DRAFT

BASIC ASSESSMENT REPORT

EXPANSION OF INFRASTRUCTURE WITHIN 100M OF THE HIGH-WATER MARK OF THE SEA RESULTING IN THE INFILLING AND EXCAVATION OF MATERIAL WITHIN 100M OF THE HIGH-WATER MARK AND THE PLANTING OF VEGETATION ON EXPOSED DUNE AT HOUSE GOTZ LOCATED AT 31 LITTLE MARITZBURG ROAD, SHAKA'S ROCK

KWADUKUZA MUNICIPALITY

DC29/0013/2021

09th September 2021

Ref: C012

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AUTHOR OF REPORT

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The EAP confirms that:

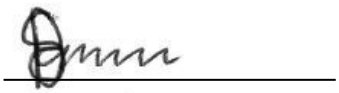
a) All information contained in the Basic Assessment Report is, to the best of my knowledge, accurate and correct.

b) Comments and input from stakeholders and registered Interested and Affected Parties have been included in the Basic Assessment Report.

c) Input and relevant recommendations contained in the attached specialist reports have been included in the Basic Assessment Report and Environmental Management Programme.

d) All relevant, available information has been provided to registered Interested and Affected Parties; and

e) Responses to comments or inputs made by registered Interested and Affected Parties has been included under Appendix D.



Stephanie Denison

30th August 2021

EXECUTIVE SUMMARY

Peter Gotz proposes to expand an existing residential dwelling on Erf 157 of Shakas Rock Township, located at 31 Little Maritzburg Road, KwaDukuza Local Municipality, iLembe District. The project includes the construction of a geofabric defence structure along the shoreline. The expansion of infrastructure on site will take place within 100m of the high-water mark of the sea. The excavation of material on site during construction as well as the placement of the geofabric defence structure on dunes / exposed sand requires Environmental Authorisation from the Department of Economic Development, Tourism and Environmental Affairs (EDTEA).

Various technological alternatives have been assessed to ensure the preferred technology alternative for the sea defence structure is used. The preferred alternative is for the use of a geofabric wall to defend the dune. Mitigation measures provided in the Beach and Coastal Assessment, Geotechnical Report and Palaeontological Impact Assessment have been included in the Environmental Management Programme (EMPr), which is to be adhered to during construction.

The following provides a summary of the key findings of the Environmental Impact Assessment:

1. Indirect impacts on the adjacent beach environment during the infilling and excavation of material at 31 Little Maritzburg Road to accommodate new infrastructure on site. Measures to manage excavations on site have been included in the attached EMPr which reduces the significance of the potential impact from moderate to low risk. These measures include the management of excess material excavated for the swimming pool and environmental awareness training to be conducted for all primary contractors on site.
2. New infrastructure negatively impacting on coastal processes (i.e. sand sharing system). This impact was assessed by the coastal specialist, who concluded that the new infrastructure proposed on site will have little to no influence on coastal processes. This is provided that the preferred dune defence structure is established to tie in and aligned with the existing dune defence structures on both neighbouring properties.
3. Direct impact on active coastal environment during the construction of the dune defence structure. The appointed contractor must provide a method statement to the Environmental Control Officer (ECO) for approval prior to work commencing on the dune. The ECO must be available to monitor construction progress associated with the dune defence system daily. Measures to include Management measures for inclusion in the construction methodology have been provided in the EMPr and includes include the requirement for work to take place when the beach is inflated (i.e. during summer), the identification of neighbouring sea defence infrastructure to connect into and the rehabilitation of the exposed dune slope on completion of the geofabric wall.
4. General construction-related impacts (i.e. dust, noise, waste management etc.) will be managed in accordance with the EMPr attached under Appendix E.
5. Positive impacts associated with the project include the long-term stabilisation of the retreating dune in front of House Gotz, the alignment of sea defence structures already in place on the neighbouring properties, the increase in dune species diversity with the re-vegetation of the dune environment and the rectification of existing erosion from the municipal stormwater outlet.
6. The long-term / operational phase of the expansion of House Gotz poses little to no risk on coastal processes. The construction of the geofabric wall as a sea defence structure has limited coastal ecological impact and significance while protecting the property and associated infrastructure on the property from the impacts of climate change (i.e. sea level rise and increase in storm severity).

All impacts identified in the Environmental Impact Assessment can be mitigated to an acceptable level of risk provided that the measures included in the attached EMPr are adhered to. The Environmental Assessment Practitioner is therefore of the opinion that the Expansion of Infrastructure within 100m of the High-Water Mark of the Sea Resulting in the Infilling and Excavation of Material within 100m of the High-Water Mark and The Planting of Vegetation on Exposed Dune at House Gotz Located at 31 Little Maritzburg Road, Shakas Rock, be authorised by EDTEA.

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APPENDICES

1.0 INTRODUCTION

1.1 DESCRIPTION OF ACTIVTY TO BE UNDERTAKEN

Peter Gotz is the owner of an existing residential dwelling located at 31 Little Maritzburg Road, Shakas Rock, KwaDukuza Local Municipality, iLembe District (Figure 1). The property where the house is located is described as Erf 157 in Shakas Rock Township and is 1 375m^2 in extent. The existing house has recently been refurbished (i.e. painting, interior improvements, new windows etc.). Mr Gotz now proposes to expand the existing footprint of the residential dwelling (Figure 2). The following new infrastructure is proposed on site:

- New double garage (48.4m^2)
- Extension of the existing house (38m^2)
- Timber decking (101.6m^2);
- Swimming pool (18m^2);
- Concrete walkway around house (33.6m^2) and
- Geofabric defence structure along the shoreline (180m^2).

The total development footprint of infrastructure expanded seaward of the existing house is 277m^2 (timber decking, a portion of the new swimming pool and the geofabric defence structure) triggering Activity 54 of Listing Notice 1. During construction, approximately 170m^3 of material will be excavated and infilled within 100m of the high-water mark of the sea. It is anticipated that a further 360m^3 of material will be excavated and infilled during the construction of the geofabric defence structure in front of the house. A total of 530m^3 of material will therefore be infilled and excavated from within 100m of the high-water mark triggering Activity 19A of Listing Notice 1. Once the geofabric defence structure is complete, approximately 180m^2 of exposed dune surface will be re-vegetated triggering Activity 18 of Listing Notice 1. All listed activities being applied for are provided in Table 1 below.

Table 1: Listed and Specified Activities Triggered and Being Applied for.

Activity #	Relevant Listing Notice	Listed Activity Description as Per the Legislation	Listed Activity Description as Per the Project Description
18	Listing Notice 1 (GNR327) 04th December 2014 as amended.	The planting of vegetation or placing of any material on dunes or exposed sand surfaces of more than 10m^2, within the littoral active zone, for the purpose of preventing the free movement of sand, erosion or accretion.	Approximately 180m^2 of dune / exposed sand surfaces in front of the existing house will be re-vegetated during the construction of the geofabric defence structure and rehabilitation.
19A	Listing Notice 1 (GNR327) 04th December 2014 as amended.	The infilling or depositing of any material of more than 5m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5m^3 from ii) the littoral active zone, an estuary or a distance of 100m inland of the highwater mark of the sea or an estuary, whichever distance is the greater.	During construction, a total of 530m^3 of material will be excavated and infilled within 100m of the high-water mark of the sea.
54	Listing Notice 1 (GNR327) 04th December 2014 as amended.	The expansion of facilities - (v) if no development setback exists, within a distance of 100m inland of the high-water mark of the sea or an estuary, whichever is the greater; in respect of— (e) infrastructure or structures where the development footprint is expanded by 50m^2 or more.	Infrastructure seaward of the existing house will be expanded by 277m^2. This expansion of infrastructure will take place within 100m inland of the high-water mark of the sea.

1.2 LOCATION OF ACTIVITY

House Gotz is located at 31 Little Maritzburg Road in Shaka's Rock. The property is in Ward 22 of the KwaDukuza Local Municipality, iLembe District (centre of site: 29°30'34.71"S; 31°14'00.61"E). Please refer to Figure 1 for the Locality Map.

21 Digit Surveyor General code	N0FU02990000015700000
Property Description	Erf 157 of Shakas Rock Township

Figure 1: Locality Map with the Site Indicated by the Red Circle.

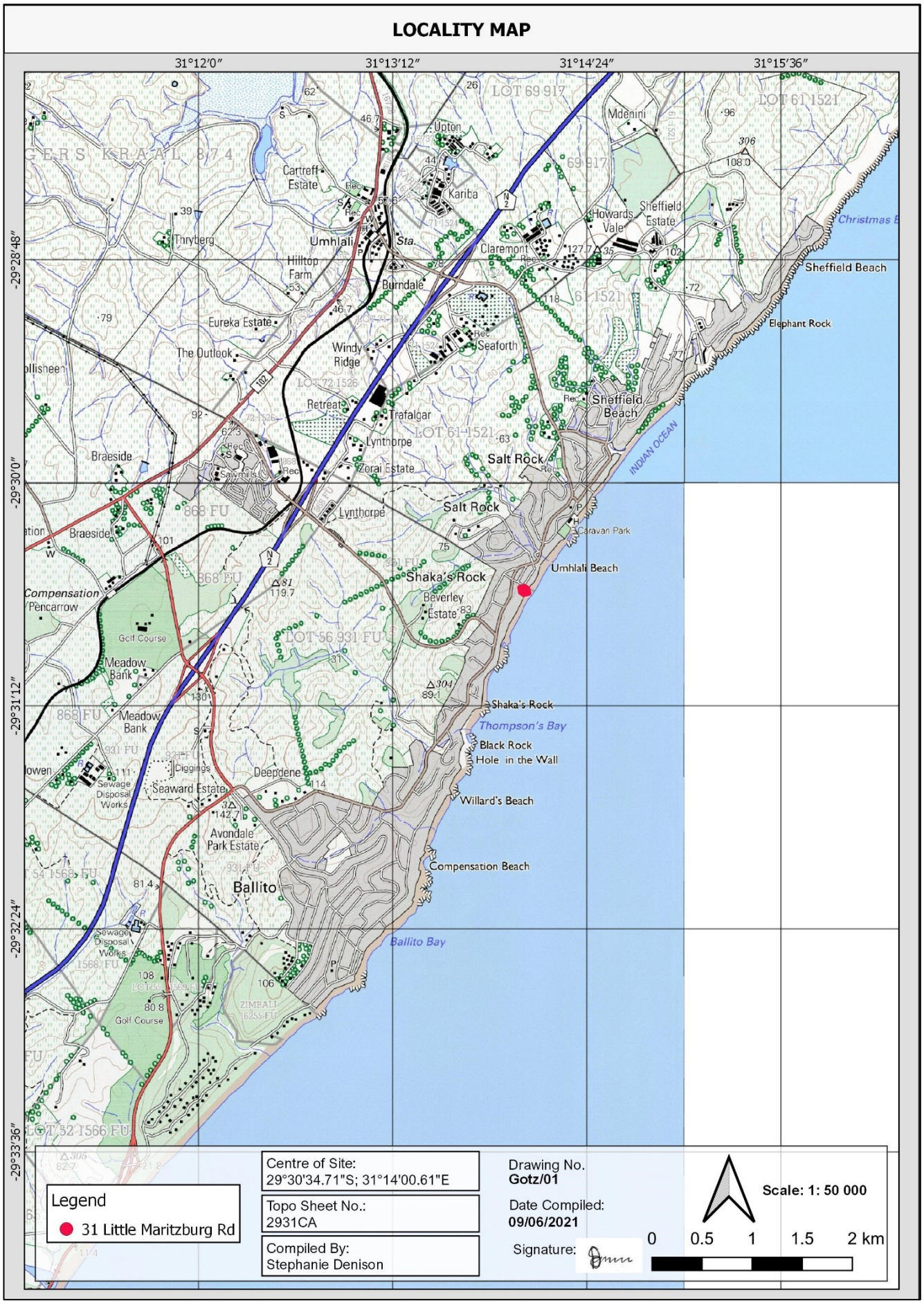


Figure 2: Site Development Plan Showing Proposed New Infrastructure for House Gotz Shaded in Red (Source: ZAARC Architects, 2021).

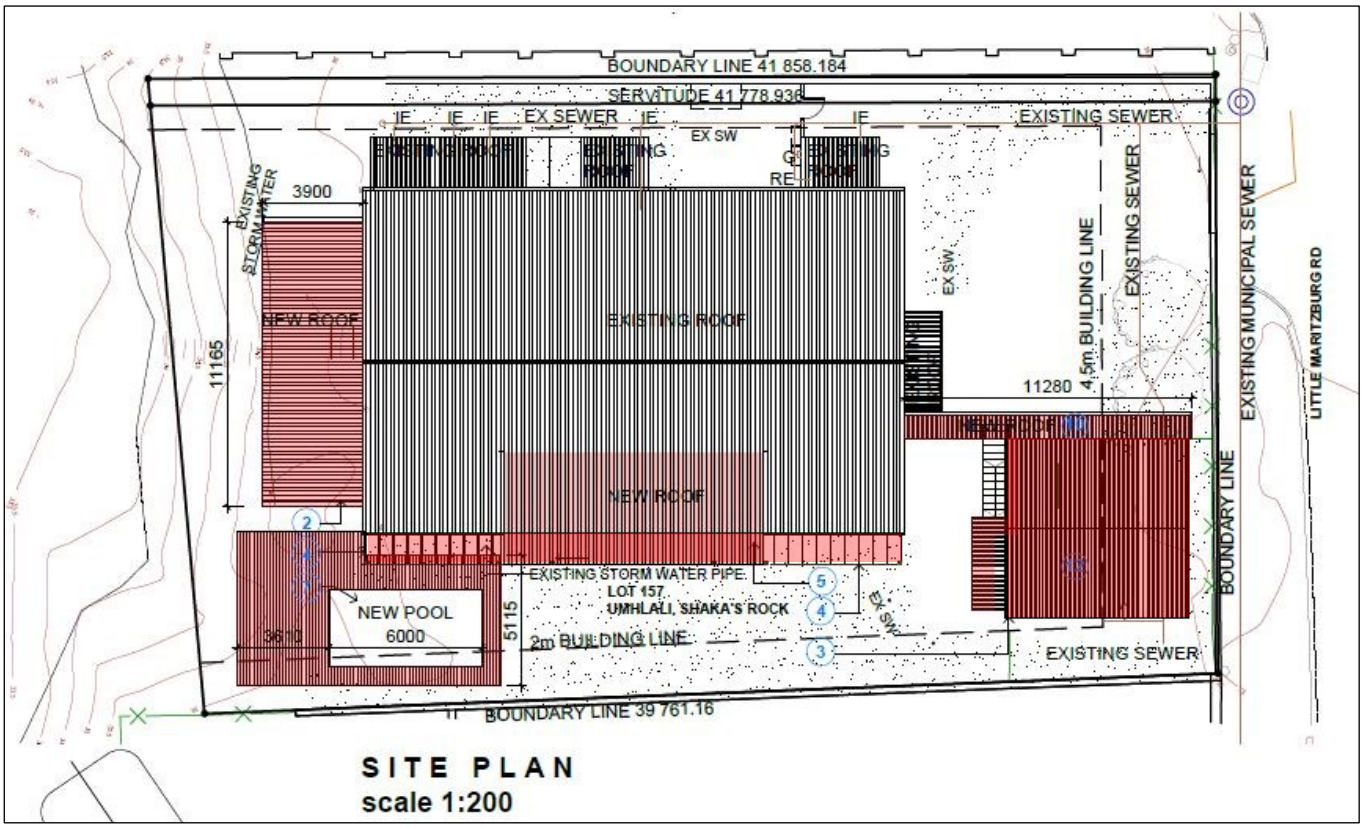
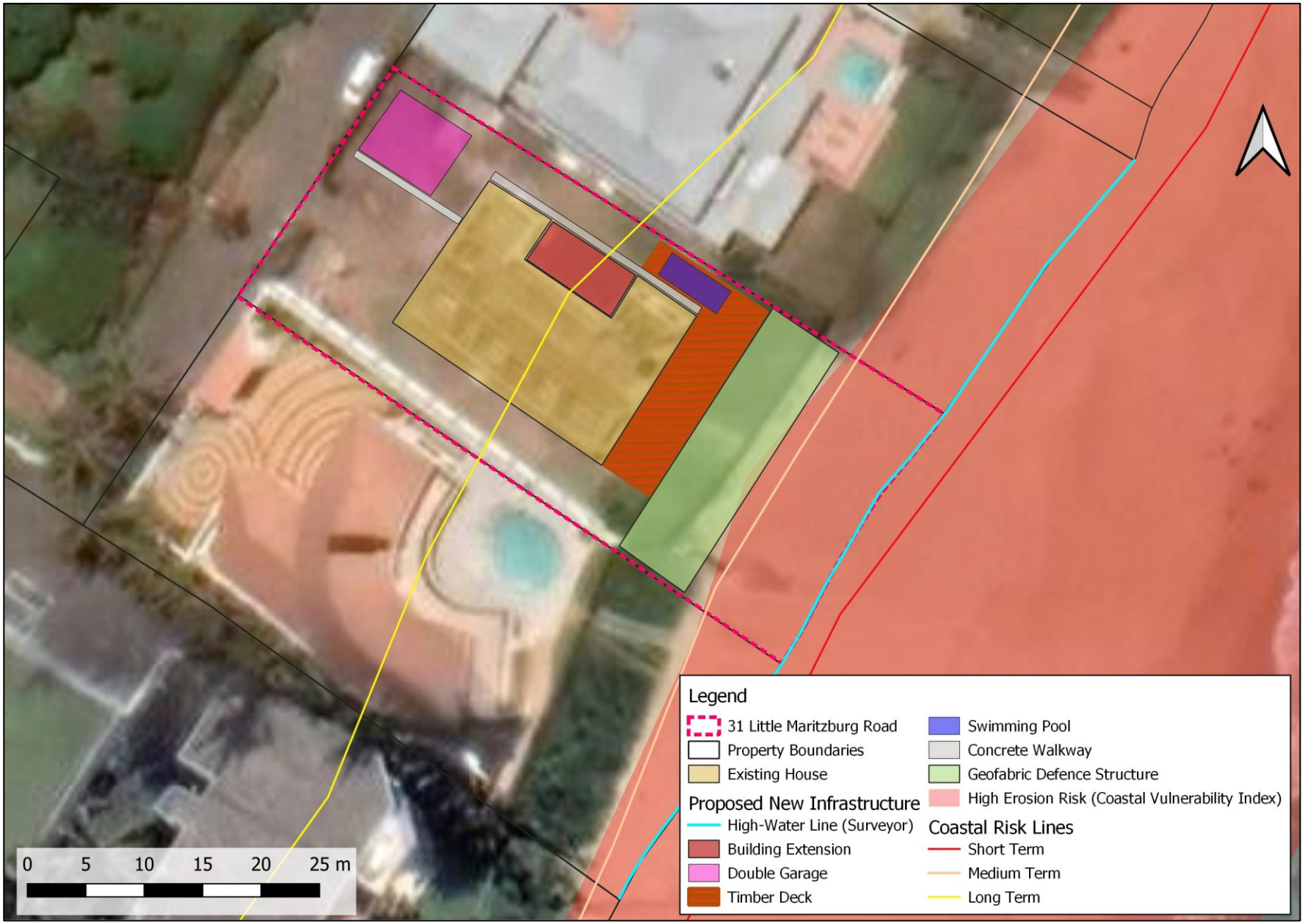


Figure 3: Map Superimposing the Proposed Activity and Associated Infrastructure on the Environmentally Sensitivities of the Site.



2.0 ALTERNATIVES

2.1 DETAILS OF ALTERNATIVES CONSIDERED

"*Alternatives*" are defined as "*different means of meeting the general purpose and requirements of the activity*"[1]. Alternatives considered must be feasible and reasonable. The general purpose and requirement for this project is for the expansion of a private residential dwelling for the Gotz family and the long-term protection of the dune in front of the existing house.

2.1.1 Site Alternatives and Outcome of the Site Selection Matrix

The proposed application is specific to Erf 157 of Shakas Rock Township. The applicant is the owner of the property and intends to expand the existing residential structure on site. No other feasible site alternatives have therefore been considered.

2.1.2 Activity

As described above, the purpose of this project is to expand the existing residential structure. No other feasible activities have therefore been considered.

2.1.3 Layout

Minor amendments to the layout were made by the applicant throughout the process however, due to the historic use of the site for residential purposes (prior to 1968), the expansion of infrastructure on the existing platform will have little to no influence on coastal processes or the natural environment[2]. The implementation of erosion prevention measures on the dune seaward of the house is situated within the sand sharing system, which includes the sub tidal, intertidal, beach and dune system. Alternatives have therefore been considered for the proposed sea defence structure, which has the potential to impact the coastline environment (see below). Therefore, from an environmental perspective, there is no substantial difference in the layout alternatives presented for the expansion of infrastructure within the property boundaries and therefore only the preferred alternative, Layout Alternative 1, has been assessed further.

2.1.4 Technology

The study area has been subject to significant coastal erosion since at least 2006. Portions of this coastline experienced catastrophic erosion during the spring tide of March 2007 (Figure 7f). Accordingly, the shoreline in front of the houses on either side of Erf 157 of Shakas Rock, as well as other properties along this coastal stretch, have implemented protection systems to stabilise and defend the dune against future erosion events. Should another storm surge occur, the applicant's property will be vulnerable to inundation and damage because of wave run up and coastal erosion. A sea / erosion defence structure is therefore proposed in front of the existing structure. As per section 5.0 of the Beach and Coastal Assessment, the defence of the shoreline is an important aspect of coastal shoreline management as it will:

- Achieve geomorphological uniformity with adjacent properties in terms of the nature and extent of shoreline protection;
- Ensure that the built structure, including sewer infrastructure, are protected during future storm events; and
- Assist with restoration measures on the shoreline following future erosion events[3].

The sea defence structure must align with existing defence structures along the shoreline in this area. The following technology alternatives have been assessed as shoreline protection systems:

- Beach / dune nourishment;
- Concrete sea wall; and
- Geofabric wall / defence structure.

A number of other sea defence options exist (e.g. shoreline armouring and offshore, detached groynes and the option of "retreating" the structure). However, these options were dismissed by the coastal specialist due to the prohibitive cost and environmental implications.

[1] DEA & DP (2010) Guideline on Alternatives, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning (DEA&DP).

[2] Executive Summary of the SDP "*Beach and Coastal Assessment*" April 2021.

[3] Section 5.0 of the SDP "*Beach and Coastal Assessment*" April 2021.

2.1.4.1 Beach / Dune Nourishment (Technology Alternative 3)

This alternative is the least invasive option as it involves adding sediment to the dune to prevent erosion or repair areas which become eroded. Sediment needs to be continuously added to the dune especially after high seas or windy conditions. Practically, when dune nourishment is required, the fore dune is difficult to access from the property itself as well as the beach front. This alternative is an ongoing expense which needs to be constantly managed by the applicant, who does not reside on the property permanently. This alternative is the least preferred option and is considered to be futile during a significant marine storm event similar to the storm which occurred in 2007. This alternative has therefore not been assessed further.

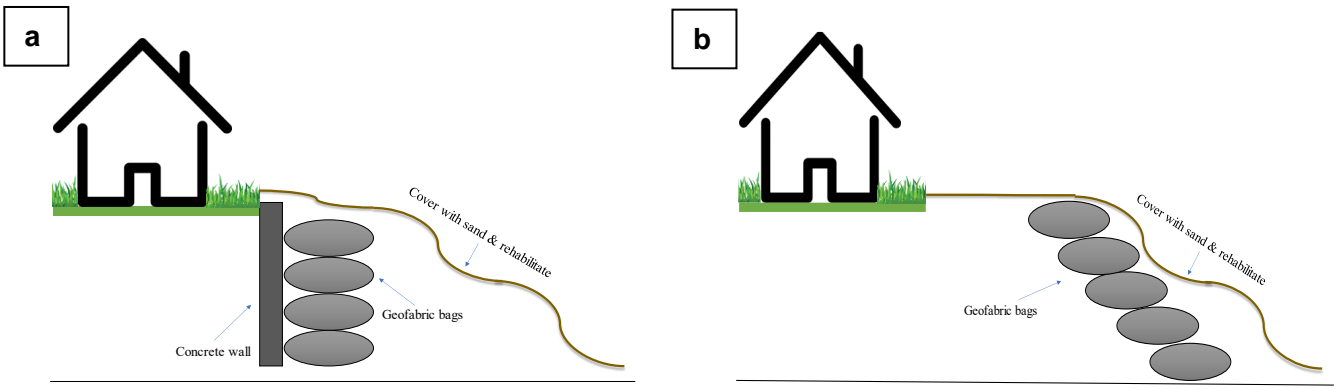
2.1.4.2 Concrete Sea Wall (Technology Alternative 1)

The establishment of a concrete wall along the properties frontage to resist high wave energy that may reach the foot of the dune. Seaward of the concrete wall, a sloping dune environment is re-created using beach sand and geofabric bags (Figure 4a). This option is similar to what has been used as a sea defence structure immediately south of House Gotz (i.e. 33 Little Maritzburg Road).

2.1.4.3 Geofabric Wall (Preferred Technology Alternative 2)

A series of sand filled geofabric bags will be used to create a natural dune slope seaward of the house (Figure 4b). The geofabric bags will be covered with sand and rehabilitated using dune vegetation. This option is similar to what has been used as a sea defence structure immediately north of House Gotz (i.e. 29 Little Maritzburg Road). This is the preferred technology alternative.

Figure 4: Technology Alternatives for the Sea Defence Structure Proposed at 31 Little Maritzburg Road (Source: SDP, 2021): (a) Concrete Sea Wall; and (b) Geofabric Wall (Preferred).



2.1.5 No-Go Alternative

The expansion of residential infrastructure at 31 Little Maritzburg Road and the defence of the dune in front of the house will not take place. There would be no negative environmental impacts that may have resulted from the construction phase. Unlike the properties on both sides of 31 Little Maritzburg Road, the dune in front of House Gotz is not protected from major marine storm events (see photograph provided in Figure 7f of the study area after the 2007 marine storm event). The property is currently vulnerable to inundation and damage during high wave run up and storm events. The coastal defence system proposed aims to protect the front of the property during storm events, reducing coastal erosion and wash away of debris into the sea / marine environment. The alignment of the proposed sea defence structure with the existing defence measures in place on the neighbouring properties a positive impact associated with the proposed development.

2.2 CONCLUDING STATEMENT INDICATING PREFERRED ALTERNATIVES

Since the project is for the expansion of the existing residential structure at 31 Little Maritzburg Road, no other feasible site or activity alternatives have been assessed. There is no substantial difference in the layout alternatives presented for the expansion of infrastructure on the existing platform and therefore only one alternative, Layout Alternative 1, has been assessed. Two technology alternatives have been assessed for the sea defence structure proposed seaward of the house with Technology Alternative 2 being the preferred alternative, which is for a geofabric wall to be constructed.

2.3 MOTIVATION FOR PREFERRED ALTERNATIVE

The following provides a summary motivating the preferred layout and technology alternative (Technology Alternative 2):

- All proposed new infrastructure associated with the expansion of the existing development footprint is leeward of the erosion risk line and will have little to no influence on coastal processes or the natural environment.
- The site falls within a "*high risk*" area in terms of the Coastal Vulnerability Index. These high-risk areas are most suspectable to the effects of erosion, sea level rise or extreme events. As recommended by CoastKZN, sites within the high-risk areas should consider options of defence along the seaward side of the property. The establishment of a geofabric wall is the preferred alternative for the sea defence structure.
- A similar geofabric wall has been successfully implemented by the adjacent property, north of the site. The proposed geofabric wall will therefore align with the neighbouring properties defence system preventing the further retreat of the dune currently occurring at 31 Little Maritzburg Road.
- The geofabric wall is preferred over a concrete wall as the three-ton sand filled geofabric bags serve to capture and deposit sediment while absorbing (not deflecting) wave and tidal energy during storm events. This alternative therefore has a lower effect on the sand sharing system compared to Technology Alternative 1.

3.0 PLANNING CONTEXT

3.1 ENVIRONMENTAL POLICY AND LEGISLATIVE CONTEXT

The table below provides a list of legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments relevant to House Gotz. The table includes comment on how the proposed development complies with and responds to the listed legislation.

Table 2: Legislation, Policies, Plans, Guidelines, Spatial Tools, Municipal Development Planning Frameworks, And Instruments Relevant to House Gotz.

Legislation	Acronym	Comment
National Environmental Management Act (Act No. 107 of 1998 as amended).	NEMA	NEMA provides environmental management principles that are applicable across South Africa to fulfil section 24 of the Constitution, which is the right to "*an environment that is not harmful to their health or wellbeing*". Section 24 of NEMA defines the activities requiring Environmental Authorisation and the processes to be followed to obtain Environmental Authorisation (published in the Environmental Impact Assessment Regulations, 2014 as amended). This application triggers activities listed in Listing Notice 1 of the Environmental Impact Assessment Regulations, 2014 as amended. A Basic Assessment process is therefore underway to obtain Environmental Authorisation prior to any activities commencing.
DEA (2017), Public Participation guideline in terms of NEMA EIA Regulations, DEA, Pretoria, South Africa.	-	To give effect to section 2 (4)(f) and (o) of NEMA, adequate and appropriate opportunity for public participation in decisions that may affect the environment is required. NEMA requires that any person conducting public participation take into account any relevant guidelines applicable to the public participation process as contemplated in section 24J of NEMA. The public participation conducted as part of the Basic Assessment process complies with the NEMA EIA Regulations and has considered the relevant guidelines.
DEA (2017), Guideline on Need and Desirability, DEA, Pretoria, South Africa.	-	This guideline contains information on best practice and how to meet the requirements prescribed by NEMA when considering the need and desirability of a development. The need and desirability of the project has considered the list of questions outlined in the Need & Desirability Guidelines.
National Environmental Management: Waste Act (Act No. 59 of 2008 as amended).	NEM: WA	NEM: WA provides measures to protect health and the environment of South Africa by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.

		There are no activities proposed that will trigger a Waste Management License however measures have been provided in the EMPr to ensure that waste management is compliant with the requirements of NEM: WA.
National Environmental Management Biodiversity Act (Act No. 10 of 2004).	NEM: BA	To manage and conserve South Africa's Biodiversity and protect species and ecosystems that warrant national protection. The proposed development does not require any specific permissions in terms of NEM:BA however the landowner must comply with the requirements of the Alien and Invasive Species Regulations (2020) which have been published in terms of section 97(1) of NEM:BA. These regulations categorise invasive species and outlines the way these species must be controlled by landowners. Section 52 of NEMBA allows for the publication of a national list of ecosystems that are threatened and in need of protection. The property is located within the Northern Coastal Grasslands Ecosystem which has been identified as "*critically endangered"* by the South African National Biodiversity Institute (SANBI). The vegetation on site has however been completely transformed by landscaping.
National Environmental Management: Air Quality Act (Act No. 39 of 2004).	NEM: AQA	Regulates air quality to protect the environment by providing measures to prevent pollution and ecological degradation and for securing ecologically sustainable development. There are no activities on site that will trigger an Air Emissions License however measures have been provided in the EMPr to ensure that air quality is managed in line with the requirements of NEM: AQA.
National Water Act (Act No. 36 of 1998) (as amended).	NWA	Provides for fundamental reform of the law relating to water resources. There are no watercourses within the property itself or within 32m of the site. The nearest watercourse is an unnamed watercourse, which terminates at Salt Rock main beach. This is approximately 370m north of the site. No watercourses will be impacted by the proposed development. A Water Use Authorisation is not required for this application.
National Forests Act (Act No. 84 of 1998).	NFA	To conserve and protect natural forests and woodlands as well as ensuring development with principles of sustainable management. The Department of Forestry Fisheries and Environment (DFFE) governs the removal, disturbance, cutting or damaging of protected tree species and natural forests. There are no forests or protected tree species located on site and therefore no permit from DFFE is required.
Integrated Coastal Management Amendment Act (Act No. 36 of 2014).	ICMAA	Establishes an integrated coastal and estuarine management system to promote the conservation of coastal environment and maintain natural attributes of coastal landscapes and seascapes. Sound coastal management principles are presented in the ICMAA which are applicable to this application. The Coastal Vulnerability Index shows the site to have a "*high*" vulnerability. All infrastructure proposed falls within 100m of the high-water mark of the sea and therefore the layout needs to be "*economically justifiable and ecologically sustainable*", which is a requirement of the ICMAA.
Best Practises for Coastal Development in KwaZulu-Natal (2021)[4]	-	Recognises the interrelationships between coastal users and ecosystems. The Provincial Coastal Management Programme (PCMP) sets out objectives to ensure coastal development occurs in a manner that is appropriate, adaptive and systems-based. As a PCMP output, EDTEA produced this Guideline on best practises to be adopted for development along the coast.

[4] Bundy, S., Goble, B., Parak, O. and Bodasing, M. "*Best Practises for Coastal Development in KwaZulu-Natal*" KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, Pietermaritzburg (2021).

		This development is classified as a private project in terms of these guidelines and adheres to the principles of development planning provided in this document.
National Heritage Resources Act (Act No. 25 of 1999).	NHRA	For the management of national heritage resources and to nurture and conserve heritage resources so that they may be bequeathed to future generations. The existing house is not a heritage feature (i.e. it is younger than 60 years). No structures with heritage or archaeological value are located on site. The property falls within a "*highly*" sensitive palaeontological (i.e. fossils) area. A Palaeontological Impact Assessment was therefore carried out and is attached under Appendix B. The findings of the report are summarised in section 4.0 below.
iLembe District Municipality Integrated Development Plan (2020 – 2021 Review)	iLembe IDP	Provided that the construction is carried out in a sustainable manner, the activities proposed at House Gotz are in line with the iLembe District Vision outlined in section 1.2 of the iLembe IDP. This vision is "*By 2030 iLembe District Municipality will be a sustainable people-centred economic hub providing excellent service and quality of life*".
KwaDukuza Local Municipality Spatial Development Framework (2017 – 2022)	KDM SDF	The proposed house alternations are compliant with the existing property zoning parameters with no special consent required. The project is therefore in line with the KDM SDF for the area.

3.2 MOTIVATION FOR THE NEED AND DESIRABILITY

The need and desirability of a project is based on the principle of obtaining a sustainable development in that the proposal must be "*ecologically sustainable and socially and economically justifiable*"[5]. The property is well located in the sought-after coastal town of Shakas Rock. The property is zoned for residential use with neighbouring properties to the north, south and west containing existing residential dwellings. The site and proposed activity are therefore considered to be desirable in terms of the municipal planning scheme for the area.

As per the Need & Desirability Guideline, the broader community's needs and interests, as reflected in the municipal planning tools, need to be considered as these planning tools provide strategies to support economic growth. The project is for the expansion of a private residential dwelling and defence of a private property. The proposed new infrastructure is in line with the relevant municipal plans and framework for the area and the installation of the dune defence system is in accordance with recommendations made by CoastKZN. The development will therefore not negatively impact on broader societies needs and interest.

The surrounding land uses include residential developments which are used as primary residence as well as holiday houses (see section 4.8 for more details on surrounding land uses). There is higher density, apartment style residential developments located south of the property. The proposed expansion of infrastructure on site is therefore in line with the surrounding land uses. Neighbouring properties to the north and south of the study area have existing sea defence structures in place to protect the dune and infrastructure on site from wave run up and damage. The proposed geofabric wall at 31 Little Maritzburg Road will align with these existing structures.

The property has been completely transformed by historic use of the site for holiday and residential purposes (prior to 1968). All new infrastructure proposed is leeward of the coastal erosion risk line and will have little to no risk on the coastal environment. According to the CoastKZN database, the study site falls within a long-term (100 year) risk category and is "*high risk*" in terms of the Coastal Vulnerability Index (indicated in Figure 3). CoastKZN recommends that landowners with property in this high-risk category explore options of shoreline defence to protect infrastructure from storm damage. As per the Beach and Coastal Assessment "*with a possible return period of ~35 years for a significant storm, coupled with sea level rise scenarios and the potential for other meteorological impacts, there is an evident need to defend the built structure and associated seaward property of the site*". The establishment of the geofabric wall is the preferred alternative recommended by the coastal specialist for this sea defence structure. The preferred layout and technology alternative is therefore considered to be ecologically sustainable.

The proposed development is strategical located in an existing residential area. The activity will not significantly impact on the broader societal needs or the public interest. The preferred layout ensures an ecologically sustainable development proposal.

[5] DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa.

4.0 ENVIRONMENTAL ATTRIBUTES

A report was generated by the national web-based environmental screening tool in terms of section 24(5)(h) of NEMA and Regulation 16(1)(b)(v) of the EIA Regulations, 2014 as amended. The Department of Environment, Forestry and Fisheries (DEFF) Screening Tool is attached under Appendix B. The Screening Tool identifies potential specialist assessments which may be required for the application. It is the responsibility of the EAP to confirm this list and to motivate the reason for not including any of the identified specialist studies. Table 3 provides a list of the specialist studies identified by the Screening Tool and a motivation as to why the studies were or were not conducted.

Table 3: List of Specialist Assessments identified in the Department of Environment, Forestry and Fisheries Screening Tool Report.

Specialist Assessment	Included in Appendix B	Motivation for Not Conducting Assessment
Landscape / Visual Impact Assessment	No	The proposed development is similar to surrounding land uses. Properties on all boundaries of the study area have already been developed in a similar manner and therefore a Visual Impact Assessment was not considered necessary.
Archaeological and Cultural Heritage Impact Assessment	No	The existing house is not a heritage feature (i.e. younger than 60 years old). The site has no cultural value and therefore this assessment was not undertaken.
Palaeontology Impact Assessment	Yes	According to the SAHRIS PalaeoSensitivity Map, the study area falls within a "*high*" palaeontological sensitive area. A Palaeontological Impact Assessment was therefore carried out by Marion Brown and is attached to Appendix B. The findings of the report are summarised in section 4.5.
Terrestrial Biodiversity Impact Assessment	No	Vegetation on the property is mainly comprised of landscaped lawn grass. As per the SDP Beach and Coastal Assessment "*much of the vegetation on the frontal vegetated dune on the property can be described as "gardenscape", being composed primarily of Carissa macrocarpa, with the exotic Sisal americana being evident*". The property is in a developed, urban area which is fenced off. A Terrestrial Biodiversity Impact Assessment was therefore not deemed necessary.
Aquatic Biodiversity Impact Assessment	No	There are no watercourses on site or within 32m of the site. No watercourses will be impacted by the proposed development and no Water Use Authorisation is required.
Marine Impact Assessment	Yes	A Beach and Coastal Assessment was carried out by SDP Ecological and Environmental Services. The report includes the Coastal Vulnerability Assessment. The report is attached under Appendix B and the findings summarised in the sections below.
Avian Impact Assessment	No	The small development footprint within a developed urban area will not significantly impact any bird communities and therefore an Avian Impact Assessment was not considered necessary.
Geotechnical Assessment	Yes	A Geotechnical Report was carried out by Marula Consulting (Pty) Ltd and is attached under Appendix B. The findings of the report are summarised under section 4.2. with recommendations included in the EMPr.
Socio-Economic Assessment	No	As per section 3.2 above, the proposed development is in line with the municipal planning framework for the area and the property zoning. There will be no significant socio-economic impact on the Shakas Rock area and therefore a Socio-Economic Assessment was not considered necessary.
Plant Species Assessment	No	The vegetation on the property is mainly comprised of landscaped lawn grass. As per the SDP Beach and Coastal Assessment "*much of the vegetation on the frontal vegetated dune on the property can be described as "gardenscape", being composed primarily of Carissa macrocarpa, with the exotic Sisal*

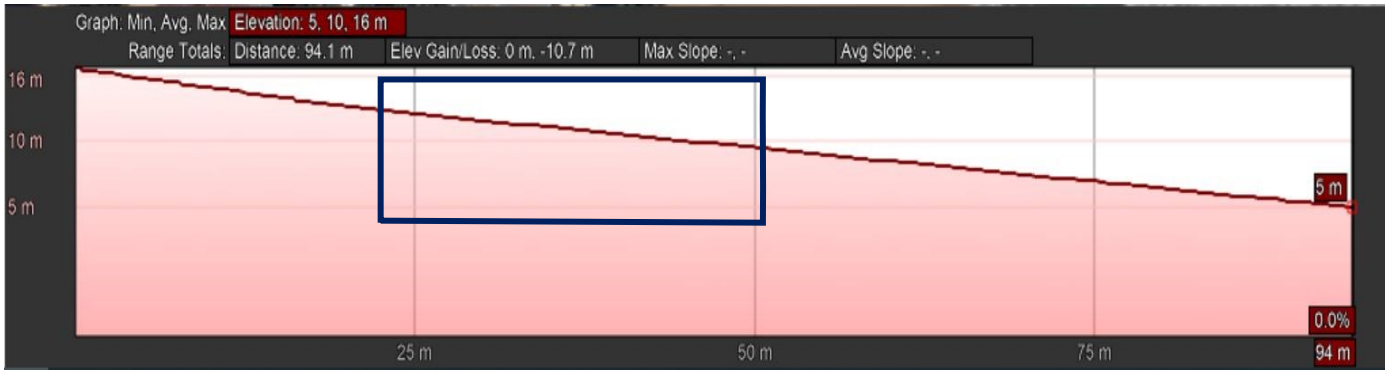
		americana being evident". *Chrysanthemoides monilifera* was also noted on site by the specialist. Please refer to the SDP Beach and Coastal Assessment attached under Appendix B which contains information on the plant species remaining on site.
Animal Species Assessment	No	The property is in a developed, urban area which is fenced off. The development will not impact any animal species and therefore this assessment was not deemed necessary.

Information provided in the specialist assessments has been used to describe the receiving environment. All mitigation measures and recommendations provided by the specialists has been incorporated into the Assessment of Impacts Table under section 6.0. and the EMPr provided under Appendix E. All specialist assessments are attached under Appendix B.

4.1 PHYSICAL CHARACTERISTICS OF THE SITE

The existing residential structure at 31 Little Maritzburg Road is located between 5m and 15m above mean sea level (Figure 5) and lies on a secondary dune. The gradient of the site is described in the Geotechnical Report as "*level*"[6]. The property is 400m south of the main Salt Rock beach and is bordered by the beach and ocean on the eastern side and Little Maritzburg Road on the western side. The eastern boundary of the property is located on the high-water mark of the sea with the entire property as well as Little Maritzburg Road, falling within 100m of the high-water mark. The beach directly in front of the house is known as Catfish beach.

Figure 5: Elevation Profile of the Application Area. House Gotz is Indicated by the Blue Rectangle (East to West Profile; Google Earth Pro, 2021).



4.2 GEOGRAPHICAL ATTRIBUTES AND GEOLOGY

A Geotechnical Investigation was carried out by Marula Consulting (Pty) Ltd. The report is attached under Appendix B. The field investigation showed that the site is underlain by "*Aeolian Sands and Dune Sands that more than likely lie above a Basal Conglomerate bedrock*". The geologist describes the soil profile as "*sandy, loose, dune or beach sands*". The loose, upper sands are therefore susceptible to surface erosion (wind and water) and therefore stormwater management during construction and re-vegetation of exposed areas is important to consider. The geologist concluded that the proposed infrastructure "*is not expected to cause any unforeseen ground instability provided that the recommendation sin the report are abided by".*

Recommendations made in the Geotechnical Report have been included as mitigation measures under section 6.0 of the Basic Assessment Report.

4.3 FAUNA AND FLORA

The study area falls within the Northern Coastal Grasslands ecosystem. This ecosystem has been classified as "*critically endangered*" by SANBI. The site is comprised of two biomes, KwaZulu-Natal Coastal Belt Grassland and Subtropical Seashore vegetation[7]. KwaZulu-Natal Coastal Belt Grassland can be described as a highly dissected undulating coastal plain environment, which was historically covered by subtropical coastal forest. Subtropical Seashore vegetation is characterised by recent/young coastal sandy sediments which form beaches and dunes that support herbaceous and dwarf-shrubby vegetation.

[6] Marula Consulting (Pty) Ltd "Proposed New Residence on 31 Little Maritzburg Road, Sat Rock, Geotechnical Report" attached under Appendix B.

[7] Mucina L M and M Rutherford "*The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia (2006).

The vegetation on the site itself is highly transformed and landscaped. The dune form in front of House Gotz has been subject to horticultural interventions in the attempt to provide a level of privacy following the 2007 storm event as well as acting to stabilise the dune embankment. The leeward vegetation on the dune is composed of *Carissa macrocarpa* and *Chrysanthemoides monilifera* as well as the exotic *Sisal americana*. Only minor associations of seaward psammoseral vegetation was identified by the vegetation specialist (only *Gazania rigens* and *Carpobrotus dimidiatus* at certain points)[8]. The absence of psammoseral vegetation suggests a retreat of the dune environment.

The property does not fall within an area identified by Ezemvelo KZN Wildlife as a Critical Biodiversity Area (see Figure 11 of the Beach and Costal Assessment attached under Appendix B). Development will take place in an existing urban area that is fenced off. No faunal species were therefore identified on site.

4.4 COASTAL VULNERABILITY

Beach and dune environments are continuously changing and shaped by sediment transport within the sand sharing system[9]. With the development of Salt Rock town and Shakas Rock in the 1900's, the terrestrial component of the sand sharing system has become highly transformed, altering the sand sharing dynamics. The coastal specialist describes the Salt Rock coastline as *"an exposed environment, subject to the effects of the prevailing wave regime which determines the extent of the sand sharing system".* The sand sharing system in this area is dynamic and more energised compared to Durban, where wave energy is dissipated further away from the beach. Waves are of low to moderate energy most of the time in Salt Rock.

The 2007 marine storm event is the highest wave run up event recorded along the coastline where historical information can be assessed. Studies suggest that the 2007 marine storm event has a 32-year return period[10]. The highest recorded wave run up associated with the 2007 storm event is therefore a reliable indicator of the extent of future wave inundation and can be a used to understand the sand sharing system along this stretch of the coastline. Taking a maximum sea level rise of 0.8m over the next 25 years, the specialist recommended that any dune defence structure must be designed to defend the site under a projected overtopping of approximately 1m.

According to the CoastKZN database, the study site falls within a long-term (100 year) risk category and is considered to be "*high risk*" in terms of the Coastal Vulnerability Index (indicated in Figure 3). Sites of high risk are those that are "*most susceptible to the effects of erosion, sea level rise or extreme events*". CoastKZN recommends that landowners with property in this high-risk category, explore options of shoreline defence to protect infrastructure from storm damage. The different alternatives for shoreline defence are presented in section 2.1.4 of the Basic Assessment Report with the preferred alternative for this site being the installation of a geofabric defence system which would align with the existing defence structures in place for the neighbouring properties.

Section 5.0 of the Beach and Coastal Assessment attached under Appendix B describes the coastal environment associated with 31 Little Maritzburg Road. It is summarised as follows:

- Offshore and immediately seaward of the property, there are two shallow shelving reefs separated by a narrow gully, which serve to focus incoming waves onto points within the beach and set up an inshore channel.
- The narrow gully concentrates wave energy and increases erosion during higher tidal states and storm surf conditions as well as developing rip cells, including a standing mega rip cell that ultimately results in sediment transfer offshore (illustrated in Figure 6 below).
- The site has been subjected to significant coastal erosion since 2006.
- The March 2007 storm event forced landowners to install sea defence systems along Catfish Beach (Figure 7f shows erosion of the frontal dune following the storm event).
- Unlike the neighbouring properties, Erf 157 of Shaka's Rock Township did not install a dune defence structure on the frontal dune leading to a slow retreat of the dune in front of the Gotz house.
- During a future storm event, the neighbours properties will resist moderate wave induced erosion at the expense of the undefended frontal dune on Erf 157 of Shaka's Rock Township. The need to defend the dune and built structure is therefore evident.

The findings and recommendations made in the Coastal Assessment have been included as mitigation measures under section 6.0 of the Basic Assessment Report.

[8] "*Psammoseral vegetation*" is vegetation which occurs on exposed coastal sand.

[9] Section 4.0 of the SDP "*Beach and Coastal Assessment*: Establishment of Structures and Erosion Prevention Measures" (April 2021).

[10] As above.

Figure 6: Aerial Photograph Showing Features and Coastal Dynamics Associated with House Gotz (Source: SDP, April 2021).

4.5 WATERCOURSES

There are no watercourses on the property or within 32m of the property boundary. The nearest watercourse is the "Salt Rock stream" and is approximately 370m north of the study area. No watercourses will be impacted by the proposed development.

4.6 CULTURAL AND HERITAGE

The existing house on site is younger than 60 years. There is no known cultural significance associated with the area and no graves. The underlying geology is that of the Vryheid Formation, which is very highly sensitive, with this type of geology having the potential to preserve fossils of the *Glossopteris* flora. A Palaeontological Impact Assessment was therefore undertaken by Professor Marion Bamford (Appendix B).

Due to the site's proximity to the beach, it has been exposed to windblown sand and destructive seas. The site is also in the extreme eastern extent of the main Karoo Basin and would have been under the sea during the early Permian. Such conditions are not conducive to the growth of terrestrial plants. The specialist concluded that it is extremely unlikely that any fossils occur in the development footprint however a Fossil Chance Find Protocol has been included in the EMPr (Appendix E)[11].

The findings and recommendations made in the Palaeontological Impact Assessment have been included as mitigation measures under section 6.0 of the Basic Assessment Report.

4.7 SOCIO-ECONOMIC PROFILE

The study area falls in the Ward 22 of KwaDukuza Local Municipality, iLembe District. Shakas Rock is a small, residential coastal town situated between Ballito and Salt Rock. The area consists of a mixture of free-standing homes, mainly located in the northern precinct of Shakas Rock, and sectional title apartments, in the southern precinct. There is limited retail and commercial developments in Shakas Rock. The expansion of House Gotz is well aligned with the socio-economic environment of the area.

[11] Section 6.0 of the Prof Marion Bamford "*Palaeontological Impact Assessment*" (March 2021).

4.8 SURROUNDING LAND USES

The table below shows the existing land uses surrounding the study area. There are existing residential dwellings directly north, south and west of the property. The Indian Ocean is directly east of the property.

Table 4: Land Uses Surrounding 31 Little Maritzburg Road, Shakas Rock.

N / W / E / S	Residential Dwelling & Little Maritzburg Road	Residential Dwelling	Residential Dwelling & Indian Ocean
	Residential Dwelling	**Application Area**	Frontal Dune & Indian Ocean
	Residential Dwelling	Residential Dwelling	Frontal Dune & Indian Ocean

Figure 7: Photographs Showing the Characteristics of the Site Taken on the 25th January 2021: (a) Dune in front of the existing house where the geofabric wall will be established; (b) Photograph of the northern property boundary showing the location of the proposed swimming pool; (c) Front of existing house where the timber deck will be constructed; and (d) Northern side of the house showing the proposed new house extension and new garage to be constructed towards the back of the property.

Figure 7 (cont.): Photographs Showing the Characteristics of the Site Taken on the 25th January 2021: (e) Black arrow indicating the location of House Gotz and the surrounding beach environment; and (f) Historic image of the study area taken after the 2007 storm event showing erosion of the dune (source: SDP, 2021).

5.0 PUBLIC PARTICIPATION PROCESS

5.1 DETAILS OF PROCESS UNDERTAKEN IN TERMS OF REGULATION 41 OF THE EIA REGULATIONS

Please refer to the Public Participation Report attached under Appendix D for all details on the public participation process followed and proof of communications. Notification of all potentially Interested and Affected Parties (I & APs) took place using the following methods:

(a) Noticeboard on the boundary of the site;
(b) Written notification to adjacent landowners, adjacent occupiers, the relevant municipal ward councillor, the municipality and all other responsible organs of state; and
(c) Advertisement placed in the local newspaper.

A copy of the Draft Basic Assessment Report was provided to all I & APs for a 30-day comment period. Once all comments have been responded to, the Basic Assessment Report will be updated and submitted to EDTEA for assessment. I & APs will also be provided an opportunity to comment on the Final Basic Assessment Report. EDTEA have a legislated period of 107 days to assess the application. Registered I & APs will be notified of the outcome of the application.

5.2 SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Please refer to the Comments and Response Table attached to the Public Participation Report (Appendix D) for a full copy of all comments received on the application to date. A summary of comments / issues raised by I & APs to date is provided below:

- Faye Kelly is the landowner of No. 33 Little Maritzburg Road, which is the property immediately south of House Gotz. Mrs Kelly advised that the sea defence structure at No. 33 Little Maritzburg Road ties into No. 31 Little Maritzburg Road. The applicant and building contractor is to be aware of this during the construction of the timber deck in front of the house. This recommendation has been included in Environmental Management Program attached under Appendix E.
- The chairman of Beau Rivage Body Corporate (located at the southern end of Little Maritzburg Road) provided contact details for the contractor who installed the dune defence system at No. 29 Little Maritzburg Road (immediately north of House Gotz) and in front of Beau Rivage. The number was passed onto the applicant.

This section of the report will be updated prior to the submission of the Final Basic Assessment Report to EDTEA.

6.0 IMPACT ASSESSMENT

The aspects and impacts listed in the table below have been identified by reviewing the receiving environmental characteristics of the site (geographical, physical, biological, social, economic, heritage and cultural), having an understanding of the environmental impacts caused by similar activities as well as input from the specialist team.

The significance of the impact (before and after mitigation) has been calculated using the recognised quantified methods described in the Department of Environment, Forestry and Fisheries Integrated Environmental Management Information Series (Series 5 on Impact Significance). The following criteria has been used to assess the significance of the impacts identified:

Table 5: Criteria Used to Assess the Significance of Impacts Identified.

Criteria	Rating
Extent of Impact *Size of area that will be affected by the impact*	▪ Site ▪ Local (<10km from site) ▪ Regional (>10km from site)
Duration of the Impact *Timeframe during which the impact will be experienced*	▪ Short / once off ▪ Medium / during operation ▪ Long-term / permanent
Severity of the Impact *Anticipated consequence of impact*	▪ Slight ▪ Moderate ▪ Substantial ▪ Severe ▪ Extreme
Probability *Probability of the impact occurring*	▪ Very likely ▪ Likely ▪ Unlikely ▪ Very unlikely ▪ Extremely unlikely
Irreplaceability *Degree of which the impact causes irreplaceable loss of resources.*	▪ High (activity will destroy resources that cannot be replaced) ▪ Moderate ▪ Low
Degree of Certainty *Confidence of impact rating based on available information*	▪ High ▪ Moderate ▪ Low
Significance of Impact *(Severity x Probability calculated as per the figure below)*	▪ Very low (very minor alterations of the environment and can be easily avoided by implementing mitigation measures) ▪ Low (minor alterations of the environment and can be easily avoided by implementing mitigation measures) ▪ Moderate (moderate alteration of the environment and can be reduced/avoided by implementing mitigation measures) ▪ High (major alteration to the environment even with the implementation of mitigation measures) ▪ Very high (Very major alteration to the environment even with the implementation of mitigation measures. The impact will have an influence on decision-making)
Ranking of residual impacts *Ranking of impact remaining after mitigation*	▪ 5 (very low) ▪ 4 (low) ▪ 3 (moderate) ▪ 2 (high) ▪ 1 (very high)

The significance of the impacts has been assessed both with and without mitigation actions. Describing the impacts in terms of the above criteria aims to provide a consistent and systematic approach for authorities to rate the effectiveness of the mitigation measures provided and assist with the assessment of the application. The *Significance of Impact* rating is calculated according to the guide below.

Figure 8: Guide to Calculating the Significance of an Impact Based on the Severity and Probability of the Impact Occurring.

Probability	Significance of Impact = Severity x Probability					
	Very Likely	Very Low	Low	Moderate	High	Very High
	Likely	Very Low	Low	Moderate	High	High
	Unlikely	Very Low	Low	Moderate	Moderate	Moderate
	Very Unlikely	Very Low	Low	Low	Low	Low
	Extremely Unlikely	Very Low	Very Low	Very Low	Very Low	Very Low
		Slight	Moderate	Substantial	Severe	Extreme
		Severity				

Table 6: Assessment of Impacts Associated with the Preferred Layout and Technology Alternative for House Gotz (Technology Alternative 2).

Aspect	Impact	Extent	Duration	Severity	Probability	Irreplaceability	Mitigation	Significance of Impact (Severity x Probability)		Ranking of residual impacts	Degree of Certainty
								Without mitigation	With Mitigation (residual impact)		
CONSTRUCTION											
1. Infilling and excavation of material within 100m inland of the high-water mark of the sea during the expansion of infrastructure at 31 Little Maritzburg Road (i.e. garage, house expansion & swimming pool).	**a. Soil erosion resulting in wash away down frontal dune and damage to adjacent coastal environment.**	Local	Short-term	Moderate	Likely	Low	As per the findings of the Geotechnical Report, the loose, upper sands on site are susceptible to surface erosion by wind and concentrated flow of water. The alteration of natural ground levels and compaction may result in silt washing off the site into the nearby beach environment during rainfall events. The following measures must be put in place to reduce stormwater runoff and associated erosion damage: • Vegetation must remain in place wherever possible and for as long as possible during earthworks. • Sound management of surface water runoff from any exposed sand surfaces must be put in place early in the construction phase. This must include the placement of sandbags and/or bidim in areas of preferential flow. • An earth berm (maximum of 900mm high) must be placed along the top edge of the platform where the bank starts to slope down towards the beach. • Should an area of erosion be noticed on site, this must be addressed immediately, and the area stabilised to prevent further erosion. • All exposed surfaces areas / cut embankments must be vegetated as soon as work is complete in that area to minimise the potential for erosion.	Low	Very Low	5	High

							• Cut embankments in the loose sands as well as any fill embankments must be restricted to a slope batter of 1:2. • Any trench excavations / temporary cut embankments deeper than 1.2m must be suitably battered back or shored to prevent collapse. • Only deep, reinforces strip concrete foundations are suitable for the proposed new infrastructure on site[12]. • There is existing stormwater infrastructure on site which the new roof extension must connect into. • The existing soakaway pit must be increased by 1m^3 for every 40m^2 of new house surface area[13].				
	b. Heavy construction machinery and equipment working in close proximity to the frontal dune (i.e. during the construction of the new timber deck and swimming pool).	Site	Short-term	Moderate	Likely	Low	• A shade cloth fence must be erected across the front of the property where the bank slopes down to the beach. The area seaward of the shade cloth must be treated as a No-Go area until such time as work commences on the dune defence structure. • During the construction of new infrastructure on the existing platform, heavy construction machinery and equipment are not permitted near the front of the property where the bank starts to slope down to the beach (i.e. in front of the existing house – see Figure 3). • The foundations for the timber decking must be dug by hand to reduce the disturbance footprint in front of the existing house. • All construction machinery / equipment on site must be in good working order to ensure there are no leaks onto the fore dune.	Low	Very Low	5	High
	c. Indirect impact on the adjacent beach environment.	Local	Short-term	Substantial	Likely	Low	• During excavations for the new swimming pool, all material must be stockpiled leeward of the swimming pool area to reduce the risk of	Moderate	Low	5	High

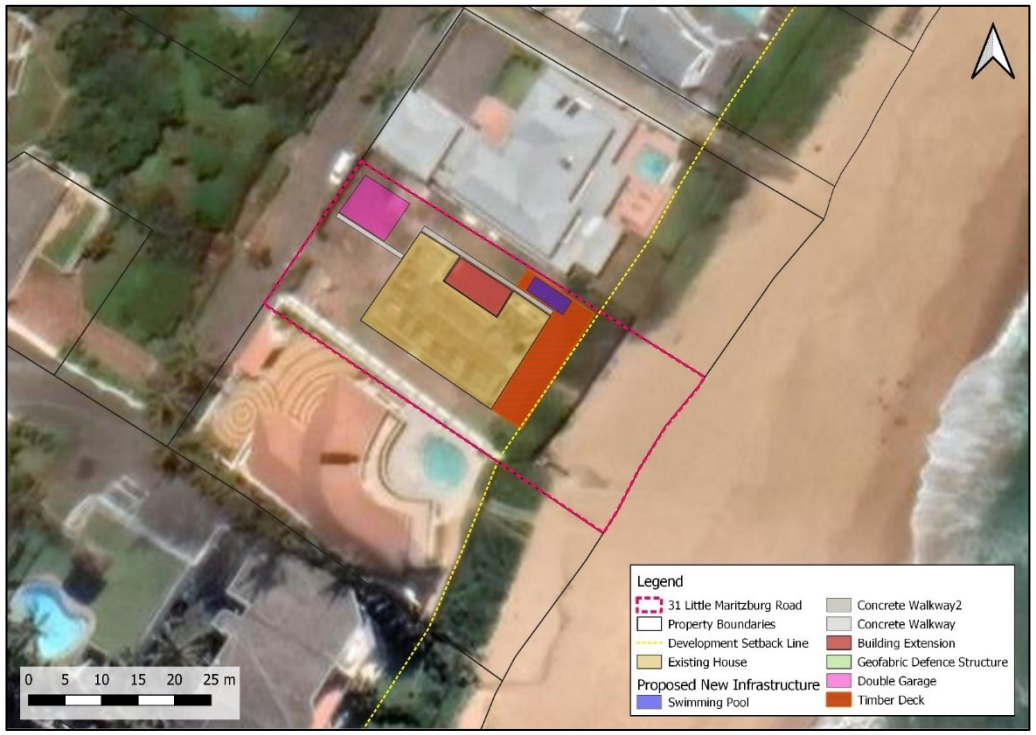
[12] Section 7.3 of the Marula Consulting (Pty) Ltd "*Proposed New Residence on 31 Little Maritzburg Road, Sat Rock, Geotechnical Report*".
[13] As above.

							excess sand / sediment from being blown / washed onto dune and / or beach environment. • Any excess material excavated from site must either be: - Removed from site completely; or - Used as fill material on site behind the new swimming pool footprint (i.e. not near the front of the property where the bank slopes down to the beach). • All cement mixing must take place on plastic sheets and must be contained to prevent cement / concrete from entering the dune and/or nearby beach environment. • Prior to any work commencing on site, the applicant must appoint an independent Environmental Control Officer (ECO). • All Primary Contractors on site must undergo environmental induction training prior to work commencing (see Environmental Awareness Plan under section 5.0 of the EMPr). • Environmental induction training must include: - An indication of the location of the environmentally sensitive area, which includes the fore dune in front of the house. - The importance of this environmentally sensitive area. - Restrictions associated with this area. - Contingency measures if the environmentally sensitive area is disturbed. • General construction related impacts must be managed in accordance with the mitigation measures provided under section 4.3 of the EMPr. • The existing sea defence structures for both neighbouring properties must be identified prior to excavations taking place for the new timber deck.				

	d. Excavations destroying fossils impacting on palaeontology.	Regional	Long-term	Substantial	Extremely Unlikely	High	The palaeontologist concluded that it is extremely unlikely that any fossils occur in the development footprint however, given the potentially very high sensitivity of the rocks underlying the site, a Fossil Chance Find Protocol has been provided under section 4.3 of the EMPr. • During earthworks, should any objects with historical, archaeological or cultural significance be uncovered, all work in this area must cease and the heritage authority, AMAFA, notified.	Very Low	Very Low	5	Moderate
2. Expansion of residential infrastructure by 277m^2 within 100m inland of the high-water mark of the sea.	**a. New infrastructure negatively impacting coastal processes (i.e. the sand sharing system, biotic environment, sea-level rise and storm surges)[14].**	Regional	Long-term	Severe	Unlikely	Moderate	The coastal specialist concluded that proposed "*activities associated with the homestead, including the swimming pool and deck will have little to no influence on coastal processes or the natural environment*". The property falls within a long-term (100 year) risk category and is under high risk in terms of the Coastal Vulnerability Index. To reduce the risk of future damage to the property, CoastKZN recommends that a sea defence system be established. This is supported by the coastal specialist, who noted the slow retreat of the dune form in front of House Gotz. The following mitigation measures are provided to ensure that the expansion of new infrastructure on site does not impact on coastal processes: • To ensure that proposed new infrastructure does not encroach into the sand sharing system, the sea defence structure must be established prior to the expansion of infrastructure seaward of the current dwelling. • The geofabric wall along the eastern extent of the property must be aligned with existing sea defence structures on neighbouring properties. Construction of the geofabric wall to be carried out in accordance with the approved construction methodology (see Impact 3b below).	Moderate	Low	4	Moderate

[14] Coastal processes identified in the "Best Practices for Coastal Development in KwaZulu-Natal" guideline that may be potentially impacted by coastal residential developments.

							• Existing services, in particular sewer infrastructure, must be incorporated to the lee of the defence structure.				
	b. Incremental creep of infrastructure towards the sea.	Site	Long-term	Moderate	Very Likely	Low	The seaward expansion of infrastructure is limited to the placement of the timber deck. The footprint of the existing infrastructure will be extended by 5m seaward. The swimming pool also shows minor expansion of structures in a seaward direction. The coastal specialist states that "the placement of the sea defence structure would obviate any impacts on coastal processes that may arise" from the expansion of infrastructure seaward. Figure 9 shows the footprint of existing infrastructure in the surrounding area with the yellow line indicating the development "*setback line*" of neighbouring properties. The proposed new deck is in line with the general development setback line of the area. • The eastern edge of the new timber deck and the start of the geofabric wall provides the development setback line for the property. Any future development on site must take place leeward of this line.	Low	Very Low	4	Moderate

		Figure 9: Google Earth Image Showing the Development Line Associated with the Southern End of Little Maritzburg Road.  									
3. Establishment of a geofabric wall as dune defence structure (Technology Alternative 2).	**a. Loss of approximately 180m² of indigenous dune vegetation from within the critically endangered Northern Coastal Grasslands ecosystem.**	Regional	Long-term	Slight	Very Likely	Moderate	During construction of the sea defence structure, backfilling will take place resulting in the loss of dune vegetation. As per the findings of the Beach and Coastal Assessment, the current state of the dune vegetation is highly transformed and is described as "*gardenscape*" being comprised of *Carissa macrocarpa and* Chrysanthemoides monilifera. Both species are related to leeward portions of the dune form. Other species present include Gazania *rigens* and *Carpobrotus dimidiatus*, which are more common seaward psammoseral species. The exotic *Sisal americana* is also evident. The loss of this vegetation is of negligible significance from a species diversity perspective. The stabilising function provided by dune vegetation will be replaced by the geofabric wall however:	Very Low	Very Low	5	High

							• Once construction of the geofabric wall is complete, exposed sand surfaces must be rehabilitated using indigenous dune vegetation (see mitigation measures provided for Impact 3c below).				
	b. Incorrect construction methodology used to construct the geofabric wall, creating a larger development footprint than necessary within the active coastal zone.	Site	Short-term	Substantial	Likely	Moderate	To avoid unnecessary interference within the active coastal zone during the construction of the sea defence system, the following is required: • The contractor appointed to construct the sea defence system must have experience in this field of work as well as working in the Salt Rock coastal area. • The appointed contractor must provide a method statement to the ECO for approval on how the establishment of the geofabric wall will take place. • The establishment of the geofabric wall must only take place when the beach is inflated (i.e. during summer). • The relevant permission and permit must be obtained from the Department of Forestry, Fisheries and Environment (DFFE) prior to any vehicles driving to the site along the beach. • Only the minimum, most necessary machinery / vehicles must access the beach. The use of plant machinery should be avoided, if applicable. • Vehicles may only drive on the beach during low tide and must drive below the high-water mark of the sea to reduce disturbance to the beach environment. • The ECO must be available to monitor the construction of the sea defence system daily. • The construction site must be clearly demarcated using shade cloth and management must ensure that construction activities are minimised in terms of extent. • General management measures must be implemented to avoid excessive excavation of the 'dune-beach' continuum, trampling and	Moderate	Low	4	Moderate

							general restriction of activities to the construction footprint. • Beach sand required to fill the geofabric bags must either be imported from an external source or sourced from below the high-water mark of the sea. • Prior to the excavator commencing work on site, neighbouring properties existing sea defence structures must be identified and uncovered, preferably by hand so that the structures are not damaged. • The geofabric wall at 31 Little Maritzburg Road must align and integrate with the neighbouring sea defence structures to present a linear, consolidated defence system. This will reduce the likelihood of failure of the system during extreme storm events. • The foundation of the bags must be below the shelly layer, preferably above the average high-water mark of the sea. • Any excavation outside the property boundary is prohibited. • Once the wall is complete, sand is to be replaced to mimic the dune slope to the north of the property. • The dune slope must not exceed 27 degrees. • Indigenous dune vegetation must be replanted on exposed sand surfaces (see measures provided for Impact 3c below).				
	c. Planting of 180m^2 vegetation and placing of material on dune surface within the littoral active zone.	Site	Short-term	Slight	Very Likely	Low	• Once the sea defence structure has been established and dune sand repacked onto the slope, the bank must be re-vegetated with indigenous species common to the Subtropical Seashore vegetation type. • The choice of species must be done in consultation with the ECO and may include *Scaevola plumieri, Phylohydrax carnosa, Gazania rigens* and *Canavalia rosea* (all common to the vegetation type).	Very Low	Very Low	5	High

							• The planted dune vegetation composition must align with the established dune vegetation on adjacent properties. • The applicant is responsible for ensuring the long-term survival of the dune species. • Any emergence and spread of exotic species must be addressed through the implementation of the Alien Invasive Plants Eradication Management Plan (section 5.4.2. of the EMPr). The planting of indigenous dune species is a positive impact and will improve the current level of biodiversity on site.				
	d. Physical impact on existing infrastructure surrounding the site (i.e. municipal stormwater infrastructure and infrastructure on neighbouring properties).	Site	Short-term	Severe	Unlikely	Low	There is an existing municipal stormwater outfall located to the south of the property (Figure 10). The structure is currently causing point-source erosion of the beach by mobilising sand which is swept away by the sea resulting in the loss of sediment in this area[15]. The rectification of this erosion is a positive impact associated with the establishment of the geofabric wall. • During the establishment of the geofabric wall, consideration must be given to the incorporation of additional erosion control mechanism around the stormwater outfall pipe to reduce the mobilisation of sand in this area. • All services on the property and adjacent property boundaries must be identified prior to excavations on site commencing. • The existing sea defence structures for both neighbouring properties must be identified prior to the geofabric wall being established. • The geofabric wall at 31 Little Maritzburg Road must align and integrate with the neighbouring sea defence structures to present a linear, consolidated defence system.	Moderate	Low	5	High

[15] Section 6.1.2 of the SDP "*Beach and Coastal Assessment*: Establishment of Structures and Erosion Prevention Measures" (April 2021).

							Figure 10: Municipal Stormwater Outfall Located South of House Gotz Causing Erosion on the Beach. 				
4. General construction-related impacts.	**a. Dust & emissions becoming a nuisance to surrounding residents.**	Site	Short-term	Moderate	Very unlikely	Low	This impact is unlikely considering the geology of the site, which is comprised on unconsolidated sand. Some dust may be generated during the construction of the house and therefore the following mitigation measures apply: • During high winds, dust suppression must take place using water carts / hose to prevent excessive dust on site. • Any fine materials stockpiled on site must be covered to prevent dust from being blown around. • Material transported to site on the back of trucks must be covered, • A complaints register must be maintained on site and any complaints received addressed timeously. • A shade cloth fence / other screening techniques must be used to reduce dust from entering other properties, where required. • All construction vehicles and equipment must be well maintained to reduce emissions generated on site.	Low	Very Low	5	High

	b. Noise form construction machinery, equipment and staff becoming a nuisance to surrounding residents.	Site	Short-term	Moderate	Likely	Low	The following measures are included in the EMPr to manage noise during construction: • All construction vehicles and equipment must be well maintained to reduce noise on site. • All construction vehicles and equipment must be fitted with standard silencers. • No construction vehicles or machinery to operate outside of construction working hours (06:00 – 18:00). • Neighbours to be advised prior to work being done outside the above times. • A complaints register must be maintained on site and any complaints received addressed timeously.	Low	Very Low	5	High
	c. Littering and improper storage / disposal of waste accumulating on site or within the adjacent coastal environment.	Site	Short-term	Moderate	Likely	Low	The following measures are included in the EMPr to manage waste during construction so that it is contained within the development footprint and correctly disposed of: • All waste generated on site must be disposed of in the designated waste management area to ensure that it is not blown around the site onto the beach or into adjacent residential properties. • The waste management area must not be located at the edge of the platform where the dune drops down towards the beach. • All waste must be stored under cover to prevent rain ingress and/or waste from being blown around site. • No waste must be buried or burnt on site. • Potentially hazardous substances [16] to be stored in a fenced off area that is undercover to prevent contamination of rainwater. • All potentially hazardous substances must be stored, in a bunded area (110% capacity of largest container) with an impermeable surface to prevent soil contamination during handling.	Low	Very Low	5	High

[16] Hazardous substances refer to substances scheduled in the Hazardous Substances Act (1973) and Hazardous Chemical Substances Regulations (1995) and include paint, oils, fuels, solvents, pesticides.

							• The use of hydrocarbons and other potentially hazardous liquids on site must be managed in accordance with section 4.3 of the EMPr. • No bulk storage of fuel is permitted on site (>30m^3). • A full inventory of all hazardous materials must be retained on site with the respective Material Safety Data Sheets.				
	d. Improper placement and management of toilet facilities potentially impacting the coastal environment and becoming a nuisance to surrounding residents.	Site	Short-term	Moderate	Unlikely	Low	Sufficient toilet facilities must be provided on site to prevent construction staff from utilising the surrounding areas. • On-site toilets will be provided for domestic purposes during construction phase (chemical or connected to municipal sewerage pipeline). • Toilets must be located within the property boundaries (i.e. not near the fore dune in front of the house). • Staff must use the toilets provided and must not use any other areas on site as toilet facilities. • Toilets should be screened from the neighbours as far as is practically possible. • Ablution facilities must be checked regularly and kept in a clean state.	Low	Very Low	5	High
	e. Greywater / hydrocarbons / chemicals storage and use on site having the potential to pollute the adjacent beach environment.	Local	Short-term	Moderate	Unlikely	Low	During construction, minor spills of material, particularly hydrocarbons, may occur. This will pose a localised threat the immediate environment. This impact can be prevented by ensuring the mitigation measures provided above for waste management are adhered to. If a spill does occur, every effort must be made to prevent the spill from entering the municipal stormwater network / washing off site. • Any spills on site must be cleaned up immediately using the Spill Response Procedure provided in section 5.4.1 of the EMPr. • The seven step Spill Response Procedure must be included in the ECO's environmental toolbox talk.	Low	Very Low	5	Moderate

							• No vehicles or equipment must be washed on site. • Drip trays must be available near the hazardous storage area and where hazardous materials are being used on the site. • A Spill Kit / similar must be available near the hazardous storage area.				
	f. Proliferation of exotic species on site and within adjacent dune environment.	Local	Medium-term	Substantial	Very Likely	Low	Construction activities, primarily vegetation clearance, typically provides an opportunity for the proliferation of exotic species within the disturbed area. The establishment and spread of alien invasive species within the disturbance footprint must be managed throughout the construction phase by the Contractor. • The "*Eradication of Alien Invasive Plant*" Management Plan must be implemented on site during construction (section 5.4.2 of the EMPr). This Management Plan includes a list of common alien invasive plant species anticipated on site, identification photographs and eradication measures. • Alien invasive species must not be permitted to establish on site or on the fore dune.	Moderate	Very Low	4	High
OPERATION											
5. Expansion of residential infrastructure & establishment of geofabric wall at 31 Little Maritzburg Road.	**a. Climate change and rising sea levels having a medium to long-term impact on infrastructure on site.**	Site	Long-term	Substantial	Unlikely	Low	Climate change is anticipated to include a rise in sea level as well as an increase in severe storm events[17]. An approximate maximum increase in sea level of 0.8m is expected over the next 25 years. • The proposed geofabric defence system must incorporate measures to defend the site under the projected rise in sea level of approximately 1m. • The coastal specialist concluded that "the proposed *implementation of a coastal protection system on the sea frontage at 31 Little Maritzburg road is considered to be a*	Moderate	Low	5	Moderate

[17] Bundy, S., Goble, B., Parak, O. and Bodasing, M. "*Best Practises for Coastal Development in KwaZulu-Natal*" KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, Pietermaritzburg (2021).

							suitable response to the need to address the potential risk of inundation and damage during any future extreme storm event". • Provided that the geofabric wall across the front of the property is constructed in accordance with the mitigation measures provided in the attached EMPr and ties into the existing defence structures on the neighbouring properties, the wall reduces the erosion risk of rising sea levels and severe storm events. Existing and proposed new infrastructure on the property will therefore be protected from the effects of climate change.				
	b. Placement of the structure within the shoreline altering drivers of coastal process (wind & wave), interruption of sediment transport regime; and alteration of habitat / eco-morphology (SDP, 2021).	Regional	Long-term	Severe	Unlikely	Moderate	As per the SDP Beach and Coastal Assessment, three eco-morphological drivers of coastal systems may be impacted by the proposed sea defence structure; wind and wave, sediment transport dynamics and biotic / vegetated dune form. Wind and wave action may disrupt the defence structure in the medium-term causing erosion. • Once construction of the defence structure is complete, dune vegetation must be replaced immediately to stabilise the exposed sand (see recommendations provided above for species composition). • The coastal specialist concluded that the geofabric wall "*will have little impact on prevailing supra tidal and sub tidal coastal processes*"[18]. Minor deviations to the sediment transport dynamics are anticipated during construction with the excavation of the dune, beach and intertidal zone. Sediment mobilisation at the point of excavation through the dune may arise. • Provided the construction methodology used to construct the geofabric wall is adhered (see above), the coastal specialist states that the	Moderate	Low	4	Moderate

[18] Section 7.0 of the SDP "*Beach and Coastal Assessment*: Establishment of Structures and Erosion Prevention Measures" (April 2021).

							natural aeolian winnowing will naturally sculpt back the beach[19]. • Sand used to fill geofabric bags / re-create the dune slope, must be imported from off site or obtained from below the low water mark of the sea when the beach is inflated (i.e. during summer). The study area is in a transformed portion of coastline and therefore the coastal specialist rates the significance of impacts on the biotic dune environment as low to very low. • As stated above, species common to the Subtropical Seashore vegetation type must be replanted on the dune in line with established dune vegetation on the neighbouring properties.				
	c. Increase in hard surfaces resulting in high velocity stormwater runoff onto the beach and dune environment.	Local	Long-term	Moderate	Likely	Low	There is existing infrastructure on site to manage stormwater, including an onsite soakpit in front of the existing house (shown on layout plan attached under Appendix C). Stormwater runoff from the new roof extension will be connected to the existing stormwater network. As recommended by the geotechnical engineer: • The existing soakaway pit must be increased by 1m^3 for every 40m^2 of new house surface area. • Rainwater must be allowed to percolate on site underneath the new timber deck. This is to promote stormwater infiltration and groundwater recharge. • All stormwater must be attenuated on site and must not be discharged out the front of the property.	Low	Very Low	5	High

[19] Section 6.1.2 of the SDP "*Beach and Coastal Assessment*: Establishment of Structures and Erosion Prevention Measures" (April 2021).

CUMULATIVE											
6. Expansion of residential infrastructure & establishment of geofabric wall at 31 Little Maritzburg Road.	**a. Cumulative impact on the sand sharing system in Shakas Rock, including the sub tidal, intertidal, beach and dune components.**	Regional	Long-term	Substantial	Unlikely	Moderate	The alteration of the sand sharing system in this area is an existing impact which arose during the 1960's with the development of the area into an urban complex. 31 Little Maritzburg Road is an existing, developed property which is one of the last properties along Little Maritzburg Road to not have a sea defence system to "defend" the frontal dune during high seas and storm events. As such, significant erosion and retreat of the dune towards the existing structure is evident. The establishment of an additional sea defence structure along this stretch of the shoreline has been rated as having very low significance provided that the mitigation measures above and in the attached EMPr are adhered to. This very low significance rating is based on information drawn from the Beach and Coastal Assessment: • The geofabric retaining system as a sea defence structure will have little impact on prevailing supra tidal and sub tidal coastal processes[20]; and • Given the implementation of the sea defence structure on the sea frontage of the property, it follows that all activities associated with the expansion of the existing residential infrastructure will have little to no influence on coastal processes[21].	Moderate	Very Low	5	High

[20] Section 7.0 of the SDP "*Beach and Coastal Assessment*: Establishment of Structures and Erosion Prevention Measures" (April 2021).

[21] Executive Summary of the SDP "*Beach and Coastal Assessment*: Establishment of Structures and Erosion Prevention Measures" (April 2021).

Table 7: Assessment of Impacts Associated with the Alternate Layout and Technology Alternative for House Gotz (Technology Alternative 1).

Aspect	Impact	Extent	Duration	Severity	Probability	Irreplaceability	Mitigation	Significance of Impact (Severity x Probability)		Ranking of residual impacts	Degree of Certainty
								Without mitigation	With Mitigation (residual impact)		
CONSTRUCTION											
1. Infilling and excavation of material within 100m inland of the high-water mark of the sea during the expansion of infrastructure at 31 Little Maritzburg Road (i.e. garage, house expansion & swimming pool).	This aspect of the project, associated impacts, mitigation measures and significance of impacts provided above for preferred Technology Alternative 2 remain the same for Technology Alternative 1.										
2. Expansion of residential infrastructure by 277m^2 within 100m inland of the high-water mark of the sea.	This aspect of the project, associated impacts, mitigation measures and significance of impacts provided above for preferred Technology Alternative 2 remain the same for Technology Alternative 1.										
3. Establishment of concrete sea wall as dune defence structure (Technology Alternative 1).	**a. Loss of approximately 180m^2 of indigenous dune vegetation from within the critically endangered Northern Coastal Grasslands ecosystem.**	Regional	Long-term	Slight	Very Likely	Moderate	During the construction of this type of sea defence structure, all indigenous dune vegetation would be stripped off the dune to allow for construction of the concrete wall, at the back of the dune (refer to Figure 4a). The significance of the impact and mitigation measures provided in the table above apply to both the preferred and alternative dune defence structures:	Very Low	Very Low	5	High

							• Once construction of the geofabric wall is complete, exposed sand surfaces must be rehabilitated using indigenous dune vegetation (see mitigation measures provided for Impact 3c below).				
	b. Incorrect construction methodology used to construct the concrete wall, creating a larger development footprint than necessary within the active coastal zone.	Site	Short-term	Substantial	Likely	Moderate	In addition to the mitigation measures provided above for the preferred Technology Alternative 2 the following mitigation measures are required: • Prior to excavation of the frontal dune commencing, sheet piling along the crest of the dune may be required to stabilise the remainder of the property during the construction of the concrete wall. • The bottom of the concrete wall and first layer of geofabric bags must be laid at the spring low water mark / shelly layer to avoid wash away. • All cement mixing must take place on a plastic sheet to avoid contact with the beach sand. • At the end of every day, all construction material must be removed off the beach. The significance of this impact has the same rating as the preferred technology alternative however additional mitigation measures must be implemented to manage the impact during construction.	Moderate	Low	4	Moderate
	c. Planting of 180m^2 vegetation and placing of material on dune surface within the littoral active zone.	Site	Short-term	Slight	Very Likely	Low	The impact significance and mitigation measures remain the same for both the preferred and alternative sea defence structures.	Very Low	Very Low	5	High
	d. Physical impact on existing infrastructure surrounding the site (i.e. municipal stormwater infrastructure and infrastructure on neighbouring properties).	Site	Short-term	Severe	Unlikely	Low	The impact significance and mitigation measures remain the same for both the preferred and alternative sea defence structures.	Moderate	Low	5	High

4. General construction-related impacts.	This aspect of the project, associated impacts, mitigation measures and significance of impacts provided above for preferred Technology Alternative 2 remain the same for Technology Alternative 1.										
OPERATION											
5. Expansion of residential infrastructure & establishment of concrete wall at 31 Little Maritzburg Road.	**a. Climate change and rising sea levels having a medium to long-term impact on infrastructure on site.**	Site	Long-term	Substantial	Unlikely	Low	The impact significance and mitigation measures remain the same for both the preferred and alternative sea defence structures.	Moderate	Low	5	Moderate
	b. Placement of the structure within the shoreline altering drivers of coastal process (wind & wave), interruption of sediment transport regime; and alteration of habitat / eco-morphology (SDP, 2021).	Regional	Long-term	Severe	Likely	Moderate	The significance of this impact can be reduced by using a geofabric wall (i.e. preferred technology alternative). The impact of the concrete sea wall as a defence system has a higher effect on the sand sharing system as the concrete structure has a bigger overall footprint and absorbs less wave energy during a storm event (i.e. can deflect tidal energy). Mitigation measures provided for the preferred technology alterative remain the same (as per the below) however the long-term effect on the sand sharing system is higher for the construction of a concrete sea wall[22]. The following mitigation measures remain for both alternatives: • Once construction of the defence structure is complete, dune vegetation must be replaced immediately to stabilise the exposed sand. • Indigenous species common to the Subtropical Seashore vegetation type must be replanted on the dune in line with established dune vegetation on the neighbouring properties.	High	Moderate	4	Moderate
	c. Increase in hard surfaces resulting in high velocity stormwater runoff onto the beach and dune environment.	Local	Long-term	Moderate	Likely	Low	The impact significance and mitigation measures remain the same for both the preferred and alternative sea defence structures.	Low	Very Low	5	High
CUMULATIVE											

[22] Table 1 under section 5.0 of the SDP "*Beach and Coastal Assessment*: Establishment of Structures and Erosion Prevention Measures" (April 2021).

6. Expansion of residential infrastructure & establishment of concrete sea wall at 31 Little Maritzburg Road.	**b. Cumulative impact on the sand sharing system in Shakas Rock, including the sub tidal, intertidal, beach and dune components.**	Regional	Long-term	Substantial	Likely	Moderate	As described above, a concrete sea defence structure has a greater long-term effect on the sand sharing system compared to a geofabric defence system[23]. The significance of this cumulative impact is therefore slightly higher for the alternate technology alternative.	Moderate	Low	5	High

[23] Table 1 under section 5.0 of the SDP "*Beach and Coastal Assessment*: Establishment of Structures and Erosion Prevention Measures" (April 2021).

7.0 ENVIRONMENTAL IMPACT STATEMENT

7.1 SUMMARY OF KEY FINDINGS (POSITIVE AND NEGATIVE IMPACTS)

The expansion of House Gotz will take place at 31 Little Maritzburg Road, which is located within 100m of the high-water mark of the Indian Ocean. The property is located within an existing urban environment and is therefore already highly developed and transformed. The most sensitive environmental feature identified is the coastal environment and sand sharing system associated with the nearby shoreline. Using the 2007 storm event as a baseline, the coastal specialist confirms that the expansion of infrastructure proposed at House Gotz will have little to no impact on coastal processes or the natural environment. All construction activity must take place in accordance with the attached EMPr to ensure that the significance of all impacts identified is reduced to "*low*" or "*very low*". The proposed sea defence structure will also mitigate impacts associated with the expansion of infrastructure on site.

The establishment of the sea defence system to prevent the further retreat of the fore dune in front of House Gotz and the construction methodology to build this structure were key considerations throughout the EIA process. If the design and construction of the geofabric wall is not carried out or managed carefully, in accordance with recommendations contained in the attached EMPr, this aspect of the project has the potential to have high and moderate environmental impacts with the alteration of coastal process drivers. The following provides a summary of the key findings of the assessment:

- The most notable impact to mitigate and manage was the potential for new infrastructure to alter or influence coastal processes and the sand sharing system associated with Catfish Beach.
- On receipt of the Beach and Coastal Assessment, it was concluded that the expansion of new infrastructure on the existing platform would have little to no impact on the coastal processes.
- The incremental creep of infrastructure at 31 Little Maritzburg Road towards the sea was assessed as having "*very low*" significance after mitigation. The proposed new timber deck is aligned with the neighbouring properties footprint and is a lightweight structure protected by the proposed geofabric defence structure.
- The construction of the geofabric wall to defend the property against a rise in sea level, severe marine storms and the long-term retreat of the dune is recommended by CoastKZN and supported by the coastal specialist.
- A construction method statement must be compiled by the appointed contractor and approved by the ECO. The method statement must include measures provided in the EMPr for preferred method of construction.

7.2 ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

The information in this report has been extracted from the various specialist reports attached under Appendix B. The assessment assumes that information received from the specialist team, architect and applicant is accurate. Assumptions and limitations of the specialist reports are listed under section 2.0 of the SDP "*Beach and Coastal Assessment*" April 2021 and section 5.0 of the "*Palaeontological Impact Assessment*".

7.3 IMPACT MANAGEMENT OUTCOMES

Through the assessment process, impact management outcomes have been identified and are provided in the table below. Impact management measures and recommendations identified during the assessment have been included in the EMPr attached under Appendix E to ensure that the impact management outcome is achieved.

Table 8: Impact Management Outcomes Associated with House Gotz.

Primary Impact Management Outcome: *To create a sustainable development by preventing construction activities from impacting the sand sharing system and ensuring the long-term defence of the property against climate change (sea level rise and more intense storm events).*		
#	**Impact Management Outcome**	**Measures in Place to Achieve Outcome**
1	To avoid unnecessary encroachment of construction activities into the sand sharing system.	An independent ECO must clearly demarcate the No Go area in front of the proposed timber deck. Measures to prevent and manage encroachment into the dune / coastal environment have been included under section 4.3 of the EMPr.
3	To avoid unnecessary disturbance (direct or indirect) to the fore dune, beach environment	During construction of the geofabric wall, work must be monitored daily by the ECO to avoid unnecessary disturbance to the surrounding area. Other measures to

	and neighbouring properties during the construction of the geofabric wall.	prevent and manage construction in this sensitive area have been included under section 4.3 of the EMPr.
4	Ensure dune stability during initial excavations for the geofabric wall.	A Construction Method Statement must be prepared by the Contractor appointed to construct the geofabric wall in front of House Gotz and submitted to the ECO prior to any work commencing in this area. Existing sea defence structures must be identified by the Contractor prior to excavations commencing on the dune in front of House Gotz.
5	The long-term defence of the shoreline preventing dune retreat at 31 Little Maritzburg Road.	Provided that construction of the geofabric wall takes place in accordance with the mitigation measures provided under section 4.3 of the EMPr, there will be no further retreat of the dune and erosion risk in front of House Gotz. The re-established dune must be re-vegetated immediately on completion of work to stabilise the dune material.

7.4 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The expansion of infrastructure at House Gotz is likely to commence within the next 5 years and therefore the EA must be valid until 2026. A post-construction audit must be undertaken by an independent ECO and the report submitted to EDTEA: Compliance and Enforcement.

7.5 MONITORING REQUIRMENTS

An independent ECO must be appointed by the applicant to monitor the development in accordance with the EMPr attached under Appendix E.

- The ECO must, prior to any work commencing on site, conduct Environmental Awareness training with site personnel (as per section 5.0 of the EMPr).
- The ECO must undertake monthly audits during the expansion of residential infrastructure on site (i.e. during the construction of the garage, decking, swimming pool and expansion of the existing house).
- The ECO must visit the site daily during the construction of the geofabric wall defence system to monitor and advise work in this sensitive environment.
- One monthly report summarising the findings of the daily audits must be submitted to the applicant, Contractor and EDTEA: Compliance and Enforcement.
- One post-construction audit must be undertaken when construction is complete.

7.6 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD BE AUTHORISED AND CONDITIONS OF AUTHORISATION

Based on the outcome of this assessment, it is recommended that the expansion of House Gotz, including the establishment of a geofabric wall as a sea defence structure (Technology Alternative 2), be authorised by EDTEA. Mitigation measures provided in the attached EMPr must be strictly adhered to during construction. A method statement must be submitted by the appointed contractor prior to the construction of the geofabric wall in front of the house. All staff working on site must be made aware of the sensitive coastal environment at the onset of construction. After mitigation, the significance of all impacts associated with the layout have "*low*" to "*very low*" significance.

As indicated by the coastal specialist, there has been a slow retreat of the dune in and around the site creating a definite variation in shoreline morphology in this area. The long-term stabilising effect of the proposed geofabric wall is therefore a positive impact associated with the project. Measures have been included in the attached EMPr to ensure that the impact management outcomes listed in the table above are achieved. It is therefore the reasoned opinion of the EAP that the expansion of House Gotz and establishment of the geofabric wall / defence structure be authorised as shown in Figure 11.

The following conditions are recommended for inclusion in the Environmental Authorisation:

- The EMPr attached under Appendix E must be adhered to during all phases of the project.
- The ECO must monitor the site on a daily basis when work commences on the geofabric wall defence structure. The ECO must ensure that work is carried out efficiently to minimise the amount of time spent in the coastal zone.
- The Contractor appointed to construction the geofabric wall must have experience in this type of work and must submit a construction method statement to the ECO for approval prior to commencing with work.
- The establishment of a geofabric wall along the eastern extent of the property to act as a sea defence must be aligned with existing sea defence structures on neighbouring properties.

- Once the sea defence structure has been established and dune sand repacked onto the slope, the bank must be re-vegetated with indigenous species common to the Subtropical Seashore vegetation type.
- The authorised footprint must be clearly demarcated using shade cloth by the Contractor, in conjunction with the ECO, to avoid unnecessary clearing of dune vegetation.
- To ensure that proposed new infrastructure does not encroach into the sand sharing system, the sea defence structure must be established prior to the expansion of infrastructure seaward of the current dwelling.
- There must be no further creep of infrastructure seaward of the timber deck.
- Sound management of surface water runoff from the site must be put in place early in the construction phase to avoid any surface flow of water onto the dune.

Figure 11: Location of House Gotz at 31 Little Maritzburg Road, Shakas Rock Showing Sensitive Environmental Areas to be Avoided During Construction.