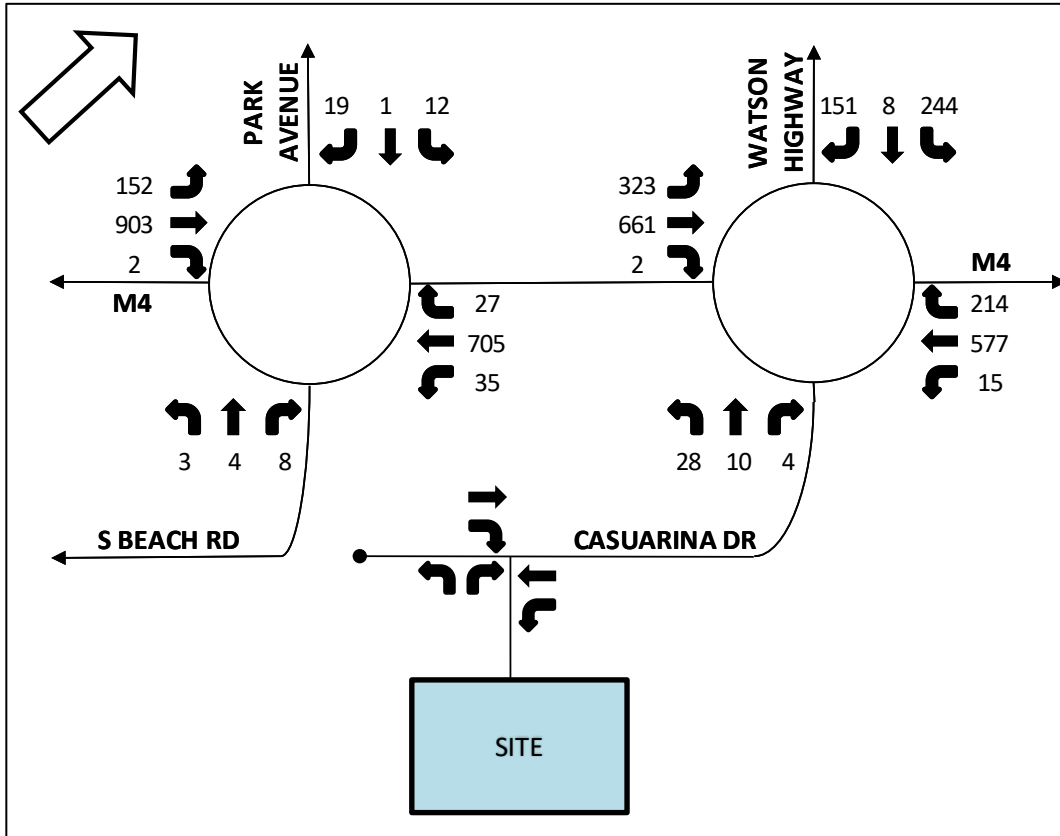


Figure 17: Existing 2019 PM Peak Hour Volumes

12.1.2 2019 Existing plus Development traffic

The 2019 existing traffic volumes were then added to the proposed development volumes for the morning peak hour and afternoon peak hour is illustrated in **Figures 18 & 19**.

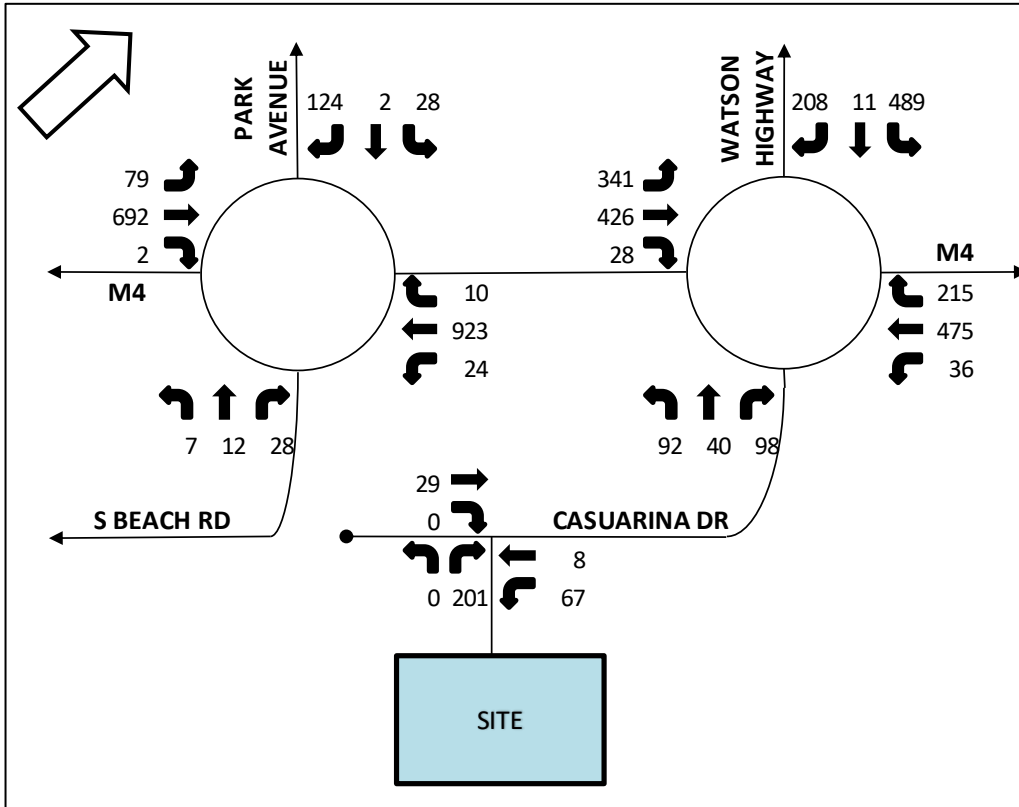


Figure 18: Existing 2019 Background plus Development traffic – AM Peak Hour

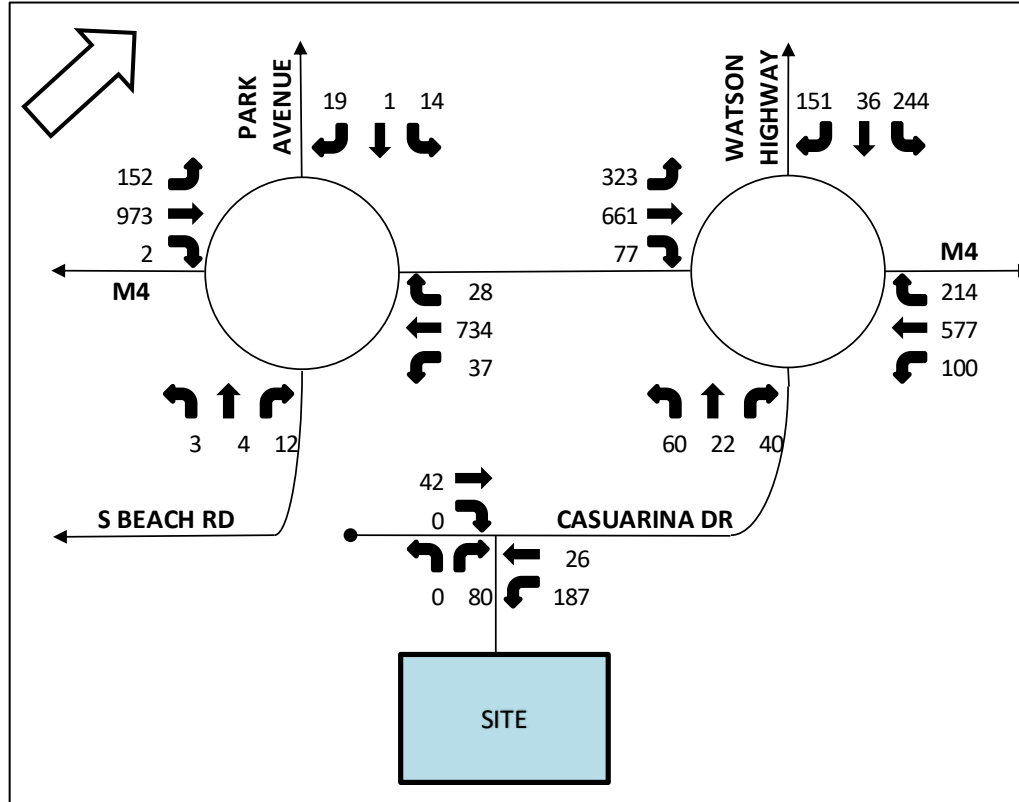


Figure 19: Existing 2019 Background plus Development traffic – PM Peak Hour

12.1.3 2024 Forecast

The 2024 forecast traffic volumes for the morning and afternoon peak hours can be seen in Figures 20 & 21.

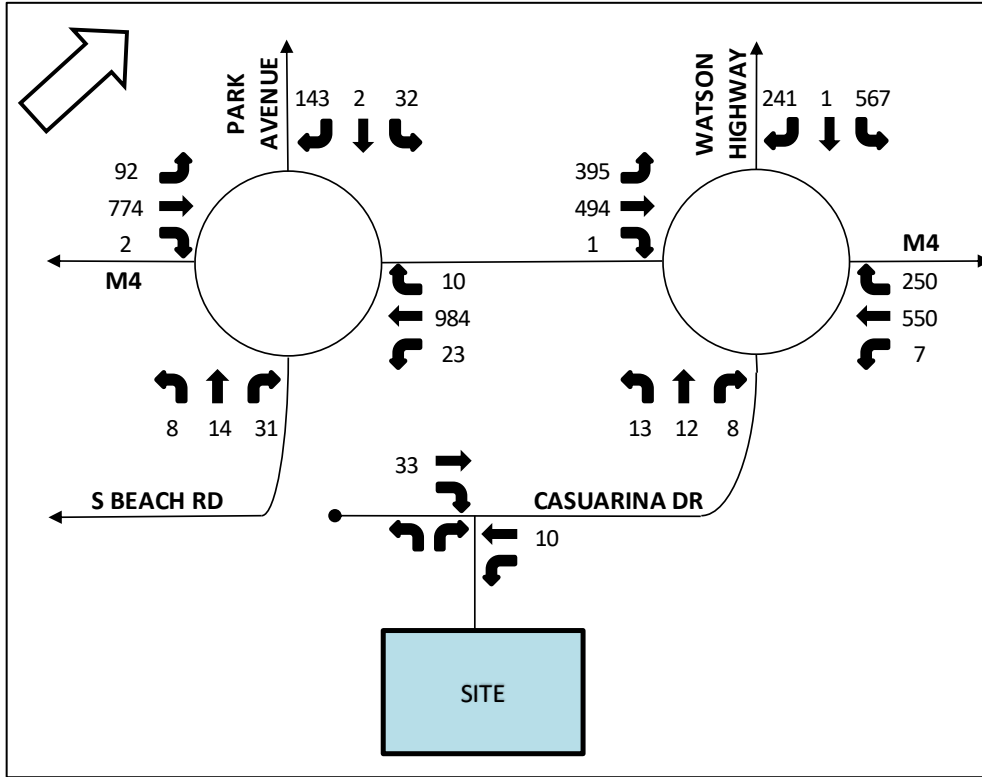


Figure 20: Forecast 2024 AM Peak Hour Volumes

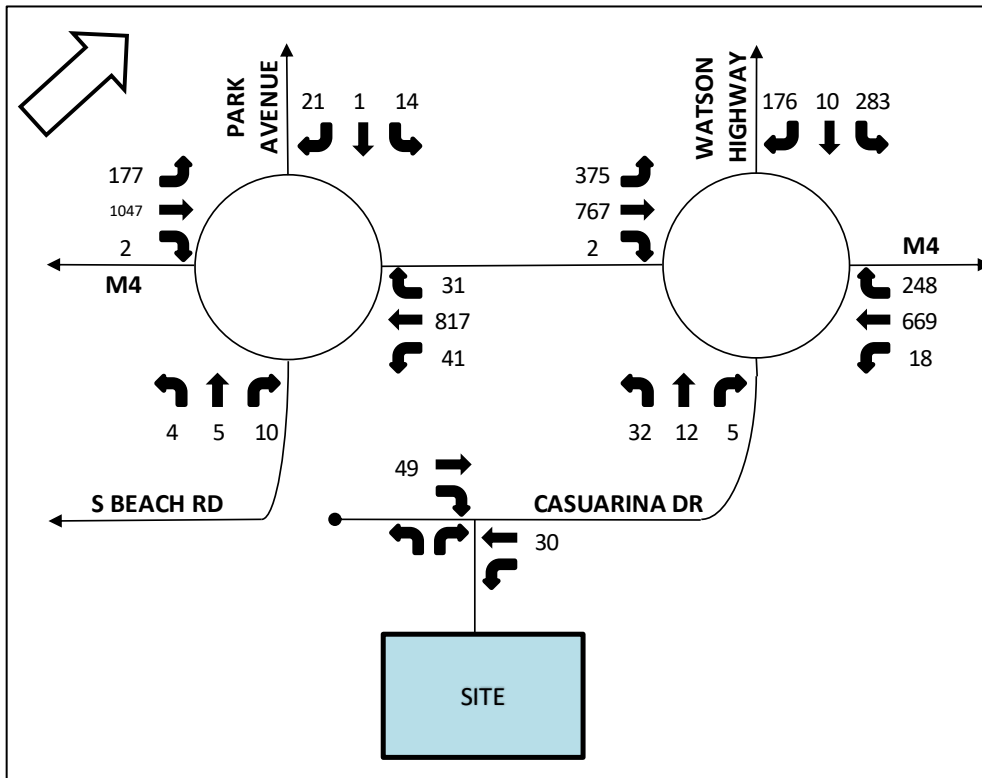


Figure 21: Forecast 2024 PM Peak Hour Volumes

12.1.4 2024 Forecast plus Development traffic

The 2024 forecast traffic volumes were then added to the proposed development volumes for the morning peak hour and afternoon peak hour is illustrated in Figures 24 & 25.

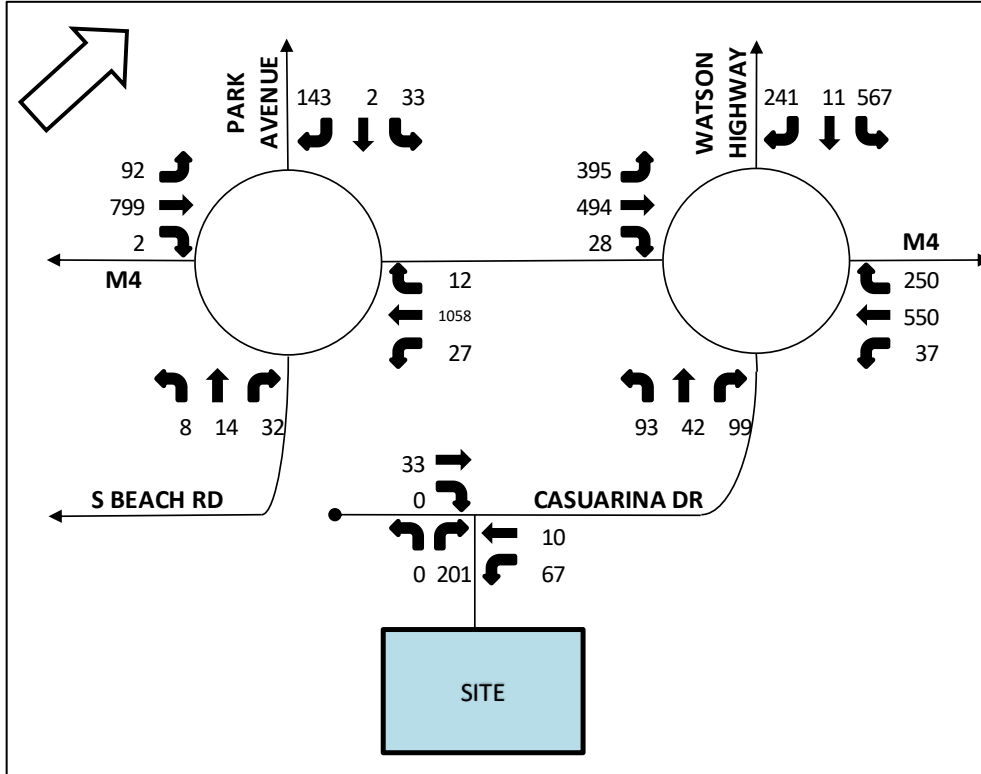


Figure 22: Forecast 2024 plus development traffic- AM Peak Hour Volumes

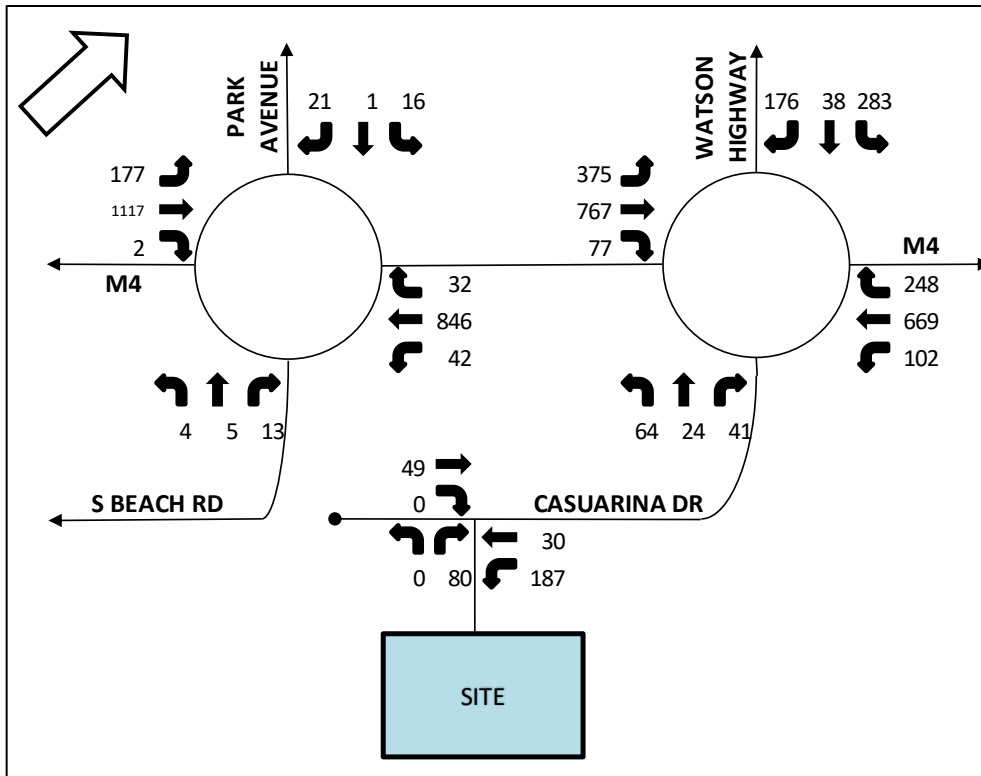


Figure 23: Forecast 2024 plus development traffic- PM Peak Hour Volumes

12.1.5 2024 Forecast plus Development Traffic plus Neighbouring Developments Traffic

The 2024 forecast traffic volumes with the development traffic and neighbouring developments traffic for the morning and afternoon peak hours can be seen in Figures 26 & 27.

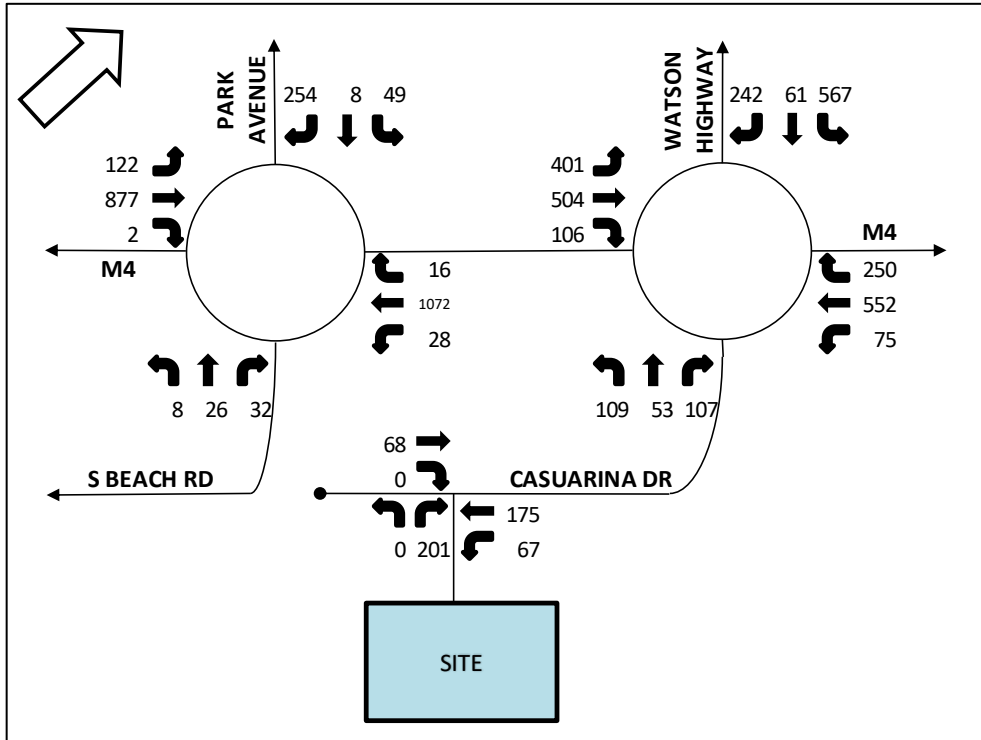


Figure 24: Forecast 2024 plus Development traffic plus NB dev–AM Peak Hour

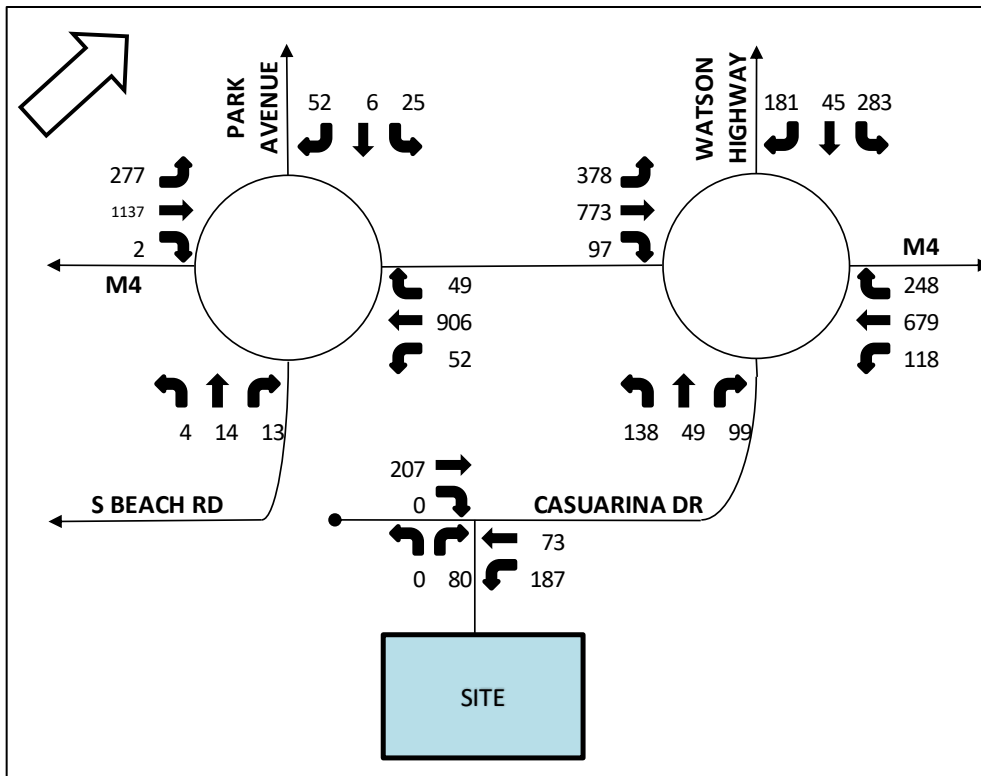


Figure 25: Forecast 2024 plus Development traffic plus NB dev–PM Peak Hour

12.1.6 Multi-modal Demand & Demand Estimation

It should be noted that the proposed development intends on catering for medium income residential. To this end, no multi-modal demand estimations have been included as part of this study.

13 Demand Side Mitigation

The initial development proposal considered 302 residential units on the site. However, upon further discussion with the developer, it was agreed that the number of units should be limited to 206 units, in order to manage the traffic demand.

14 Traffic Impact Assessment Scenarios

An assessment was undertaken to determine the Levels of Service (LOS) at the analysed intersections. LOS is a measure used by traffic engineers to gauge the performance of intersections. The delay is inversely proportional to the LOS, as the delay increases the LOS at the intersection decreases. The LOS ranges from A to F, with A being the best LOS.

14.1.1 2019 Existing

The 2019 background volumes without development traffic were analysed using the software Sidra, Version 8. **Table 3** contains illustrations indicating the existing intersection layout as analysed in Sidra. **Table 4** contains a summary of the intersection analysis for the existing road network conditions.

Table 3: Existing Intersection Configuration

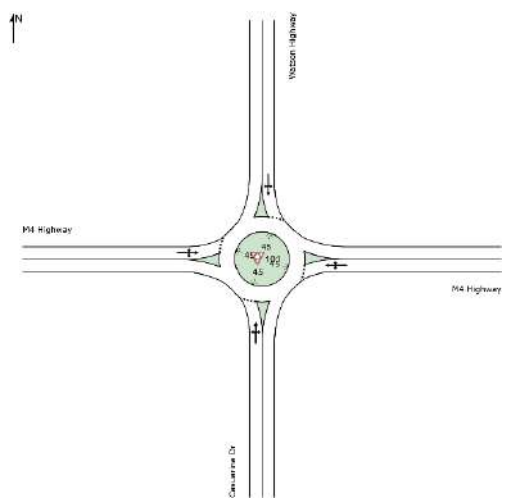
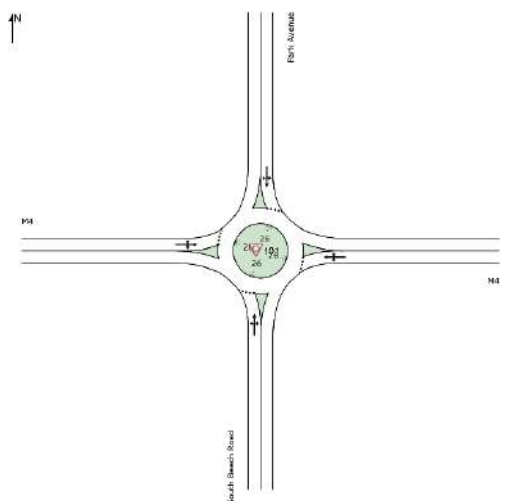
| M4 Highway and Casuarina Drive | M4 Highway and South Beach Road |
|---|---|
|  <p>The diagram shows a roundabout intersection between M4 Highway and Casuarina Drive. The roundabout is circular with four entry points. Traffic flow is indicated by arrows. Volume data is provided for each approach: Northbound (45), Southbound (45), Westbound (45), and Eastbound (45). The intersection is labeled 'Casuarina Dr' and 'M4 Highway'.</p> |  <p>The diagram shows a roundabout intersection between M4 Highway and South Beach Road. The roundabout is circular with four entry points. Traffic flow is indicated by arrows. Volume data is provided for each approach: Northbound (26), Southbound (26), Westbound (26), and Eastbound (26). The intersection is labeled 'South Beach Road' and 'M4 Highway'.</p> |

Table 4: Intersection Analysis with 2019 Background Traffic

| Intersection / Approach | | 2019 Existing | | | | | |
|--------------------------------|----------------|---------------|-------------|----------|--------------|-------------|----------|
| | | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | V/C | Delay (sec) | LOS | V/C | Delay (sec) | LOS |
| M4 Highway & South Beach Road | South Approach | 0.094 | 14.6 | B | 0.020 | 10.8 | B |
| | East Approach | 0.677 | 4.9 | A | 0.491 | 4.0 | A |
| | North Approach | 0.205 | 12.4 | B | 0.054 | 13.3 | B |
| | West Approach | 0.510 | 4.0 | A | 0.692 | 4.0 | A |
| | Overall | 0.677 | 5.4 | A | 0.692 | 4.2 | A |
| M4 Highway and Casuarina Drive | South Approach | 0.041 | 9.7 | A | 0.065 | 9.4 | A |
| | East Approach | 0.536 | 6.0 | A | 0.589 | 5.5 | A |
| | North Approach | 0.652 | 9.3 | A | 0.491 | 10.2 | B |
| | West Approach | 0.593 | 4.2 | A | 0.753 | 5.4 | A |
| | Overall | 0.652 | 6.5 | A | 0.753 | 6.4 | A |

Analysis results reveal that the intersection of M4 Highway with South Beach Road experiences an overall intersection LOS A during both the morning and afternoon peak hours. The intersection of M4 Highway and Casuarina Drive exhibits an overall intersection LOS A during both the morning and afternoon peak hours.

14.1.2 2019 Existing plus Development

The intersection analysis was undertaken for the development traffic with the 2019 background traffic. All intersections were analysed using the intersection layouts as per status quo assessment. An illustration of the proposed accesses intersection is provided in **Table 5**. The analysis results can be seen in **Table 6**.

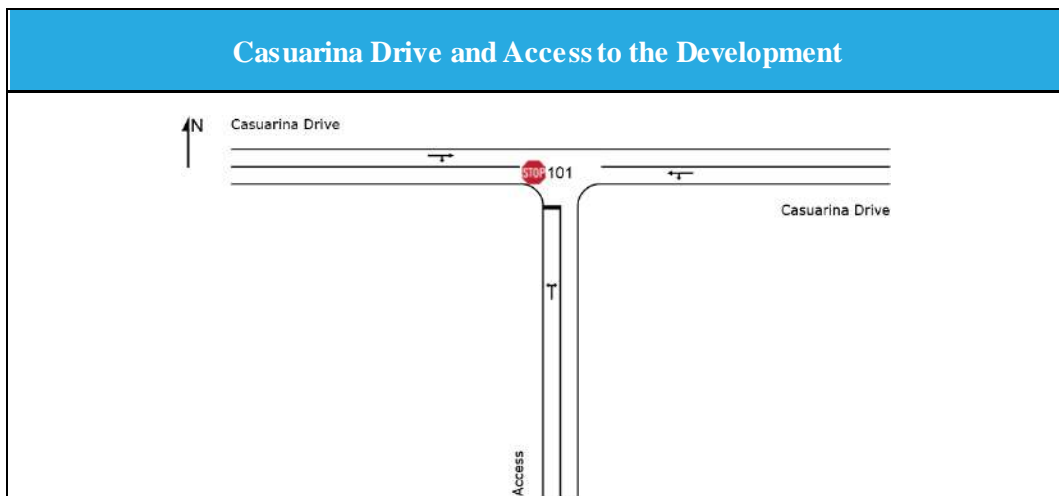


Table 5: Proposed Access

Table 6: Intersection Analysis with 2019 background plus development traffic

| Intersection / Approach | | 2019 Existing plus Development Traffic | | | | | |
|--|----------------|--|-------------|-----------|--------------|-------------|-----------|
| | | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | V/C | Delay (sec) | LOS | V/C | Delay (sec) | LOS |
| M4 Highway & South Beach Road | South Approach | 0.111 | 16.2 | B | 0.027 | 11.7 | B |
| | East Approach | 0.736 | 5.1 | A | 0.511 | 4.0 | A |
| | North Approach | 0.211 | 12.7 | B | 0.065 | 14.4 | B |
| | West Approach | 0.529 | 4.0 | A | 0.744 | 4.2 | A |
| | Overall | 0.736 | 5.5 | A | 0.744 | 4.3 | A |
| M4 Highway and Casuarina Drive | South Approach | 0.341 | 12.0 | B | 0.205 | 11.5 | B |
| | East Approach | 0.581 | 6.2 | A | 0.713 | 7.1 | A |
| | North Approach | 0.742 | 13.1 | B | 0.637 | 15.0 | B |
| | West Approach | 0.674 | 6.6 | A | 0.849 | 9.3 | A |
| | Overall | 0.742 | 8.9 | A | 0.849 | 9.6 | A |
| Access and Casuarina Drive | South Approach | 0.196 | 7.8 | A | 0.086 | 8.2 | A |
| | East Approach | 0.042 | 5.0 | NA | 0.120 | 4.9 | NA |
| | West Approach | 0.016 | 0.2 | NA | 0.023 | 0.2 | NA |
| | Overall | 0.196 | 6.4 | NA | 0.120 | 5.1 | NA |

Analysis results reveal that the intersection of M4 Highway with South Beach Road experiences an overall intersection LOS A during both the morning and afternoon peak hours. The intersection of M4 Highway and Casuarina Drive exhibits an overall intersection LOS A during both the morning and afternoon peak hours. The intersection of the access to the development and Casuarina Drive experiences no significant delays and operates at an acceptable LOS.

14.1.3 2024 Forecast

The intersection analysis was undertaken for the 2024 forecast background traffic. The intersections were analysed in Sidra as per status quo assessment. The analysis results can be seen in **Table 7**.

Table 7: Intersection Analysis with 2024 forecast background traffic

| Intersection / Approach | | 2024 Forecast background Traffic | | | | | |
|--|----------------|----------------------------------|-------------|----------|--------------|-------------|----------|
| | | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | V/C | Delay (sec) | LOS | V/C | Delay (sec) | LOS |
| M4 Highway & South Beach Road | South Approach | 0.154 | 18.5 | B | 0.029 | 12.2 | B |
| | East Approach | 0.802 | 5.6 | A | 0.570 | 4.0 | A |
| | North Approach | 0.272 | 13.8 | B | 0.079 | 16.1 | B |
| | West Approach | 0.598 | 4.1 | A | 0.809 | 4.3 | A |
| | Overall | 0.802 | 6.0 | A | 0.809 | 4.5 | A |
| M4 Highway and Casuarina Drive | South Approach | 0.061 | 12.0 | B | 0.101 | 12.4 | B |
| | East Approach | 0.647 | 6.4 | A | 0.704 | 5.9 | A |
| | North Approach | 0.917 | 23.1 | C | 0.713 | 17.8 | B |
| | West Approach | 0.716 | 5.7 | A | 0.910 | 11.7 | B |
| | Overall | 0.917 | 12.0 | B | 0.910 | 10.7 | B |

Analysis results reveal that the intersection of M4 Highway with South Beach Road experiences an overall intersection LOS A during both the morning and afternoon peak hours. The intersection of M4 Highway and Casuarina Drive exhibits an overall intersection LOS B during both the morning and afternoon peak hours.

14.1.4 2024 Forecast plus Development traffic

The intersection analysis was undertaken for the development traffic with the 2024 forecast traffic. The intersections were analysed in Sidra as per status quo assessment. The analysis results can be seen in **Table 8**.

Table 8: Intersection Analysis with 2024 background plus development Traffic

| Intersection / Approach | | 2024 plus development Traffic | | | | | |
|--|----------------|-------------------------------|-------------|-----------|--------------|-------------|-----------|
| | | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | V/C | Delay (sec) | LOS | V/C | Delay (sec) | LOS |
| M4 Highway & South Beach Road | South Approach | 0.199 | 21.3 | C | 0.035 | 13.0 | B |
| | East Approach | 0.863 | 6.8 | A | 0.590 | 4.0 | A |
| | North Approach | 0.282 | 14.2 | B | 0.101 | 17.9 | B |
| | West Approach | 0.618 | 4.1 | A | 0.860 | 4.6 | A |
| | Overall | 0.863 | 6.7 | A | 0.860 | 4.6 | A |
| M4 Highway and Casuarina Drive | South Approach | 0.445 | 16.3 | B | 0.298 | 14.5 | B |
| | East Approach | 0.691 | 7.5 | A | 0.835 | 10.2 | B |
| | North Approach | 0.955 | 37.1 | D | 0.870 | 35.9 | D |
| | West Approach | 0.809 | 10.2 | B | 1.019 | 44.5 | D |
| | Overall | 0.955 | 17.8 | B | 1.019 | 29.5 | C |
| Access and Casuarina Drive | South Approach | 0.197 | 7.9 | A | 0.087 | 8.3 | A |
| | East Approach | 0.043 | 4.8 | NA | 0.122 | 4.8 | NA |
| | West Approach | 0.018 | 0.2 | NA | 0.027 | 0.1 | NA |
| | Overall | 0.197 | 6.3 | NA | 0.122 | 4.9 | NA |

Analysis results reveal that the intersection of M4 Highway with South Beach Road experiences an overall intersection LOS A during both the morning and afternoon peak hours. The intersection of M4 Highway and Casuarina Drive exhibits an overall intersection LOS C and LOS D during the morning and afternoon peak hours respectively. The intersection of the access to the development and Casuarina Drive experiences no significant delays and operates at an acceptable LOS.

14.1.5 2024 Forecast plus Development Traffic plus Neighbouring Developments Traffic

The intersection analysis was undertaken for the development traffic plus neighbouring development traffic together with the 2024 forecast traffic. The intersections were analysed in Sidra as per status quo assessment. The analysis results can be seen in **Table 9**.

Table 9: Intersection Analysis with 2024 background plus development traffic plus NB developments traffic

| Intersection / Approach | | 2024 plus development plus NB Dev | | | | | |
|--------------------------------|----------------|-----------------------------------|-------------|-----------|--------------|-------------|-----------|
| | | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | V/C | Delay (sec) | LOS | V/C | Delay (sec) | LOS |
| M4 Highway & South Beach Road | South Approach | 0.304 | 27.1 | C | 0.063 | 14.0 | B |
| | East Approach | 1.021 | 47.2 | D | 0.697 | 4.5 | A |
| | North Approach | 0.566 | 20.8 | C | 0.304 | 21.4 | C |
| | West Approach | 0.708 | 4.4 | A | 0.977 | 8.3 | A |
| | Overall | 1.021 | 26.2 | C | 0.977 | 7.3 | A |
| M4 Highway and Casuarina Drive | South Approach | 0.528 | 18.1 | B | 0.696 | 32.8 | C |
| | East Approach | 0.782 | 10.6 | B | 0.874 | 12.5 | B |
| | North Approach | 1.154 | 166.9 | F | 0.880 | 38.2 | D |
| | West Approach | 0.911 | 17.6 | C | 1.113 | 119.0 | F |
| | Overall | 1.154 | 58.6 | E | 1.113 | 61.7 | E |
| Access and Casuarina Drive | South Approach | 0.245 | 9.2 | A | 0.109 | 9.5 | A |
| | East Approach | 0.132 | 1.5 | NA | 0.145 | 4.0 | NA |
| | West Approach | 0.037 | 0.1 | NA | 0.113 | 0.0 | NA |
| | Overall | 0.245 | 4.4 | NA | 0.145 | 3.3 | NA |

Analysis results reveal that the intersection of M4 Highway with South Beach Road experiences an overall intersection LOS D and LOS B during the morning and afternoon peak hours, respectively. The east approach is likely to experience some capacity constraints and it recommended that this intersection be monitored by the authorities once all developments come on line. The intersection of M4 Highway and Casuarina Drive exhibits an overall intersection LOS F during both the morning and afternoon peak hours. The intersection of the access to the development and Casuarina Drive experiences no significant delays and operates at an acceptable LOS.

14.1.6 Mitigation Measures

As seen in the results from the previous analysis, the intersection of the M4 highway with Casuarina Drive experiences significant delays. **Table 12** below depicts upgrades to the current intersection that will reduce delays and increase the LOS to an acceptable level. It is proposed that the northern and western approaches be restriped to accommodate for two approach lanes, where one lane facilitates the left turn movement only. Analysis results using the worst-case scenario being 2024 forecast traffic plus proposed development traffic plus approved neighbouring developments traffic can be seen in **table 13**.

Table 10: Upgrades to status quo intersection Layouts

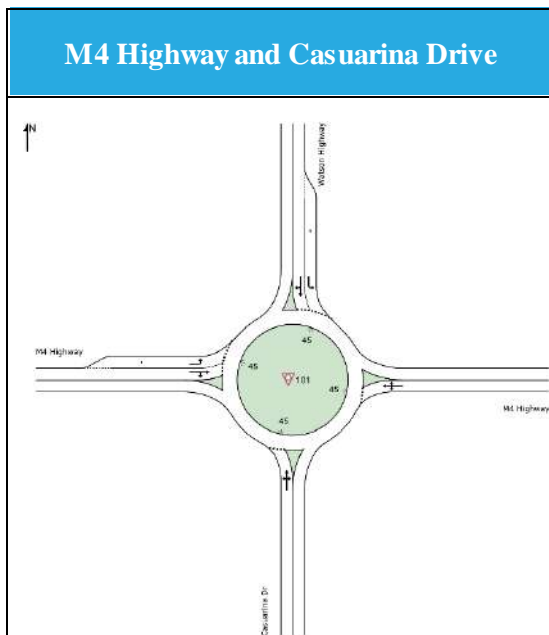


Table 11: Intersection Analysis with 2024 background plus development traffic plus NB developments traffic with mitigation measures

| Intersection / Approach | | 2024 plus development traffic and NB with Mitigation | | | | | |
|--------------------------------|----------------|--|-------------|----------|--------------|-------------|----------|
| | | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | V/C | Delay (sec) | LOS | V/C | Delay (sec) | LOS |
| M4 Highway and Casuarina Drive | South Approach | 0.794 | 41.0 | D | 0.841 | 57.2 | E |
| | East Approach | 0.856 | 15.0 | B | 0.979 | 30.7 | C |
| | North Approach | 0.889 | 28.5 | C | 0.884 | 45.6 | D |
| | West Approach | 0.725 | 8.4 | A | 0.975 | 22.9 | C |
| | Overall | 0.889 | 19.5 | B | 0.979 | 32.6 | C |

The intersection of M4 Highway and Casuarina Drive exhibits an overall intersection LOS B and LOS C during the morning and afternoon peak hours respectively.

14.1.7 Planning Year Horizon (>2000 Trips)

The proposed development is not expected to generate more than 2000 trips. To this end, no planning year horizon scenario has been analysed.

15 Link Capacity

An assessment was undertaken of the link demands for the 2024 forecast plus development scenario. The analysis was undertaken for the following roads:

- Casuarina Drive – Class 5

The analysis was done for the weekday AM and PM peak hours.

| Section | Item | AM | PM |
|-----------------------------|---------------------------------|------|------|
| Casuarina Dr (eastbound) | Max. traffic volume (veh/hr) | 269 | 287 |
| | Capacity (veh/hr)* | 700 | |
| | Free flow speed (km/h) | 40 | |
| | v/c | 0.38 | 0.41 |
| Casuarina Dr (westbound) | Max. traffic volume (veh/hr) | 242 | 260 |
| | Capacity (veh/hr)* | 700 | |
| | Free flow speed (km/h) | 40 | |
| | v/c | 0.35 | 0.37 |

**the capacities of these roads have been estimated based on free-flow speeds (FFS) of the roads and determined using the HCM “speed-flow curve with LOS criteria” graph (for LOC C). The FFSs have been assumed based on off-peak car-follow speed surveys and validated using Google Maps live traffic data for the relevant links.*

As is apparent in the table, the 2024 forecast plus development traffic volumes on Casuarina Drive are not expected to exceed the link capacity of the road.

16 Summary of Proposed Upgrades & TRL

It is proposed that the intersection of M4 Highway with Watson Highway and Casuarina Drive be restriped to accommodate 5m short lanes along the western and northern approaches. It is proposed that the circulating lanes along this portion of the circle be clearly marked for two lanes of traffic. In addition, the narrow portions of road along Casuarina Drive are to be widened to at least 5m wide. Please see attached TRL in **Appendix B**.

17 Site Traffic Assessment

At this re-zoning stage of the project, the final Site Development Plan has not been prepared. At the building plan submission stage, a Site Traffic Assessment (STA) will be undertaken to assess the following in terms of the relevant guidelines:

- Parking Requirements;
- Delivery Vehicles;
- Internal Circulation.

18 Pedestrian Assessment

No significant pedestrian movement was observed within the study area.

19 Public Transport Assessment

No existing or forecast issues with public transport within the study area are known.

20 Transport Requirements and Costs

At the building plan submission stage, the cost estimates, financial guarantees and undertakings will be provided to the eThekweni Municipality.

21 Conclusion & Recommendations

Arup (Pty) Ltd have been appointed by Mr. AH Singh to undertake a Traffic Impact Assessment (TIA) for the proposed medium to high income residential development to be located in Westbrook, Kwa-Zulu Natal. This TIA will form part of the rezoning application from special residential to general residential 2.

The site is to be re-zoned to *General Residential 2* for the development of a 206-unit residential development.

The proposed accesses to the residential development will be via Casuarina Drive. A portion of Casuarina Drive currently encroaches onto the developer's site (erf 612) and in this regard, the developer wishes to register a servitude in favour of the road.

A trip rate of 1.3 trips/ dwelling unit has been used. The proposed development will generate approximately 268 trips during the AM and PM peak hours.

The traffic analysis and results indicate that there will be minimal impact on the surrounding road network, however minor upgrades are required. It is proposed that the intersection of M4 Highway with Watson Highway and Casuarina Drive be restriped to accommodate 5m short lanes along the west and north approaches. Casuarina Drive is to be widened to at least 5m wide.

The proposed re-zoning is supported subject to the following conditions:

- A Site Traffic Assessment (STA) to be prepared as part of the building plan submission;
- All mitigation measures proposed in this report are implemented by the developer
- Parking to be provided as per municipal requirements;
- Any changes in the zoning rights will require a separate TIA.
- The registration of an ROW to accommodate the existing road encroachment on Erf 612. This ROW would consist of a 6.1m wide strip identified as A d1 G H and is shown in **Appendix B**.

•

22 References

1. EThekwini Transport Authority, 2019. Manual for Traffic Impact Assessments and Site Traffic Assessments. Version 1.0, July 2019.
2. EThekwini Municipality, 2013. Summary of Recommended Minimum Standards for Parking and Loading Facilities to be provided within the Property. 30 October 2013.

Appendix A

Architect's Site Plan

TO BE PROVIDED AT BUILDING PLAN SUBMISSION STAGE

Appendix B

Traffic Road Layout and ROW Servitude

Appendix C

KZN DOT Responses

Appendix D

Traffic Counts

| TRAFFIC SURVEY ANALYSIS | | | | | | | | | | | | | | | | |
|--|-------------------------|----------|----------|----------|----------|------------|-----------|-----------|-----------|------------|------------|----------|----------|----------|-----------|------------|
| CLIENT: | | | | | | | | | | | | | | | | |
| SITE: INTERSECTION OF MARINE AVENUE AND GENAZZANO ROAD | | | | | | | | | | | | | | | | |
| DATE: 12 HOUR COUNT ON MONDAY 17 AUGUST 2015 | | | | | | | | | | | | | | | | |
| UNITS: CLASSIFIED | | | | | | | | | | | | | | | | |
| APPROACH FROM NAME MOVEMENT TIME | NORTH GENAZZANO ROAD | | | | | | | | | | | | | | | TOTAL |
| | LEFT TURN | | | | | STRAIGHT | | | | | RIGHT TURN | | | | | ALL |
| | C | T | H | B | TOTAL | C | T | H | B | TOTAL | C | T | H | B | TOTAL | MOVEMENTS |
| 06:00 - 06:15 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 9 | 5 | 0 | 0 | 0 | 5 | 14 |
| 06:15 - 06:30 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 2 | 7 |
| 06:30 - 06:45 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 1 | 1 | 13 | 3 | 0 | 0 | 0 | 3 | 16 |
| 06:45 - 07:00 | 0 | 0 | 0 | 0 | 0 | 10 | 2 | 0 | 0 | 12 | 1 | 0 | 0 | 0 | 1 | 13 |
| 07:00 - 07:15 | 0 | 0 | 0 | 0 | 0 | 27 | 1 | 0 | 1 | 29 | 0 | 0 | 0 | 0 | 0 | 29 |
| 07:15 - 07:30 | 0 | 0 | 0 | 0 | 0 | 45 | 5 | 0 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 50 |
| 07:30 - 07:45 | 0 | 0 | 0 | 0 | 0 | 35 | 3 | 0 | 0 | 38 | 3 | 0 | 0 | 0 | 3 | 41 |
| 07:45 - 08:00 | 0 | 0 | 0 | 0 | 0 | 6 | 3 | 0 | 0 | 9 | 1 | 0 | 0 | 0 | 1 | 10 |
| 08:00 - 08:15 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 1 | 7 |
| 08:15 - 08:30 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 1 | 10 | 2 | 0 | 0 | 0 | 2 | 12 |
| 08:30 - 08:45 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 1 | 0 | 0 | 0 | 1 | 8 |
| 08:45 - 09:00 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 1 | 6 |
| 09:00 - 09:15 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 1 | 1 | 7 | 0 | 0 | 0 | 0 | 0 | 7 |
| 09:15 - 09:30 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 1 | 0 | 8 | 2 | 0 | 0 | 0 | 2 | 10 |
| 09:30 - 09:45 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 1 | 7 |
| 09:45 - 10:00 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 4 |
| 10:00 - 10:15 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 1 | 0 | 10 | 1 | 0 | 0 | 0 | 1 | 11 |
| 10:15 - 10:30 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 9 | 1 | 0 | 0 | 0 | 1 | 10 |
| 10:30 - 10:45 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 12 | 2 | 0 | 0 | 0 | 2 | 14 |
| 10:45 - 11:00 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 |
| 11:00 - 11:15 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 2 | 1 | 9 | 1 | 0 | 0 | 0 | 1 | 10 |
| 11:15 - 11:30 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 2 | 7 |
| 11:30 - 11:45 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 9 |
| 11:45 - 12:00 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 |
| 12:00 - 12:15 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 2 | 7 |
| 12:15 - 12:30 | 0 | 0 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 9 | 2 | 0 | 0 | 0 | 2 | 11 |
| 12:30 - 12:45 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 10 | 1 | 0 | 0 | 0 | 1 | 11 |
| 12:45 - 13:00 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 13 | 1 | 0 | 0 | 0 | 1 | 14 |
| 13:00 - 13:15 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 1 | 1 | 15 | 2 | 0 | 0 | 0 | 2 | 17 |
| 13:15 - 13:30 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 1 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 12 |
| 13:30 - 13:45 | 0 | 0 | 0 | 0 | 0 | 15 | 1 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 16 |
| 13:45 - 14:00 | 0 | 0 | 0 | 0 | 0 | 21 | 1 | 0 | 0 | 22 | 2 | 0 | 0 | 0 | 2 | 24 |
| 14:00 - 14:15 | 0 | 0 | 0 | 0 | 0 | 21 | 2 | 0 | 0 | 23 | 2 | 0 | 0 | 0 | 2 | 25 |
| 14:15 - 14:30 | 0 | 0 | 0 | 0 | 0 | 25 | 2 | 1 | 1 | 29 | 3 | 0 | 0 | 0 | 3 | 32 |
| 14:30 - 14:45 | 0 | 0 | 0 | 0 | 0 | 18 | 2 | 0 | 1 | 21 | 3 | 0 | 0 | 0 | 3 | 24 |
| 14:45 - 15:00 | 0 | 0 | 0 | 0 | 0 | 20 | 2 | 0 | 0 | 22 | 5 | 0 | 0 | 0 | 5 | 27 |
| 15:00 - 15:15 | 0 | 0 | 0 | 0 | 0 | 22 | 1 | 0 | 0 | 23 | 6 | 0 | 0 | 0 | 6 | 29 |
| 15:15 - 15:30 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 1 | 23 | 3 | 0 | 0 | 0 | 3 | 26 |
| 15:30 - 15:45 | 0 | 0 | 0 | 0 | 0 | 14 | 3 | 1 | 0 | 18 | 1 | 0 | 0 | 0 | 1 | 19 |
| 15:45 - 16:00 | 0 | 0 | 0 | 0 | 0 | 26 | 2 | 1 | 1 | 30 | 4 | 0 | 0 | 0 | 4 | 34 |
| 16:00 - 16:15 | 0 | 0 | 0 | 0 | 0 | 16 | 1 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 17 |
| 16:15 - 16:30 | 0 | 0 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 30 | 4 | 0 | 0 | 0 | 4 | 34 |
| 16:30 - 16:45 | 0 | 0 | 0 | 0 | 0 | 21 | 1 | 0 | 0 | 22 | 4 | 0 | 0 | 0 | 4 | 26 |
| 16:45 - 17:00 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 19 | 5 | 0 | 0 | 0 | 5 | 24 |
| 17:00 - 17:15 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 1 | 0 | 28 | 5 | 0 | 0 | 0 | 5 | 33 |
| 17:15 - 17:30 | 0 | 0 | 0 | 0 | 0 | 27 | 1 | 0 | 0 | 28 | 2 | 0 | 0 | 0 | 2 | 30 |
| 17:30 - 17:45 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 1 | 0 | 28 | 8 | 0 | 0 | 0 | 8 | 36 |
| 17:45 - 18:00 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 20 | 3 | 0 | 0 | 0 | 3 | 23 |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 711 | 35 | 13 | 10 | 769 | 98 | 0 | 0 | 0 | 98 | 867 |

| TRAFFIC SURVEY ANALYSIS | | | | | | | | | | | | | | | | |
|-------------------------------------|--|----------|----------|----------|-----------|------------|-----------|-----------|-----------|------------|------------|----------|----------|----------|----------|---------------|
| CLIENT: | | | | | | | | | | | | | | | | |
| SITE: | INTERSECTION OF MARINE AVENUE AND GENAZZANO ROAD | | | | | | | | | | | | | | | |
| DATE: | 12 HOUR COUNT ON MONDAY 17 AUGUST 2015 | | | | | | | | | | | | | | | |
| UNITS: | CLASSIFIED | | | | | | | | | | | | | | | |
| APPROACH FROM NAME MOVEMENT TIME | SOUTH GENAZZANO ROAD | | | | | | | | | | | | | | | TOTAL |
| | LEFT TURN | | | | | STRAIGHT | | | | | RIGHT TURN | | | | | ALL MOVEMENTS |
| | C | T | H | B | TOTAL | C | T | H | B | TOTAL | C | T | H | B | TOTAL | |
| 06:00 - 06:15 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 |
| 06:15 - 06:30 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 1 | 12 | 0 | 0 | 0 | 0 | 0 | 12 |
| 06:30 - 06:45 | 2 | 0 | 0 | 0 | 2 | 33 | 1 | 1 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 37 |
| 06:45 - 07:00 | 2 | 0 | 0 | 0 | 2 | 28 | 1 | 0 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | 31 |
| 07:00 - 07:15 | 0 | 0 | 0 | 0 | 0 | 48 | 1 | 0 | 0 | 49 | 0 | 0 | 0 | 0 | 0 | 49 |
| 07:15 - 07:30 | 2 | 0 | 0 | 0 | 2 | 53 | 3 | 0 | 2 | 58 | 0 | 0 | 0 | 0 | 0 | 60 |
| 07:30 - 07:45 | 7 | 0 | 0 | 0 | 7 | 57 | 2 | 0 | 0 | 59 | 0 | 0 | 0 | 0 | 0 | 66 |
| 07:45 - 08:00 | 1 | 0 | 0 | 0 | 1 | 25 | 2 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 28 |
| 08:00 - 08:15 | 0 | 0 | 0 | 0 | 0 | 13 | 2 | 1 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 16 |
| 08:15 - 08:30 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 13 |
| 08:30 - 08:45 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 8 |
| 08:45 - 09:00 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 7 |
| 09:00 - 09:15 | 2 | 0 | 0 | 0 | 2 | 7 | 0 | 0 | 1 | 8 | 0 | 0 | 0 | 0 | 0 | 10 |
| 09:15 - 09:30 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| 09:30 - 09:45 | 0 | 0 | 1 | 0 | 1 | 10 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 11 |
| 09:45 - 10:00 | 1 | 0 | 0 | 0 | 1 | 8 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 9 |
| 10:00 - 10:15 | 2 | 0 | 0 | 0 | 2 | 6 | 0 | 0 | 2 | 8 | 0 | 0 | 0 | 0 | 0 | 10 |
| 10:15 - 10:30 | 1 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 7 |
| 10:30 - 10:45 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 16 |
| 10:45 - 11:00 | 1 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 7 |
| 11:00 - 11:15 | 2 | 0 | 0 | 0 | 2 | 9 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 11 |
| 11:15 - 11:30 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 1 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 11 |
| 11:30 - 11:45 | 1 | 0 | 0 | 0 | 1 | 9 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 10 |
| 11:45 - 12:00 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 1 | 1 | 12 | 0 | 0 | 0 | 0 | 0 | 12 |
| 12:00 - 12:15 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 |
| 12:15 - 12:30 | 2 | 0 | 0 | 0 | 2 | 12 | 1 | 0 | 1 | 14 | 0 | 0 | 0 | 0 | 0 | 16 |
| 12:30 - 12:45 | 1 | 0 | 1 | 0 | 2 | 12 | 0 | 1 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 15 |
| 12:45 - 13:00 | 1 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 |
| 13:00 - 13:15 | 1 | 0 | 0 | 0 | 1 | 15 | 1 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 17 |
| 13:15 - 13:30 | 0 | 0 | 1 | 0 | 1 | 10 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 11 |
| 13:30 - 13:45 | 1 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 6 |
| 13:45 - 14:00 | 1 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 6 |
| 14:00 - 14:15 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 1 | 1 | 13 | 0 | 0 | 0 | 0 | 0 | 13 |
| 14:15 - 14:30 | 2 | 1 | 0 | 0 | 3 | 52 | 4 | 2 | 0 | 58 | 0 | 0 | 0 | 0 | 0 | 61 |
| 14:30 - 14:45 | 1 | 0 | 0 | 0 | 1 | 32 | 5 | 1 | 0 | 38 | 0 | 0 | 0 | 0 | 0 | 39 |
| 14:45 - 15:00 | 1 | 0 | 0 | 0 | 1 | 11 | 3 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 15 |
| 15:00 - 15:15 | 0 | 0 | 0 | 0 | 0 | 8 | 1 | 0 | 1 | 10 | 0 | 0 | 0 | 0 | 0 | 10 |
| 15:15 - 15:30 | 4 | 0 | 0 | 0 | 4 | 18 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 22 |
| 15:30 - 15:45 | 3 | 1 | 0 | 0 | 4 | 9 | 1 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 14 |
| 15:45 - 16:00 | 1 | 0 | 0 | 0 | 1 | 14 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 15 |
| 16:00 - 16:15 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 1 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 18 |
| 16:15 - 16:30 | 3 | 0 | 0 | 0 | 3 | 16 | 0 | 1 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 20 |
| 16:30 - 16:45 | 9 | 0 | 0 | 0 | 9 | 15 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 24 |
| 16:45 - 17:00 | 3 | 0 | 0 | 0 | 3 | 14 | 0 | 1 | 1 | 16 | 0 | 0 | 0 | 0 | 0 | 19 |
| 17:00 - 17:15 | 3 | 0 | 0 | 0 | 3 | 21 | 1 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 25 |
| 17:15 - 17:30 | 4 | 0 | 0 | 0 | 4 | 11 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 15 |
| 17:30 - 17:45 | 3 | 0 | 0 | 0 | 3 | 22 | 1 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 26 |
| 17:45 - 18:00 | 5 | 0 | 0 | 0 | 5 | 12 | 0 | 0 | 1 | 13 | 0 | 0 | 0 | 0 | 0 | 18 |
| TOTAL | 73 | 2 | 3 | 0 | 78 | 752 | 30 | 14 | 12 | 808 | 0 | 0 | 0 | 0 | 0 | 886 |

TRAFFIC SURVEY ANALYSIS

CLIENT:

SITE: INTERSECTION OF MARINE AVENUE AND GENAZZANO ROAD

DATE: 12 HOUR COUNT ON MONDAY 17 AUGUST 2015

UNITS: CLASSIFIED

| APPROACH FROM NAME MOVEMENT TIME | WEST MARINE AVENUE | | | | | | | | | | | | | | | TOTAL |
|---|-----------------------|----------|----------|----------|------------|----------|----------|----------|----------|----------|------------|----------|----------|----------|-----------|------------------|
| | LEFT TURN | | | | | STRAIGHT | | | | | RIGHT TURN | | | | | ALL MOVEMENTS |
| | C | T | H | B | TOTAL | C | T | H | B | TOTAL | C | T | H | B | TOTAL | |
| 06:00 - 06:15 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 06:15 - 06:30 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 |
| 06:30 - 06:45 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 6 |
| 06:45 - 07:00 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 | 7 |
| 07:00 - 07:15 | 9 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 7 | 16 |
| 07:15 - 07:30 | 8 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 1 | 8 | 16 |
| 07:30 - 07:45 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 6 | 10 |
| 07:45 - 08:00 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 5 |
| 08:00 - 08:15 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 |
| 08:15 - 08:30 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 5 |
| 08:30 - 08:45 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:45 - 09:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 09:00 - 09:15 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 09:15 - 09:30 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 09:30 - 09:45 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 09:45 - 10:00 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 10:00 - 10:15 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 10:15 - 10:30 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 10:30 - 10:45 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 10:45 - 11:00 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 11:00 - 11:15 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 11:15 - 11:30 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 3 |
| 11:30 - 11:45 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 4 |
| 11:45 - 12:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:00 - 12:15 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 12:15 - 12:30 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 |
| 12:30 - 12:45 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 6 |
| 12:45 - 13:00 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 13:00 - 13:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 13:15 - 13:30 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 5 |
| 13:30 - 13:45 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 13:45 - 14:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:00 - 14:15 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 |
| 14:15 - 14:30 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 5 |
| 14:30 - 14:45 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 3 |
| 14:45 - 15:00 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 15:00 - 15:15 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 15:15 - 15:30 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 |
| 15:30 - 15:45 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 |
| 15:45 - 16:00 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 4 |
| 16:00 - 16:15 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 16:15 - 16:30 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 |
| 16:30 - 16:45 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 5 |
| 16:45 - 17:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 17:00 - 17:15 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 6 |
| 17:15 - 17:30 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 |
| 17:30 - 17:45 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 4 |
| 17:45 - 18:00 | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 9 |
| TOTAL | 104 | 3 | 1 | 0 | 108 | 0 | 0 | 0 | 0 | 0 | 65 | 1 | 1 | 1 | 68 | 176 |

| P.C.U.'s counted on 2014-Jul-30 | | | | | | | | | | | Weather: FINE | | | | | | | | | | |
|---------------------------------|------------------|-------------|------------|-------------|-------------|------------------|-------------|-----------|-------------|-------------|----------------------------|------------|------------|------------|------------|-----------------------|-----------|------------|------------|------------|--------------|
| Comments: . . | | | | | | | | | | | | | | | | | | | | | |
| End Time | MR398 From North | | | | | MR398 From South | | | | | SOUTH BEACH ROAD From East | | | | | PARK AVENUE From West | | | | | Interse |
| | NL | NS | NR | App | Dep | SL | SS | SR | App | Dep | EL | ES | ER | App | Dep | WL | WS | WR | App | Dep | |
| 06:15 | 0 | 104 | 2 | 106 | 32 | 4 | 28 | 0 | 32 | 114 | 3 | 1 | 4 | 8 | 1 | 0 | 1 | 7 | 8 | 7 | 154 |
| 06:30 | 0 | 134 | 2 | 136 | 94 | 6 | 82 | 0 | 88 | 174 | 0 | 0 | 4 | 4 | 0 | 8 | 0 | 40 | 48 | 8 | 276 |
| 06:45 | 1 | 220 | 0 | 221 | 72 | 2 | 68 | 0 | 70 | 238 | 2 | 1 | 3 | 6 | 6 | 1 | 5 | 16 | 22 | 3 | 319 |
| 07:00 | 4 | 170 | 0 | 174 | 102 | 7 | 91 | 1 | 99 | 216 | 1 | 3 | 3 | 7 | 6 | 8 | 1 | 45 | 54 | 10 | 334 |
| 07:15 | 5 | 215 | 1 | 221 | 174 | 18 | 154 | 0 | 172 | 276 | 4 | 7 | 5 | 16 | 8 | 15 | 3 | 57 | 75 | 26 | 484 |
| 07:30 | 3 | 229 | 1 | 233 | 137 | 15 | 127 | 0 | 142 | 271 | 2 | 7 | 2 | 11 | 6 | 8 | 3 | 40 | 51 | 23 | 437 |
| 07:45 | 2 | 177 | 0 | 179 | 176 | 18 | 162 | 0 | 180 | 232 | 0 | 6 | 6 | 12 | 5 | 8 | 3 | 55 | 66 | 24 | 437 |
| 08:00 | 7 | 241 | 2 | 250 | 159 | 5 | 148 | 0 | 153 | 269 | 0 | 4 | 4 | 8 | 8 | 7 | 1 | 28 | 36 | 11 | 447 |
| 08:15 | 4 | 109 | 1 | 114 | 119 | 3 | 111 | 1 | 115 | 133 | 0 | 0 | 5 | 5 | 7 | 3 | 2 | 24 | 29 | 4 | 263 |
| 08:30 | 1 | 156 | 0 | 157 | 17 | 6 | 6 | 1 | 13 | 167 | 0 | 5 | 5 | 10 | 4 | 6 | 2 | 11 | 19 | 11 | 199 |
| 08:45 | 2 | 171 | 5 | 178 | 179 | 3 | 179 | 0 | 182 | 179 | 0 | 4 | 0 | 4 | 4 | 0 | 2 | 8 | 10 | 12 | 374 |
| 09:00 | 9 | 151 | 1 | 161 | 86 | 4 | 77 | 0 | 81 | 167 | 2 | 0 | 4 | 6 | 11 | 5 | 2 | 14 | 21 | 5 | 269 |
| 09:15 | 1 | 30 | 0 | 31 | 44 | 3 | 39 | 0 | 42 | 46 | 2 | 3 | 2 | 7 | 1 | 3 | 0 | 14 | 17 | 6 | 97 |
| 09:30 | 0 | 47 | 1 | 48 | 135 | 10 | 133 | 0 | 143 | 58 | 1 | 0 | 2 | 3 | 1 | 0 | 1 | 10 | 11 | 11 | 205 |
| 09:45 | 6 | 125 | 5 | 136 | 60 | 7 | 53 | 0 | 60 | 135 | 0 | 2 | 5 | 7 | 7 | 2 | 1 | 10 | 13 | 14 | 216 |
| 10:00 | 4 | 91 | 2 | 97 | 103 | 6 | 99 | 0 | 105 | 101 | 3 | 1 | 3 | 7 | 7 | 1 | 3 | 7 | 11 | 9 | 220 |
| 10:15 | 4 | 110 | 7 | 121 | 68 | 7 | 66 | 0 | 73 | 121 | 3 | 1 | 1 | 5 | 5 | 1 | 1 | 8 | 10 | 15 | 209 |
| 10:30 | 3 | 82 | 2 | 87 | 97 | 8 | 86 | 2 | 96 | 93 | 0 | 0 | 7 | 7 | 5 | 4 | 0 | 11 | 15 | 10 | 205 |
| 10:45 | 3 | 113 | 1 | 117 | 115 | 8 | 105 | 2 | 115 | 122 | 0 | 2 | 8 | 10 | 6 | 2 | 1 | 9 | 12 | 11 | 254 |
| 11:00 | 6 | 133 | 1 | 140 | 84 | 7 | 78 | 0 | 85 | 139 | 1 | 1 | 5 | 7 | 7 | 1 | 1 | 5 | 7 | 9 | 239 |
| 11:15 | 4 | 57 | 8 | 69 | 131 | 8 | 124 | 0 | 132 | 63 | 0 | 1 | 6 | 7 | 4 | 1 | 0 | 6 | 7 | 17 | 215 |
| 11:30 | 2 | 101 | 4 | 107 | 92 | 4 | 83 | 0 | 87 | 116 | 3 | 1 | 2 | 6 | 4 | 7 | 2 | 12 | 21 | 9 | 221 |
| 11:45 | 5 | 88 | 0 | 93 | 113 | 4 | 100 | 2 | 106 | 90 | 0 | 4 | 9 | 13 | 7 | 4 | 0 | 2 | 6 | 8 | 218 |
| 12:00 | 12 | 120 | 1 | 133 | 102 | 6 | 98 | 0 | 104 | 122 | 1 | 3 | 2 | 6 | 13 | 2 | 1 | 1 | 4 | 10 | 247 |
| 12:15 | 8 | 94 | 1 | 103 | 77 | 17 | 71 | 2 | 90 | 98 | 0 | 2 | 4 | 6 | 12 | 2 | 2 | 4 | 8 | 20 | 207 |
| 12:30 | 5 | 143 | 0 | 148 | 139 | 13 | 129 | 1 | 143 | 155 | 4 | 0 | 7 | 11 | 7 | 3 | 1 | 8 | 12 | 13 | 314 |
| 12:45 | 7 | 55 | 0 | 62 | 59 | 14 | 54 | 1 | 69 | 60 | 3 | 2 | 5 | 10 | 8 | 0 | 0 | 2 | 2 | 16 | 143 |
| 13:00 | 4 | 129 | 0 | 133 | 104 | 5 | 95 | 1 | 101 | 137 | 2 | 1 | 5 | 8 | 6 | 4 | 1 | 6 | 11 | 6 | 253 |
| 13:15 | 4 | 66 | 0 | 70 | 152 | 8 | 139 | 1 | 148 | 77 | 2 | 3 | 10 | 15 | 10 | 3 | 5 | 9 | 17 | 11 | 250 |
| 13:30 | 3 | 59 | 0 | 62 | 120 | 3 | 115 | 1 | 119 | 70 | 4 | 2 | 5 | 11 | 4 | 0 | 0 | 7 | 7 | 5 | 199 |
| 13:45 | 4 | 96 | 1 | 101 | 103 | 13 | 99 | 2 | 114 | 100 | 2 | 0 | 4 | 6 | 6 | 0 | 0 | 2 | 2 | 14 | 223 |
| 14:00 | 8 | 105 | 1 | 114 | 117 | 8 | 100 | 0 | 108 | 118 | 0 | 3 | 9 | 12 | 14 | 8 | 6 | 13 | 27 | 12 | 261 |
| 14:15 | 4 | 85 | 0 | 89 | 119 | 9 | 110 | 1 | 120 | 97 | 3 | 6 | 8 | 17 | 10 | 1 | 5 | 9 | 15 | 15 | 241 |
| 14:30 | 7 | 106 | 0 | 113 | 137 | 18 | 125 | 0 | 143 | 115 | 1 | 4 | 5 | 10 | 12 | 7 | 5 | 8 | 20 | 22 | 286 |
| 14:45 | 9 | 89 | 4 | 102 | 117 | 13 | 111 | 2 | 126 | 115 | 2 | 0 | 3 | 5 | 13 | 3 | 2 | 24 | 29 | 17 | 262 |
| 15:00 | 4 | 85 | 5 | 94 | 93 | 9 | 86 | 1 | 96 | 95 | 1 | 1 | 3 | 5 | 8 | 4 | 3 | 9 | 16 | 15 | 211 |
| 15:15 | 7 | 80 | 2 | 89 | 135 | 12 | 123 | 1 | 136 | 84 | 1 | 5 | 6 | 12 | 9 | 6 | 1 | 3 | 10 | 19 | 247 |
| 15:30 | 5 | 114 | 1 | 120 | 151 | 18 | 142 | 1 | 161 | 120 | 0 | 1 | 6 | 7 | 9 | 3 | 3 | 6 | 12 | 20 | 300 |
| 15:45 | 6 | 83 | 1 | 90 | 193 | 21 | 182 | 1 | 204 | 87 | 0 | 2 | 8 | 10 | 7 | 3 | 0 | 4 | 7 | 24 | 311 |
| 16:00 | 6 | 133 | 4 | 143 | 188 | 23 | 180 | 3 | 206 | 139 | 0 | 5 | 4 | 9 | 11 | 4 | 2 | 6 | 12 | 32 | 370 |
| 16:15 | 3 | 110 | 6 | 119 | 155 | 12 | 145 | 0 | 157 | 115 | 1 | 5 | 5 | 11 | 3 | 5 | 0 | 4 | 9 | 23 | 296 |
| 16:30 | 8 | 144 | 3 | 155 | 188 | 34 | 180 | 4 | 218 | 151 | 1 | 2 | 7 | 10 | 13 | 1 | 1 | 6 | 8 | 39 | 391 |
| 16:45 | 10 | 111 | 3 | 124 | 237 | 43 | 223 | 0 | 266 | 123 | 2 | 3 | 5 | 10 | 11 | 9 | 1 | 10 | 20 | 49 | 420 |
| 17:00 | 6 | 117 | 8 | 131 | 144 | 34 | 136 | 0 | 170 | 127 | 1 | 4 | 2 | 7 | 10 | 6 | 4 | 9 | 19 | 46 | 327 |
| 17:15 | 7 | 149 | 1 | 157 | 196 | 44 | 181 | 2 | 227 | 160 | 1 | 4 | 2 | 7 | 10 | 13 | 1 | 10 | 24 | 49 | 415 |
| 17:30 | 7 | 129 | 3 | 139 | 196 | 41 | 186 | 1 | 228 | 131 | 0 | 2 | 4 | 6 | 8 | 6 | 0 | 2 | 8 | 46 | 381 |
| 17:45 | 6 | 108 | 6 | 120 | 174 | 43 | 164 | 2 | 209 | 118 | 3 | 1 | 6 | 10 | 9 | 4 | 1 | 7 | 12 | 50 | 351 |
| 18:00 | 7 | 89 | 6 | 102 | 148 | 35 | 145 | 0 | 180 | 92 | 1 | 6 | 2 | 9 | 12 | 1 | 5 | 2 | 8 | 47 | 299 |
| Total | 233 | 5653 | 103 | 5989 | 5933 | 659 | 5518 | 37 | 6214 | 6326 | 63 | 121 | 222 | 406 | 355 | 193 | 85 | 610 | 888 | 883 | 13497 |

Appendix E

Zoning Information

Appendix F

TIA Electronic Copy & Sidra Intersection 6 Files

TO BE EMAILED TO RELEVANT ETHEKWINI TRANSPORT
AUTHORITY REVIEWER, ONCE ASSIGNED



Environmental & Engineering Consultants
Postal Address: P.O Box 2311, Westville, 3630
Tel: 031 262 8327
Fax: 086 726 3619

Bulk Services Report

Mr A H Singh

**Proposed New Residential
Development, 49 Casuarina Road,
Tongaat**

Outline scheme/services report

Revision D | 6 July 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 602230-27

Arup (Pty) Ltd
Reg. No. 1994/004081/07 Registered Firm
Consulting Engineers South Africa









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ARUP

Document Verification

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| | | | | | | | |
|-----------------------|---|--|---|--|--------------|-----------|--|
| Job title | | Proposed New Residential Development, 49 Casuarina Road, Tongaat | | Job number | | 602230-27 | |
| Document title | | Outline scheme/services report | | File reference | | | |
| Document ref | | | | | | | |
| Revision | Date | Filename | Civil Report Tongaat Residential.docx | | | | |
| Draft 1 | 10 July 2018 | Description | First draft | | | | |
| | | | Prepared by | Checked by | Approved by | | |
| | | Name | Sarge Govender | Shaun Dixon | Naeem Hassen | | |
| | | Signature |  |  | | | |
| Rev B | 08 Oct. 19 | Filename | | | | | |
| | | Description | | | | | |
| | | | Prepared by | Checked by | Approved by | | |
| | | Name | Sarge Govender | Naeem Hassen | Shaun Dixon | | |
| Signature |  | |  | | | | |
| Revision C | 27 May 2020 | Filename | Infrastructure intent-rev C.docx | | | | |
| | | Description | | | | | |
| | | | Prepared by | Checked by | Approved by | | |
| | | Name | Sarge Govender | Yeshkin Maharaj | Shaun Dixon | | |
| Signature | | | | | | | |
| Rev D | 6 July 2020 | Filename | | | | | |
| | | Description | | | | | |
| | | | Prepared by | Checked by | Approved by | | |
| | | Name | Sarge Govender | Naeem Hassen | Shaun Dixon | | |
| Signature |  | |  | | | | |

Issue Document Verification with Document



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Appendices

Appendix A

Stormwater management plan

Appendix B

Locality Plan

1 Introduction

Arup (Pty) Ltd have been appointed to compile a services report for the **Proposed New Residential Development** situated on erven 612, 613,R/614,1/614 and 1/620 within the eThekweni district municipality located along Casuarina Road along the M4. The site is located between Casuarina road and the Indian ocean.

Co-ordinates -29.608227, 31.163410

The purpose of this report is to set out the parameters and proposed civil engineering infrastructure that is to be put in place to service the proposed developed site.

2 Project overview

2.1 General site description

The site currently consists of 5 residential Erven which will be consolidated into one residential site to accommodate the newly proposed development.

The sites currently consist of standalone units which occupy approximately 30% of the total combined area footprint with the remainder of the site covered in fine grass and trees. The site is rectangular in shape and has a gentle slope from west to east towards the neighbouring Indian ocean.

Table 1 Proposed project development data

| Land Use | Area (m ²) |
|----------------------------------|------------------------|
| Combined site area | 8419.00 |
| Proposed coverage | 4781.07 |
| Proposed soft Landscaping | 3637.93 |

2.2 Locality Plan



The site is located along the northern coastline within the eThekweni district municipality. The site forms part of the Genazzano suburb and is located alongside Casuarina Road on the western side which runs along the M4 south bound with the coastline to the west. A protected green belt separates the site from the coastal shoreline

The site will have a total coverage of 8419.00m² with the proposed development covering 4781.07m². 56.70% of the site will be developed with structure and hard stand parking with the remaining site consisting of soft landscapes

3 Civil engineering services

To facilitate the provision of engineering services it is recommended that all the erven are consolidated into a single stand. These erven are to become a unified stand with single water, sewer and stormwater connection points.

3.1 Potable water reticulation

3.1.1 Design parameters

Typical standards used for the design of sewer reticulation networks are summarized below.

Table 2 Potable water design guidelines

| Parameter | Element | Guideline |
|-----------------------|---|--|
| Pressure | Maximum (Static) | 6.0 bar (60m) |
| | Minimum | 2.0 bar (20m) |
| Flow Velocity | Peak Demand Flow Velocity | ≤ 1.5m/s |
| | Recommended Velocities | 0.6 m/s <V> 1.2m/s |
| | Velocities through Special fittings | 6 m/s or as manufacturers specifications |
| Fire Flow | Hydrant Spacing: Residential | 200m Max |
| | Hydrant Spacing: Industrial | 200m Max |
| | Flow: Residential (High Rising) ≥ 4 stories | Total Fire Flow 50 ℓ/s Mini Flow 50 ℓ/s |
| Peak Factor | Design Peak | 4.6 (|
| Pipe Location | All Areas | 2m from Erf Boundary |
| Pipe Materials | ∅ ≤ 250mm | uPVC Class 12 with spigot and socket couplings OR HDP PE80 PN 12.5 with electro-fusion fitting and couplings |
| Pipe Size | Network Pipes | Min ∅ = 75mm |
| | Near side house connections | 1 Stand : 25mm ∅ min 2 Stands : 32mm ∅ min |
| | Far side house connections | 1 Stand : 25mm ∅ min 2 Stands : 32mm ∅ min |
| Cover to Pipes | Under tarred and paved roads/trafficked areas | 1000mm min |
| | Under other areas | 800mm min |
| | Maximum (All Areas) | 1500mm |
| Valves | Type | RSV – Class 16 to SANS 664, cap top, non-rising spindle and anti-clockwise closing |

3.1.2 Potable Water Design Approach

- Existing Pipe Network Pressure and Supply Zone**

Local Municipality department of water and sanitation is to comment on whether the proposed development can be served by the current infrastructure and whether the development is aligned to any future master planning of the area.

- Demand Estimation**

The water demand for the proposed development is assessed according to the adopted design guidelines and standards.

The general development type for the site is that of a residential development.

Planning standards for Average Annual Daily Demand (AADD) for a standard three-bedroom unit is 600ℓ/unit/day.

The water model was based on a maximum development height of 11 stories with a corresponding minimum residual head of 24m from the municipal supply. Pressure in the existing line must be confirmed to determine whether a PRV is required. Design flows are summarized in the table below.

Table 3 water demand estimation

| Water Demand (Tongaat Residential) | | | | | | | |
|---|---------------------|---------------------------|---------------|---------------|----------------------------|--------------------|--------------------|
| <i>Description</i> | <i>No. of Units</i> | <i>Daily Water Demand</i> | <i>AADD</i> | <i>Losses</i> | <i>TAADD (incl losses)</i> | <i>Peak Factor</i> | <i>Peak Demand</i> |
| | | <i>L/unit/day</i> | <i>KL/day</i> | <i>%</i> | <i>KL/d</i> | | <i>L/s</i> |
| Residential Units | 200 | 600 | 120 | 15 | 138 | 4.6 | 7.35 |
| Fire Demand | | | | | | | 50 |
| Total Peak Hour Demand | | | | | | | 57.35 |

All calculations are based on the Neighbourhood Planning and Design Guide (Redbook), Section J, Water

AADD - Average Annual Daily Demand

AADD (L/day) = Unit Water Demand (L/unit/day) x no. of Units (As per Eqn J.2)

Real Loss Percentage Estimate - 15% Used (As per Section J.4.1.3, Method 1)

TAADD - Total Average Annual Daily Demand

$$\text{TAADD} = \text{AADD} (1 + \text{Real Losses}) \quad (\text{As per Section J.4.1})$$

Peak Factor

$$\text{PF} = 4.6 \quad (\text{As per Table J.9})$$

$$\text{Peak Demand} = \text{TAADD} \times \text{PF} / (24 \text{ hours} \times 60 \text{ min} \times 60 \text{ sec} \div 1000)$$

(As per Section J.4.1.5)

- **Connection Point**

The connection point for the proposed development is obtained from an existing 75mmØ (size to be confirmed by municipality) water main located in Casuarina Road. A 75mmØ connection from the existing water main will serve the site. The proposed connection point will need to be identified on site. The local municipality need to confirm if there is sufficient capacity to service this development.

- **Internal Reticulation**

Internal reticulation is private and will be designed by a qualified engineer as per the final architectural layouts of the development. The internal design will form part of a separate submission, the Site Development Plan (SDP). As a minimum, a water meter will also have to be installed at the main connection point, along with a nonreturn valve

All watermains will be constructed according to local municipality design standards with appropriate approvals from the eThekweni department of water and sanitation.

For the rational fire design, a fire risk assessment will have to be carried out by a specialist. This design will comply with SANS 10400 and SANS 10090 and will form part of a submission for approval separate from this report. A pressure test will have to be done at the new connection to determine if a boosted connection will be required, subject to the final design of the building and the rational fire design.

3.2 Sewer Drainage Network

3.2.1 Design Parameters

Table 4 Potable water design guidelines

| Parameter | Element | Guideline |
|-------------------------------|--|---|
| Min Pipe Diameter | Gravity Sewer | Ø160mm |
| | Connections | Ø110mm (min) |
| Min Velocity at Full Flow | Gravity Sewer and Rising Mains | 0.7m/s |
| Peak Factor | Residential | 2.3 |
| Stormwater Infiltration | Gravity Sewers | 15% of Design Flow |
| Pipe Capacity | Flow level in pipe as fraction of diameter | 67% at Design Flow |
| Min Gradients for Pipes | Ø110mm | 1:60 |
| | Ø160mm | 1:140 |
| | Ø200mm | 1:200 |
| | Ø≥300mm | 1:350 |
| | First pipe length | 1:80 |
| Hydraulic Calculations | Manning Equation | .n = 0.012 |
| Pipe Materials | All Pipes | uPVC Class 34 Heavy Duty to SANS 791 OR uPVC Class 400 (TYPE I) to SANS 1601 |
| Pipe Location | All Areas | 1.5m to 2m from road reserve boundary depending on road reserve width, unless otherwise indicated |
| Connections | For stands | Ø110mm (min) uPVC with slip on couplings or HDPE equivalent |
| Cover to pipe | In road reserves | 1400mm (min) |
| | Other areas | 1000mm (min) |
| Manhole | Spacing | 80m (max) |
| | Manhole Cover and Frame | TYPE 2A Heavy Duty in Roads TYPE 4 in all un-trafficked areas |

3.2.2 Sewer Design Approach

• Existing Pipe Network and Drainage Zone

The current sites do not have a waterborne sewerage system. The existing individual units are served by individual septic tanks.

The local Genazzano WWTW is unlicensed and according to our knowledge is out of capacity

Sewage disposal for the proposed development is a challenge, therefore Alternative options were explored in order to determine the most viable method to dispose of the sewage. The following options were looked at.

Option 1 – the provision of a conservancy tank

Option 2 – the upgrading of the existing Genazzano WWTW

Option 3 – the provision of a sewerage package plant

The options above were presented to EWS for comment and guidance on a best fit solution.

Discharge Estimation

The sewer discharge for the proposed development is assessed according to the adopted design guidelines and standards.

The sewer layout has been analysed with respect to ground slope (%) and excavation depth to optimize the position of sewers and conservancy tank or package plant to reduce the cost of the sewerage scheme.

The unit and average sewerage flows of the site's land use is summarised in the table below. The design criteria for the development of the site have been based on standards from guidelines for Human settlement planning and design manual.

Table 5 Sewer discharge table

| Zoning | Developed Area (m ²) | Unit Demand (ℓ/unit/day) | DWF (Kℓ/day) | PDWF (ℓ/s) | PWWF (ℓ/s) |
|-----------------|-------------------------------------|-----------------------------|-----------------|---------------|---------------|
| Number of units | 200 | 600 | 345 | 3.993 | 1.837 |

DWF – Daily Wet Flow

PDWF – Peak Daily Wet Flow (x2.5)

PWWF – Peak Wet Winter Flow (x1.15)

• Connection Point

As stipulated previously, there is no municipal sewer available for this development. After consultation with EWS we have received email confirmation from Mr. Brian Neale from EWS advising that the available capacity at the Genazzano WWTW is constrained.

From the above options presented, it became apparent that either a conservancy tank or sewerage package plant be used with adequate vehicular access.

An on-site package plant is an option and will be allowed if all requirements are met by the relevant authorities, details of which to are to be made available at detail design stage.

An on-site package plant is the chosen option as this is the most viable and cost-effective solution adding future value with the options of recycling and gray water harvesting.

- **Internal Reticulation**

Internal reticulation is private and will be designed by a qualified engineer as per the final architectural layouts of the development. The internal design will form part of a separate submission, the Site Development Plan (SDP). All sewer mains will be constructed according to guidelines for Human settlement planning and design manual.

3.3 Stormwater Drainage Network

3.3.1 Design Parameters

Typical guidelines used for the design of the stormwater reticulation are discussed below.

- Applicable design standards include:
 - SANS 1200 & SANS 10400
 - Guidelines for the Provision of Engineering Services and Amenities in Township Development (“The Civil Redbook”)
 - Standards as set out by the eThekweni local municipality
 - All materials, construction and testing of the stormwater system should comply with the standards as set out in the documents mentioned above.
 - The design is based on the major system and the minor system. The following recurrence intervals were used for the respective systems:
 - Minor system = 1:5 year (Piped system)
 - Major system = 1:50 year (Roof runoff, surface road runoff)
 - Minimum velocities should be between 0.9m/s and 1.5 m/s to prevent sedimentation.
 - Desirable minimum slopes for different pipe diameters are given in the table below.

| Pipe Diameter (mm) | Desirable Minimum Slope |
|--------------------|-------------------------|
| 110 | 1:100 |
| 160 | 1:100 |
| 200 | 1:100 |
| 300 | 1:100 |
| 450 | 1:150 |
| 525 | 1:170 |
| ≥600 | 1:200 |

- For the subsoil drainage, rodding eyes should be placed at maximum spacing of 25.0m.
- In general, all subsoil drains, channels and pipes should have a minimum slope of 1:100.
- All pipes with a diameter of 200mm and smaller are to be uPVC, Class 34. Syphonic drainage systems if employed are to have all piping as HDPE.

- All pipes larger than 200mm in diameter should be precast concrete pipes. All precast pipes shall have spigot and socket joints in strict accordance with the requirements of SANS 677.
- All pipe bedding to be Class B bedding as per SANS 1200 LB with bedding cradle of selected fill material.

3.3.2 Stormwater design philosophy

Refer to appendix A

- **Existing Drainage Zone**

There is an existing stormwater line in Casuarina Road. The exact diameter of the underground stormwater system is to be determined on site by a survey. The minimum size to be expected is a 450mmØ pipe to manage the minor flood (1:5-year recurrence interval).

- **Run off from Buildings**

The Structure will have a flat roof that will be drained by gutters and rainwater outlets (full-bore outlets). From full-bore outlets, the stormwater will be routed through rainwater downpipes either cast in columns or externally mounted to the building face. At ground level stormwater will be released into a piped network system which will reticulate to the municipal tie-in point via an onsite attenuation structure. All external landscaped areas will be drained using a combination of a piped network as well as maintain natural surface runoff in areas that have not been altered.

- **Run off from Surfaces**

Surface runoff will be directed into inlets located within the hard-landscaped areas and parking lots. Stormwater will be then reticulated via a piped network system into the attenuation tank prior to discharge into the municipal manhole located outside the property on Casuarina Road. A survey will be carried out to identify the exact position and invert level.

- **Catchment Analysis & Runoff Estimation**

A summary of the model parameters is given in the table below.

Table 6 Catchment Characteristics

| Catchment Runoff Parameters | |
|--------------------------------|---|
| Catchment area | 8417m ² |
| Region | Coastal |
| MAP | 950mm |
| Storm duration | 15 min |
| Pre-development Factor | 0.379 (permeable) |
| Post-development Runoff Factor | 0.450 (Due to introduction of hard spaces) |

A summary of the analysis of the flows for the development are given in the table below, based on different storm events or recurrence intervals.

Table 7 Runoff coefficient

| Recurrence Interval | Post Development Runoff (ℓ/s) |
|---------------------|-------------------------------|
| 1:5 | |
| 1:10 | 94 |
| 1:50 | 147 |
| 1:100 | |

- **Attenuation**

It is envisaged that stormwater attenuation will be required for the site. The existing condition of the site is that of a partially developed residential stand semipermeable. The development will increase the runoff coefficient due to the introduction of the new building footprint. Provision of soft landscaping would effectively decrease the runoff due to increase infiltration on the site.

- **Internal Reticulation**

The stormwater design is based on conventional parameters, with the requirement that the development does not suffer the risk of damage from inadequate drainage. The general levels and grades of the site are generated with the consideration of keeping earthworks operations to a minimum as far as possible.

3.4 Electrical

Electricity usage across the development will primarily be from the following occupancy classifications:

- Parking & common/circulation areas
- Residential apartment units

We've used the following codes and guidelines as a reference to estimate the anticipated maximum demand for this building:

- NRS 034-1:2014 - Electricity distribution — Guidelines for the provision of electricity distribution networks in residential areas.
- SANS 10400-XA:2011 – Energy Usage in Buildings

Based on the above we estimate the maximum demand of the development to be in the order of **1377 kVA**.

4 Conclusion

A practical design approach reflects that water and stormwater can be provided, with no above normal risks to the developer and neighboring sites.

The sewer requires additional input from the local authorities as well as guidelines from the environmental authorities regarding the provision of onsite utilities to capture treat and discharge wastewater in a safe manor with no negative impact to neighboring sites.

The importance of maintenance and sustainability plays a crucial role in the successful functioning of the envisaged systems.

Key aspects concerning water and sanitation for the proposed development include:

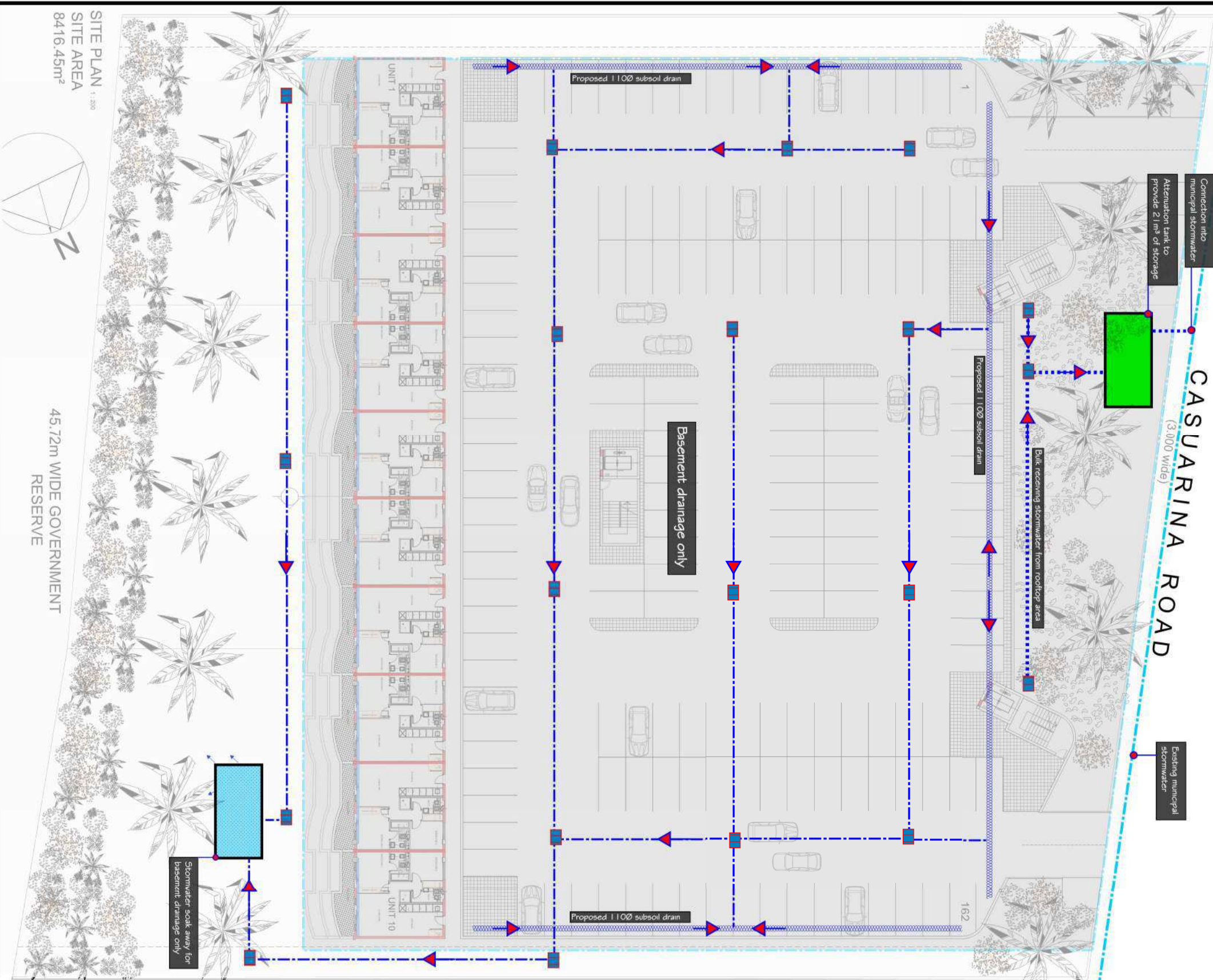
- Location of the existing water connection point for the proposed development must be identified and agreed with the local authorities. Water main (size to be verified by eThekweni Water) located on Casuarina Road.
- Onsite treatment facility is of utmost importance for the sewer disposal. Clarification is required by the municipalities sanitation division to verify if there are possible future plans to provide a waterborne sewer system for this area. This will play a decisive role in deciding whether to forge ahead with alternative sewer disposal means

Key aspects concerning stormwater management for the proposed development include:

- Attenuation will be required. Stormwater will be captured in a stormwater attenuation facility and discarded into the municipal system in a controlled manor ensuring all municipal bylaws are adhered to.
- Refer to appendix A stormwater management plan.

Appendix A

Stormwater management plan



SITE PLAN
1:200
SITE AREA
8416.45m²

45.72m WIDE GOVERNMENT
RESERVE

CASUARINA ROAD
(3000 wide)

Existing municipal
stormwater

Connection info
municipal stormwater
Attenuation tank to
provide 21m³ of storage

Dike receiving stormwater from rooftop area

Basement drainage only

Proposed 1100 subsol drain

Proposed 1100 subsol drain

Stormwater soak away for
basement drainage only

Pre-development C

| Rural runoff coefficient | | Urban runoff coefficient | |
|--------------------------|----------|--------------------------|---------|
| Catchment slope Cs | % area C | Land use | %area |
| <3% | 0.05 | lawn sandy < 2% | 0.08 |
| 3-10% | 0.11 | lawn sandy > 2% | 0.18 |
| 10-30% | 0.2 | lawn heavy < 2% | 0.15 |
| >30% | 0.3 | lawn heavy > 2% | 0.3 |
| Total | 100 | residential single | 0.5 |
| Soil permeability Cp | % area C | flats/dense township | 0.65 |
| Very perm (Dunes) | 0.05 | industry, light | 0.7 |
| Perm (light soil) | 0.1 | business local | 0.6 |
| semi perm (most soils) | 0.2 | business CBD | 0.85 |
| Imperm (rock, paving) | 0.3 | Streets/roofs | 0.95 |
| Total | 100 | total | 48 |
| Vegetal growth Cv | % area C | Urban C | 3.9% |
| Dense bush, forest | 0.05 | Area weighting | |
| cut land, sparse bush | 0.15 | Rural | 52 |
| Grassland | 0.25 | Urban | 42 |
| Bare Surface | 0.3 | Design C | 0.37872 |
| Total | 100 | | |
| | 0.15 | | |
| | 0.35 | | |
| Rural C | 0.25 | | |

Post-development C

| Rural runoff coefficient | | Urban runoff coefficient | |
|--------------------------|----------|--------------------------|----------|
| Catchment slope Cs | % area C | Land use | % area |
| <3% | 0.05 | lawn sandy < 2% | 0.08 |
| 3-10% | 0.11 | lawn sandy > 2% | 0.18 |
| 10-30% | 0.2 | lawn heavy < 2% | 0.15 |
| >30% | 0.3 | lawn heavy > 2% | 0.3 |
| Total | <100% | residential single | 0.5 |
| Soil permeability Cp | % area C | flats/dense township | 0.6 |
| Very perm (Dunes) | 0.05 | industry, light | 0.65 |
| Perm (light soil) | 0.1 | industry, heavy | 0.7 |
| semi perm (most soils) | 0.2 | business local | 0.6 |
| Imperm (rock, paving) | 0.3 | business CBD | 0.85 |
| Total | <100% | Streets/roofs | 0.95 |
| Vegetal growth Cv | % area C | total | 65 |
| Dense bush, forest | 0.05 | Urban C | 14.00% |
| cut land, sparse bush | 0.15 | Area weighting | |
| Grassland | 0.25 | Rural | 35 |
| Bare Surface | 0.3 | Urban | 65 |
| Total | <100% | Design C | 0.529125 |
| | 0 | | |
| | 0 | | |
| Rural C | 0 | | |

On-site storage and attenuation

Maximum allowable runoff rate
eThekweni Municipality have imposed restrictions on the rate at which runoff can be discharged from new developments into the Municipal network or into watercourses. The maximum allowable runoff rate from a new development is to be restricted to the equivalent runoff from that site for the 1 in 10 year storm under pre-development conditions.

Therefore the maximum allowable runoff rate from the new development is to be restricted to: 0.079m³/s (79.0 litres/sec).

On-site storage requirements

eThekweni Municipality have imposed that provision for the storage of runoff be provided such that the restrictions in runoff rate can be temporarily retained on-site before discharging to the Municipal network or watercourse.

The required storage is to be calculated from the difference in runoff volume for the 1 in 50 year storm between the pre and post development conditions. The simplified triangular hydrograph method was used, to calculate the required storage volume. The minimum on-site storage required for the new residential development is: 121m³ (21,000 litres).

Storage and attenuation methods

Runoff is to be collected from the roofs via gutters and downpipes which into the newly proposed formal storm water system via a piped network system. Similarly all roads, hardstand parking areas and landscaped areas will also be drained using a combination of storm water catch pits, sumps, berms, storm water channels both hard and soft adequately positioned which will be channelled towards the new proposed storm water attenuation tank as shown on the layout.

65% of the site will be hard with the remaining 45% soft landscapes. Should a rainfall event occur that exceeds the 1 in 10 year event then the storage tank will provide the total required storage volume.

All runoff will be channelled or piped towards the storm water attenuation tank. The discharge from the tank will be restricted using a single reducing orifice (169mm opening) for the 1:10 year pre-development runoff.

The diameter of this orifice opening has been designed using the Orifice Flow equation

$$\text{Orifice} - Q = cd^2 \sqrt{2gH} \sqrt{.5}$$

Conclusions

The proposed residential development will result in an increase in runoff volume and rate.
eThekweni Municipality have imposed restrictions on the maximum allowable runoff from the site as well as the required on-site storage and attenuation of runoff. Runoff from the proposed development is to discharge via an underground network, as well as through surface channeling camouflaged into the landscaping which will be directed into the storage tanks.
The runoff from the tanks will be reduced using a 169mm orifice.

With these measures in place the Municipal storm water requirements will be met.

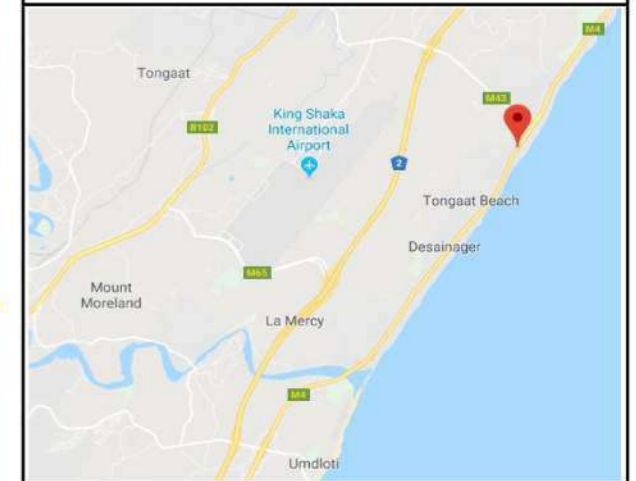
| | | |
|--|---------------------------|---------------------------------------|
| 1:10 (mm/h) | 138.8 | |
| 1:50 (mm/h) | 217.2 | |
| Contributing Area (m ²) | 5420 | |
| Storm duration (min) | 15 | |
| Permeability (mm/h) | NA | |
| Side wall area for infiltration (m ²) | NA | |
| Pre development C | 0.37872 | |
| Post development C | 0.450125 | |
| Return period | | Pre development Q (m ³ /s) |
| 1:10 year | 0.0791 | 0.0941 |
| 1:50 year | 0.1238 | 0.1472 |
| Maximum allowable runoff (m ³ /s) | 0.0791 | |
| Storage required (municipal network available) (m ³) | 22.9 | |
| Office Flow | Q=Cd ² √2gH√.5 | |
| Calculated using | Q=Cd ² √2gH√.5 | |
| (Assume orifice is circular) | | |
| Internal Pipe Diameter | 169 mm | |
| Head | 1.5 m | |
| Cd (coefficient of discharge thro orifice) | 0.65 | |
| Flow | 79.1 l/s | |

Appendix B

Locality Plan

No. 45 - 53 CASUARINA ROAD, GENAZZANO, TONGAAT

LOCALITY PLAN



PHYSICAL ADDRESS:

1. No. 45 CASUARINA ROAD
 2. No. 47 CASUARINA ROAD
 3. No. 49 CASUARINA ROAD
 4. No. 51 CASUARINA ROAD
 5. No. 53 CASUARINA ROAD
- ALL OF
GENAZZANO, TONGAAT

PROPERTY DESCRIPTION:

1. ERF 613 TONGAAT
2. ERF 612 TONGAAT
3. REMAINDER OF ERF 614 TONGAAT
4. PORTION 1 OF ERF 614 TONGAAT
5. PORTION 1 OF ERF 620 TONGAAT

eThekweni Metropolitan Municipality
North Operational Entity
Registration Division - FU
Province of KwaZulu-Natal

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SCALE: 1 : 1250

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME
PROPOSED DEVELOPMENT OF RESIDENTIAL / SERVICED APARTMENTS
SITUATED AT 49 CASUARINA ROAD, TONGAAT BEACH, ETHEKWINI
METROPOLITAN MUNICIPALITY
[SEPTEMBER 2020]



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Disclaimer:

This Environmental Management Programme (EMPr) has acknowledged the impacts such as health and waste that are associated with the development. This EMPr must not be considered a Waste Management Plan or assumed to be a health license or permit of any kind. The EMPr has been prepared pre-construction and must be regarded as a working document that may be updated if and when necessary. Any amendments made to the proposed construction must be submitted to the Competent Authority as an amendment to the authorisation for approval before being implemented.

Double sided printing saves paper!

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAM

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CHAPTER 1: BACKGROUND AND CONTEXT

1. Introduction

The focus of the Environmental Management Program (EMPr) is to allow for the development activity(ies) to commence, whilst still protecting the following from damage:

- any water courses in the area and/or the sea,
- the general surrounds including soils and sensitive areas and
- sensitive or endangered flora and fauna

Damage to the sea, water courses, soils, vegetation, animal life, surroundings roads (by construction vehicles), etc. may result from the proposed development activities. The EMPr will endeavour to monitor, minimise and mitigate impacts identified by the Environmental Assessment Practitioner (EAP) and the relevant Competent Authority (CA). Any concerns already raised by Interested and Affected Parties (I&APs) and/or Stakeholders which may include the client and project team, will also be included in the EMPr.

1.1. Scope, Purpose and Objectives

The scope of the EMPr is to allow for the proposed development to continue whilst still protecting the environment. Particular reference is given to the following key aims:

- The general protection of the receiving environment via compliance with all applicable laws, protocols and guidelines,
- Water courses and wetlands are protected,
- Prevent or minimise pollution of the receiving environment,
- Minimise disturbance of the environment and aim to protect flora and fauna,
- Prevent soil erosion and soil degradation
- Facilitate the rehabilitation of disturbed areas
- Restrict the nuisance factor by providing protocols for staff and/or vehicles

The purpose of this document is to:

- Provide an EMPr that captures learning and best practice in managing the approved development in sufficient detail to enable the relevant authorities to approve this EMPr, or
- Provide approvals, general authorisations or letters of no objection under specified conditions where applicable, and thereby provide a more pro-active, responsive and efficient approval process for such projects.

The objectives of the EMPr are to:

- Comply with local, provincial, national and/or international regulations, standards and guidelines, relating to the protection of the environment.
- Clarify roles and responsibilities of the team members
- Identify measures of mitigating any potential negative impacts thereby reducing or eliminating them
- Provide detail on specific actions required for minimising negative impacts and provide tools or methods for monitoring the effectiveness of mitigation measures
- Optimise positive impacts to maximise the benefit thereof
- Provide management of concerns/complaints from I&AP's
- Provide monitoring and auditing processes during all phases of the development.
- Provide methods of compliance monitoring and reporting of the monitoring
- Provide waste management, recycling and re-use strategies

Some Exclusions and Assumptions are that:

- The EMPr covers particular activities that require authorisation by the competent authorities (CA) only. Activities not approved must be submitted for environmental authorisation, before commencement.
- The EMPr is not independent of a Basic Assessment Report (BAR), or in this case any correspondence received from the CA. Therefore, the EMPr must be read in conjunction with other relevant documents

1.2. EMPr Framework

The EMPr specifies the requirements to be implemented by the developer in order to minimise and manage any potential environmental impacts. The provisions of this EMPr are legally binding to the Authorisation Holder or any authority to whom responsibility has been delegated to, for the proposed development, for the duration of the construction phase.

The EMPr is legally binding to the contractors/sub-contractor(s) and must be included in the Contractual Clauses. A copy of the approved EMPr must be kept on site during construction and operation. In terms of the Environmental Conservation Act and the National Environmental Management Act, those parties responsible for damage to the environment must pay the costs to repair and compensate for environmental and/or human health as well as for preventative measures to avoid or reduce further damage. The Contractor must make provisions in the budget for implementation of the EMPr.

Non-compliances may result in the application of penalty(ies) following non-compliance after a written warning by the Environmental Compliance Officer (ECO). Failure to rectify non-compliances within one (1) week of the issue or a repeat offense will result in a fine issued by the ECO. The following rates will apply for issuing of fines (**N.B. rate subject to escalation**):

Table 1: Fine Rates to be Applied

| Offense | Fine Amount |
|---|-------------------|
| Failure to demarcate working areas | R 1 000 |
| Working or trespassing outside of the demarcated areas | R 3 000 |
| Failure to strip topsoil with intact vegetation | R 5 000 |
| Failure to stockpile topsoil correctly | R 3 000 |
| Failure to stockpile materials in designated areas | R 1 000 |
| Failure to implement dust suppression actions | R 1 000 |
| Washing of vehicles on site | R 1 000 |
| Pollution of surface or ground water | R 5 000 |
| Failure to implement stormwater management plans | R 10 000 |
| Failure to control stormwater runoff | R 10 000 |
| Soil erosion | R 20 000 |
| Failure to provide adequate sanitation | R 5 000 |
| Failure to erect temporary fencing around trenches | R 5 000 |
| Failure to provide adequate waste disposal facilities and services | R 5 000 |
| Failure to re-instate disturbed areas within a specified time frame | R 5 000 |
| Removal of protected flora without a permit to do so | Specified by DAFF |
| Any non-compliance of the project specifications | R 10 000 |

The fines will be paid by the Contractor to the Developer which will be utilised in the landscaping and/or rehabilitation of the site.

The layout of the EMPr is as follows:

| | |
|--|---|
| <p style="text-align: center;">Chapter 1 Background and Context</p> | <ul style="list-style-type: none"> • This section is focused on introducing an EMPr, and highlighting the purpose and objectives • Legal requirements are highlighted and is case sensitive/ project specific • Roles and responsibilities of personnel discussed. • The environmental file and requirements as per ECO monitoring is discussed. |
| <p style="text-align: center;">Chapter 2 Project Background and Description</p> | <ul style="list-style-type: none"> • Project proposal plans and layout. • Locality description and sensitivity maps. |
| <p style="text-align: center;">Chapter 3 Environmental Controls</p> | <p>The EMPr is presented in five phases namely, the pre-construction, demolition, construction, rehabilitation and operational phases of the project. Each phase has specific mitigation measures that address potential impacts which may be unique to that phase.</p> <ul style="list-style-type: none"> • Pre-construction - This phase includes pre-construction activities including the site handover, site establishment, environmental training and access routing. The specifications of all mitigation measures, the responsibilities and the procedures for this phase must form part of the contract documentation. Hence, the relevant personnel will be required to comply with this phase of the EMPr. • Demolition phase - This phase is focused on demolishing existing buildings and structures to clear the site for the approved new plans. Impacts are identified and the relevant mitigation measures must be implemented. • Construction phase – This phase is focused on building the approved new development. It is important that all mitigation measures are implemented according to the frequency stipulated to ensure a smoother construction period. • Rehabilitation Phase – This phase of the EMPr provides for the removal of the contractor's camp, rehabilitation of the site and any disturbed areas and handover to the Client. • Operational phase – This phase becomes the developer's responsibility. The developer must ensure the smooth running of the new development. |

1.3. Legal Requirements

In terms of the Environmental Impact Assessment (EIA) Regulations 2017, promulgated in terms of the National Environmental Management Act, 1998 (NEMA) a Basic Assessment (BA) has been conducted by an independent Environmental Assessment Practitioner (EAP), 1World Consultants (Pty) Ltd. According to the BA requirements, an Environmental Management Programme (EMPr) was formulated to address the impacts identified. The EMPr endeavours to monitor, minimise and mitigate impacts identified and concerns raised by I&APs and/or stakeholders.

The EMPr presented covers activities authorised by the competent authority, Department of Economic Development, Tourism and Environmental Affairs (EDTEA) only. Activities not approved must be submitted for Environmental Authorisation (EA), before commencement. If the impacts identified in the BAR be more significant than assessed, the EMPr must be reviewed; and updated if necessary. The EMPr is not independent of the BAR, therefore both must be read in conjunction with each other.

The following Listed Activity in Government Notice (GN) R327 (Listing Notice 1) of 2017 are triggered, requiring a Basic Assessment (BA) Process for the proposed development at 49 Casuarina Road, Tongaat.

Table 2: Relevant Activities from EIA Regulations 2017

| EIA Regulations 2017 | | | |
|----------------------|----------------------|--|--|
| Regulation Year | Listed Activity NEMA | Description of Activity | Applicability to the Project |
| 2017 | LN 1, Activity 19A | <p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from—</p> <ul style="list-style-type: none"> (i). the seashore; (ii). the littoral active zone, an estuary or a distance of 100 metres inland of the highwater mark of the sea or an estuary, whichever distance is the greater; or (iii). the sea; — <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</p> <ul style="list-style-type: none"> (f) will occur behind a development setback; (g) is for maintenance purposes undertaken in accordance with a maintenance management plan; (h) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (i) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or <p>where such development is related to the development of a port or harbour, in which</p> | <p>The proposed development is located within 100m from the High-Water Mark (HWM) of the sea and will require more than 5 cubic metres of material to be removed from site as the proposed development footprint on the ground level is 4781.07m².</p> <p>The nature of the material which will be removed will be of the building material being demolished from the existing residence such as concrete, bricks, timber etc. and most of the infill will be consisted from the existing original natural site material.</p> |

| | | |
|--|---|--|
| | case activity 26 in Listing Notice 2 of 2014 applies. | |
|--|---|--|

Table 3 provides a list of all applicable legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA regulations.

Table 3: Applicable Legislation, Policies and/or Guidelines

| Title of Legislation, Policy or Guideline | Administering authority | Date |
|--|---|--------------------|
| National Environmental Management Act (Act 107 of 1998) – for its potential to cause degradation of the environment (Section 28). | Department of Environmental Affairs | 1998 |
| Environmental Conservation Act (Act 73) – for potential environmental degradation. | Department of Environmental Affairs | 1989 |
| National Water Act (Act 36 of 1998) – for potential to cause pollution of water resources defined under the Act (Section 19). | Department of Water and Sanitation | 1998 |
| Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) – for protection of agricultural resources and for control and removal of alien invasive plants. | National Department of Agriculture | 1983 |
| National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) – for protection of biodiversity. | Department of Agriculture and Environmental Affairs & Ezemvelo KZN Wildlife | 2004 |
| The National Heritage Resources Act (Act No 25 of 1999 as amended) – for the identification and preservation of items of heritage importance. | South African Heritage Resources Agency | 1999 |
| KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No. 5 of 2018) | KwaZulu-Natal Amafa and Research Institute | 2018 |
| EIA Regulations GNR 326 – for guidelines on the process to be followed and the format of the BAR. | Department of Economic Development, Tourism and Environmental Affairs | 2017 |
| Public Participation guideline in terms of NEMA EIA Regulations | Department of Economic Development, Tourism and Environmental Affairs | 2017 |
| National Climate Change Response Plan White Paper | Department of Environmental Affairs | 2011 |
| National Environmental Management: Waste Act | Department of Environmental Affairs | 2008 |
| National Environmental Management: Air Quality Act | Department of Environmental Affairs | 2004 |
| Minimisation of Shadows on Beaches Policy for eThekweni: Shadow Impacts on Beach and Residential Amenities. | eThekweni Municipality | 2008 |
| eThekweni Municipality By-Laws | eThekweni Municipality | Current |
| Spatial Development Framework | eThekweni Municipality | 2016-2017 |
| Integrated Development Plan | eThekweni Municipality | 2013/12 to 2016/17 |

The final EMPr is submitted and is subject to approval by the EDTEA. The EMPr is formulated to include only those aspects pertaining to the environmental authorisation. It may not have taken all the necessary legislation and regulations, pertaining to the actual development activities. The appointed project manager and/or developer must adhere to the necessary legal requirements.

Examples of such legislation or regulations, amongst others, include:

- The Constitution (1996)

- Labour Relations Act (1995)
- National Building Regulations and Building Standards Act (1977)
- Health Act (1977)
- National Water Act (1998)
- Occupational Health and Safety Act (1994)
- National public health and food hygiene regulations
- National Water Act 1998 (Act 36 of 1998)
- Minimisation of Shadows on Beaches Policy for eThekweni: Shadow Impacts on Beach and Residential Amenities (2008)

The EMPr covers legislative requirements derived from the following:

- National Environmental Management Act (107 of 1998) as amended
- National Water Act (Act 36 of 1998)
- National Environment Management Act: Biodiversity Act

The contractor is to ensure that any activity performed complies with the relevant legislation and the necessary permits are in place before commencement of the specific activity triggering the need for the relevant license or approval.

1.4. Activities in the Lifecycle of the Casuarina Road Project

Table 4 below provides a broad overview on the tasks undertaken for the development of the residential/ serviced apartments at 49 Casuarina Road in terms of the application for EA.

Table 4: Activities in the Lifecycle

| Number | Activity |
|---------------------------------|--|
| Basic Assessment Process | |
| 1 | Screen the site for environmental sensitives. |
| 2 | Engage with EDTEA and EPCPD via enquiry processes, site inspections and pre-application meetings. |
| 3 | Assess proposed layouts against legislation and applicable guidelines. |
| 4 | Highlight needs and desirability of the project. |
| 5 | Consideration of alternatives including site, layouts and technology. |
| 6 | Undertake specialist studies relevant to the project proposal. |
| 7 | Assess the potential impacts that the project has on the environment and vice versa. Points to consider: <ul style="list-style-type: none"> • General Construction Activities • Clearance of Site • Loss of Biodiversity • Increased Traffic Frequency on Road Infrastructure • Dust • Stockpiling of Topsoil Cleared Vegetation • Erosion • Installation and Use of Ablution Facilities • Cleaning of Vehicles, Equipment and Construction Areas • Utilisation of Groundwater • Storage and Handling of Hazardous Chemicals • Generation of Hazardous Waste • Production of General Waste and Building Rubble • Storage, Mixing and Disposal of Cement and Concrete • Fire Establishment |

| | |
|---|--|
| | <ul style="list-style-type: none"> • Generation of Noise from Construction Vehicles and Machinery • Visual Impacts • Use of Resources such as Electricity, Water, Oil, Grease, Fuel and Construction Material • Injury to Local People and Construction Workers • Disturbance on Heritage Resources • Socio Economic Impacts |
| 8 | Compile EMPr detailing impacts and associated mitigation measures. |
| 9 | Conduct a 30-day Public Participation Process (PPP). |
| 10 | Update reports as per comments received and address comments. |
| 11 | Submit final BAR/EIA to the identified CA for approval/rejection. |
| 12 | <p>Legislated timeframe to undertake the Basic Assessment Process:</p> |
| Figure 1: Legislated Timeline for BA Process | |
| Post Environmental Authorisation | |
| 13 | Clearance of site. |
| 14 | Site establishment and construction activities. |
| 15 | Rehabilitation of disturbed areas. |
| 16 | Site handover |
| 17 | Closure of Project. |

1.5. Definitions and Terminology

The following definitions apply to the EMPr and are defined according to Government Notice Regulation (GNR) 326.

Table 5: Definitions Identified

| Term | Definition/ Description |
|---|---|
| Alternatives | In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the— a. property on which or location where the activity is proposed to be undertaken; b. type of activity to be undertaken; c. design or layout of the activity; d. technology to be used in the activity; or e. operational aspects of the activity; f. and includes the option of not implementing the activity; |
| Development | The building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint. |
| Basic Assessment Report | A report contemplated in regulation 19. |
| Cumulative Impact | The past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities. |
| Development Footprint | Any evidence of physical alteration as a result of the undertaking of any activity. |
| EAP | Environmental assessment practitioner as defined in section 1 of the Act. |
| EMPr | Environmental management programme contemplated in regulations 19 and 23. |
| Environmental Audit Report | A report contemplated in regulation 34. |
| Indigenous Vegetation | Refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years. |
| Maintenance | Actions performed to keep a structure or system functioning or in service on the same location, capacity and footprint. |
| Mitigation | To anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible. |
| Registered Interested and Affected Party | An interested and affected party whose name is recorded in the register opened for that application in terms of regulation 42. |
| The Act | National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended. |

1.6. Acronyms and Abbreviations

The following apply:

Table 6: Acronyms Used

| Acronym | Definition |
|----------------|---------------------------------------|
| BAR | Basic Assessment Report |
| CA | Competent Authority |
| DW&S | Department of Water and Sanitation |
| EA | Environmental Authorisation |
| EAP | Environmental Assessment Practitioner |
| ECO | Environmental Compliance Officer |

| | |
|-------|---|
| EDTEA | Department of Economic Development, Tourism and Environmental Affairs (KwaZulu-Natal) |
| EMPr | Environmental Management Programme |
| EPCPD | Environmental Planning and Climate Protection Department |
| I&APs | Interested and Affected Party(ies) |
| NEMA | National Environmental Management Act |
| PM | Project Manager |
| PPP | Public Participation Process |

1.7. Roles and Responsibility

The effective implementation of the EMPr is dependent on established and clear roles, responsibilities and communication lines within an institutional framework. The various roles and responsibilities are stated below and will be maintained throughout the construction phase until such time as the final construction phase Environmental Audit Report has been prepared and accepted. The project team will consist of the Project Manager, the Project Engineer, the Environmental Compliance Officer (ECO) and the Contractor.

1.7.1. Project Engineer

The Project Engineer must provide the project specifications of the construction phase. The contractor is legally bound to follow these specifications unless agreed upon by the Engineer. The engineer has the following responsibilities:

- Monitor compliance of the project, following provision of inspection reports provided by the ECO.
- Assess the Contractors performance with regard to completion of the task and keep records on a monthly basis.
- Facilitate the site handover to the Contractor.

| | |
|-----------------------|---------------------------------------|
| Company Name | Arup (Pty) Ltd |
| Contact Person | To Be Confirmed |
| Address | 167 Florida Road, Morningside, Durban |
| Telephone | 031 328 8700 |
| Fax | 031 328 8701 |
| Email | To Be Confirmed |

1.7.2. Environmental Control Officer (ECO)

The ECO is responsible for monitoring and reporting that the contractor and applicant are implementing and following the EMPr during the construction and operational phases (for the timeframe specified in the conditions of the environmental authorisation) and to liaise and report to EDTEA. The following will fall within the ECO responsibilities:

- Have a working knowledge of the recommendations and mitigation measures as provided in this EMPr and of the permits, authorisations and licenses.
- Conduct monthly audits of the construction site according to the EMPr and according to the conditions of the environmental authorisation.
- Provide the contractor with environmental training and a copy of the EMPr and confirm in writing that it is understood.
- Liaise with the contractor and project manager.
- Recommend corrective steps for any non-compliance activity on site with respect to the EMPr.
- Compile a monthly audit report highlighting compliance and non-compliance with the EMPr and submit to EDTEA.
- All agreements between the contractor and the ECO with regard to the EMPr will be in writing and co-signed by the Project Manager.

- The ECO will not be on site on a daily basis and the Contractor is responsible for implementing the EMPr. The Contractor will be provided with a contact number for the ECO.

| | |
|-----------------------|--|
| Company Name | Arup (Pty) Ltd |
| Contact Person | Yusuf Raja |
| Address | 167 Florida Road, Morningside, Durban |
| Telephone | 031 328 8700 |
| Fax | 031 328 8701 |
| Email | Yusuf.raja@arup.com |

1.7.3. Contractor and Sub-Contractors

The Contractor is responsible for implementing and adhering to the EMPr during the construction phase, in all respects as stipulated. Compliance with the EMPr by staff during the construction must be adhered to by the contractor and this must be recorded by the contractor for audit purposes. The following will be the responsibility of the Contractor:

- Be familiar with the EMPr and all conditions of authorisations, licenses and/or permits.
- Supply method statement for implementation of the EMPr.
- Attend training provided by the ECO, and relay training to all staff and sub-contractors. Proof of training must be kept on record.
- Maintain an environmental file that must contain the following documents:
 - Company environmental policy
 - Hazardous material handling and storage protocols
 - Spill Contingency Plan
 - Emergency Response Plan and Contact Numbers
 - Waste disposal certificates
 - Servicing of portable toilets
- Maintain an environmental complaint register that must have carbon copies and numbered pages, to record all incidents that occur on site during construction. Incidents include but may not be limited to:
 - Public involvement / complaints
 - Occupational health and safety incidents
 - Incidents/ spills involving hazardous materials and/or equipment on site
 - Non-compliance incidents
 - Spills into or around watercourses
 - Encountering fauna of interest
 - Finding archaeological artefacts and/or human remains
- Bear any costs associated with non-compliance and/or damage to the environment as a result of not implementing the EMPr or due to negligence.

1.7.4. Developer

The Developer is legally ultimately responsible for the overall compliance with the conditions of the environmental authorisation, since any authorisation and/or license is in the name of the developer. The following fall within the responsibilities of the developer:

- Be familiar with the recommendations and mitigation measures of the EMPr. The contractor and all staff must agree to adhere to it.
- Monitor site activities on an ongoing basis or contract the service out.
- Conduct internal audits of the site.

- The contractor must confine the activities to within the demarcated area.
- Rectify transgressions via communication with the contractor and staff and the ECO.
- An ECO must conduct monthly audits and audit reports must be submitted to the EDTEA.

1.8. Environmental Documentation Reporting and Compliance

To ensure accountable and demonstrated implementation of the EMPr, a number of reporting systems, documentation controls and compliance mechanisms must be in place for all projects as a minimum requirement. These are highlighted below.

1.8.1. Training

Contractors and workers must receive basic training in environmental awareness i.e. minimisation of impacts to sensitive elements, waste management, water pollution and the requirements of the EMPr.

1.8.2. Implementation of EMPr by Contractor

The contractor must implement and comply with the EMPr at all times. If clarity be required, the contractor must contact the ECO for advice. The ECO must provide the contractor with their contact details. The layout plans and Stormwater Management Plan (SWMP) must be adhered too. Refer to Appendix 1 and 2 respectively.

1.8.3. Document Control/ Filing System

The approved filing system, Environmental File, must be established at the outset of the construction phase and must be maintained throughout the lifespan of the project. The ECO is solely responsible for the upkeep and management of the Environmental file. All documentation detailed below must be stored in the Environmental file. The Environmental file must be made available at all times upon request by the Competent Authority. The Environmental File comprises the following documents and must be kept on site in order to record compliance:

- Copy of any Environmental Authorisation, licenses, permits, Stormwater Management Plan, and the approved Final EMPr
- Method statement for complying to the EMPr,
- Record of complaints from I&AP's capturing the time, date, location and nature of complaint as well as the actions taken and by whom. The complaints register must have carbon copy pages and numbered pages.
- Emergency Response Plan and Record of emergencies and incidents
- Spill Contingency Plans
- Proof of Training
- Emergency contacts and numbers
- Material Safety Data Sheets for any hazardous substances
- Dust suppression records
- Written corrective action instructions provided by the ECO (including emails)
- Any Non-Conformance Reports (NCR) that have been issued to the contractor and/or sub-contractor(s). A Non-Conformance follows non-compliance to rectifying a problem area and must be reported to the Competent Authorities. A Non-Conformance Report typically contains the following information:
 - Details on the non-conformance,
 - Any plant or equipment involved,
 - Any chemicals or hazardous substances involved,
 - Details on the non-conforming action,
 - Nature of associated risk(s),
 - Corrective actions to rectify non-conformance, as agreed by all parties concerned,

- Timeframes for corrective measures to be implemented,
- Record of compliance by corrective actions, as verified by the ECO

1.8.4. Environmental Monitoring

A monitoring program for compliance with the EMPr must be implemented for the duration of the proposed construction. The program will include the following:

- Monthly site visits and audits (subject to the conditions of any environmental authorisation or license) which will be conducted by the Environmental Control Officer (ECO) to monitor compliance of the final EMPr.
- Provide corrective recommendations to rectify any non-compliance.
- Compilation and submission of audit reports to EDTEA providing rating of compliance with the EMPr. Any evidence of damage to areas outside the construction zone will be recorded via photographs as well as a record of the date and time of damage, type of damage and reason for damage. The contractor will be liable for damages if it has resulted from non-compliance to the EMPr.
- A register of complaints from I&AP's will be opened and maintained. Complaints and concerns must be responded to immediately.

1.8.5. Environmental Checklists and Audit Reports

The ECO is required to complete Environmental Checklists which meets the requirements of the EMPr. The frequency of the checklists is based on the Environmental Authorisation. The ECO is required to sign and date the checklist, retain a copy in the Environmental File and submit a copy of the completed checklist to the Contractor. The completed checklists will assist the Contractor to improve on areas on concern and ensure 100% compliance. The checklists form the basis for the Monthly Environmental Reports.

The ECO must prepare Environmental Audit Reports as stipulated in the Environmental Authorisation. The Report must be submitted to the Project Manager and filed in the Environmental file. At a frequency determined by the environmental authorisation, the ECO must submit the audit reports to the Competent Authority in terms of NEMA. At a minimum, the monthly audit report is to cover the following:

- Deviations and non-compliances with the checklists;
- Non-compliances issued;
- Completed and reported corrective actions;
- Environmental monitoring;
- General environmental findings and actions; and
- Minutes of environmental site meetings, if conducted.

Environmental Audits of the construction phase and implementation of the EMPr will be undertaken by the ECO and are a legal requirement in terms of NEMA once an EA is issued and as long as the EMPr is valid. The findings and outcomes of these audits will be recorded in the Environmental File. The environmental audits and associated reports must be conducted and submitted to the Competent Authority at intervals as indicated in the environmental authorisation.

On final completion of the Construction Phase, the ECO is required to prepare a Final Environmental Audit Report. The Report must be submitted to the Competent Authority for acceptance and approval. Acceptance and approval of the Final Environmental Audit Report by the Competent Authority will end the construction phase EMPr as successful and completed.

1.8.6. Environmental Site Meetings

Environmental site meetings must be conducted at a frequency as stipulated in the Environmental Authorisation. Environmental issues and areas of concern must be highlighted and discussed at the meetings. An attendance register must

be signed, and minutes of meetings must be compiled and included into the Environmental file. Meeting minutes must be circulated to all attendees for record keeping.

1.8.7. Required Method Statements

A Method Statement is a written submission by the Contractor to the Project Manager and/or ECO in response to the EMP, setting out the equipment, materials, labour and method the contractor proposes using to carry out an activity. Method statements must be kept in the Environmental File and includes but is not limited to the following:

- Construction site establishment,
- Dust suppression,
- Cement mixing/concrete batching,
- Contaminated/used water,
- Erosion control and stormwater management,
- Storage, handling and decanting of fuel (diesel) and other hazardous substances,
- Bunding
- Project management including training,
- Personnel and public safety,
- Protection of fauna and flora,
- Rehabilitation of disturbed areas,
- Solid and liquid waste management,
- Topsoil management including storage and re-use,
- Sourcing and Storage of materials,
- Rest and Wash areas, including toilets
- Interaction with public and stakeholders
- Traffic Management Plan

1.8.8. Environmental Incident Log

The ECO is required to maintain an Environmental Incident Log. The Environmental Incident Log is a means to record all environmental incidents for which a non-compliance notice would not be issued. An environmental incident is defined as:

- Any environmental impact resulting from an action or activity by a contractor in contravention of the environmental stipulations and guidelines listed in the EMP;
- General environmental information such as road kills or injured wildlife.

The ECO must record all environmental incidents in the Environmental Incident Log. All incidents regardless of severity must be reported to the Developer and will be captured in the Environmental Audit Report. The Log must be kept in the Environmental File. For each environmental incident the following details must be recorded:

- The date and time of the incident;
- Description of the incident;
- The name of the Contractor responsible;
- The incident must be listed as significant or minor;
- If the incident is listed as significant, a non-compliance notice may be issued, and recorded in the log;
- Remedial or corrective action taken to mitigate the incident.

1.8.9. Non-Compliance

A non-compliance notice will be issued to the responsible contractor by the ECO via the Project Manager. The non-compliance notice will be issued in writing and a copy must be filed in the Environmental File. Details will include:

- Time and date of the non-compliance;

- Name of the contractor responsible;
- Nature and description of the non-compliance;
- Recommended/ required corrective action; and
- Date by which the corrective action to be completed.

The Contractors must act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Failure to address the cause must be reported to the relevant authority (i.e. DAFF, EDTEA, DEA, DWS, etc.) for them to deal with the transgression. For each non-compliance notice issued, a documented corrective action must be recorded in a report format and must be made available to the ECO. If satisfied that the corrective action, the ECO can sign and approve the report which must then be filed.

1.8.10. Environmental Emergency Response Plan

The Contractor is responsible for preparing an Environmental Emergency Response Plan. This is to exhibit the Contractors ability to respond effectively to incidents that have detrimental impacts on the environment. Such incidents include the following among others:

- Accidental spillage of hazardous substances (oil, fuels, sewage, etc.) resulting in negative impacts such as soil contamination, surface and groundwater pollution, habitat and biodiversity loss, etc.
- Accidental toxic air emissions resulting in negative impacts such as air pollution, habitat and biodiversity loss, etc.
- Accidental discharges to watercourses and onto land resulting in negative impacts such as contamination, pollution, habitat and biodiversity loss, etc.,
- Specific impacts from accidental incidents, e.g. mass death of fish, etc.

The emergency response plan must include for the following:

- Provide actions to be taken in the event of an emergency, in the most logical sequence of events,
- Emergency contact numbers,
- Roles of designated emergency response team members from the contractor's team,
- Incident recording,
- Remediation measures to be implemented,
- Information on hazardous substances, plant and equipment, including warnings and potential risks,
- Proof of emergency response training, including proof of emergency preparedness, as per legal requirements.

1.8.11. Photographic Evidence

Photographic record must be kept and must be used to show before, during and post rehabilitation evidence of the project. This evidence can also be used in the cases of damages claims if they arise. The Contractor must allow the ECO access to take photographs of all areas, activities and actions. The ECO must keep photographic records which must include:

- Pictures of all areas designated as work areas, camp areas, construction sites and storage areas taken before these areas are set up
- All bunding and fencing
- Road conditions
- Topsoil storage areas
- Waste management sites
- Ablution facilities
- Any non-conformances
- All required signage
- All areas before, during and post rehabilitation

1.8.12. Complaints Register

The ECO must keep a complaints register. The complaints register is a record of all complaints received from communities, stakeholders and individuals. The Complaints Record must:

- Record the name and contact details of the complainant;
- Record the time and date of the complaint;
- Contain a detailed description of the complaint; and
- Where relevant and appropriate, contain photographic evidence of the complaint or damage

CHAPTER 2: PROJECT BACKGROUND AND DESCRIPTION

2. Background

1World Consultants (Pty) Ltd has been appointed by Arup (Pty) Ltd, on behalf of the landowner and applicant, Casuarina 5153 Properties (Pty) Ltd (Mr. Anant Singh), to undertake the required environmental services for the proposed demolishing and construction of residential / serviced apartments situated at 49 Casuarina Road, Tongaat Beach, located within the eThekweni Municipality. The proposed development at 49 Casuarina Road is located within 100m from the High-Water Mark (HWM) of the sea within an urban area, residential area. Table 7 below contains project specifications.

Table 7: Project Specifications

| 49 Casuarina Road | |
|---|---|
| Project Applicant | Casuarina 5153 Properties (Pty) Ltd (Mr Anant Singh) |
| Ward | Ward 58 |
| Local Municipality | eThekweni Metropolitan Municipality |
| District Municipality | eThekweni Metropolitan Municipality |
| Property Description | 49 Casuarina Road, Genazzano, Tongaat Beach |
| Erf Number | <ul style="list-style-type: none"> • Erf Farm No. 1/620 • Erf Farm No. 1/614 • Erf Farm No. R/614 • Erf Farm No. 612 • Erf Farm No. 613 |
| Property Extent | 8419m ² |
| New Development Footprint on the Ground Level | 4781.07m ² |
| Proposed Number of Levels | 2 levels below ground and 8 levels above ground |
| Total Floor Area Ratio (F.A.R) | 12 628.50m ² |
| Development Specifications | <ul style="list-style-type: none"> • Demolition of the existing structures; • Excavations and earthworks as required for the development; • The construction of new residential / serviced apartments; • Establishment of new parking blocks; • Potential widening of a very small portion of Casuarina Road by 1m to create easy vehicle movement in either direction; and • On-site waste water (sewage) treatment. |

2.1. Location of the Activity

The proposed development at 49 Casuarina Road is located within Ward 58 of the eThekweni Metropolitan Municipality. The property is currently used as Mr. Singh's vacation home. The site is a consolidation of five erven as per Figure 2 below. Table 8 below provides further site details such as the 21-digit Surveyor General (SG) number for the property and site coordinates.

Table 8: Site Details

| Demolishing and development at: | | |
|--|---|-----------------------|
| Property Description | 49 Casuarina Road, Genazzano, Tongaat Beach | |
| Landowner | Casuarina 5153 Properties (Pty) Ltd (Mr Anant Singh) | |
| Current Property Zoning | Property currently zoned as Special Residential. A re-zoning application has been submitted to change the zoning to General Residential 2 | |
| 21-digit Surveyor General (SG) numbers | Erf Number | |
| | 21-Digit Code | |
| | Erf Farm No. 1/620 | N0FU03350000062000001 |
| | Erf Farm No. 1/614 | N0FU03350000061400001 |
| | Erf Farm No. R/614 | N0FU03350000061400000 |
| Erf Farm No. 612 | N0FU03350000061200000 | |
| Erf Farm No. 613 | N0FU03350000061300000 | |
| Property Size | 8419m ² | |
| Development Footprint at Ground Level | 4781.07m ² | |
| GPS Coordinates | 29° 36' 12.32" S 31° 9' 47.76" E | |

A greater overview of the Tongaat Beach area and project site area are depicted in Figures 3 and 4 respectively.

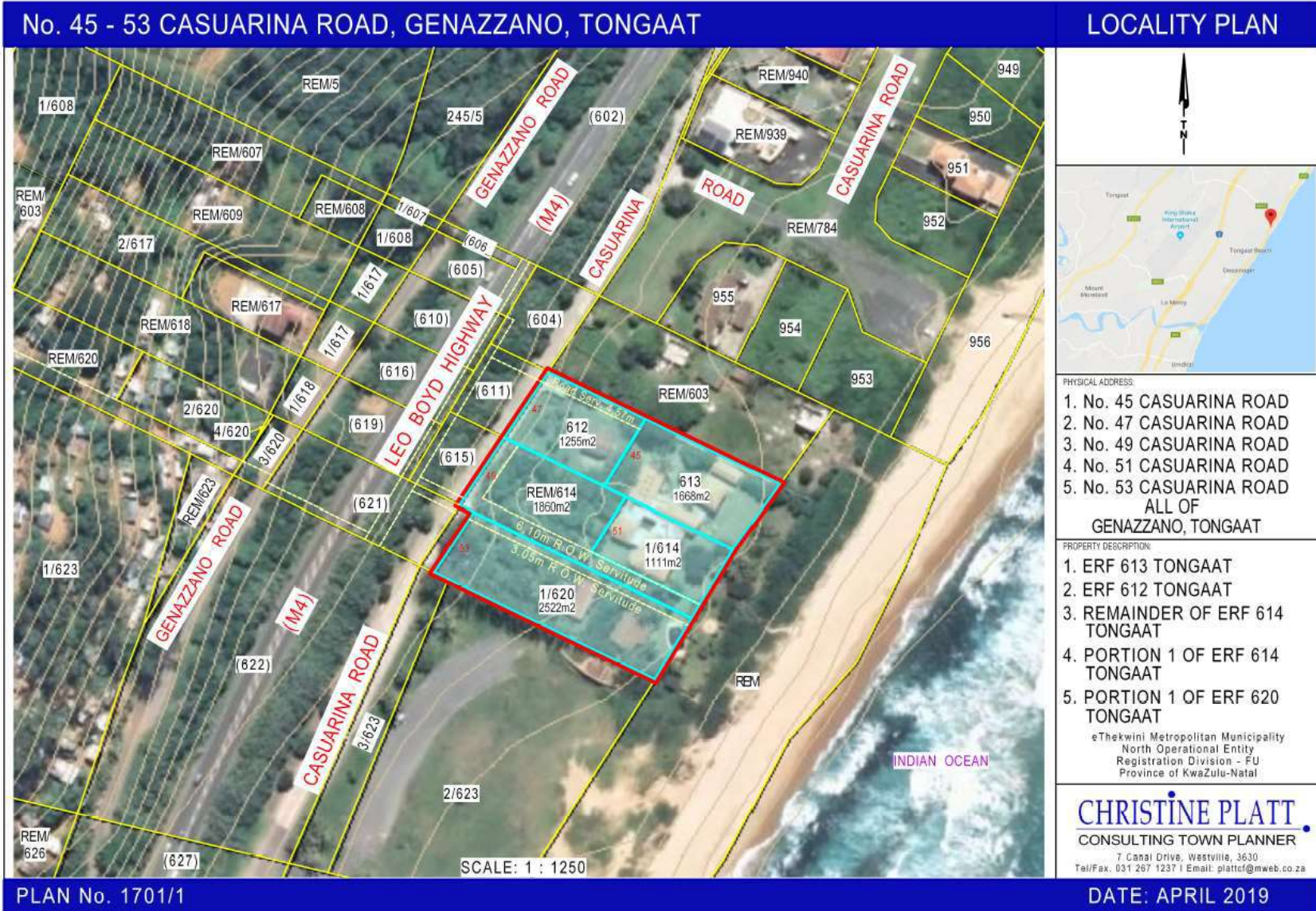


Figure 2: Locality Plan Depicting Consolidated Erven (Consulting Town Planner, 2019)

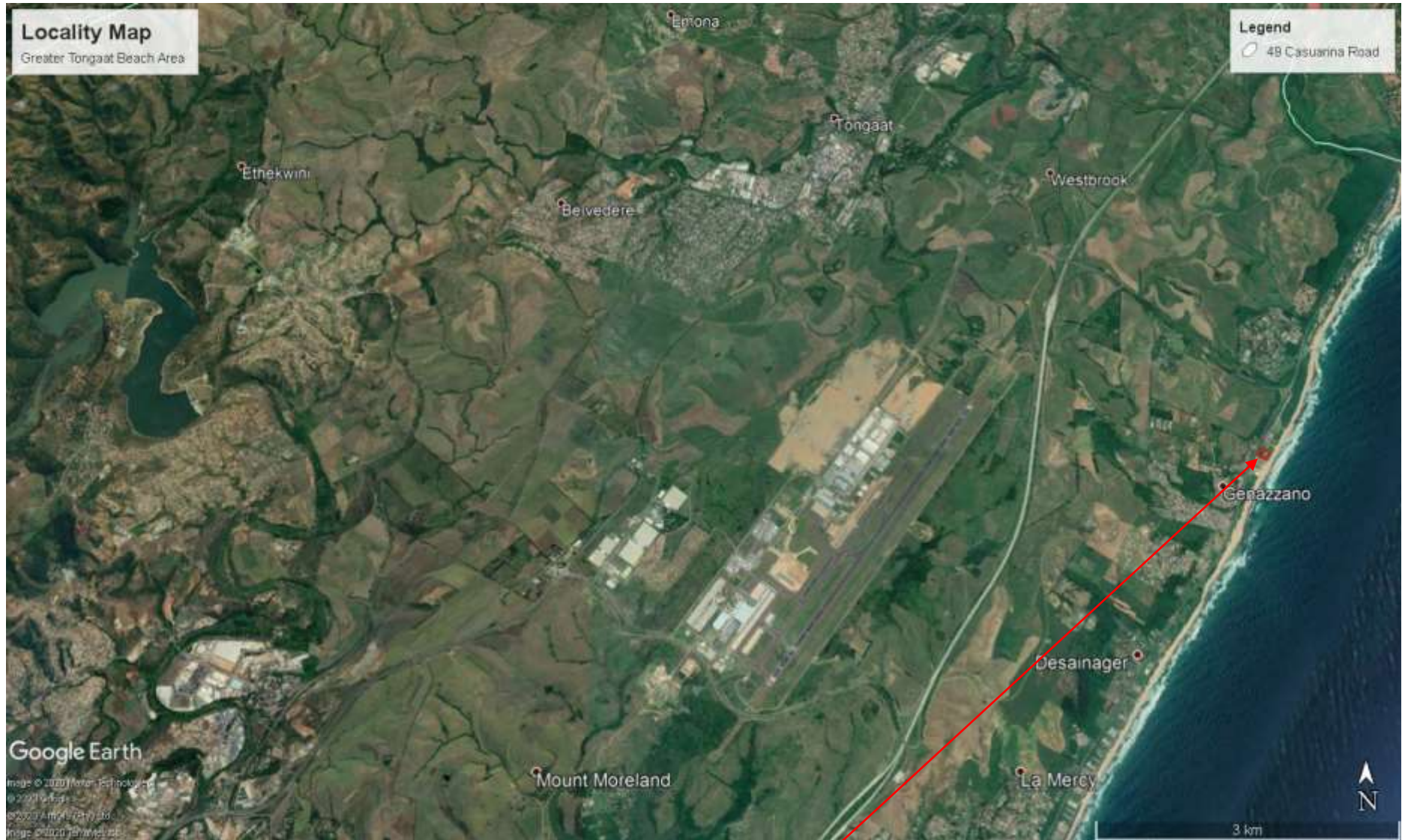


Figure 3: Greater Tongaat Beach Area and Site Location (Red), (Google Earth Imagery, 2019)



Figure 4: Proposed Site Area (Red), (Google Earth Imagery, 2019)

2.2. Project Description and Plans

Construction Description

The existing residential dwelling will be demolished. There will be a development of new residential/ serviced apartments with a development footprint of 4781.07m² at ground level. The area is currently zoned as special residential; however, a re-zoning application has been lodged to change the zoning to general residential 2. The site is located within 100m from the High-Water Mark (HWM) of the sea. The site is located within an urban area. The proposed development will entail moving, removing and excavation of soil of more than 5m³ within a distance of 100m inland of the High-Water Mark (HWM) of the sea. The proposed development will involve the following:

- Demolition of the existing structures;
- Excavations and earthworks as required for the development;
- The construction of new residential / serviced apartments;
- Establishment of new parking blocks;
- Potential widening of a very small portion (approximately 200m) of Casuarina Road by 1m to create easy vehicle movement in either direction; and
- On-site waste water (sewage) treatment.

The proposed development will be a multi-storey residential block, which will include 11 levels (including the ground level, and 2 below-ground levels) with an approximate Total Floor Area Ratio (F.A.R.) of 12 628.50m². Table 9 below provides an indication of the development schedule.

Table 9: Development Schedule as per Architects Plans

| Development Schedule – 49 Casuarina Road | |
|---|---------------|
| Consolidated Site Area | 8418 sqm |
| Proposed coverage | 4781.07 sqm |
| Percentage Coverage | 56.7 % |
| Total Proposed Floor Area Ratio (F.A.R) | 12 628.50 sqm |
| Percentage F.A.R. | 1.5 % |
| Total Number of Units | 206 |
| Number Parking Provided | 369 Bays |
| Area Schedule – Level -2 to 0 | |
| 10 Units Per Level | 700 sqm |
| Area Schedule – Level 1 to 2 | |
| 22 Units Per Level | 1316.06 sqm |
| Area Schedule – Level 3 to 8 | |
| 21 Units Per Level | 1316.06 sqm |

The above schedules are based on the latest available information. The final development schedule will be in line with local authority (e.g. zoning, town planning, building planning) requirements. The layout plans can be reviewed under Appendix 1 of this EMP. The land use surrounding the project area consists predominantly of planted agriculture (specifically sugarcane plantations), urban developments and some natural coastal forest areas. The sites in question have not been included in the Durban Metropolitan Open Space System (D'MOSS) due to the partial transformation of the properties as a result of residential development activities. The narrow portion of intact dune vegetation between the sites and the beach is

part of D'MOSS. The Indian Ocean is found to the east of the project area. Figure 5 below is an Environmental Sensitivity map produced for Casuarina Road and surrounding areas.



Figure 5: Environmental Sensitivity Map (SANBI BGIS Tool, 2014)

Chapter 3: Environmental Controls

3.1. Design and Pre-Construction Phase

The pre-construction phases include all activities that are required to render the project ready to begin construction.

| Authorisations, Permits and Licenses | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| All legally required authorisations, permits and licenses must be obtained prior to commencement of construction. | Developer | Once |
| The Developer must appoint an independent EAP and/or ECO. | Developer | Once |
| All I&AP's and stakeholders must be notified prior to commencement of construction. | Developer/Contractor | Once |

| Appointment of Contractor | | |
|---|-------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| An experienced and suitably qualified contractor must be appointed. | Developer/Engineer | Once |
| The EMPr must form part of the contractual agreements with any Contractor which must include any Sub-Contractor(s). The Contractor must take cognisance of this when budgeting during the tender process. | Developer/Contractor | Once |
| The Contractor must comply fully with the authorisations, permits and licenses pertaining to the construction phase of the project. | Contractor | Once |
| Tender documents must allow for the employment of local community members. | Developer/Contractor/Engineer | Once |
| The Contractor must provide Method Statements pertaining to implementation of the EMPr, emergency response plans, stormwater management, hazardous substance handling and storage, spill contingency plans, environmental incidents records file and complaints register. | Contractor | Once |
| The Method Statements must be submitted to the ECO for record keeping. | Developer/Contractor/ECO | Once |

| Appointment of ECO | | |
|---|------------------------------|--|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| An independent ECO must be appointed to monitor the implementation of the EMPr. | Developer | Once |
| The Appointed ECO must monitor the project from an environmental perspective, as per the conditions of any authorisations, permits and licenses and according to the EMPr. The findings of each inspection must be documented in a monthly report (or as stipulated by the CA) and submitted to the CA. | ECO | Monthly or as specified in the Authorisation |

| Environmental Education and Training | | |
|--|------------------------------|--------------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| The Contractor must receive environmental training to effectively implement the EMPr. | Developer/ECO | Once |
| The Contractor must relay training received to all staff and sub-contractors, in a language easily understandable to them. All contractor representatives, sub-contractors and staff must acknowledge receipt of training in writing. | Contractor/ECO | Once |
| Toolbox sessions must be scheduled and must include refreshers on environmental responsibilities. | Contractor | Weekly or as and when required |
| All site personnel must have a basic level environmental awareness training session. Topics covered must include: <ul style="list-style-type: none"> • What is meant by “The Environment”, • Why the environment needs to be protected and conserved, • How construction activities can impact on the environment, • What can be done to mitigate against such impacts, • Awareness of emergency and spill response provisions, • Social responsibility during construction of the serviced apartments e.g. being considerate of the local community who share the roads | Contractor/ECO | Once |
| The ECO must provide training to the Contractor’s representatives. It is the Contractors responsibility to provide the site | ECO | Once |

| | | |
|--|-----------------|--|
| foremen with environmental training and to confirm that the foremen have sufficient understanding to pass this information onto the construction staff. Translators must be used for thorough training. | | |
| Training by the contractor must be provided to the staff members for use of the firefighting equipment. | Contractor | Once |
| Environmental awareness posters on site must be used to further facilitate compliance to the EMPr. | Contractor | Once |
| The need for a clean site policy must be explained to the workers. This includes prohibiting sanitation activities outside of the ablution facilities and toilets provided by the Contractor. | Contractor | Weekly |
| Staff operating equipment (e.g. loaders, excavators, etc.) must be trained and sensitised to any potential hazards associated with their tasks. | Contractor | Weekly/ Monthly |
| Although the Contractor is responsible for ensuring that the environmental awareness training of staff members is put in place, it must be the direct responsibility of the appointed ECO to carry out the training. Each staff member must sign a register confirming their attendance at this training. This register must be included in the site Environmental file. | ECO | Once |
| The contractor must monitor the performance of the workers to verify that the training was properly understood and is being followed. | Contractor | Weekly |
| The ECO must monitor the construction phase periodically to ascertain if training was effective. | ECO | Monthly or as specified in the Authorisation |
| Areas that are demarcated as 'No-Go' areas must not be accessed by workers. | Contractor/ ECO | Daily |
| There must be no trapping of animals on site. | Contractor/ ECO | Daily |
| A pre-construction walk-through must be implemented by the ECO. This must be used to identify any species of conservation importance that have occupied the site after the compilation of this report. | ECO | Once |

| Environmental Planning and Design | | |
|--|--------------------------|----------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| The ECO must assess and examine the environment for sensitive elements of flora and fauna which must then be demarcated and relocated accordingly. | ECO | Once |
| Erosion control measures must be incorporated, by the engineer, into the design of the water infrastructure. These include: <ul style="list-style-type: none"> • Sandbags, • Hessian sheets, • Retention or replacement of vegetation; and • Gabion walls. | Engineer/Contractor/ECO | Once |
| Records of relocated flora and fauna must be kept. | Ecologist/ECO/Contractor | Once |
| A set of “before” photographs must be captured for record keeping purposes and to monitor any degradation of the environment. | Contractor/ECO | Once |
| Before any construction takes place the proposed area for the construction must be pegged out. All construction activities will be limited to these areas in order to reduce the footprint of the proposed activity and impact on adjacent natural vegetation, animal life and neighboring properties. | Contractor/ECO | Once |
| Construction areas must be fenced off or demarcated prior to and during construction. | Contractor/ECO | Monthly |

| Visual Impact | | |
|---|-----------------------|----------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| The height of the building must not obstruct other properties. | Developer | Once |
| The design of the building must be in keeping to a South African style (including the use of paint work). | Developer | Once |

| Site Establishment | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| The ECO/Engineer/ Contractor must approve the site selected for the Construction Camp. | Engineer/Contractor/ ECO | Once |
| The construction camp must be defined, secured and limited to authorised contractors only. | Contractor | Monthly |
| The construction camp must be comprised of: <ul style="list-style-type: none"> • site office • ablution facilities • designated first aid area • eating areas • staff lockers • storage areas • refuelling areas (if required) | Contractor | Daily |
| The ECO/Contractor must demarcate the construction camp so that the minimal amount of space is occupied. | Contractor | Once |
| The ECO/Ecologist must approve alien weeds and invader plants that must be removed. The ECO must monitor that no trees are removed. | ECO/Ecologist | Monthly |

| Health and Safety | | |
|---|-------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| The design and planning of the development must be conducted by trained and relevant consultants. | Engineer/Consultant/Developer | Once |
| Skilled contractors must be utilized for specialized tasks. | Contractor | Monthly |
| Buildings and/or steel structures must be constructed according to engineers' specifications. | Contractor/Engineer | Daily |
| Fire safety measures must be included in the design of the facility. | Engineer/Consultant/Developer | Once |

| Bulk Services | | |
|--|-------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Municipal Water Supply | | |
| Local Municipality department of water and sanitation must comment on whether the proposed development can be served by the current infrastructure and whether the development is aligned to any future master planning of the area. | Engineer/Consultant/Developer | Once |
| The water demand for the proposed development must be assessed according to the adopted design guidelines and standards. | Engineer/Consultant/Developer | Once |
| Sewage Discharge | | |
| An appropriate area must be provided to accommodate the on-site sewerage package plant with vehicular access. | Engineer/Consultant/Developer | Once |
| A service level agreement must be obtained and signed between the Client and service provider. | Developer | Once |
| Electrical Supply | | |
| Electricity usage across the development will primarily be from the following occupancy classifications: <ul style="list-style-type: none"> ○ Parking & common/circulation areas ○ Residential apartment units | Engineer/Consultant/Developer | Once |
| The estimated maximum demand of the development is 1377 kVA. | Engineer/Consultant/Developer | Once |

3.2. Demolition Phase

A Demolition Permit must be obtained by the Client prior to any activities being undertaken on site.

| Dust Emissions | | |
|---|-----------------------|----------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Soft strip (all retaining walls and windows) before demolition to act as a screen against dust. | Contractor/ECO | Once |
| Water suppression methods must be utilized such as hand-held sprays or hoses. Dust suppression measures could include but are not limited to: <ul style="list-style-type: none"> • retaining existing vegetation where possible • staging works to minimise areas of disturbance at any one time before working on other areas • using an environmentally friendly chemical spray to bind soil together thus stabilising unused soil • restricting speed of vehicles onsite • using temporary grassing • using jute mesh • using bitumen straw mulching • using bitumen spraying • using hydro-mulching and seeding • covering stockpiles and locating them where they are protected from the wind • covering the load when transporting material • constructing wind breaks such as wind fences • ceasing work in dry and windy conditions. | Contractor/ECO | Monthly |
| Avoid explosive blasting and use appropriate manual or mechanical alternatives. | Contractor/ECO | Once |
| Bag and remove any biological debris or damp down such material before demolition. | Contractor/ECO | Once |

| | | |
|--|----------------|---------|
| Re-vegetate earthworks and exposed areas/soils stockpiles to stabilize surfaces. | Contractor/ECO | Monthly |
| Use hessian where re-vegetation is not possible to cover topsoil. | Contractor/ECO | Monthly |

| Noise and Vibration | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Personnel must be trained in etiquette regarding noise and trespassing, as well as in health issues and occupational safety. | Contractor/ECO | Once |
| Construction activities must be limited to normal construction industry working hours. | Contractor/ECO | Monthly |
| A registered contractor providing a project schedule must be employed. Penalties for extending the timeline must be enforced to try and minimise the period of impact. | Contractor | Once |
| In addition, construction vehicles and machinery must be fitted with the appropriate noise muffling devices and must be appropriately maintained to ensure that the machines and vehicles do not produce excessive noise disturbance. | Contractor/ECO | Monthly/Weekly |
| No loud music is allowed on site and workers must always be aware of disturbance to neighbours. | Contractor/ECO | Monthly |
| The contractor must inform the surrounding offices and community in advance or prior to operations that bear the risk of nuisance and accidents. | Contractor | Monthly |
| The contractor must be responsible for compensating if the vibration during demolition damages any structures. | Contractor | Monthly |

| Visual Impacts | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| The site must be well maintained and neat. The use of screening during construction is recommended. | Contractor/ECO | Monthly |
| The contractor must adhere to project schedule in order to minimise the length of the demolition period. | Contractor/ECO | Monthly |
| Stockpiles must be covered using material that is environmentally friendly to avoid dust impacts. | Contractor/ECO | Monthly |
| Chemical toilets must be regularly serviced and maintained. Toilet doors must always remain closed. | Contractor/ECO | Weekly |

| | | |
|--|----------------|----------------|
| Waste material must always be disposed off into bins and/or skips. Bins must be covered. | Contractor/ECO | Monthly/Weekly |
|--|----------------|----------------|

| Waste Management | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Personnel must be trained in etiquette regarding littering and waste management. | Contractor/ECO | Monthly |
| Demolition debris must be stockpiled and disposed of at an appropriate and licensed disposal facility. Debris can also be re-used in the construction of the proposed development. | Contractor/ECO | Monthly |
| Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid). | Contractor/ECO | Monthly |
| A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal. | Contractor/ECO | Weekly |
| In the case of a spill of hydrocarbons, chemicals or bituminous, the spill must be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk. | Contractor/ECO | Monthly |
| On-site chemical toilets must be provided for domestic purposes during the demolition phase. These must be situated as far as is practically possible from neighbors. | Contractor/ECO | Monthly |
| The contractors must be responsible for the maintenance of the chemical toilets. | Contractor/ECO | Monthly |
| Waste must be collected by an accredited waste company and disposed of at an appropriate and licensed waste disposal facility. | Contractor/ECO | Monthly |
| Littering is prohibited and general housekeeping must be enforced. | Contractor/ECO | Monthly/Weekly |

| Disturbance to Locals | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Install corresponding signs, hoarding boards, temporary alternate route for bypasses. | Contractor/ECO | Monthly |
| Obtain necessary hoarding permits from the City. | Contractor/ECO | Monthly |

| | | |
|---|----------------|---------|
| Install barriers such as plastic construction barriers, fencing, geo-nets, etc. especially at the western side of the building facing the road, to shield from dust and aggregates. | Contractor/ECO | Weekly |
| All excavations must be clearly marked. | Contractor/ECO | Monthly |
| Provide adequate lighting at demolition site to increase visibility at night, to prevent accident. | Contractor/ECO | Weekly |

| Safety for the Demolition Workers | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Make mandatory the use of Personal Protective Equipment (PPE) which includes helmets, safety belts, masks, gloves and boots by workers. | Contractor/ECO | Monthly |
| Necessary planning and safety approach must be made for rescue during emergency. | Contractor/ECO | Monthly |
| Workers must be provided with first aid and health facilities at the site. | Contractor/ECO | Monthly |

| Heritage Impacts | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| According to section 37(1)(a) of the KwaZulu-Natal Amafa and Research Institute Act, no structure which is, or which may reasonably be expected to be older than 60 years, must be demolished, altered or added to without the prior written approval of the KwaZulu-Natal Amafa and Research Institute having been obtained on written application to the Institute. | Contractor/ECO | Monthly |
| If the client does not want to apply for a permit to destroy the three structures, then the client must find documentation indicating the date of the three structures to prove that they are not older than 60 years. | Contractor/ECO | Monthly |
| No activity, developmental or otherwise, must take place within 30m of the beach due to the presence of shell middens that could be damaged by such activity. If development does take place in this area, then prior to any construction activity, the removal of vegetation from the dunes must be monitored by an archaeologist to prevent any damage to shell middens or any other archaeological remains that may be found in the dunes. | Contractor/ECO | Monthly |

3.3. Construction Phase

The construction phase includes all activities on the site that are required to render the project operational. Environmental training must be provided to the contractor before commencement of construction activities. The duration of the construction phase is approximately 24 months.

| General Construction Activities | | |
|---|-----------------------|---------------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| The contractor must ensure that all employees, including sub-contractors and their employees, attend on-site Environmental Awareness Training prior to commencing work on site. Training must cover all aspects of the EMP, procedures to be followed, the sensitivity of the site and importance of adhering to “no-go” areas. | Contractor/ECO | Monthly |
| Follow-up Environmental Awareness Training must be conducted from time to time as new subcontractors or crews commence work or for specific activities that impact the environment, or if work is being undertaken in sensitive environments. | Contractor/ECO | Monthly or as and when required |
| The contractor must maintain accurate records of any training undertaken and the ECO must monitor the contractor’s compliance with the requirement to provide environmental awareness training to all site staff. | Contractor | Monthly |
| Environmental signage must be displayed on the site including – “no smoking”, “fire hazards”, etc. | Contractor/ECO | Monthly |
| Emergency numbers must be clearly displayed. | Contractor/ECO | Monthly |
| Access to fuel and other equipment stores must be strictly controlled so unnecessary materials are not brought onto ground unless required. | Contractor/ECO | Monthly |

| Clearance of Site | | |
|---|-----------------------|----------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Site clearing must be limited to only the area designated for the specified works. | Contractor/ECO | Monthly |
| “No-go” areas prior to earthworks commencing must be demarcated with danger tape for protection for the duration of the construction phase. | Contractor/ECO | Monthly |

| | | |
|--|----------------|---------|
| The contractor must draw up a plan for submission to the ECO indicating the locations of construction infrastructure including the site-camp, paint or cement cleaning pits, toilets, site office, and “no-go” areas. | Contractor | Once |
| No unauthorised entry, stockpiling, dumping or storage of equipment in “no-go” areas, or outside the site boundary is permitted. | Contractor/ECO | Monthly |
| All construction activities, plant, labour and materials must be restricted within the site boundary. | Contractor/ECO | Monthly |
| Demarcation must remain in place for the duration of the work on site. | Contractor/ECO | Monthly |
| Rehabilitation of disturbed areas must be undertaken within a month after construction activities have concluded. | Contractor/ECO | Monthly |
| The following applies when removing vegetation during construction: <ul style="list-style-type: none"> • Herbicides must only be used if absolutely necessary and under supervision of a manager, with prior experience in using and mixing herbicides. • The correct Personal Protective Equipment (PPE) must be used at all times. • Herbicides must not be used in close proximity to the dune or shoreline, unless the herbicide is specifically designed for the application and will not harm an aquatic environment and is highly selective. | Contractor/ECO | Monthly |

| Earthworks | | |
|--|------------------------------|-------------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| All trenches must be clearly demarcated and barricaded on site at all times | Contractor/ECO | Daily or as and when required |
| Trenches must have one sloped side to allow animals which fall in to get out. | Contractor/ECO | Daily/Weekly |
| The earthworks operation must be carried out by a suitably qualified contractor. | Contractor | Monthly |

| Stockpiling of Topsoil and Cleared Vegetation | | |
|--|------------------------------|------------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Topsoil must be stockpiled in areas that are not used for development, but within the development footprint, for use in future landscaping activities. | Contractor/ECO | Monthly |
| Topsoil stockpiles must not exceed 2m in height and must be protected from wind, erosion and runoff by covering with fabric approved by the ECO. Once earthworks are complete, disturbed areas must be re-vegetated or rehabilitated. | Contractor/ECO | Monthly |
| If stockpiles are exposed to windy conditions or heavy rain, they must be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles must further be protected by the establishment of berms or low brick walls around their bases. | Contractor/ECO | Monthly |
| Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding. | Contractor/ECO | Monthly |
| The contractor must implement erosion control measures to limit erosion and sedimentation from construction activities. Erosion protection measures include: <ul style="list-style-type: none"> • The use of sandbags, berms, reno mattresses, temporary sediment/ silt fencing and gabions; • The prompt rehabilitation of exposed sand/ embankment areas (with indigenous vegetation); • Preventing the unnecessary removal of vegetation especially on steep areas. | Contractor | Monthly |
| Any sub-soil or rocks removed must also be stockpiled separately and must be used during the rehabilitation. | Contractor/ECO | Monthly |
| A month upon completion of the construction activities, the remaining disturbed area must be top soiled, sloped and re-vegetated using common grass species such as <i>Brachiaria brizantha</i> (Common Signal Grass). This re-vegetation will assist in reducing the potential of erosion. | Contractor/ECO | Once or as and when required |
| Sub-soil and topsoil must be stored separately and covered to prevent the liberation of soil. | Contractor/ECO | Monthly |

| Traffic Pressures and Access | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Routes and times of construction activities must be carefully planned. Strict instruction must be given to the contractor to ensure that the existing driveway will be used to gain access to the site during construction only. The access route in terms of accessing the area is very limited. Realistically there is one main route to enter the Casuarina Road which is via the M4. However, access to the site will be via the existing driveway on Casuarina Road. | Contractor/ECO | Monthly |
| Signage indicating construction activities and vehicles must be put in place. | Contractor/ECO | Monthly |
| Construction vehicles and personnel must adhere to business hours. This may be relaxed to accommodate abnormal vehicles, so they do not hinder daily life and/or regular traffic. | Contractor/ECO | Monthly |
| Construction vehicles must use predetermined and agreed routes to and from site. | Contractor/ECO | Monthly |
| Vehicles must be assessed for oil and hydraulic leaks etc. before gaining entrance onto the construction site to avoid the contamination of soil. Maintenance must be done off site or in cases of emergency with the aid of drip trays. | Contractor/ECO | Monthly |
| Pointsmen must guide traffic for entry and exit of construction vehicles. | Contractor/ECO | Monthly |
| Safety measures such as appropriate pavements, speed humps, signage boards for construction site and vehicles and for workmen must be implemented to slow down traffic within the development. | Contractor/ECO | Monthly |
| The construction phase must be as short as possible. Reliable building contractors must be employed to avoid delays. | Contractor/ECO | Monthly |
| Vehicles must park on demarcated site only. | Contractor/ECO | Monthly |

| Soil Erosion | | |
|---|-----------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Peron(s) | Monitoring Frequency |
| Project management of construction activities must be done to ensure that only small and/or necessary portions of land are disturbed at any given time. Vegetation must not be removed until necessary. | Contractor/ECO | Monthly |
| Soil erosion measures must be placed on sensitive areas like banks and slopes. Stream/Riverbank stabilization must be | Contractor/ECO | Monthly |

| | | |
|---|----------------|---------|
| employed using a variety of methods including riprap, gabion walls, reinforced concrete on riverbanks, asphalt paving, etc. | | |
| All stockpiles must be covered with material accepted by the Contractor or ECO to prevent loss of sediment via wind/ water. | Contractor/ECO | Monthly |
| Topsoil (top 300mm layer minimum) must be removed prior to the construction by earthmoving equipment. Topsoil must be stored in heaps of not higher than 2m in a way that prevents damming. Stored topsoil must not be compacted. | Contractor/ECO | Monthly |
| Topsoil must not be used as fill material for backfilling of excavations on site. | Contractor/ECO | Monthly |
| Minimize the amount of area that needs to be disturbed and the amount of time spent on sensitive areas. | Contractor/ECO | Monthly |
| Offsite runoff around disturbed areas must be diverted to reduce the amount of stormwater which comes into contact with exposed soils, as a result there will be less erosion. | Contractor/ECO | Monthly |
| Cement, concrete and chemicals must be mixed on an impermeable surface and provisions must be made to contain spillages or overflows into the soil. | Contractor/ECO | Monthly |
| After the construction phase any disturbed banks must be returned to their original profiles as far as possible. | Contractor/ECO | Monthly |

| Risk of Alien Invasive Encroachment | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Protect as much indigenous vegetation as possible. Do not clear large portions of land at once. | Contractor/ECO | Monthly |
| Re-grass/ re-vegetate exposed areas as early as practically possible with indigenous vegetation. | Contractor/ECO | Monthly |
| Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. | Contractor/ECO | Monthly |

| Flora, Vegetation Communities and Critical Biodiversity Areas | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Prior to the clearing of the site, the ECO and if necessary, the Biodiversity Specialist must ensure that all plants of conservation significance are relocated for possible reuse. | Contractor/ECO | Monthly |

| | | |
|--|----------------|---------|
| The site boundary must be pegged out to identify the limits of the construction site. Construction activities must be limited to within these boundaries. | Contractor/ECO | Monthly |
| Burning of removed vegetation is prohibited. | Contractor/ECO | Monthly |
| Sealant, coatings, adhesives and glazing's, can be toxic to flora, if released into the environment. Therefore, the products used must be stored and used carefully, to save resources as well as protect the environment. | Contractor/ECO | Monthly |
| The ECO must ensure that a list of any indigenous trees/ shrubs which must be removed is provided. This list must include the tree/ shrub species and the number of each species. | ECO | Once |
| Development is only allowed within the project area. As far as possible, the proposed developments must be placed in areas that have already been disturbed, and no further loss of secondary vegetation must be permitted. Areas to be developed must be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon, laydown areas and ablutions can be in the parking area to the east of the project area, and access to the area must only be done from the parking area. | Contractor/ECO | Monthly |
| Areas of indigenous vegetation, even secondary communities, which were mainly found toward the coastline must under no circumstances be fragmented or disturbed further or used as an area for dumping of waste. | Contractor/ECO | Monthly |
| Areas that are denuded during construction must be re-vegetated with indigenous vegetation, the gardens of the new complex must try and use indigenous species and trees that represent what is located within the area. This will reduce the likelihood of encroachment by alien invasive plant species. | Contractor/ECO | Monthly |
| The White Milkwood (<i>Sideroxylon inerme</i>) trees found within the project area, depending on the layout of the infrastructure, must rather be left undisturbed and implemented in the garden plan, if possible. Otherwise the trees must be relocated to the nearby CBA if a permit can be acquired. | Contractor/ECO | Monthly |

| Fauna | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Identify sensitive fauna on the site prior to construction. | Contractor/ECO | Monthly |
| Trapping/snaring/killing of animals including snakes and reptiles is prohibited. | Contractor/ECO | Monthly |
| Fishing by employed staff on this stretch of the sea is prohibited. | Contractor/ECO | Monthly |
| Sealant, coatings, adhesives and glazing's, can be toxic to fauna, if released into the environment. Therefore, the products used must be stored and used carefully, to save resources as well as protect the environment. | Contractor/ECO | Monthly |
| If any faunal species of conservation concern are recorded during construction, activities must temporarily cease, and allow the species to either move off, or be relocated safely. | Contractor/ECO | Monthly |
| Prior and during vegetation clearance, the project area must be walked, and any larger fauna species noted must be given the opportunity to move away from the construction machinery. | Contractor/ECO | Monthly |
| Fauna species such as frogs and reptiles that have not moved away must be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified ECO trained in the handling and relocation of animals. | Contractor/ECO | Monthly |
| Fencing must be erected around the project area to prevent workers and members of the public from entering the surrounding forest and coastal portions. This fence must have small openings to allow wildlife to pass through. | Contractor/ECO | Monthly |
| During the construction phase noise must be kept to a minimum to reduce the impact of the development on the fauna residing on the site. | Contractor/ECO | Monthly |
| The intentional killing of any animals including snakes, insects, lizards, birds or other animals must be strictly prohibited. | Contractor/ECO | Monthly |

| Stormwater Management | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| A storm water layout has been designed and must be implemented once approved by the municipality, for both the construction and operational phases to prevent stormwater from pooling and to direct stormwater to any existing stormwater infrastructure on | Contractor/ECO | Monthly |

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|--|----------------|---------|
| the surrounding roads and residential areas. Refer to Appendix 2. | | |
| Earth, stone and rubble must be properly disposed of so as not to obstruct natural water pathways over the site (i.e. these materials must not be placed in stormwater channels, drainage lines, etc.) | Contractor/ECO | Monthly |

| Groundwater Pollution (Sea) | | |
|---|-----------------------|----------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Chemical substances must be mixed or handled on impervious surfaces. Concrete must be mixed on impervious surfaces. There must be a contained/ designated area for washing out and cleaning of concrete mixing equipment, to further prevent pollution. In addition, wash waters from site must be collected and disposed of off-site. | Contractor/ECO | Monthly |
| An adequate number of chemical toilets for the staff must be provided and serviced regularly. The positioning of the toilets must be determined taking cognizance of the neighbors. The ECO must authorize the positioning of the toilets. | Contractor/ECO | Monthly |
| Specific areas must be designated for cement mixing. Care to protect the soil from contamination must be taken. | Contractor/ECO | Monthly |
| Spills that result in the contamination of ground and/or surface water must be reported immediately to the ECO | Contractor/ECO | Monthly |
| Spills must be managed in the following manner: <ul style="list-style-type: none"> - Stop the spill - Contain the spill - Report significant spills to DWS and the Local Municipality Water and Sanitation Department. - Remove spilled material for treatment/disposal. - Determine any possible impact to soils, groundwater, storm water, etc. - Undertake any necessary remedial actions - Document the spill | Contractor/ECO | Monthly |
| Emergency contact numbers provided by the Municipality, must be contacted in order to deal with spillages and contamination of the soil and water sources. | Contractor/ECO | Monthly |

| Surface Water Pollution (Sea) | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| A no-go area to protect the sea must be demarcated. The limits of the working space must be demarcated and adhered to. No personnel working on the site, may enter the designated no-go areas. | Contractor/ECO | Monthly |
| Environmental training must be provided to personnel. | Contractor/ECO | Monthly |
| No laundry and bathing are allowed in the sea. Contractors must provide ablution facilities to staff. | Contractor/ECO | Monthly |
| Abstraction of water for construction use is prohibited unless obtained legally. Municipal water must be brought in by tanker/vessels to the site for use by the contractors. | Contractor/ECO | Monthly |
| Concrete and cement mixing wash areas must be placed at least 20m from any drainage line/ the sea to minimize the risk of run-off entering a water source. | Contractor/ECO | Monthly |
| Storage areas for any chemical, fuel (for machinery), oil, cement etc. must be located above any flood line and away from high risk areas (i.e. 20m from a water source/sea) to minimize the risk of spill entering the water. | Contractor/ECO | Monthly |

| Installation and Use of Ablution Facilities | | |
|---|------------------------------|--------------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Sufficient ablution facilities must be provided – minimum of 1 toilet per 20 workers. | Contractor/ECO | Monthly |
| Toilets must have properly closing doors and supplied with toilet paper. | Contractor/ECO | Weekly or as and when required |
| The location of toilets must be approved by the ECO prior to site establishment and must be located within 100m of any work front further away from the sea-facing side. | ECO | Monthly |
| Chemical toilets must be serviced weekly. The contractor must monitor that no spillage occurs and that the contents are removed from site according to approved methods. Servicing receipts must be maintained and kept on site within the site environmental file. | Contractor/ECO | Weekly |

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|---|------------|---------------|
| All temporary chemical toilets must be removed from the construction camp and be disposed in a safe and efficient manner. | Contractor | Daily/ Weekly |
|---|------------|---------------|

| The Cleaning of Vehicles, Equipment and Construction Areas | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| No washing of vehicles or equipment is permitted on site. | Contractor/ECO | Monthly |
| Cleaning of equipment must take place within designated areas. | Contractor/ECO | Monthly |
| A dedicated cleaning area must be demarcated to facilitate washing of all cement and painting equipment. | Contractor/ECO | Monthly |
| No wastewater must be disposed on site, onto the soil or into any water body. | Contractor/ECO | Monthly |

| Storage, Mixing and Disposal of Cement/Concrete | | |
|---|------------------------------|---------------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| No mixing of concrete or cement directly on the ground is permitted. The mixing of concrete must only be done on a mixing tray or on impermeable sheeting. | Contractor/ECO | Monthly |
| Ready-mix trucks are not permitted to clean chutes on site. Cleaning into foundations or a dedicated cleaning pit is permitted. | Contractor/ECO | Monthly or as and when required |
| Bricklayers and plasterers must minimize any cement spill or runoff in their work area and must ensure that the work area is cleaned of all cement spillage at the end of each workday. | Contractor/ECO | Monthly |
| Both used and unused cement bags must be stored in weatherproof containers so as not to be affected by rain or runoff. | Contractor/ECO | Monthly |
| Contaminated soil resulting from concrete or cement spills, must be removed immediately after the spillage has occurred and placed on the appropriate rubble stockpile. | Contractor/ECO | Monthly |
| Clean stormwater must be kept away from areas where it could be contaminated and must be directed to the stormwater drainage system. | Contractor/ECO | Monthly |

| Storage and Handling of Hazardous Chemicals, Including Fuel | | |
|---|-----------------------|-------------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| All fuels and flammable materials must be handled and stored as per the relevant Material Safety Data Sheet(s) (MSDS). Storage must be within bunded areas with a capacity of holding more than the volumes contained within it (e.g. if the volume to be stored is 5m ³ the bunded area must be able to hold more than 5m³). The storage area and vessels of substances must be clearly labelled for identification and level of hazard (e.g. 'Petrol' = 'Highly Flammable Liquid'). | Contractor/ECO | Monthly |
| Storage and handling of flammable materials must comply with standard fire safety regulations. Safety signage including "No Smoking", "No Naked Lights" and "Danger", and product identification signs, must be clearly displayed on fuel stores and tanks. | Contractor/ECO | Monthly |
| Drip trays must be used to contain possible spillage from equipment, vehicles and plant. These must be emptied weekly into secondary containers and disposed at a licensed landfill site. The Contractor must receive a safe disposal certificate and keep for record purposes in the Environmental file. | Contractor/ECO | Weekly |
| If refueling of equipment occurs on site, the ground must be protected with a non-permeable surface, and proper dispensing equipment must be used i.e. hand pumps and funnels. Drums must not be tipped to dispense fuel since this increases the probability of accidental spills. | Contractor/ECO | Daily or as and when required |
| All liquid fuels (petrol and diesel) must be stored in tanks or containers with lids on an impermeable surface. | Contractor/ECO | Monthly |
| Fuel and flammable materials must be kept under lock and key at all times and must be stored at a central, easily accessible location. | Contractor/ECO | Monthly |
| Fire-fighting equipment (i.e. fire extinguisher) must be closely available at hand. No smoking is permitted within the vicinity of storage areas. No smoking signs must be clearly visible for all. | Contractor/ECO | Monthly |
| All personnel handling fuels and hazardous substances/materials must be issued with Personal Protective Equipment (PPE) and must be wearing PPE when handling hazardous substances/materials. | Contractor/ECO | Monthly |
| Soil contaminated with hazardous substances, fuel or oil must be treated as hazardous waste and removed from site. | Contractor/ECO | Monthly |

| Waste and Littering | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Litter | | |
| Personnel must be trained in etiquette regarding littering and waste management. | Contractor/ECO | Monthly |
| Closed refuse bins must be provided at strategic points to prevent accumulation of litter on-site and must be stored in sealed refuse bins which must be removed from site on a weekly/monthly basis. The contractor must supply waste collection bins and skips for all manner of solid waste which must be disposed of at a registered landfill site. A certificate of disposal must be obtained by the contractor and kept on file for audit purposes. | Contractor/ECO | Monthly/Weekly |
| The contractor is responsible for taking steps to ensure that littering by construction workers does not occur and persons must be employed on site to collect litter from the site and immediate surroundings. A housekeeping team must be appointed to ensure that bins are emptied on a weekly/ monthly basis and other litter is disposed of in the correct manner. | Contractor/ECO | Monthly/Weekly |
| Burning of solid waste on site is prohibited. | Contractor/ECO | Monthly |
| The ECO must monitor the neatness of the work site and the camp site. | ECO | Monthly |
| Construction Rubble | | |
| Rubble must be disposed of in a pre-agreed demarcated site in a sufficiently sized skip or vessel. | Contractor/ECO | Monthly |
| If debris is too large to fit in a vessel then use of an impervious mat must be made. | Contractor/ECO | Monthly |
| All debris and rubble must be disposed of at a registered disposal site on a Monthly basis. | Contractor/ECO | Monthly |
| All surplus or unsuitable material must be spoiled in the local landfill site or designated areas as directed by the Engineer. Safe disposal certificates and waybills must be retained for all waste leaving site. | Contractor/ECO | Monthly |
| Hazardous waste | | |
| All hazardous waste materials must be carefully stored as advised by the ECO i.e. on impervious surfaces etc. and then disposed of at a licensed landfill site with waybills retained as proof of safe disposal. | Contractor/ECO | Monthly |
| Spills must be handled immediately following spill protocols. | Contractor/ECO | Monthly |

| Sanitation | | |
|--|----------------|---------|
| The contractor must install a sufficient number of chemical toilets on site based on the staff compliment. One toilet for every 20 site personnel. | Contractor/ECO | Monthly |
| Staff must be instructed to use the facilities provided instead of conducting indiscriminate sanitary activities on site. | Contractor/ECO | Monthly |
| Male and female toilets must be provided if necessary and possible. | Contractor/ECO | Monthly |
| Toilets must be 50m away from the sea. | Contractor/ECO | Monthly |
| Potable water must be provided for staff. | Contractor/ECO | Monthly |

| Noise Disturbance | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| <p>As per Regulations provided in the National Building Regulations and Building Standards Act (Act No. 103 of 1977) No. R574 of 2008, no person shall during the course of any construction use any machinery, machine, engine, apparatus, tool or contrivance, which in the opinion of the local authority may unreasonably disturb or interfere with the amenity of the neighbourhood:</p> <ul style="list-style-type: none"> • On a public holiday or after 13:00 on any Saturday; and • Before 06:00 or after 18:00 on any day • Noisy operations must not be conducted at night • Neighbours & relevant stakeholders must be notified at least 48 hours in advance if the contractor will be working outside of this working hour. | Contractor/ECO | Monthly |
| Personnel must be trained in etiquette regarding noise and trespassing, as well as in health issues and occupational safety. | Contractor/ECO | Monthly |
| Construction activities must be limited to normal construction industry working hour – avoid nighttime hours. | Contractor/ECO | Monthly |
| Route construction related traffic along roadways that will cause least disturbance. | Contractor/ECO | Monthly |

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| A registered contractor providing a project schedule must be employed. Penalties for extending the timeline must be enforced to try and minimize the period of impact. | Contractor/ECO | Monthly |
| In addition, construction vehicles and machinery must be fitted with the appropriate noise muffling devices and must be appropriately maintained to ensure that the machines and vehicles do not produce excessive noise disturbance. | Contractor/ECO | Monthly |
| No loud music is allowed on site and workers must always be aware of disturbance to neighbors. | Contractor/ECO | Monthly |
| Workers must not loiter around after work hours and their shift be complete. | Contractor/ECO | Monthly |

| Air Quality | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Dust control measures/suppression of dust must be implemented timeously by the contractor. | Contractor/ECO | Monthly |
| Water trucks must be utilized to wet exposed road surfaces or stockpiled areas. The dust levels must be kept as minimal as possible to ensure minimal impact to the surrounding community and the environment. | Contractor/ECO | Monthly |
| Vehicles must be kept in good condition to minimize vehicular fumes. The contractor must remove the vehicle from the site if excessive emissions are observed. | Contractor/ECO | Monthly |
| Dust and mud must be controlled at vehicle exit and entry points to prevent the dispersion of dust and mud beyond the site boundary. | Contractor/ECO | Monthly |
| Odors from the chemicals and paints being used must be minimized by not leaving unused/empty vessels open unnecessarily. | Contractor/ECO | Monthly |
| Speed limit sign boards must be erected during the construction phase to limit dust emissions. | Contractor/ECO | Monthly |

| Visual Impacts | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| The site must be well maintained and neat. The use of screening during construction is recommended. | Contractor/ECO | Monthly |
| The contractor must adhere to project schedule in order to minimize the length of the construction period. | Contractor/ECO | Monthly |

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| Inspections of the site by an Environmental Control Officer are required. | Contractor/ECO | Monthly |
| Facilities such as toilets, bins, tanks and stockpiles must be covered with lids or be placed under covered roofs | Contractor/ECO | Monthly |

| Public Health and Safety | | |
|--|------------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Stakeholders must be notified as soon as possible. This includes the community, the municipalities, the service providers and ward councilor. | Contractor/ECO | Monthly |
| Servitudes of infrastructure must be confirmed prior to design of the development and permission granted. | Contractor/ECO | Monthly |
| No-Go areas must be demarcated. | Contractor/ECO | Monthly |
| The construction team must be made aware that heritage resources, such as archaeological remains, usually occur below the ground surface level. If any archaeological material and other heritage resources be accidentally unearthed during the course of construction, all such activities must be halted immediately, and the Contractor must immediately inform the Project Manager. A registered heritage specialist must be called to site for inspection. Amafa must also be informed about the findings. | Contractor/ECO | Monthly |
| The heritage specialist must assess the significance of the resource and provide guidance on the way forward. | Contractor/ECO/Heritage Specialist | Monthly |
| Written permission must be obtained from Amafa if heritage resources must be removed, destroyed or altered. | Contractor/ECO | Monthly |
| All heritage resources found in close proximity to the construction area must be protected by a 5m buffer in which no construction can take place. The buffer material (danger tape, fencing, etc.) must be highly visible to construction crews. | Contractor/ECO | Monthly |
| Under no circumstances may any heritage material be destroyed or removed from site unless under direction of a heritage specialist. | Contractor/ECO | Monthly |
| If any recent remains be found on site that is potentially human remains, the South African Police Service as well as Amafa must be contacted. No SAPS official must remove remains (recent or not) until the correct permit/s have been obtained. | Contractor/ECO | Monthly |

| Existing Infrastructure Disturbance and Heritage Significance | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Contractor must provide method statements and adhere to the agreed scope of works. | Contractor/ECO | Monthly |
| Contractor must survey for common underground and overhead services prior to establishing on site. | Contractor/ECO | Monthly |
| Contractors must provide project schedules that will enforce penalties for delays | Contractor/ECO | Monthly |
| Unskilled labour must be trained relevantly including environmental training. Workers must receive thorough training in using potentially dangerous equipment or chemicals. | Contractor/ECO | Monthly |
| Hazardous working areas must be marked | Contractor/ECO | Monthly |
| The construction team must be made aware that heritage resources, such as archaeological remains, usually occur below the ground surface level. If any archaeological material and other heritage resources be accidentally unearthed during the course of construction, all such activities must be halted immediately, and the Contractor must immediately inform the Project Manager. A registered heritage specialist must be called to site for inspection. Amafa must also be informed about the findings. | Contractor/ECO | Monthly |
| The heritage specialist must assess the significance of the resource and provide guidance on the way forward. | Contractor/ECO | Monthly |
| Written permission must be obtained from Amafa if heritage resources must be removed, destroyed or altered. | Contractor/ECO | Monthly |
| All heritage resources found in close proximity to the construction area must be protected by a 5m buffer in which no construction can take place. The buffer material (danger tape, fencing, etc.) must be highly visible to construction crews. | Contractor/ECO | Monthly |
| Under no circumstances must any heritage material be destroyed or removed from site unless under direction of a heritage specialist. | Contractor/ECO | Monthly |
| If any recent remains be found on site that could potentially be human remains, the South African Police Service as well as Amafa must be contacted. No SAPS official may remove remains (recent or not) until the correct permit/s have been obtained. | Contractor/ECO | Monthly |
| Where the trenches and excavations reach a depth of 1.5m, a suitably qualified paleontologist must be appointed to record and collect the fossils according to South African Heritage Resources Agency (SAHRA) and AMAFA specifications as part of a Phase 1 paleontological impact assessment during the initial stages of excavation. | Contractor/ECO | Monthly |

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| The ECO of the project must be informed of the fact that significant plant fossils may be found because the area is underlain with the Vryheid Formation. | Contractor/ECO | Monthly |
|---|----------------|---------|

| Fire risk | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Basic fire-fighting equipment, fire extinguishers, must be placed at strategic locations on site (e.g. at the site office, flammable material store and watchman's container). | Contractor/ECO | Monthly |
| Equipment must be maintained in good working order to the satisfaction of local fire authorities. | Contractor/ECO | Monthly |
| No open fires are permitted. A dedicated braai facility must be approved by the ECO. If the campsite is in close proximity to firefighting equipment, at no time must a braai fire be left unattended. | Contractor/ECO | Monthly |
| Burning of removed vegetation is prohibited. | Contractor/ECO | Monthly |
| Smoking is prohibited near places where any readily combustible or flammable materials are present. Notices must be prominently displayed prohibiting smoking in such areas. | Contractor/ECO | Monthly |
| Welding, flame cutting, and other hot work must be undertaken in places where safety precautions are in place (i.e. not near potential sources of combustion and with a fire extinguisher immediately accessible). | Contractor/ECO | Monthly |
| All flammable materials must be stored in a lockable storage area. | Contractor/ECO | Monthly |
| Combustible materials must not accumulate on the construction site. | Contractor/ECO | Monthly |
| Cooking must be restricted to designated areas approved by the ECO. This facility must be supervised and strictly controlled. | Contractor/ECO | Monthly |

| Socio-Economic Impacts | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Community members and leaders must be notified as soon as possible by posting notice boards with illustrations on site. | Contractor/ECO | Monthly |
| Local people must be employed where possible. | Contractor/ECO | Monthly |
| Ward councilors must be involved in the public participation. | Contractor/ECO | Monthly |
| Strict penalties must be built into tenders to deal with issues such as petty crime, fence cutting, trespassing etc. | Contractor/ECO | Monthly |
| All contact with any affected parties must be courteous at all times. The objections and rights of an affected party must be respected at all times. Measures to address any valid objections must be dealt with in an organised manner. | Contractor/ECO | Monthly |
| A complaints register must be kept on site together with a copy of the final EMP. Details of complaints must be recorded and incorporated into the monthly audit reports. This complaints register must be maintained by the contractor and available for inspection by the ECO. | Contractor/ECO | Monthly |
| Damage to infrastructure must be rectified immediately by the contractor. A record of all damage and the remedial actions must be kept on site by the contractor and available for inspection by the ECO. | Contractor/ECO | Monthly |
| Construction workers must be clearly identifiable by wearing the contractor's uniforms. Workers must also be issued with identifications tags | Contractor/ECO | Monthly |
| In order to promote good industrial relations practice and limit issues such as strikes etc. the Contractor must adhere to Labour Law Legislation at all times. | Contractor/ECO | Monthly |

| Closure of Construction Camp Site | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| If there are temporary shutdowns during construction due to holidays, builders break etc. the site must be appropriately secured with no potential for dust and other impacts affecting the environment and neighbours. | Contractor/ECO | Monthly |
| Once construction has been completed and all excess material has been removed, the camp site must be rehabilitated | Contractor/ECO | Monthly |

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| Any spilled concrete must be removed, and any soil compacted during the construction phase must be ripped, levelled and re-vegetated or surfaced. | Contractor/ECO | Monthly |
| After all construction work is complete, the contractor is required to dismantle/detach/demolish and remove the temporary facility from site and make good to all damage, to the satisfaction of the engineer and ECO. | Contractor/ECO/Engineer | Monthly |
| All structures comprising the camp site must be removed from the site. | Contractor/ECO | Monthly |
| The camp, storage and waste storage areas must be inspected for spills of substances such as paint, oil, etc. and these must be cleaned up. | Contractor/ECO | Monthly |
| All temporary worker facilities must be removed or decommissioned. | Contractor/ECO | Monthly |
| Copies of all certificates from any waste disposals must be provided to the ECO. | Contractor/ECO | Monthly |
| Burying of any waste on site is prohibited. All waste must be disposed of at the appropriate facilities. | Contractor/ECO | Monthly |
| The contractor must repair any damage that the construction works have caused to neighbouring sites. | Contractor/ECO | Monthly |
| The ECO must be notified of the complete decommissioning of the site camp after which the ECO will perform a final audit of the site. | ECO | Monthly |

3.4. Rehabilitation Phase

The Rehabilitation Phase refers to the closing of the camp site and site handover to the Developer. The duration of the Rehabilitation Phase is approximately ± 2 months.

| Rehabilitation | | |
|--|--------------------------|----------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| The Developer is responsible for compliance with the provisions for Duty of Care and Remediation of Damage in accordance with Section 28 of National Environmental Management Act (NEMA), Act No. 107 of 1998. | Developer | Monthly |
| All remaining maintenance materials, building rubble and waste must be removed from the site. Remove all construction material from the area where construction has been completed. To be undertaken by hand. | Developer/Contractor/ECO | Monthly |
| All disturbed surfaces compacted by maintenance activities including ablutions and storage areas must be deep ripped to a minimum depth of 30cm to allow organic contaminants to breakdown and promote vegetation establishment | Developer/Contractor | Monthly |
| Final rehabilitation must be completed within a period specified by the Engineer | Developer/Contractor/ECO | Monthly |
| Topsoil that has been stockpiled during construction must be applied to the area to undergo rehabilitation. The depth of the topsoil layer to be applied depends on the natural depth of topsoil in the area, and the amount of topsoil that may have been lost during construction. | Developer/Contractor/ECO | Monthly |
| The naked ground may be seeded with a stabilising grass mix, suited to the conditions. The quantity of seed used will depend on the slope, with a steeper slope requiring a heavier application of seed. For slopes: <ul style="list-style-type: none"> • >15°: 25-50 kg/ha • <15°: 15-25 kg/ha | Developer/Contractor/ECO | Monthly |

| Employees | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Staff must take cognisance of this EMPr as well as any local Municipality Standard EMPr for construction, maintenance and management. | Developer/Contractor/ECO | Monthly |
| Staff and/or residents must abide by the mitigation measures that apply to waste management, sanitation, surface water pollution, traffic, access, soil erosion, stormwater management, protection of flora and fauna, public safety & health and the noise and disturbance factor. | Developer/Contractor/ECO | Monthly |
| Employees must receive necessary training with regard to environmental management. | Developer/Contractor/ECO | Monthly |

| Management and Monitoring | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Immediate repair operation for any damaged portion of the new infrastructure must be taken. | Developer/Contractor/ECO | Monthly |
| Buffer zones, gabion walls, ripraps etc., must be implemented to prevent stormwater from pooling and to direct stormwater to existing stormwater infrastructure on the surrounding roads and residential area. | Developer/Contractor/ECO | Monthly |

3.5. Operational Phase

The Operational Phase is briefly addressed and refers to the Management and Maintenance of the new residential/serviced apartments to be situated at 49 Casuarina Road.

| Stormwater Management | | |
|---|-----------------------|----------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| The site must be managed in order to prevent pollution of drains or groundwater, due to suspended solids, silt or chemical pollutants. | Developer | Monthly |
| Earth, stone and rubble must be properly disposed of so as to not obstruct natural water pathways over the site (i.e. these materials must not be placed in stormwater channels, drainage lines, etc. | Developer | Monthly |
| There must be a periodic checking of the site's reticulation to ensure that the water flow is unobstructed. | Developer | Monthly |

| Surface Runoff | | |
|---|-----------------------|----------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| The applicant must ensure regular maintenance of all drainage systems within the project area as they help in improving site drainage, and reduce pollutants entering surface waters and groundwater. | Developer | Monthly |
| Grass filter stripes can be used as they function by slowing runoff velocities, trapping sediment and other pollutants and providing a modest infiltration. | Developer | Monthly |
| Proper management and disposal of waste must occur during the lifespan of the project. Waste must not be disposed of on the roadside or along the dune and beach area. | Developer | Monthly |

| Sea Level Rise Due to Climate Change | | |
|--|-----------------------|----------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Protection of the proposed development can be done using green infrastructure such as beach dunes. A beach dune is a hill of | Developer | Monthly |

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|---|-----------|---------|
| loose sand built by wind or the flow of water. Beach dunes currently exist outside the property of the proposed development and must be maintained. | | |
| There are one or more sets of dunes running parallel to the shoreline directly outside of the properties boundary and must be maintained. | Developer | Monthly |
| A temporary gabion wall can be formed along areas of erosion, but life expectancy will normally be between 1 and 5 years. | | |
| During adverse weather conditions, erosion control measures must be implemented along areas susceptible to erosion, these include sandbags, hessians sacks, gabion structure. | Developer | Monthly |

| Noise and Disturbance | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| All noise generating plant such as air conditioning, refrigeration, fans, etc. must comply with noise standards. | Developer | Monthly |
| Silencers must be installed if necessary. | Developer | Monthly |
| Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species. | Developer | Monthly |

| Visual Quality | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| All flood lighting must comply with relevant municipal standards. | Developer | Monthly |
| No unauthorized or un-approved structures must be erected. | Developer | Monthly |
| The site must be kept neat and tidy always, visually pleasing. | Developer | Monthly |

| Socio-Economic Benefits | | |
|---|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Local people must be employed where possible. | Developer | Monthly |
| Increased property values. | Developer | Monthly |

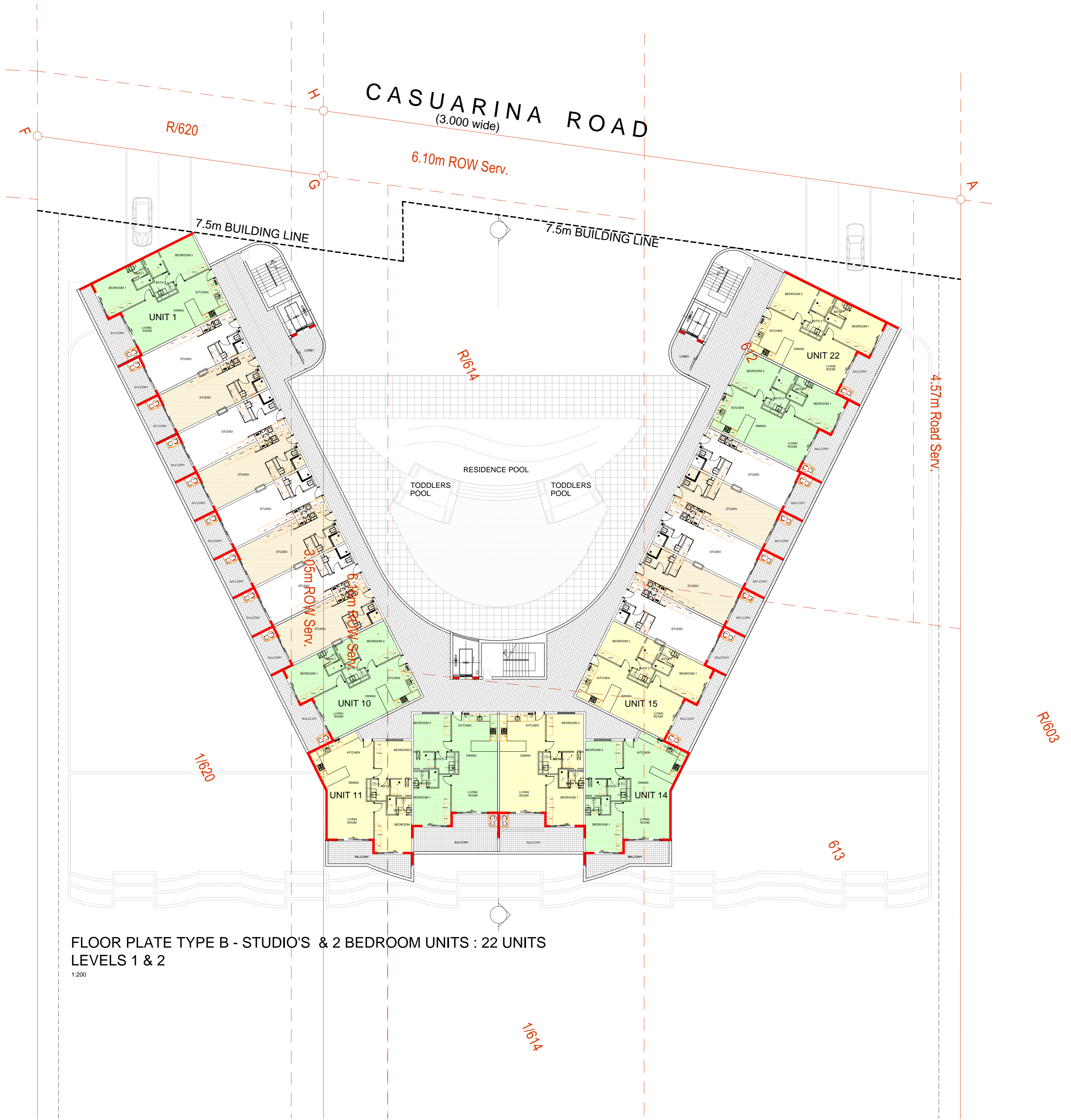
| Bulk Services | | |
|--|------------------------------|-----------------------------|
| Actions and Mitigation Measures | Responsible Person(s) | Monitoring Frequency |
| Municipal Water Supply | | |
| The water demand for the proposed development must be assessed according to the adopted design guidelines and standards. | Developer | Once |
| Sewage Discharge | | |
| A service level agreement must be obtained and signed between the Client and service provider. | Developer | Once |
| Electrical Supply | | |
| Electricity usage across the development will primarily be from the following occupancy classifications: <ul style="list-style-type: none"> ○ Parking & common/circulation areas ○ Residential apartment units | Developer | Once |
| The estimated maximum demand of the development is 1377 kVA. | Developer | Once |

3.6. Proposed Monitoring and Auditing – Closing Comments

- The construction activities must be inspected during the demolition, construction, rehabilitation and operational phases, according to the conditions of the environmental authorisation, which is generally once a month during construction.
- The date and time of the inspection may not be available to the contractor and/or developer.
- The audit must be executed by an independent environmental control officer (ECO).
- The inspection must cover all aspects stipulated in the approved EMPr.
- Each action must be assigned according to “Adequately done”, “Inadequately done” and “Not done”.
- The ECO may adjust actions should they not be effective in protecting sensitive elements or mitigating threats. This may require an amendment to the EMPr and EDTEA must be consulted prior to any changes.
- Audits must be well documented in Monthly Audit Reports and submitted to the Competent Authority and the Project Manager.
- Ultimately, the client Casuarina 5153 Properties (Pty) Ltd (Mr. Anant Singh) is responsible for the **implementation** of the EMPr.
- Should a concern be raised by an interested and affected party and/or stakeholder, EDTEA will refer to the monthly audit reports from the ECO.
- The ECO is not responsible for the implementation of the EMPr but is responsible for auditing the developer’s and contractor’s compliance to the EMPr.
- Following the rehabilitation of the affected site and the final ECO inspection and report, a site handover to the developer must be scheduled.
- This Draft EMPr is hereby submitted to KZN EDTEA for approval.
- The approved layout plans, bulk services report and a COVID management plan must be provided as Appendices to this EMPr in the Environmental File during construction.

Appendix 1

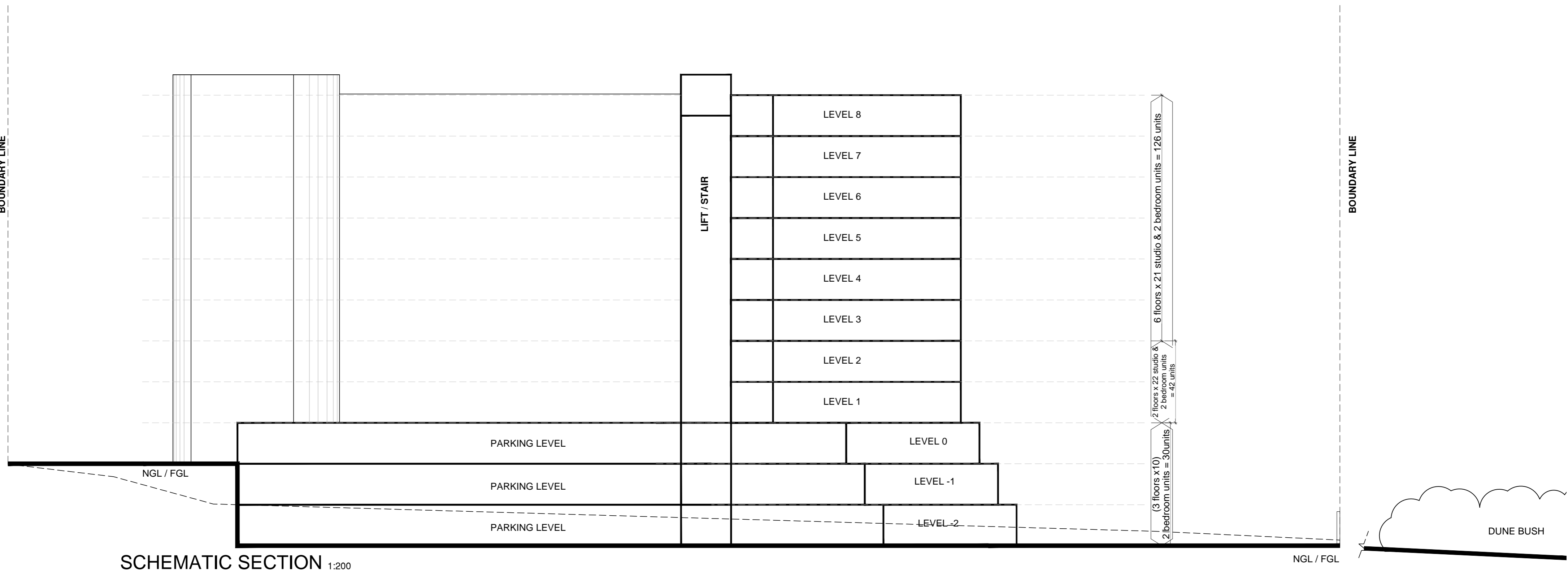
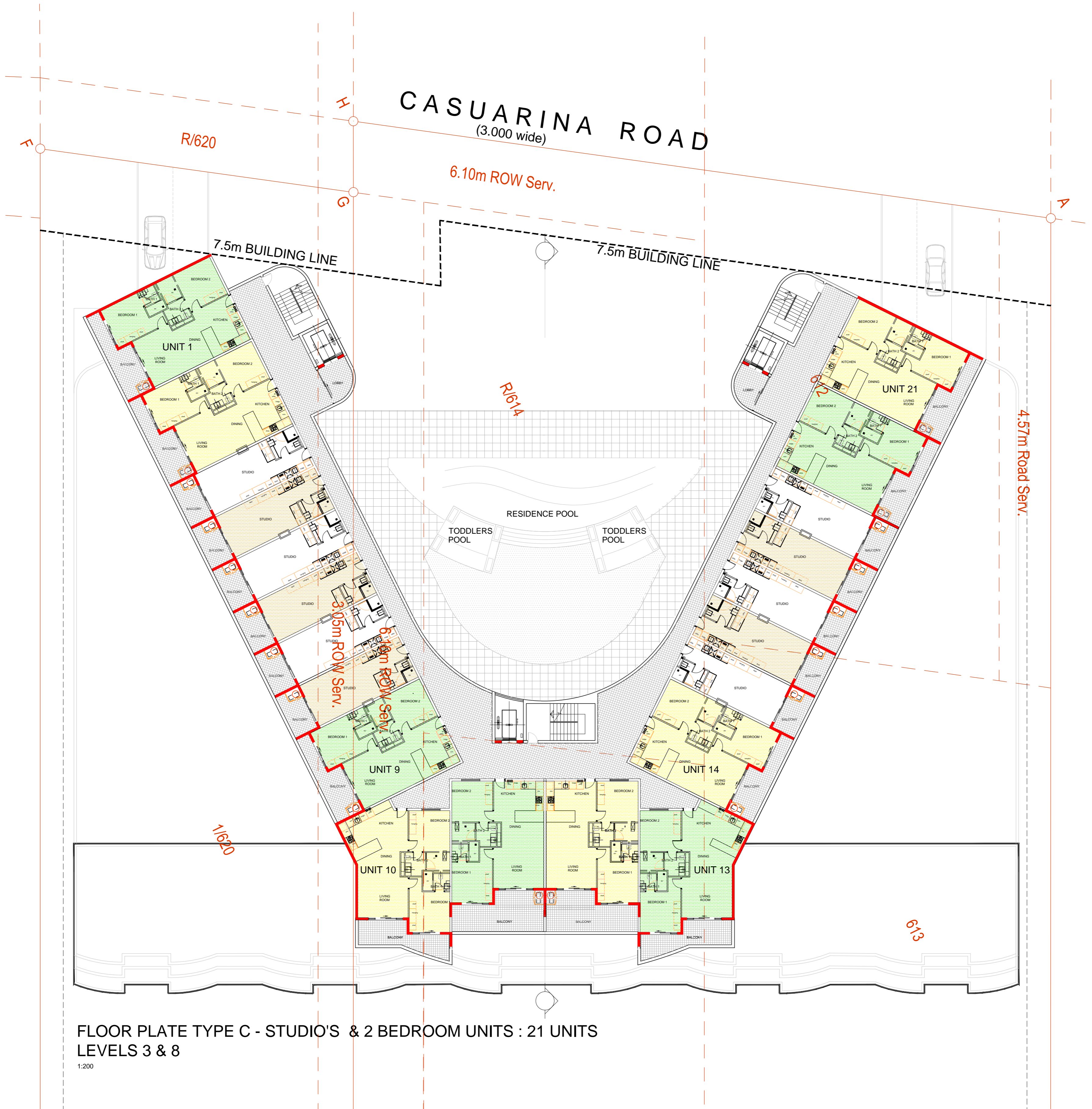
Layout Plans



AREA SCHEDULE

| | |
|--|-------------------------|
| COMBINED SITE AREA | : 8419.00m ² |
| PROPOSED COVERAGE | : 4781.07m ² |
| PERCENTAGE COVERAGE (RESIDENTIAL & PARKING) | : 56.7% |
| PROPOSED RESIDENTIAL COVERAGE | : 32.74% |

| | | |
|-------------------------|---------------------------|------------------------|
| PROPOSED F.A.R | | |
| LEVEL -2 (10 UNITS) | : 700.00m ² | 3x10 UNITS = 30 UNITS |
| LEVEL -1 (10 UNITS) | : 700.00m ² | |
| LEVEL -0 (10 UNITS) | : 700.00m ² | |
| LEVEL 1 (22 UNITS) | : 1316.06m ² | 2x22 UNITS = 44 UNITS |
| LEVEL 2 (22 UNITS) | : 1316.06m ² | |
| LEVEL 3 (21 UNITS) | : 1316.06m ² | 6x21 UNITS = 126 UNITS |
| LEVEL 4 (21 UNITS) | : 1316.06m ² | |
| LEVEL 5 (21 UNITS) | : 1316.06m ² | |
| LEVEL 6 (21 UNITS) | : 1316.06m ² | |
| LEVEL 7 (21 UNITS) | : 1316.06m ² | |
| LEVEL 8 (21 UNITS) | : 1316.06m ² | |
| TOTAL PROPOSED F.A.R | : 12 628.50m ² | |
| PERCENTAGE F.A.R | : 1.5 | |
| TOTAL NUMBER OFF UNITS | : 200 | |
| NUMBER PARKING PROVIDED | : 369 BAYS | |



PROPOSED NEW RESIDENTIAL DEVELOPMENT AT 49 CASUARINA ROAD
200 UNIT PROPOSAL



Appendix 2

Bulk Services Report

Mr A H Singh

**Proposed New Residential
Development, 49 Casuarina Road,
Tongaat**

Outline scheme/services report

Revision D | 6 July 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 602230-27

Arup (Pty) Ltd
Reg. No. 1994/004081/07 Registered Firm
Consulting Engineers South Africa









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Document Verification

ARUP

| | | | | | | | |
|-----------------------|---|--|---|--|--------------|-----------|--|
| Job title | | Proposed New Residential Development, 49 Casuarina Road, Tongaat | | Job number | | 602230-27 | |
| Document title | | Outline scheme/services report | | File reference | | | |
| Document ref | | | | | | | |
| Revision | Date | Filename | Civil Report Tongaat Residential.docx | | | | |
| Draft 1 | 10 July 2018 | Description | First draft | | | | |
| | | | Prepared by | Checked by | Approved by | | |
| | | Name | Sarge Govender | Shaun Dixon | Naeem Hassen | | |
| | | Signature |  |  | | | |
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| | | Description | | | | | |
| | | | Prepared by | Checked by | Approved by | | |
| | | Name | Sarge Govender | Naeem Hassen | Shaun Dixon | | |
| Signature |  | |  | | | | |
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| | | | Prepared by | Checked by | Approved by | | |
| | | Name | Sarge Govender | Yeshkin Maharaj | Shaun Dixon | | |
| Signature | | | | | | | |
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| | | Description | | | | | |
| | | | Prepared by | Checked by | Approved by | | |
| | | Name | Sarge Govender | Naeem Hassen | Shaun Dixon | | |
| Signature |  | |  | | | | |

Issue Document Verification with Document



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Appendices

Appendix A

Stormwater management plan

Appendix B

Locality Plan

1 Introduction

Arup (Pty) Ltd have been appointed to compile a services report for the **Proposed New Residential Development** situated on erven 612, 613,R/614,1/614 and 1/620 within the eThekweni district municipality located along Casuarina Road along the M4. The site is located between Casuarina road and the Indian ocean.

Co-ordinates -29.608227, 31.163410

The purpose of this report is to set out the parameters and proposed civil engineering infrastructure that is to be put in place to service the proposed developed site.

2 Project overview

2.1 General site description

The site currently consists of 5 residential Erven which will be consolidated into one residential site to accommodate the newly proposed development.

The sites currently consist of standalone units which occupy approximately 30% of the total combined area footprint with the remainder of the site covered in fine grass and trees. The site is rectangular in shape and has a gentle slope from west to east towards the neighbouring Indian ocean.

Table 1 Proposed project development data

| Land Use | Area (m ²) |
|----------------------------------|------------------------|
| Combined site area | 8419.00 |
| Proposed coverage | 4781.07 |
| Proposed soft Landscaping | 3637.93 |

2.2 Locality Plan



The site is located along the northern coastline within the eThekweni district municipality. The site forms part of the Genazzano suburb and is located alongside Casuarina Road on the western side which runs along the M4 south bound with the coastline to the west. A protected green belt separates the site from the coastal shoreline

The site will have a total coverage of 8419.00m² with the proposed development covering 4781.07m². 56.70% of the site will be developed with structure and hard stand parking with the remaining site consisting of soft landscapes

3 Civil engineering services

To facilitate the provision of engineering services it is recommended that all the erven are consolidated into a single stand. These erven are to become a unified stand with single water, sewer and stormwater connection points.

3.1 Potable water reticulation

3.1.1 Design parameters

Typical standards used for the design of sewer reticulation networks are summarized below.

Table 2 Potable water design guidelines

| Parameter | Element | Guideline |
|-----------------------|---|--|
| Pressure | Maximum (Static) | 6.0 bar (60m) |
| | Minimum | 2.0 bar (20m) |
| Flow Velocity | Peak Demand Flow Velocity | ≤ 1.5m/s |
| | Recommended Velocities | 0.6 m/s <V> 1.2m/s |
| | Velocities through Special fittings | 6 m/s or as manufacturers specifications |
| Fire Flow | Hydrant Spacing: Residential | 200m Max |
| | Hydrant Spacing: Industrial | 200m Max |
| | Flow: Residential (High Rising) ≥ 4 stories | Total Fire Flow 50 ℓ/s Mini Flow 50 ℓ/s |
| Peak Factor | Design Peak | 4.6 (|
| Pipe Location | All Areas | 2m from Erf Boundary |
| Pipe Materials | ∅ ≤ 250mm | uPVC Class 12 with spigot and socket couplings OR HDP PE80 PN 12.5 with electro-fusion fitting and couplings |
| Pipe Size | Network Pipes | Min ∅ = 75mm |
| | Near side house connections | 1 Stand : 25mm ∅ min 2 Stands : 32mm ∅ min |
| | Far side house connections | 1 Stand : 25mm ∅ min 2 Stands : 32mm ∅ min |
| Cover to Pipes | Under tarred and paved roads/trafficked areas | 1000mm min |
| | Under other areas | 800mm min |
| | Maximum (All Areas) | 1500mm |
| Valves | Type | RSV – Class 16 to SANS 664, cap top, non-rising spindle and anti-clockwise closing |

3.1.2 Potable Water Design Approach

- Existing Pipe Network Pressure and Supply Zone**

Local Municipality department of water and sanitation is to comment on whether the proposed development can be served by the current infrastructure and whether the development is aligned to any future master planning of the area.

- Demand Estimation**

The water demand for the proposed development is assessed according to the adopted design guidelines and standards.

The general development type for the site is that of a residential development.

Planning standards for Average Annual Daily Demand (AADD) for a standard three-bedroom unit is 600ℓ/unit/day.

The water model was based on a maximum development height of 11 stories with a corresponding minimum residual head of 24m from the municipal supply. Pressure in the existing line must be confirmed to determine whether a PRV is required. Design flows are summarized in the table below.

Table 3 water demand estimation

| Water Demand (Tongaat Residential) | | | | | | | |
|---|---------------------|---------------------------|---------------|---------------|----------------------------|--------------------|--------------------|
| <i>Description</i> | <i>No. of Units</i> | <i>Daily Water Demand</i> | <i>AADD</i> | <i>Losses</i> | <i>TAADD (incl losses)</i> | <i>Peak Factor</i> | <i>Peak Demand</i> |
| | | <i>L/unit/day</i> | <i>KL/day</i> | <i>%</i> | <i>KL/d</i> | | <i>L/s</i> |
| Residential Units | 200 | 600 | 120 | 15 | 138 | 4.6 | 7.35 |
| Fire Demand | | | | | | | 50 |
| Total Peak Hour Demand | | | | | | | 57.35 |

All calculations are based on the Neighbourhood Planning and Design Guide (Redbook), Section J, Water

AADD - Average Annual Daily Demand

AADD (L/day) = Unit Water Demand (L/unit/day) x no. of Units (As per Eqn J.2)

Real Loss Percentage Estimate - 15% Used (As per Section J.4.1.3, Method 1)

TAADD - Total Average Annual Daily Demand

$$\text{TAADD} = \text{AADD} (1 + \text{Real Losses}) \quad (\text{As per Section J.4.1})$$

Peak Factor

$$\text{PF} = 4.6 \quad (\text{As per Table J.9})$$

$$\text{Peak Demand} = \text{TAADD} \times \text{PF} / (24 \text{ hours} \times 60 \text{ min} \times 60 \text{ sec} \div 1000)$$

(As per Section J.4.1.5)

- **Connection Point**

The connection point for the proposed development is obtained from an existing 75mmØ (size to be confirmed by municipality) water main located in Casuarina Road. A 75mmØ connection from the existing water main will serve the site. The proposed connection point will need to be identified on site. The local municipality need to confirm if there is sufficient capacity to service this development.

- **Internal Reticulation**

Internal reticulation is private and will be designed by a qualified engineer as per the final architectural layouts of the development. The internal design will form part of a separate submission, the Site Development Plan (SDP). As a minimum, a water meter will also have to be installed at the main connection point, along with a nonreturn valve

All watermains will be constructed according to local municipality design standards with appropriate approvals from the eThekweni department of water and sanitation.

For the rational fire design, a fire risk assessment will have to be carried out by a specialist. This design will comply with SANS 10400 and SANS 10090 and will form part of a submission for approval separate from this report. A pressure test will have to be done at the new connection to determine if a boosted connection will be required, subject to the final design of the building and the rational fire design.

3.2 Sewer Drainage Network

3.2.1 Design Parameters

Table 4 Potable water design guidelines

| Parameter | Element | Guideline |
|-------------------------------|--|---|
| Min Pipe Diameter | Gravity Sewer | Ø160mm |
| | Connections | Ø110mm (min) |
| Min Velocity at Full Flow | Gravity Sewer and Rising Mains | 0.7m/s |
| Peak Factor | Residential | 2.3 |
| Stormwater Infiltration | Gravity Sewers | 15% of Design Flow |
| Pipe Capacity | Flow level in pipe as fraction of diameter | 67% at Design Flow |
| Min Gradients for Pipes | Ø110mm | 1:60 |
| | Ø160mm | 1:140 |
| | Ø200mm | 1:200 |
| | Ø≥300mm | 1:350 |
| | First pipe length | 1:80 |
| Hydraulic Calculations | Manning Equation | .n = 0.012 |
| Pipe Materials | All Pipes | uPVC Class 34 Heavy Duty to SANS 791 OR uPVC Class 400 (TYPE I) to SANS 1601 |
| Pipe Location | All Areas | 1.5m to 2m from road reserve boundary depending on road reserve width, unless otherwise indicated |
| Connections | For stands | Ø110mm (min) uPVC with slip on couplings or HDPE equivalent |
| Cover to pipe | In road reserves | 1400mm (min) |
| | Other areas | 1000mm (min) |
| Manhole | Spacing | 80m (max) |
| | Manhole Cover and Frame | TYPE 2A Heavy Duty in Roads TYPE 4 in all un-trafficked areas |

3.2.2 Sewer Design Approach

• Existing Pipe Network and Drainage Zone

The current sites do not have a waterborne sewerage system. The existing individual units are served by individual septic tanks.

The local Genazzano WWTW is unlicensed and according to our knowledge is out of capacity

Sewage disposal for the proposed development is a challenge, therefore Alternative options were explored in order to determine the most viable method to dispose of the sewage. The following options were looked at.

Option 1 – the provision of a conservancy tank

Option 2 – the upgrading of the existing Genazzano WWTW

Option 3 – the provision of a sewerage package plant

The options above were presented to EWS for comment and guidance on a best fit solution.

Discharge Estimation

The sewer discharge for the proposed development is assessed according to the adopted design guidelines and standards.

The sewer layout has been analysed with respect to ground slope (%) and excavation depth to optimize the position of sewers and conservancy tank or package plant to reduce the cost of the sewerage scheme.

The unit and average sewerage flows of the site's land use is summarised in the table below. The design criteria for the development of the site have been based on standards from guidelines for Human settlement planning and design manual.

Table 5 Sewer discharge table

| Zoning | Developed Area (m ²) | Unit Demand (ℓ/unit/day) | DWF (Kℓ/day) | PDWF (ℓ/s) | PWWF (ℓ/s) |
|-----------------|-------------------------------------|-----------------------------|-----------------|---------------|---------------|
| Number of units | 200 | 600 | 345 | 3.993 | 1.837 |

DWF – Daily Wet Flow

PDWF – Peak Daily Wet Flow (x2.5)

PWWF – Peak Wet Winter Flow (x1.15)

• Connection Point

As stipulated previously, there is no municipal sewer available for this development. After consultation with EWS we have received email confirmation from Mr. Brian Neale from EWS advising that the available capacity at the Genazzano WWTW is constrained.

From the above options presented, it became apparent that either a conservancy tank or sewerage package plant be used with adequate vehicular access.

An on-site package plant is an option and will be allowed if all requirements are met by the relevant authorities, details of which to are to be made available at detail design stage.

An on-site package plant is the chosen option as this is the most viable and cost-effective solution adding future value with the options of recycling and gray water harvesting.

- **Internal Reticulation**

Internal reticulation is private and will be designed by a qualified engineer as per the final architectural layouts of the development. The internal design will form part of a separate submission, the Site Development Plan (SDP). All sewer mains will be constructed according to guidelines for Human settlement planning and design manual.

3.3 Stormwater Drainage Network

3.3.1 Design Parameters

Typical guidelines used for the design of the stormwater reticulation are discussed below.

- Applicable design standards include:
 - SANS 1200 & SANS 10400
 - Guidelines for the Provision of Engineering Services and Amenities in Township Development (“The Civil Redbook”)
 - Standards as set out by the eThekweni local municipality
- All materials, construction and testing of the stormwater system should comply with the standards as set out in the documents mentioned above.
- The design is based on the major system and the minor system. The following recurrence intervals were used for the respective systems:
 - Minor system = 1:5 year (Piped system)
 - Major system = 1:50 year (Roof runoff, surface road runoff)
- Minimum velocities should be between 0.9m/s and 1.5 m/s to prevent sedimentation.
- Desirable minimum slopes for different pipe diameters are given in the table below.

| Pipe Diameter (mm) | Desirable Minimum Slope |
|--------------------|-------------------------|
| 110 | 1:100 |
| 160 | 1:100 |
| 200 | 1:100 |
| 300 | 1:100 |
| 450 | 1:150 |
| 525 | 1:170 |
| ≥600 | 1:200 |

- For the subsoil drainage, rodding eyes should be placed at maximum spacing of 25.0m.
- In general, all subsoil drains, channels and pipes should have a minimum slope of 1:100.
- All pipes with a diameter of 200mm and smaller are to be uPVC, Class 34. Syphonic drainage systems if employed are to have all piping as HDPE.

- All pipes larger than 200mm in diameter should be precast concrete pipes. All precast pipes shall have spigot and socket joints in strict accordance with the requirements of SANS 677.
- All pipe bedding to be Class B bedding as per SANS 1200 LB with bedding cradle of selected fill material.

3.3.2 Stormwater design philosophy

Refer to appendix A

- **Existing Drainage Zone**

There is an existing stormwater line in Casuarina Road. The exact diameter of the underground stormwater system is to be determined on site by a survey. The minimum size to be expected is a 450mmØ pipe to manage the minor flood (1:5-year recurrence interval).

- **Run off from Buildings**

The Structure will have a flat roof that will be drained by gutters and rainwater outlets (full-bore outlets). From full-bore outlets, the stormwater will be routed through rainwater downpipes either cast in columns or externally mounted to the building face. At ground level stormwater will be released into a piped network system which will reticulate to the municipal tie-in point via an onsite attenuation structure. All external landscaped areas will be drained using a combination of a piped network as well as maintain natural surface runoff in areas that have not been altered.

- **Run off from Surfaces**

Surface runoff will be directed into inlets located within the hard-landscaped areas and parking lots. Stormwater will be then reticulated via a piped network system into the attenuation tank prior to discharge into the municipal manhole located outside the property on Casuarina Road. A survey will be carried out to identify the exact position and invert level.

- **Catchment Analysis & Runoff Estimation**

A summary of the model parameters is given in the table below.

Table 6 Catchment Characteristics

| Catchment Runoff Parameters | |
|--------------------------------|---|
| Catchment area | 8417m ² |
| Region | Coastal |
| MAP | 950mm |
| Storm duration | 15 min |
| Pre-development Factor | 0.379 (permeable) |
| Post-development Runoff Factor | 0.450 (Due to introduction of hard spaces) |

A summary of the analysis of the flows for the development are given in the table below, based on different storm events or recurrence intervals.

Table 7 Runoff coefficient

| Recurrence Interval | Post Development Runoff (ℓ/s) |
|---------------------|-------------------------------|
| 1:5 | |
| 1:10 | 94 |
| 1:50 | 147 |
| 1:100 | |

- **Attenuation**

It is envisaged that stormwater attenuation will be required for the site. The existing condition of the site is that of a partially developed residential stand semipermeable. The development will increase the runoff coefficient due to the introduction of the new building footprint. Provision of soft landscaping would effectively decrease the runoff due to increase infiltration on the site.

- **Internal Reticulation**

The stormwater design is based on conventional parameters, with the requirement that the development does not suffer the risk of damage from inadequate drainage. The general levels and grades of the site are generated with the consideration of keeping earthworks operations to a minimum as far as possible.

3.4 Electrical

Electricity usage across the development will primarily be from the following occupancy classifications:

- Parking & common/circulation areas
- Residential apartment units

We've used the following codes and guidelines as a reference to estimate the anticipated maximum demand for this building:

- NRS 034-1:2014 - Electricity distribution — Guidelines for the provision of electricity distribution networks in residential areas.
- SANS 10400-XA:2011 – Energy Usage in Buildings

Based on the above we estimate the maximum demand of the development to be in the order of **1377 kVA**.

4 Conclusion

A practical design approach reflects that water and stormwater can be provided, with no above normal risks to the developer and neighboring sites.

The sewer requires additional input from the local authorities as well as guidelines from the environmental authorities regarding the provision of onsite utilities to capture treat and discharge wastewater in a safe manor with no negative impact to neighboring sites.

The importance of maintenance and sustainability plays a crucial role in the successful functioning of the envisaged systems.

Key aspects concerning water and sanitation for the proposed development include:

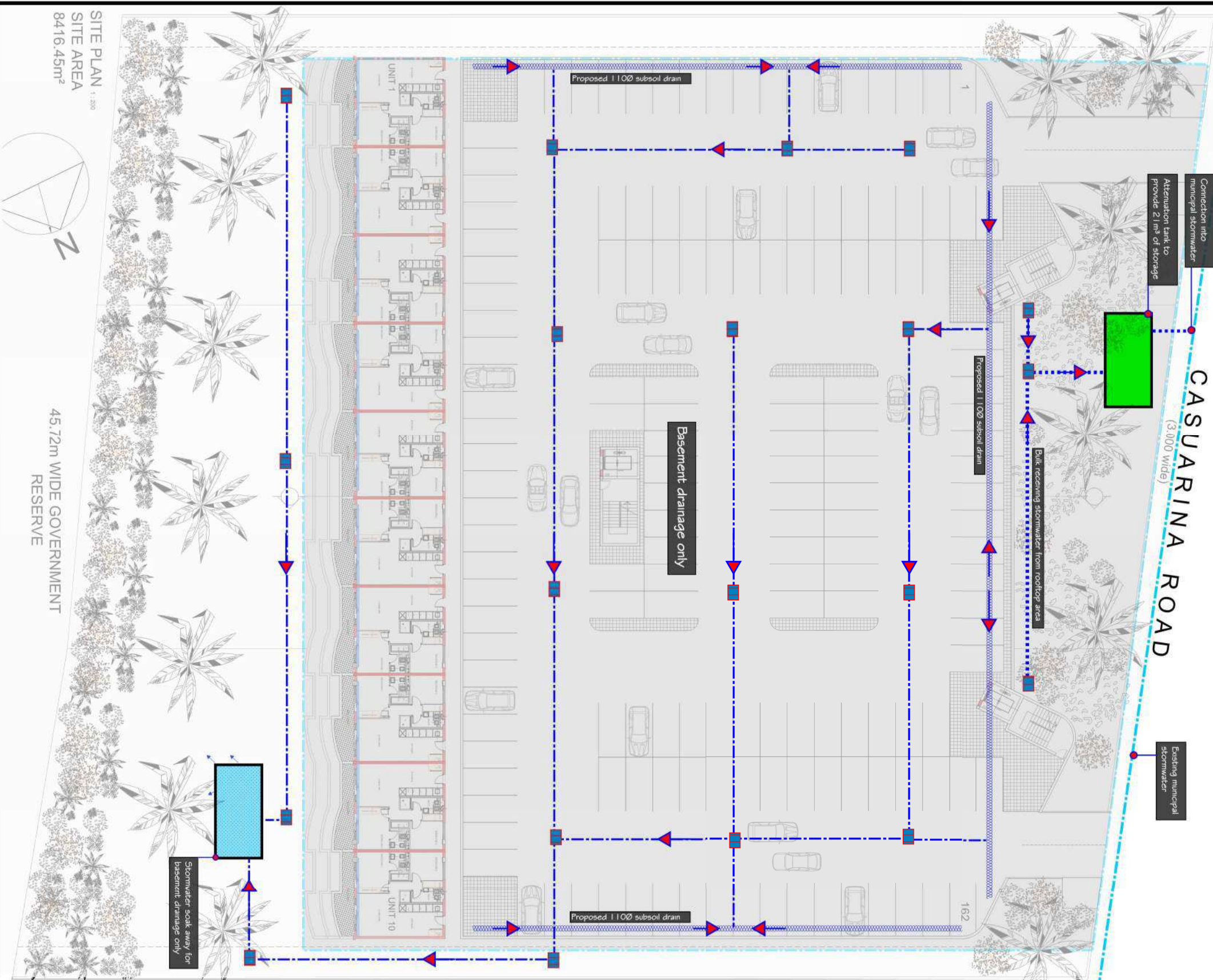
- Location of the existing water connection point for the proposed development must be identified and agreed with the local authorities. Water main (size to be verified by eThekweni Water) located on Casuarina Road.
- Onsite treatment facility is of utmost importance for the sewer disposal. Clarification is required by the municipalities sanitation division to verify if there are possible future plans to provide a waterborne sewer system for this area. This will play a decisive role in deciding whether to forge ahead with alternative sewer disposal means

Key aspects concerning stormwater management for the proposed development include:

- Attenuation will be required. Stormwater will be captured in a stormwater attenuation facility and discarded into the municipal system in a controlled manor ensuring all municipal bylaws are adhered to.
- Refer to appendix A stormwater management plan.

Appendix A

Stormwater management plan



| Pre-development C | | | Urban runoff coefficient | | |
|---------------------------------|--------|------|--------------------------|-------|---------|
| Rural runoff coefficient | | | | | |
| Catchment slope Cs | % area | C | Land use | %area | |
| < 3% | 0.05 | 0 | lam sandy < 2% | 0.08 | |
| 3-10% | 0.11 | 0.15 | lam sandy > 7% | 0.18 | |
| 10-30% | 0.2 | 0.25 | lam heavy < 2% | 0.15 | |
| >30% | 0.3 | 0.3 | lam heavy > 7% | 0.3 | |
| Total | 100 | 0.11 | residential single | 0.5 | |
| Soil permeability Cp | % area | C | flat/dense township | 0.65 | |
| Very perm (Dunes) | 100 | 0.1 | industry, light | 0.7 | |
| semi perm (most soils) | 0 | 0.2 | business local | 0.6 | |
| Imperm (rock, paving) | 0 | 0.3 | business CBD | 0.85 | |
| Total | 100 | 0.1 | Streets/roofs | 0.95 | |
| Vegetal growth Cv | % area | C | Total | 48 | 0.95 |
| Dense bush, forest | 0.05 | 0 | Urban C | 3.92 | |
| cut land, sparse bush | 0.15 | 0 | Area weighting | %area | C |
| Grassland | 0.25 | 0 | Rural | 52 | 0.36 |
| Bare Surface | 0.3 | 0 | Urban | 42 | 0.456 |
| Total | 100 | 0.15 | Design C | | 0.37872 |
| | | 0.35 | | | |

| Post-development C | | | Rural runoff coefficient | | |
|------------------------|--------|------|--------------------------|--------|---------|
| | | | | | |
| Catchment slope Cs | % area | C | Land use | % area | |
| < 3% | 0.05 | 0 | lam sandy < 2% | 0.08 | |
| 3-10% | 0.11 | 0.18 | lam sandy > 7% | 0.18 | |
| 10-30% | 0.2 | 0.25 | lam heavy < 2% | 0.15 | |
| >30% | 0.3 | 0.3 | lam heavy > 7% | 0.3 | |
| Total | 100 | 0 | residential single | 0.5 | |
| Soil permeability Cp | % area | C | flat/dense township | 0.65 | |
| Very perm (Dunes) | 0.05 | 0.05 | industry, light | 0.7 | |
| Perm (light soil) | 0.1 | 0.2 | industry, heavy | 0.7 | |
| semi perm (most soils) | 0.2 | 0.3 | business local | 0.6 | |
| Imperm (rock, paving) | 0.3 | 0.3 | business CBD | 0.85 | |
| Total | 100 | 0 | Streets/roofs | 0.95 | |
| Vegetal growth Cv | % area | C | Total | 65 | 0.95 |
| Dense bush, forest | 0.05 | 0 | Urban C | 1.0075 | 0.892 |
| cut land, sparse bush | 0.15 | 0 | Area weighting | % area | C |
| Grassland | 0.25 | 0 | Rural | 35 | 0 |
| Bare Surface | 0.3 | 0 | Urban | 65 | 0.6225 |
| Total | 100 | 0 | Design C | | 0.59715 |
| | | 0 | | | |

| Return period | Pre-development Q (m³/s) | Post-Development Q (m³/s) |
|---------------|---|---------------------------|
| 1:10 year | 0.0791 | 0.0941 |
| 1:50 year | 0.1238 | 0.1472 |
| | Maximum allowable runoff (m³/s) | 0.0793 |
| | Storage required (municipal network available) (m³) | 22.9 |

| Office Flow | Q=Cd*A*(2gh) ^{0.5} (Assume orifice is circular) | Internal Pipe Diameter | Head | Cd (coefficient of discharge thro orifice) | Flow |
|-------------|---|------------------------|-------|--|----------|
| | | 169 mm | 1.5 m | 0.65 | 79.1 l/s |

On-site storage and attenuation
Maximum allowable runoff rate

eThekwin Municipality have imposed restrictions on the rate at which runoff can be discharged from new developments into the Municipal network or into watercourses. The maximum allowable runoff rate from a new development is to be restricted to the equivalent runoff from that site for the 1 in 10 year storm under pre-development conditions.

Therefore the maximum allowable runoff rate from the new development is to be restricted to: 0.079m³/s (79.0 litres/sec).

On-site storage requirements

eThekwin Municipality have imposed that provision for the storage of runoff be provided such that the restrictions in runoff rate can be temporarily retained on-site before discharging to the Municipal network or watercourse.

The required storage is to be calculated from the difference in runoff volume for the 1 in 50 year storm between the pre and post development conditions. The simplified triangular hydrograph method was used, to calculate the required storage volume. The minimum on-site storage required for the new residential development is: 121m³ (21,000 litres).

Storage and attenuation methods

Runoff is to be collected from the roofs via gutters and downpipes which into the newly proposed formal storm water system via a piped network system. Similarly all roads, hardstand parking areas and landscaped areas will also be drained using a combination of storm water catch pits, sumps, berms, storm water channels both hard and soft adequately positioned which will be channelled towards the new proposed storm water attenuation tank as shown on the layout.

65% of the site will be hard with the remaining 45% soft landscapes. Should a rainfall event occur that exceeds the 1 in 10 year event then the storage tank will provide the total required storage volume.

All runoff will be channelled or piped towards the storm water attenuation tank. The discharge from the tank will be restricted using a single reducing orifice (169mm opening) for the 1:10 year pre-development runoff.

The diameter of this orifice opening has been designed using the Orifice Flow equation

$$\text{Orifice} - Q = cd \cdot A \cdot (2gh)^{0.5}$$

Conclusions

The proposed residential development will result in an increase in runoff volume and rate.

eThekwin Municipality have imposed restrictions on the maximum allowable runoff from the site as well as the required on-site storage and attenuation of runoff. Runoff from the proposed development is to discharge via an underground network, as well as through surface channeling camouflaged into the landscaping which will be directed into the storage tanks. The runoff from the tanks will be reduced using a 169mm orifice.

With these measures in place the Municipal storm water requirements will be met.

SITE PLAN 1:200
SITE AREA 8416.45m²
45.72m WIDE GOVERNMENT RESERVE

Appendix B

Locality Plan

No. 45 - 53 CASUARINA ROAD, GENAZZANO, TONGAAT

LOCALITY PLAN



- PHYSICAL ADDRESS:
- No. 45 CASUARINA ROAD
 - No. 47 CASUARINA ROAD
 - No. 49 CASUARINA ROAD
 - No. 51 CASUARINA ROAD
 - No. 53 CASUARINA ROAD
- ALL OF
GENAZZANO, TONGAAT

- PROPERTY DESCRIPTION:
- ERF 613 TONGAAT
 - ERF 612 TONGAAT
 - REMAINDER OF ERF 614 TONGAAT
 - PORTION 1 OF ERF 614 TONGAAT
 - PORTION 1 OF ERF 620 TONGAAT
- eThekweni Metropolitan Municipality
North Operational Entity
Registration Division - FU
Province of KwaZulu-Natal

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Appendix 3

COVID-19 Management Plan



COVID-19 RETURN TO WORK PLAN



SEPTEMBER 2020

COVID-19 RETURN TO WORK PLAN

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1. INTRODUCTION

The Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered virus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

The best way to prevent and slow down transmission is to be well informed about the virus and how it spreads. Individual are required to protect themselves and others from infection by washing hands regularly, using an alcohol-based sanitizer and avoid touching your face.

The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow). As work and construction activities resume, the necessary precautions must be implemented and enforced to reduce the spread of the virus.

This document details measures that must be enforced at the workplace during the COVID-19 Alert Level 3.

2. PURPOSE OF THE DOCUMENT

This document outlines the control measures that must be implemented as employees return to work. This document must be considered a live document which can be updated at any time to ensure compliance with the national regulations as South Africa shifts to the different Covid-19 Alert Level.

3. RETURN TO WORK PLAN

The plan contains the following information:

3.1. DETAILS OF THE COVID-19 COMPLIANCE OFFICER

The contractor or a member of the management team must be designated as the COVID-19 Compliance Officer. The designated individual must ensure that the health and safety of employees are not comprised. The COVID-19 Compliance Officer must implement the required hygiene standards and protocols as per the national regulations. These include conducting screening processes; obtaining and distributing hand sanitizers; demarcating entry and exit points to enforce social distancing; and ensure all staff are provided with the necessary Personal Protective Equipment (PPE) such as masks and/or face shields.

The details of the COVID-19 Compliance Officer are provided below:

| | |
|--------------------------------------|--|
| Name of Designated Individual | |
| Contact Details | |
| Designation | |
| Company | |

The contractor or a member of the team must be responsible for communicating to all staff members on the requirements for working under the COVID-19 Alert Level 3 conditions.

3.2. WORKERS PERMITTED TO RETURN TO WORK

The Department of Health has indicated that the old/ elderly are more vulnerable to COVID-19 and are encouraged to remain home as much as possible. An employee is at a greater risk if the following applies:

- If the individual is over the age of 60.
- Have medical conditions such as high blood pressure, etc.
- Have low immune systems and other illnesses.

3.3. RETURN OF WORKFORCE

A daily COVID-19 temperature screening must be conducted for all personnel and visitors entering the construction area. The site must have a designated entry point where construction personnel can be screened. The ground must be marked indicating the 1m distance between employees as they enter the site. This process must not be undertaken in confined spaces where social distancing would not be possible. Every individual must be required to complete the COVID-19 screening tool which was provided by the Client. Individuals are requested to be as true and honest as possible when completing the screening tool.

The Non-Contact Screening Process is as follows:

All employees must be screened prior to being permitted access to the site using a non-contact apparatus. All employees must be observed for symptoms consistent with COVID-19. Symptoms include:

- Cough,
- Sore throat,
- Redness of eyes,
- Shortness of breath,
- Difficulty in breathing, and
- A body temperature exceeding 37,5°C using an infrared thermometer.

If an employee has a temperature of 38 degrees or more, the individual must undergo further screening whereby a doctor can be consulted. Individuals may be asked to self-isolate if necessary and must do so for a period of 14-days. All health and safety precautions must be taken by the designated personnel that will be screening employees to ensure their safety and the safety of those being screened. Some important measures to implement are:

- Wear appropriate PPE (disposable type gloves, cloth masks, face shields);
- Follow all social distancing measures;
- Ensure all equipment (e.g. thermometers) used must be cleaned.

Interim Screening Process:

In the event that there isn't a thermal scan thermometer available, screening can still be undertaken via a series of questions which include but are not limited to:

1. Do you feel ill?
2. Have you been around anyone who was or is ill?
3. Are you experiencing shortness of breath and/or coughing?

Positive responses might suggest that the individual further consults a doctor.

Positive COVID-19 Cases:

If there are positive COVID-19 cases at the construction site, the following measures are applicable:

- Inform the COVID-19 Compliance Officer;
- Inform the Department of Health;
- Screen all employees and enforce a 14-day self-isolation period;
- Disinfect the entire work space including areas designated for lunch, ablution, boardrooms, etc.

3.4. HEALTH PROTOCOLS TO PROTECT THE WORKERS FROM COVID-19

The following hygiene requirements must be implemented to ensure protection of workers:

Sanitizers and Washing Facilities:

- There must be adequate facilities for the washing of hands with soap and clean water.
- Hand sanitizers must contain at least 70% alcohol.
- There must be sufficient quantities of hand sanitizer available at the entrance to the site and within the working area.
- If on-site meetings are undertaken all members of the meeting must sanitize.
- Disinfect all surfaces and equipment as much as possible.
- Areas such as toilets, common areas, door handles, and shared electronic equipment are regularly cleaned and disinfected.
- Paper towels must be provided to dry hands after washing. Fabric towelling is prohibited.

Cloth Masks and PPE:

- The Department of Health recommended that all people should wear cloth masks in public to prevent the spread of COVID-19.
- Employers must provide each employee with at least two cloth masks to wear while at work.
- Employees must be made aware of the safe and healthy use of cloth masks (i.e. wash regularly).
- Besides the use of cloth masks, employees can also make use of surgical masks, face shields, disposable gloves or any other PPE keeping in line with the COVID-19 requirements.

Signage and Social Distancing:

- Sign boards with rules to prevent the spread of COVID-19 must be established at entry points, ablutions facilities, areas for hand washing, lunch areas or as identified by the COVID-19 Compliance Officer.
- Employees must refrain from physical contact as far as possible.
- The 1m distance must be maintained as much as possible.
- Meetings can be undertaken if and when absolutely necessary with the minimal number of attendees.