DRAFT

BASIC ASSESSMENT REPORT

INFILLING AND EXCAVATION OF MATERIAL AND CLEARANCE OF INDIGENOUS VEGETATION WITHIN 100M OF THE HIGH-WATER MARK OF THE SEA AT 78 NORTH BEACH ROAD, UMDLOTI

ETHEKWINI MUNICIPALITY

DM/0017/2021

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The EAP confirms that:

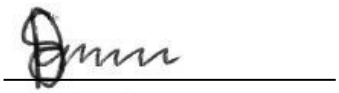
a) All information contained in the Basic Assessment Report is, to the best of my knowledge, accurate and correct.

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

11th June 2021

EXECUTIVE SUMMARY

The A & J Kellerman Family Trust propose to construct a private residential dwelling on Portion 1283 of Farm Cotton Lands 1575, located at 78 North Beach Road, uMdloti. A five (5) storey house is proposed, including a garage / parking level. The construction of the house 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 clearance of indigenous vegetation requires Environmental Authorisation from the Department of Economic Development, Tourism and Environmental Affairs (EDTEA).

A preferred layout alternative has been formulated which responds to the sensitive geological environment associated with the site. The development footprint is located outside the eThekwini Durban Metropolitan Open Space System (DMOSS), which comprises 79% of the property. Recommendations made in the Geotechnical Investigation Report, Mega Pile Construction Method Statement as well as mitigation measures provided in the Ecological Assessment, have been included in the Environmental Management Programme (EMPr).

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

1. The clearance of 447m^2 of indigenous coastal vegetation during construction. This impact cannot be avoided. The Ecological Assessment provides mitigation measures to restrict the clearance of vegetation and cordon off the development footprint to prevent excessive vegetation clearing outside of the authorised footprint. A permit from the Department of Environment, Forestry and Fisheries (DEFF) is required for the clearance of two protected tree species and 228m^2 of natural forest.
2. Encroachment into the adjacent KZN Coastal Dune Forest / DMOSS during construction. Through careful planning and design modifications, the risk of construction activities disturbing the DMOSS area has been reduced. Mitigation measures to be implemented during the pre-construction and construction phases have been included in the EMPr. The significance of the impact, after mitigation, has been reduced from "*high*" to "*low*".
3. Erosion of banks / dune movement during earthworks. The installation of the lateral support system for House Kellerman must be carried out in strict accordance with the Method Statement compiled by Mega Pile and attached under Appendix B. Environmental Control Officer (ECO) to monitor the earthworks phase every second week.
4. Construction taking place within 100m of the high-water mark of the sea potentially impacting the beach environment. Construction activity must be monitored in accordance with the EMPr. Stormwater management is essential to reduce any impacts on the adjacent beach and dune environments.
5. Transformation of previously undeveloped land restricting faunal movement. The proposed residential dwelling is confined to the eastern portion of the property with the remaining 79% of the site being retained as unrestricted open space.
6. General construction-related impacts (i.e. dust, noise, waste management, site camp etc.) will be managed in accordance with the EMPr attached under Appendix E.
7. The long-term / operational phase of House Kellerman poses a low risk to the surrounding environment. The retention of the remainder of the property as an ecological corridor, connected to other open space areas in uMdloti, was identified as a positive impact associated with the project.

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 Infilling and Excavation of Material and Clearance of Indigenous Vegetation within 100m of the High-Water Mark of the Sea at 78 North Beach Road, uMdloti, be authorised by EDTEA.

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APPENDICES

1.0 INTRODUCTION

1.1 DESCRIPTION OF ACTIVTY TO BE UNDERTAKEN

The A & J Kellerman Family Trust, represented by Jaco Kellerman, recently purchased Portion 1283 of Farm Cotton Lands 1575, located at 78 North Beach Road in uMdloti (Figure 1). The property is currently undeveloped. The A & J Kellerman Family Trust intends to develop a private residential dwelling on the property which will accommodate the family on different levels. The ground floor level will be used as a garage with visitor parking available. Four (4) storeys of living area are proposed above the garage (Figure 2). There are existing municipal bulk services available to provide the house with potable water and sewage disposal.

The extent of the property is 2 135m^2. The total footprint of the proposed residential dwelling will be 447m^2. The remaining 1 688m^2 will remain undeveloped as part of the Durban Metropolitan Open Space System (DMOSS; Figure 3). No request for the relaxation of DMOSS from eThekwini Environmental Planning and Climate Protection Department (EPCPD) is therefore required.

All development will take place within 100m of the high-water mark of the sea. The excavation / infilling of material during construction triggers Activity 19A of Listing Notice 1. Indigenous vegetation within the development footprint will be cleared to accommodate the new residential dwelling. Clearance of indigenous vegetation will take place within the critically endangered Northern Coastal Grasslands Ecosystem (KZN16) and within 100m of the high-water mark of the sea triggering Activity 12 in Listing Notice 3. 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	Description of Listed Activity as Per the Project Description
19A	Listing Notice 1 (GNR327) 04th December 2014 as amended.	During the construction of House Kellerman, a significant volume of material will be excavated on site (>1 000m^3). Material will be excavated within 100m of the high-water mark of the sea.
12(d)(iv) & (vi)	Listing Notice 3 (GNR324) 04th December 2014 as amended.	During construction of House Kellerman, 447m^2 of indigenous vegetation will be cleared to accommodate the new infrastructure on site. The clearance of indigenous vegetation will take place within the critically endangered Northern Coastal Grasslands Ecosystem (KZN16) and within 100m of the high-water mark of the sea.

1.2 LOCATION OF ACTIVITY

House Kellerman will be located at 78 North Beach Road in uMdloti. The property is in Ward 58 of eThekwini Municipality (centre of site: 29°39'17.64"S; 31°07'32.18"E). Please refer to Figure 1 for the Locality Map.

21 Digit Surveyor General code	N0FU00000000157501283
Property Description	Portion 1283 of Farm Cotton Lands 1575

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

Figure 2: Site Development Plan Showing a Cross Section of the Proposed Infrastructure for House Kellerman (Source: EPA Architects, 2021).

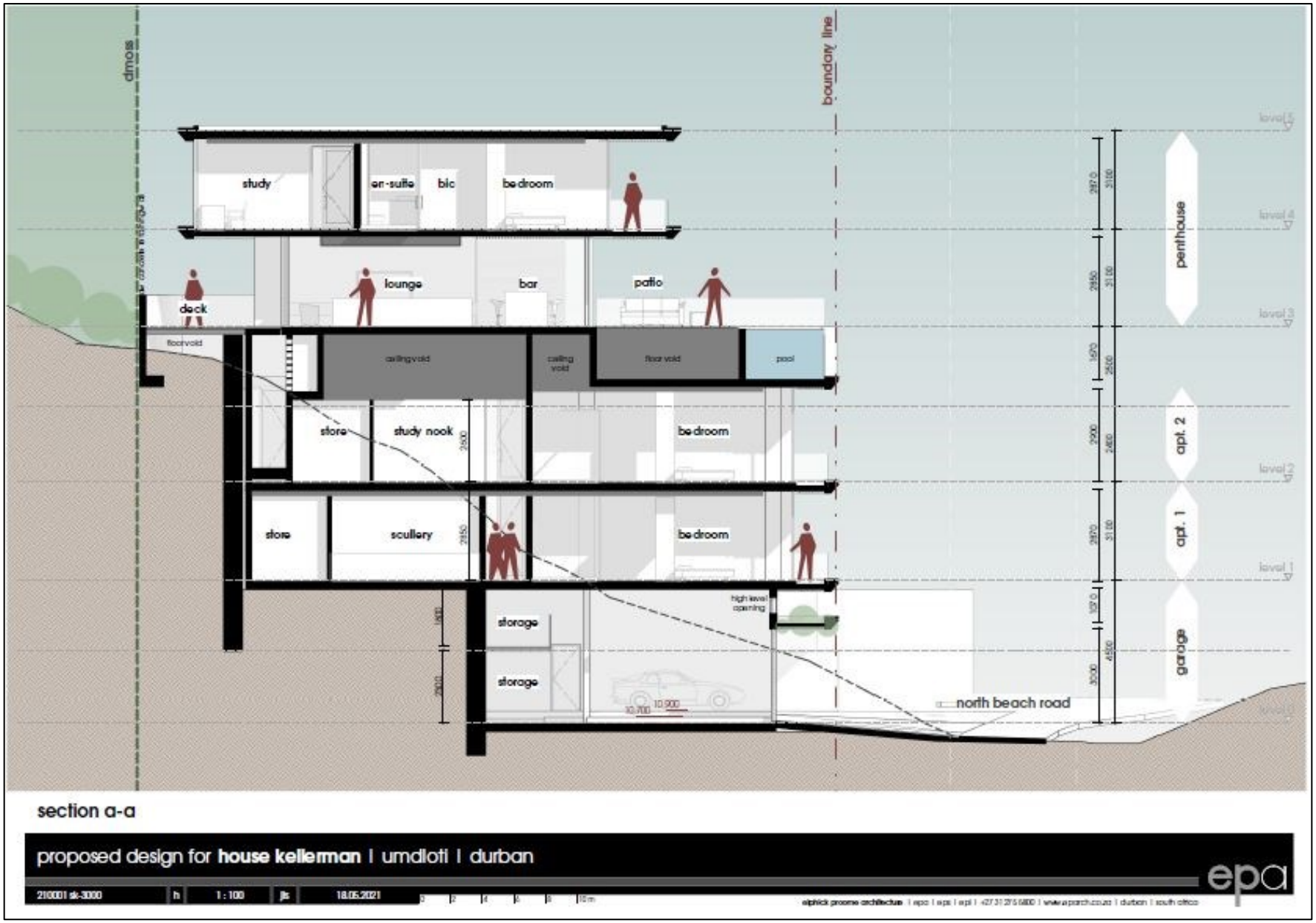
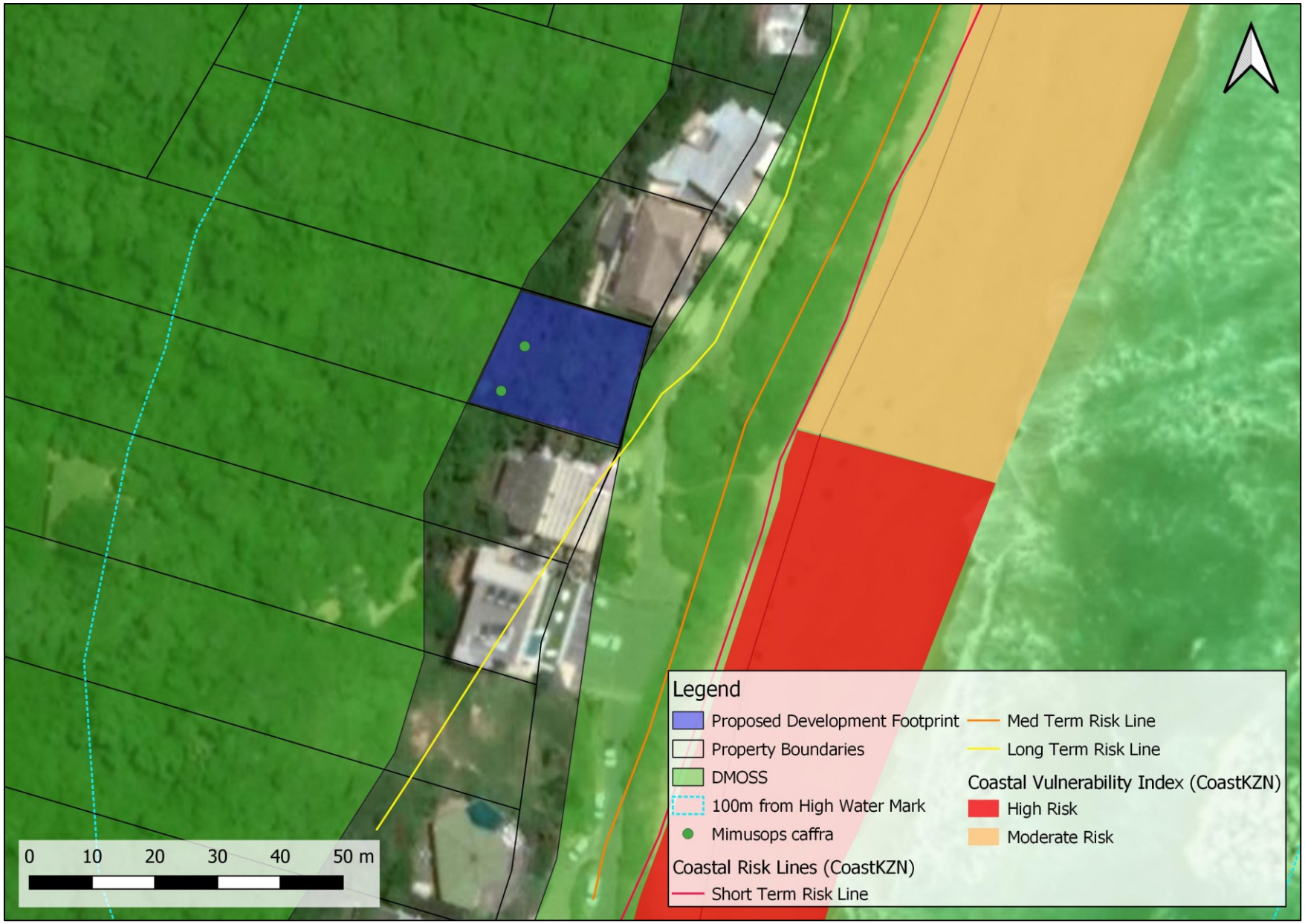


Figure 3: Map Superimposing the Proposed Activity and Associated Infrastructure on the Environmentally Sensitivities of the Site.



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 development of a private residential dwelling for the Kellerman family.

2.1.1 Site Alternatives and Outcome of the Site Selection Matrix

The proposed application is specific to Portion 1283 of Farm Cotton Lands 1575. The property was purchased by the applicant for the purpose of constructing a residential dwelling. The site was selected for development because of its prime location in the sought-after town of uMdloti and its uninterrupted beach access. No other feasible site alternatives have therefore been considered.

2.1.2 Activity

As described above, the purpose of this project is to provide the Kellerman family with a residential house. No other feasible activities have therefore been considered.

2.1.3 Layout

The Ecological Assessment confirmed the high ecological integrity of the adjacent DMOSS area and therefore development is restricted to the lower 21% of the property, as shown in Figure 3. Various layout alternatives have been considered during the Environmental Impact Assessment (EIA) process and are attached under Appendix C. The construction of a block / apartment type residential dwelling with all five storeys stacked on top of one another was initially considered as a layout alternative. This would allow for a larger garden area to be established behind the house (i.e. between the structure and DMOSS). This layout alternative was however dismissed early in the process due to the negative "*imposing*" aesthetic impact this type of structure would have on the neighbouring properties (i.e. restricting sea views and creating shade) and the general view from North Beach Road / the public area.

To create a gentler appearance, the levels of the house have been stepped back to follow the gradient of the existing landform. Initially, two platforms were to be created to accommodate the structure (Layout Alternative 1; Figure 4a). The western extent of the building would be constructed on the DMOSS boundary line. This would result in direct physical disturbance to the DMOSS area during piling as the piling rig would need to be established leeward of the structure. The location of the contiguous piling required is indicated in black in Figure 4a[2]. No garden area was available in this layout.

Figure 4b shows a similar layout with the Living Area being shifted seaward to allow for a garden between DMOSS and the structure (Layout Alternative 2). This is preferred from an environmental perspective as the garden area can be used by construction staff to access the western side of the structure without encroaching into DMOSS. The DMOSS area would be fenced off to prevent unnecessary encroachment. The garden area would act as a "soft buffer" between construction activities and the DMOSS. This layout, however, required one large cut to be made into the dune (indicated in Figure 4b). On review of this layout, the piling specialist indicated that this would not be feasible considering the sensitive geology of the site. The dune is highly erodible and therefore the steep cut would result in dune movement / slip.

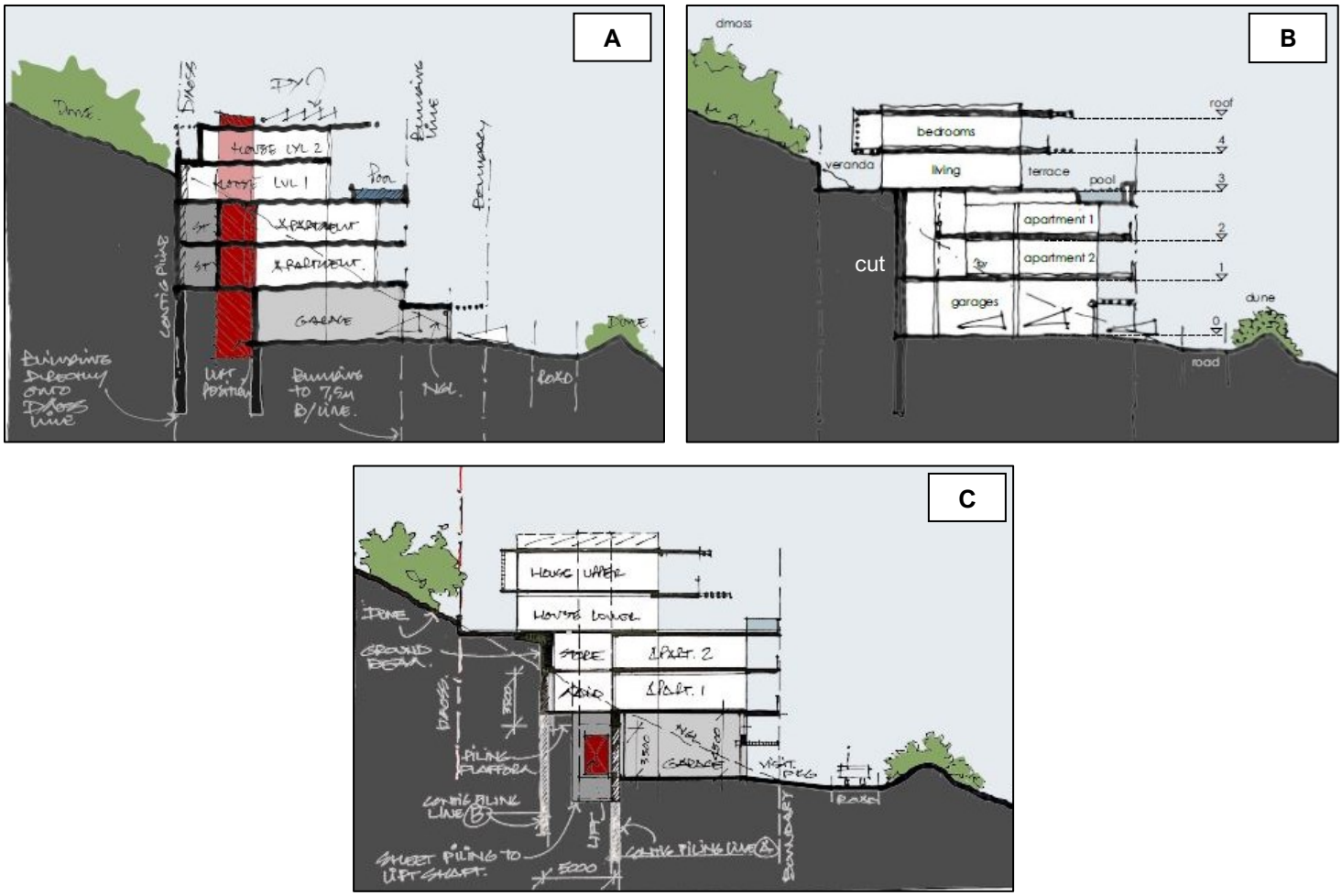
The layout was adjusted accordingly to accommodate the structure on three platforms (Figures 4c and 5). Layout Alternative 3 is the preferred layout as the garden area still creates a soft buffer between DMOSS and construction activities but still ensuring long-term stability of the dune. Technical input from the geotechnical engineer and piling specialist has been taken into consideration when designing the preferred layout (see more details on the technical alternatives outlined in the subsection below).

From an environmental perspective, there is no substantial difference in the overall development footprint of the various layout alternatives and therefore only the preferred alternative, Layout Alternative 3, has been assessed further.

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

[2] "Contiguous piling" is when reinforced concrete piles are arranged next to one another to create a wall. This type of retaining structure is commonly used in difficult ground conditions and for slope stabilisation.

Figure 4: Comparison of the Layout Alternatives Considered for House Kellerman (a) Layout Alternative 1 with the Structure Located on the DMOSS Boundary Line; (b) Layout Alternative 2 Allowing a Buffer Between Contiguous Pilling and the DMOSS area. The Steep Cut Line was Dismissed by the Piling Specialist; and (c) Layout Alternative 3, the Preferred Layout, with Three Platforms Accommodating the Structure (Source: EPA Architects, 2021).



2.1.4 Technology

Due to the sensitive geological environment of the site, a specialist piling contractor (Mega Pile) in conjunction with the geotechnical engineer, provided input on the technical / structural design of the dwelling. As discussed above, the creation of three platforms on site is required to accommodate the preferred layout alternative. The platforms will be created in phases:

- A concrete retaining wall will be constructed on the DMOSS boundary line to prevent slip of the dune slope leeward of the development footprint during the excavation of Platform 1 (yellow line in Figure 5).
- The piling rig will be located on Platform 1, outside of DMOSS.
- The piling rig will create a second retaining structure (contiguous piling) which forms the backbone for levels 1 and 2 (red line in Figure 5).
- Once the bank is secured, the second platform will be excavated, and the piling rig moved onto this lower platform.
- A third retaining structure (contiguous piling) will be created (blue line in Figure 5).
- The third and final platform will be created, which will be level with North Beach Road.

Mega Pile have prepared a Construction Method Statement outlining the process of installing the lateral support system required for House Kellerman (attached under Appendix B). Without the construction of the first, concrete retaining wall on the DMOSS boundary, the dune slope behind the house is at risk of collapsing / slipping and therefore this design technology is preferred.

2.1.5 No-Go Alternative

The development of House Kellerman will not take place and the property will remain vacant. There would be no negative environmental impacts that may have resulted from the construction phase. The ecologist noted disturbance in the lower elevations of the site, next to North Beach Road and the adjacent housing developments[3]. Anthropogenic disturbance has resulted in the establishment of exotic species such as *Chromolaena odorata*, *Pandanus utilis* and *Opuntia spp*. in the lower extent of the site. There is the potential for these alien invasive species to spread into the better-quality vegetation, located higher up on the slopes. Since the property is vacant, there is currently no management of alien vegetation or the DMOSS area in general. With the development of House Kellerman, the applicant will be responsible for the long-term conservation and management of the coastal dune forest environment on the remaining 79% of the property. This is a positive impact associated with the proposed development.

2.2 CONCLUDING STATEMENT INDICATING PREFERRED ALTERNATIVES

Since the property was purchased by the applicant for the purpose of constructing a residential dwelling, no other feasible site or activity alternatives have been assessed. The preferred layout alternative is Layout Alternative 3, which takes into consideration recommendations made by the piling specialist (i.e. technology alternatives) as well as the sites environmental constraints. Layout Alternatives 1 and 2 have not been assessed further as these alternatives were not considered feasible by the specialist piling contractor.

2.3 MOTIVATION FOR PREFERRED ALTERNATIVE

The following provides a summary motivating the preferred alternative:

- The preferred layout accommodates the structure on three platforms using contiguous piling, as recommended by the ecological specialist. Contiguous piling ensures stability of the dune slope above and around the development footprint.
- By securing the slopes early in the construction phase (i.e. "1st phase" indicated in Figure 5), the risk of the development having an indirect impact on the adjacent coastal dune forest / DMOSS area is reduced (i.e. no dune movement or disturbance to dune vegetation).
- The proposed concrete retaining wall which will be constructed on the DMOSS boundary will act as a physical barrier between construction activities and the coastal dune forest prevent encroachment during construction.
- All construction activity, including the establishment of the piling rig will therefore remain on the seaward side of the top concrete retaining wall.
- The garden area included on Level 3, acts as a "soft buffer" between construction activities and the DMOSS reducing the risk of construction staff accessing the adjacent coastal dune forest.

[3] Section 7.0 of the SDP Ecological Assessment of Portion 1283 Cottonland, uMdloti, eThekwini (April 2021).

Figure 5: Cross Section Through the Preferred Layout Alternative of House Kellerman Showing the Preferred Structural Design (Source: EPA, 2021).

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 Kellerman. 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 Kellerman.

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 and 3 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).

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 the uMdloti River, which is approximately 340m north of the site. The uMdloti River will not 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. A permit for the clearance of 228m^2 of natural forest must be applied for prior to construction taking place. A permit is also required for the removal of two protected Milkwood trees.
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 "*moderate*" 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.
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. There is no existing infrastructure on site and therefore no structures with heritage or archaeological value. No graves are located on site. The property falls within a "*very high*" palaeontological (i.e. fossils) sensitive 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.
eThekwini Spatial Development Plan (2020 – 2021).	SDF	The SDF as well as other lower order plans provide developers with detailed spatial guidance on land use and densities for an area in conjunction with the strategic intentions of the SDF. The site is located within an urban area with access to municipal services. The property is zoned for residential use. The proposed development is similar to the surrounding residential developments and is therefore in line with the municipal SDF.
eThekwini North Spatial Development Plan (adopted 2013-2014)	-	The proposed development is compliant with the spatial plan for the area which describes the land use intentions of the northern coastal corridor east of the N2 as "*a mixed use and mixed density residential, recreation, entertainment and tourist-oriented corridor*".
Ohlanga-Tongati Local Area Plan	-	The proposed development must consider the architectural considerations provided in this plan as was as the Coastal Management Plan. The aim of the architectural guidelines is that "*development in the coastal area should strive to blend in with and reflect the unique nature of the coastal environment*". A number of specific measures are provided which must be incorporated into the design of the building (i.e. use of natural coastal colours).
Coastal Management Plan (adopted 2010)	-	

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*"[4].

Proposed House Kellerman is strategically located in the sought-after coastal town of uMdloti. The property is zoned for residential use with neighbouring properties to the north and south both 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 proposed development is in line with the relevant municipal plans and framework (i.e. eThekwini SDF and North Spatial Development Plan) and therefore will ultimately benefit the broader societies needs and interest.

Initial input from eThekwini's Strategic Spatial Planning (SSP) Branch has been received on the application (Comments & Response Table attached under Appendix D). The SSP Branch describes the surrounding land uses as being characterise by high density residential developments with some restaurants. The stretch on which the site is located is mainly comprised of large dwelling units. The proposed five storey residential dwelling is therefore in line with the surrounding land uses.

The preferred layout alternative is ecologically sustainable with only 21% of the property being earmarked for development. The remaining 79% will be conserved and managed by the applicant. No infrastructure or fencing is proposed in the remaining coastal forest leeward of the proposed development, allowing uninterrupted movement of fauna through the site.

The proposed development is therefore 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.

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

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 both the northern and southern 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 site is undeveloped with no structures of archaeological significance. 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 "*very 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	Yes	SDP Ecological and Environmental Services carried out an Ecological Assessment of the site which assesses the impact of

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

		the proposed development on fauna and flora. The findings of the report are summarised in the sections below.
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	The Ecological Assessment undertaken by SDP Ecological and Environmental Services includes a Marine Impact Assessment / Coastal Vulnerability Assessment. The findings of the report are summarised in the sections below.
Avian Impact Assessment	No	The small development footprint in the eastern portion of the site will not significantly impact any bird communities. The balance of the property will remain natural Coastal Dune Forest. No bird species of conservation concern were identified by the specialist (see section 7.2 of the Ecological Assessment).
Geotechnical Assessment	Yes	A Geotechnical Investigation Report was carried out by Drennan Maud and is attached under Appendix B. The findings of the report are summarised under section 4.2.
Socio-Economic Assessment	No	As per section 3.2 above, the proposed development is in line with the municipal planning framework for the area. There will be no significant socio-economic impact on the uMdloti area and therefore a Socio-Economic Assessment was not considered necessary.
Plant Species Assessment	Yes	A plant species list is included in the Ecological Assessment attached under Appendix B.
Animal Species Assessment	Yes	The SDP Ecological Assessment includes a faunal species list as well as comment on the potential impact on local fauna (see section 7.2 of the Ecological Report).

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 town of uMdloti lies on the seaward portion of a Pleistocene dune cordon. Portion 1283 of Farm Cotton Lands 1575, where development is proposed, is positioned on the northern side of uMdloti town. The eastern portion of the property, is situated at the toe of the primary shoreline dune. The eastern portion of the property is situated at the toe of the primary shoreline dune. The eastern boundary of the property is approximately 25m inland from the high-water mark of the sea. North Beach Road, which is used to access the site, separates the property from the fore dune. As shown in Figure 6, the gradient rises steeply from a relatively gentle terrace next to North Beach Road, to the upper extent of the property. Section 5.2 of the Geotechnical Investigation Report describes the gradient as "*extremely steep, in excess of 40°, but flattening out towards the eastern boundary along North Beach Road*".

Figure 6: Elevation Profile of the Application Area. Proposed Location of House Kellerman Indicated by the Blue Rectangle (East to West; Google Earth Pro, 2021).

4.2 GEOGRAPHICAL ATTRIBUTES AND GEOLOGY

A Geotechnical Investigation was carried out on the site by Drennan Maud (Pty) Ltd. The report is attached under Appendix B. The field investigation showed that the site is comprised of "*a sequence of unconsolidated, recent wind-blown dune sands overlying relatively hard bedrock, which is exposed intermittently on the beach front*"[5]. The geologist describes the bedrock geology as being "*comprised of sandstone of the Vryheid Formation (widely-jointed medium hard to hard rock) intruded by Karoo Dolerite (widely-jointed hard to very hard rock)*".

The steep dune on site is classified as a "*bluff slope*" with the following restrictions put in place by eThekwini Municipality:

- The vegetation binding the slope should not be removed, failing which the slope may become unstable.
- No cutting into the slope may be carried out without providing lateral support.

The dune slope is comprised of very loose, fine grained sands which are highly susceptible to erosion and liquefaction if subjected to concentrated stormwater runoff (i.e. term known as "*dune movement*"). The geology of the site is itself a significantly sensitive environmental feature of the site. Any arbitrary excavation on site may de-stabilise the dune slope above and on either side of the excavation creating a safety as well as an environmental risk. As advised in section 9.7.2 of the Geotechnical Investigation, a piling specialist, with experience in the uMdloti area, was contacted to provide further input on the founding of the main structure. Mega Pile accordingly, prepared a Construction Method Statement outlining how the lateral support / piling foundations will be constructed for House Kellerman (Appendix B). The method statement was requested by the EAP to ensure secure foundations for the residential dwelling in the long-term while not compromising the dune slope and associated northern coastal forest on the western side of the development.

The findings and recommendations made in the Geotechnical Investigation and Construction Method Statement 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 Indian Ocean Coastal Belt biome and Northern Coastal Grassland (KZN 16) ecosystem. This ecosystem has been classified as "*critically endangered*" by SANBI. Portion 1283 of Farm Cotton Lands 1575 is comprised of Kwa-Zulu Natal Northern Coastal Forest, which is considered "*vulnerable*" from a conservation perspective. As shown in Figure 3, the steep dune formation, which has not been subject to transformation has been designated as DMOSS. The specialist describes the dune forest as having "*regionally significant botanical constituents*". The DMOSS designation is therefore relevant and appropriate for the site. The intact dune forest, in the western portion of the property has accordingly been identified as a highly sensitive environmental feature.

B. discolor and *Ficus burtt-davyi* dominate the site, creating a dense, entangled thicket. Few large and significant woody species, such as *Mimusops caffra* and *Euclea natalensis* were identified in the upper reaches of the study area, allowing for the presence of typical dune forest undergrowth. Exotic species such as *Chromolaena odorata, Pandanus utilis* and *Opuntia spp* were recorded along the fringes of the property, where disturbance has previously taken place (construction of North Beach Road and neighbouring residential developments). A full list of the plant species encountered on site is provided as Annexure B of the Ecological Assessment attached under Appendix B.

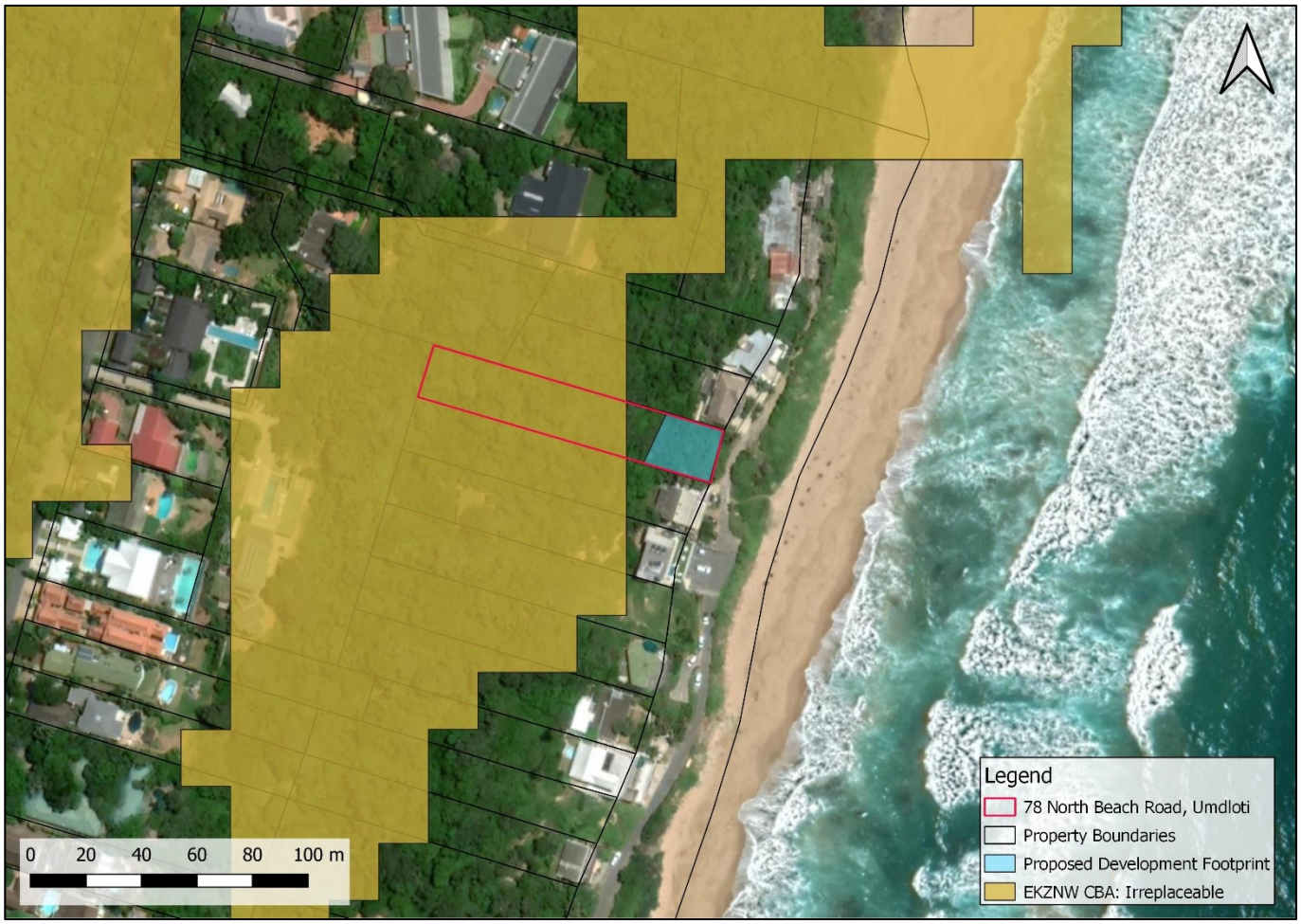
The specialist notes a definite distinction between the lower portions of the site (transects 1 & 2 in Figure 7 of the Ecological Report) and the more elevated portions. The botanical composition at higher elevations (transects 3 - 5 in Figure 7 of the Ecological Report) is consistent with Northern Coastal Forest. Two *M caffra* (Milkwood) species were identified within the proposed development footprint (29°39'17.95"S; 31°07'32.99"E and 29°39'17.72"S; 31°07'33.13"E).

The eastern extent of the property, where development is proposed, does not fall within the Ezemvelo KZN Wildlife Critical Biodiversity Area (CBA, Figure 7). The CBA is restricted to further up the dune cordon and is associated with the DMOSS area. Table 1 in the Ecological Assessment provides a list of the faunal species anticipated in the study area. All species apart from *Philantomba monticola* (Blue Duiker) are listed as "*Least Concern*". *Philantomba monticola* is listed as "*vulnerable*". Animal species are expected to leave the site as a consequence of disturbance at the commencement of construction.

[5] Section 7.1 of the Drennan Maud "Geotechnical Investigation Report for 78 North Beach Road, Umdloti: Proposed House Kellerman" April 2021.

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

Figure 7: Location of the EKZNW Critical Biodiversity Area (Irreplaceable), Shaded in Yellow (QGIS with EKZNW CBA Overlay).



4.4 COASTAL VULNERABILITY

The Coastal Vulnerability Index suggests that the study area has a "*moderate*" vulnerability (indicated in Figure 3). This vulnerability index refers to the level of vulnerability that may arise on built structures as a result of both sea level rise, storm forced erosion and tidal inundation, or a combination of both. The site was considered to have a moderate vulnerability due to the geological stability of the area, aspect, a wide beach and a wide and stable dune form. The area was impacted by erosion during the 2007 marine storm event (1:35 years interval) however the specialist concludes that the proposed development footprint is "*generally suitably protected from such events in the short to medium term*" due to the presence of North Beach Road, which is located between the property and the fore dune[6].

4.5 WATERCOURSES

There are no watercourses on the property or within 32m of the property boundary. The nearest watercourse is the mouth of the Umdloti River and is approximately 335m north of the study area. No watercourses will be impacted by the proposed development.

4.6 CULTURAL AND HERITAGE

The property is undeveloped and therefore no infrastructure with archaeological value is located on site. There is no known cultural significance associated with the area and no graves noted. 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).

[6] Section 6.1 of the SDP Ecological Assessment of Portion 1283 Cottonland, uMdloti, eThekwini (April 2021).

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)[7].

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 58 of eThekwini Municipality. uMdloti is a small, coastal town which stretches for approximately 3.7km along the coastline. The area consists of a mixture of free-standing homes, mainly located along South Beach Road, and sectional title apartments, mostly along North Beach Road. There is limited retail and commercial developments in the town. The proposed House Kellerman is well aligned with the socio-economic environment of the area.

4.8 SURROUNDING LAND USES

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

Table 4: Land Uses Surrounding 78 North Beach Road, uMdloti.

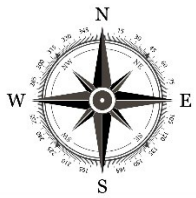
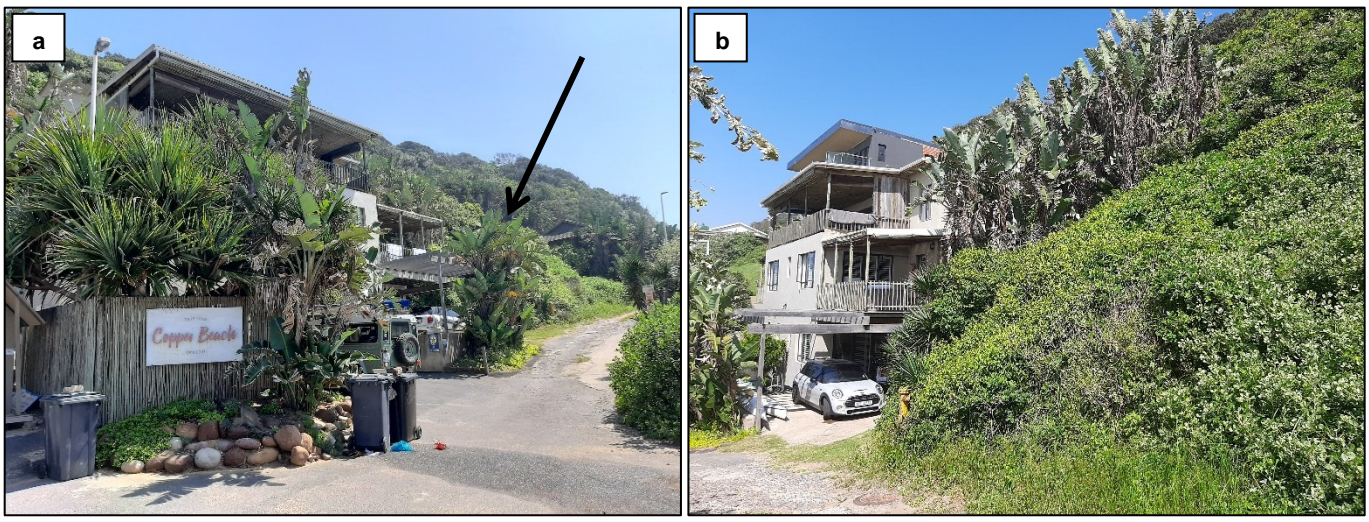
	Northern Coastal Forest	Residential Dwelling	Fore Dune & Indian Ocean
	Northern Coastal Forest	**Application Area**	Fore Dune & Indian Ocean
	Northern Coastal Forest	Residential Dwelling (B&B)	Fore Dune & Indian Ocean

Figure 8: Photographs Showing the Characteristics of the Site Taken on the 08th March 2021: (a) Entrance to the Site off North Beach Road. Photographer Facing North from Public Parking Area. The Site is Indicated by the Arrow; and (b) Dune Vegetation Associated with the Lower Portions of the Site.



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

Figure 8 (cont.): Photographs Showing the Characteristics of the Site Taken on the 08th March 2021: (c) Northern Property Boundary Indicated by *Strelitzia nicolaii*; and (d) Photographer Facing South Showing Fore Dune Separated By North Beach Road.

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 issues raised by I & APs to date is provided below:

- Concerns regarding the clearance of indigenous dune forest vegetation were raised early in the process by the uMdloti Coastal Conservancy. More information on the proposed development footprint was requested and has been provided in the Basic Assessment Report.
- DFFE was notified of the application in April 2021. DFFE has raised initial concerns about the proposed development impacting on existing natural forests as well as protected tree species in terms of the National Forest Act (1998). A Vegetation Assessment was requested by DFFE and has been attached under Appendix B of the Basic Assessment Report.
- A meeting was held with eThekwini EPCPD on the 24th May 2021. Meeting minutes are attached under Appendix B of the Public Participation Report. EPCPD requested that, since there is no buffer proposed between construction and the DMOSS area, strong mitigation measures must be provided by the EAP and specialists to ensure there is no encroachment or indirect impact on the sensitive dune forest environment. Mitigation measures have been provided in section 6.0 below and the EMPr attached under Appendix E.

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 9: 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 Alternative for House Kellerman.

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. Earthworks for foundation piling.	**a. Clearance of 447m^2 of indigenous vegetation from within the critically endangered Northern Coastal Grasslands ecosystem.**	Local	Long-term	Substantial	Very Likely	Moderate	The total area of vegetation cleared from the site will be 447m^2. The eastern portion of the property consists of disturbed vegetation however 228m^2 of natural forest will be cleared from higher up the slope (i.e. from SDP vegetation transect 3 upwards). Two protected *Mimusops caffra* (Milkwood) species are located within the development footprint and will need to be removed. This impact cannot be fully mitigated however the measures provided below are essential to not only ensure minimal disturbance to the adjacent Coastal Dune Forest but also to limit destabilization of the slope above the development footprint. The ecological specialist emphasised the need to maintain vegetation immediately leeward of the developable area to prevent dune movement / slip. • Prior to any work commencing on site, an independent Environmental Control Officer (ECO) must be appointed and conduct Environmental Awareness training as per section 5.0 of the EMPr (Appendix E). • The induction training must include: - An indication of the location of the environmentally sensitive areas, which includes the fore dune in front of the property and the DMOSS area, behind the development footprint. - The importance of the environmentally sensitive areas.	Moderate	Low	4	High

							- Restrictions associated with the environmentally sensitive areas. - Contingency measures if the environmentally sensitive areas are disturbed. • Vegetation clearing must be carried out in phases. • The northern and southern property boundaries must be clearly demarcated using a shade cloth fence. • Clearing of vegetation and excavating outside the property boundary is prohibited. • The extent of DMOSS must be disclosed to the piling specialists prior to work commencing on site. • The ECO must clearly demarcate the DMOSS boundary line prior to the construction of the Phase 1 retaining wall. • A small retaining wall must be constructed on the DMOSS line to indicate the boundary of the No Go area and the construction footprint (indicated in yellow in Figure 5). • No vegetation may be cleared from behind the retaining wall. • A shade cloth fence must be erected on top of the retaining wall to ensure that a barrier of no less than 2.8m high is created between construction activities and the adjacent Coastal Dune Forest / DMOSS. • The maintenance of larger woody branches extending beyond the shade cloth into the development area should be retained as far as possible. • An "*Application for a License Regarding Trees in Natural Forests*" must be submitted to the Department of Environment, Forestry and Fisheries (DEFF) prior to the clearing of the 228m^2 of natural forest. • An "*Application for a License Regarding Protected Trees*" must be submitted to DEFF				

							prior to the clearing of the two *Mimusops caffra* tree species.				
	b. Piling rig established too close to the DMOSS boundary resulting in disturbance to the sensitive KZN Coastal Dune Forest.	Site	Short-term	Substantial	Likely	Low	A Tractor Mounted Piling Rig will be established on the top platform, seaward of the Phase 1 retaining wall constructed on the DMOSS boundary line. This is required to construct the second retaining structure which forms the structural backbone for levels 1 & 2 (contiguous piling indicated in red in Figure 5). • The installation of the lateral support and piling foundations of House Kellerman must be carried out by a piling specialist familiar with the coastal conditions. • The installation of the lateral support and piling foundations of House Kellerman must be carried out in strict accordance with section 5.0 of the Method Statement compiled by Mega Pile and attached under Appendix B. • As per the Method Statement, an excavator must clear and grub only where necessary to create the access ramp for the piling rig to reach the highest point of the developable area. • The small retaining wall on the DMOSS line must be constructed first, before the piling rig is established on site. • Prior to the creation of the access ramp, the ECO must clearly demarcate the DMOSS boundary line to ensure no vegetation is disturbed beyond this line. • Disturbance to the area leeward of the retaining wall is prohibited. • The Contractor must inspect the piling rig, excavator and any other machinery used on the top platform to ensure all machinery is in good working order with there are no leaks or unnecessary diesel emissions entering the adjacent Coastal Dune Forest.	Moderate	Low	4	High

	c. Erosion of banks / dune movement during the excavation of the various platforms impacting Coastal Dune Forest above the development area.	Local	Short-term	Extreme	Very Likely	Moderate	• The installation of the lateral support system for House Kellerman must be carried out in strict accordance with the Method Statement compiled by Mega Pile and attached under Appendix B. • Any excavations exposing highly erodible sands must take place during the dry season (i.e. March – Aug). • The access ramps for the piling equipment must have hardstanding material to prevent erosion from plant moving machinery. • Vegetation must remain in place wherever possible and for as long as possible during earthworks. • Sound management of surface water runoff from the platforms and other areas under construction must be put in place early in the construction phase. This must include the placement of sandbags and bidim to create berms to control stormwater runoff during earthworks. • Should an area of erosion be noticed on site, this must be addressed immediately, and the area stabilised to prevent further erosion. • Once construction access has been provided and a piling rig established, rock levels along the western margin of the property must be proven as a matter of urgency, to allow design adjustments to be made where necessary. • Should disturbance of the interface between the development footprint and the DMOSS area arise, rehabilitation interventions must be employed. These interventions must include: - Sculpting and stabilization of the dune using geofabrics; - Sowing an appropriate commercial seed mix (ECO to confirm);	Very High	Low	3	Moderate

							- Any emergence and spread of exotic species in this disturbed area must be addressed through the implementation of the Alien Invasive Plants Eradication Management Plan (section 5.4.2. of the EMPr).				
	d. Earthworks undermining adjacent properties and residential infrastructure.	Local	Short-term	Severe	Likely	Moderate	Provided that the lateral support system is carried out in accordance with the specialist piling design (Figure 5), there should be no undermining of the slope impacting adjacent properties. • Contiguous piling must be carried out in a "U" shape to not only protect the western dune slope from collapsing but the northern and southern dune slopes. • Excavation of material on site must not take place until contiguous piling securing that section of the site is complete (to be advised by specialist piling contractor). • All services on the property and adjacent property boundaries must be identified prior to excavations on site commencing. • Vegetation on the property boundaries (i.e. *Strelitzia nicolaii*) must be retained.	High	Low	5	High
	e. Change in edaphic form and structure.	Local	Long-term	Substantial	Likely	Moderate	Excavation and removal of dune material during the earthworks phase of the project will alter the sub-surface form and structure of the dune[8]. This impact is unavoidable and cannot be mitigated. The change in structure of the dune is confined to the 447m^2 development footprint. • Earthworks must not encroach beyond the property boundaries or outside the development footprint, indicated in Figure 3. • No further change in edaphic form and structure is permitted within the DMOSS area in the long-term.	Moderate	Very Low	2	High

[8] Section 8.0 of the SDP "*Ecological Assessment of Portion 1283 Cottonland, uMdloti, eThekwini*" April 2021.

	f. Negative impact on local fauna residing, foraging and /or moving through the site.	Local	Short-term	Slight	Very Likely	Low	Once there is construction activity on site, animal species will vacate the site as a consequence of the noise and disturbance. The construction of the retaining wall at the DMOSS interface will prevent most animal species from entering the construction site after hours and harming themselves. • Should an animal be trapped within the construction site, trained personnel must be engaged where capture and release is required. • Staff are not permitted to harm, poach or trap animal species on site or within the adjacent areas. No snares are permitted. • Feeding of monkeys is not permitted. • All food brought to site by staff must be kept away from monkeys.	Very Low	Very Low	5	High
	g. 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. General construction-related impacts.	**a. Dust & emissions becoming a nuisance to surrounding residents and coating the adjacent dune forest reducing functionality.**	Site	Short-term	Moderate	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.	Moderate	Very Low	5	High

							• 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. • All construction vehicles and equipment must be well maintained to reduce emissions generated on site.				
	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, within neighbouring residential properties or within environmentally sensitive areas (KZN Coastal Dune Forest and beach).	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 into the environmentally sensitive areas or adjacent residential properties. • The waste management area must not be located on the top platform, directly adjacent to the DMOSS interface. • All waste must be stored under cover to prevent rain ingress and/or waste from being blown around site.	Low	Very Low	5	High

							• No waste must be buried or burnt on site. • Potentially hazardous substances [9] 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. • The use of hydrocarbons and other potentially hazardous liquids on site must be managed in accordance with section 4.3 of the EMPr attached under Appendix E. • 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 becoming a nuisance to surrounding residents and negatively impacting environmentally sensitive areas (KZN Coastal Dune Forest and beach).	Site	Short-term	Moderate	Unlikely	Low	Sufficient toilet facilities must be provided on site to prevent construction staff from utilising the surrounding areas. • Toilets must be located within the site camp within the property boundaries (i.e. not on 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. • On-site toilets will be provided for domestic purposes during construction phase (chemical or connected to municipal sewerage pipeline). • 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

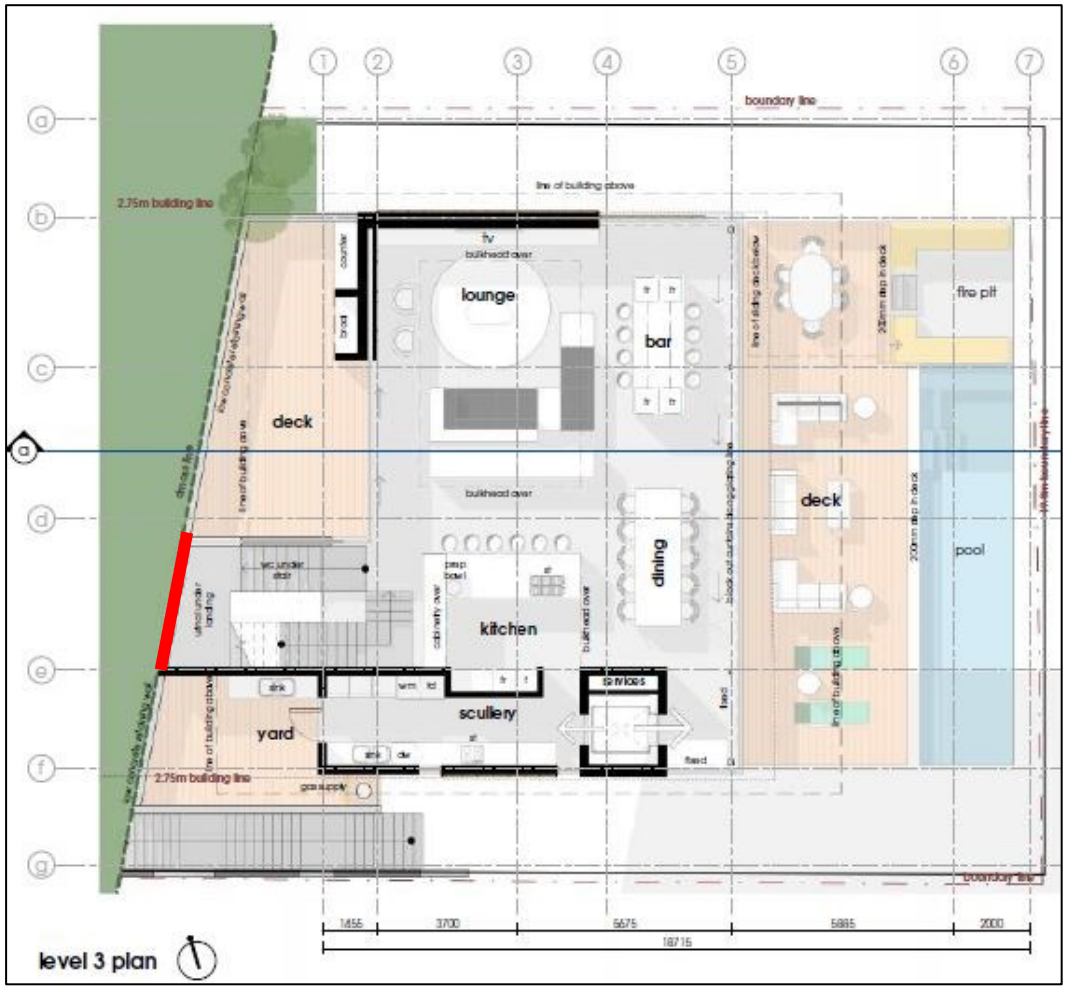
[9] Hazardous substances refer to substances scheduled in the Hazardous Substances Act (1973) and Hazardous Chemical Substances Regulations (1995) and include paint, oils, fuels, solvents, pesticides.

	e. Incorrect placement of the site camp indirectly impacting environmentally sensitive areas (KZN Coastal Dune Forest and beach).	Local	Short-term	Substantial	Likely	Low	• The site camp must not be located on the top platform / at the DMOSS interface. This is to reduce activity levels at the DMOSS interface. • The site camp must be located on a flat portion of land and must include a parking area for vehicles. • Signage is to be erected outside site camp indicating relevant contact details of responsible person in case of complaints or emergencies after hours.	Moderate	Very Low	5	High
3. Construction of House Kellerman.	**a. Alteration of surface and sub-surface hydrology.**	Local	Long-term	Moderate	Very Likely	Moderate	The increase in hard surfaces associated with the proposed structure will reduce subsurface infiltration and increase the volume of surface water runoff. The subsurface hydrology of the site will also change as the lower portions of the dune are altered to accommodate the structure[10]. This impact is unavoidable and cannot be mitigated. The alteration of surface and sub-surface hydrology will be confined to the 447m^2 development footprint.	Low	Low	4	High
	b. Uncontrolled stormwater runoff eroding the fore dune in front of the construction site.	Local	Short-term	Moderate	Unlikely	Low	The alteration of natural ground levels and compaction of the platforms may result in silt running off the site into the nearby beach environment during rainfall events. • Sound management of surface water runoff from the platforms and other areas under construction must be put in place early in the construction phase. • This must include the placement of sandbags and bidim to create berms to control stormwater runoff during earthworks. • Stormwater must be managed on site and directed into the formal municipal stormwater network and not allowed to discharge directly onto the fore dune environment in front of the property.	Low	Very Low	5	High

[10] Section 8.0 of the SDP "*Ecological Assessment of Portion 1283 Cottonland, uMdloti, eThekwini*" April 2021.

	c. Greywater / hydrocarbons / chemicals washing into the formal stormwater network and polluting the associated 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. • No vehicles or equipment must be washed on site unless at a designated wash bay where dirty water must drain into a sump where hydrocarbons / contaminated material is separated out before the water is discharged into the surrounding environment. • 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.	Low	Very Low	5	Moderate

	d. Encroachment into and/or disturbance of adjacent KZN Coastal Dune Forest / DMOSS area by staff or construction activities.	Site	Short-term	Severe	Likely	Moderate	Through careful planning and design modifications, the risk of construction activities disturbing the DMOSS area has been reduced. The following must be retained in the design to prevent this impact from occuringoccurring: • The Phase 1 retaining wall with shade cloth fence (no less than 2.8m high) must be constructed along the DMOSS boundary to create a physical barrier between construction activities and the adjacent Coastal Dune Forest / DMOSS. • The edge of the actual building footprint will be constructed between 1.5 to 4.5m from the DMOSS boundary. With the exception of one section of the building, which is the western wall of the staircase (indicated by the red line in Figure 10 below). The outer wall will be built out of off-shutter concrete, hence will not be plastered or painted, reducing construction activity at this point. Mitigation measures to be implemented during the pre-construction and construction phases: • Prior to any work commencing on site, the ECO must conduct Environmental Awareness training with all site personnel as per section 5.0 of the EMPr (Appendix E). • Should staff personnel enter the No-Go DMOSS area beyond the retaining wall or dispose of any waste or construction material into the DMOSS area, that staff member must be given a disciplinary warning. • Once construction is complete and the shade cloth fence removed, the Contractor must inspect the area behind the fence and ensure there is no litter or construction material in this area prior to vacating the site.	High	Low	4	High

							Figure 10: Proposed Design for Level 3 of House Kellerman (Source: EPA Architects, May 2021). 					
	e. Proliferation of exotic species within the development footprint and adjacent environmentally sensitive areas.	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[11]. The establishment and spread of alien invasive species within the disturbance footprint	Moderate	Very Low	4	High

[11] Section 8.0 of the SDP "*Ecological Assessment of Portion 1283 Cottonland, uMdloti, eThekwini*" April 2021.

							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.				
OPERATION											
4. General residential activities at 78 North Beach Road.	**a. Nuisance to fauna and flora within the adjacent sensitive KZN Coastal Dune Forest / DMOSS area.**	Local	Long-term	Moderate	Likely	Moderate	The following mitigation measures must be implemented during the planning and operational phases to ensure the Coastal Dune Forest habitat is not negatively impacted in the long-term: • The architect must ensure minimal exposure of artificial light into the nearby Coastal Dune Forest during the design of House Kellerman (specifically Levels 3 & 4). • External lighting must not be obtrusive or a nuisance. All lighting must be ambient type (yellow rather than white), downlighting. • No lights must be directed into the DMOSS area at the back of the house. • Pets (dogs and cats) are not permitted to enter the DMOSS area unaccompanied. • The applicant is responsible for the long-term conservation and management of the remaining 1 688m^2 of DMOSS behind the house. • No infrastructure is permitted to be constructed within the DMOSS area. • An Alien Invasive Plant Management Plan has been included under section 5.4.2 of the EMPr (Appendix E) and must be adhered to by the applicant. • Should there be any landscaping carried out on site, this must not encroach into the	Low	Low	5	Moderate

							DMOSS area. Species used in landscaping must be species found in coastal dune habitat. • No invasive species are to be planted on site as part of the landscaping.				
	b. Structure at risk of sea level risk, storm forced erosion and / or tidal inundation.	Local	Long-term	Severe	Unlikely	Low	Although the Coastal Vulnerability Index suggests that the site has a "*moderate*" vulnerability, the specialist concluded that the structure is "*generally suitably protected from such events in the short to medium term*" [12]. The residential development is position at elevation and well back from the shoreline. North Beach Road in front of House Kellerman is considered to have moderate to high vulnerability to coastal erosion events. No further mitigation was provided by the specialist.	Moderate	Low	5	High
	c. Increase in hard surfaces resulting in high velocity stormwater runoff onto the beach and dune environment.	Local	Long-term	Moderate	Likely	Low	Once constructed, significant runoff from rooftop and other hardpan surfaces will arise. To this end, the following measures should be set in place: • Use of attenuators and spreaders should be undertaken to retain surface water on site and promote percolation of stormwater into the surrounding ground. • Harvesting of rainwater must be implemented on site. • Existing stormwater infrastructure should be utilized within North Beach Road.	Low	Very Low	5	High
CUMULATIVE											
5. Development of House Kellerman along the coastal strip in uMdloti.	**a. Cumulative alteration in habitat in the uMdloti area and reduction in area of open space used by local faunal species.**	Local	Long-term	Moderate	Likely	Moderate	The development of House Kellerman will contribute to the cumulative removal of prevailing vegetation forms within uMdloti[13]. As above, the total area of vegetation cleared is 447m^2. Of this, 228m^2 of natural forest will be cleared. This is unavoidable however the remaining 79% of the property (1 688m^2) will be retained as open space, undisturbed by development. The proposed development is in line with the zoning and therefore	Low	Very Low	5	High

[12] Section 6.1 of the SDP "*Ecological Assessment of Portion 1283 Cottonland, uMdloti, eThekwini*" April 2021.
[13] Section 8.0 of the SDP "*Ecological Assessment of Portion 1283 Cottonland, uMdloti, eThekwini*" April 2021.

							the municipal spatial development framework for the area.				
	b. Retention of DMOSS corridor through uMdloti dune environment.	Local	Long-term	N/A	Very Likely	N/A	This is a positive impact associated with the development. The applicant will maintain the DMOSS corridor behind the house in the long-term. This ecological corridor comprises 79% of the property and is connected to other open space to the north, south and west of the property (shown in green in Figure 3). This open space, which serves as an important botanical feature and ecological corridor in uMdloti, will be maintained free of alien invasive vegetation and remained undeveloped in perpetuity by the applicant.	Positive	Positive	N/A	High
	c. Pressure on municipal services (traffic, bulk potable water supply and sewerage disposal network) and electricity demand.	Local	Long-term	Slight	Unlikely	Low	The property is zoned for residential development within existing municipal services available at the property boundary. The development will connect to the available waterborne sewerage network as well as the municipal water network. To reduce demand on the potable water supply, rainwater harvesting has been included in the design. Re-use of greywater will also be catered for in the design. Solar powered geysers are proposed to reduce electricity usage. Since the development is a private residential development (i.e. not commercial), no upgrades are required for the existing road network.	Very Low	Very Low	5	High

7.0 ENVIRONMENTAL IMPACT STATEMENT

7.1 SUMMARY OF KEY FINDINGS (POSITIVE AND NEGATIVE IMPACTS)

Proposed House Kellerman, located at 78 North Beach Road in uMdloti, is located within 100m of the high-water mark of the Indian Ocean. Due to the elevation of the site and the presence of North Beach Road between the property and the fore dune, the specialist concluded that the structure is suitably protected from the risk of storm forced erosion or tidal inundation in the short to medium term. The geology of the site is comprised of unconsolidated, recent wind-blown dune sands giving rise to a sensitive and dynamic dune environment susceptible to minor changes in slope and vegetation clearance[14]. The development footprint as well as the construction methodology were therefore key considerations throughout the EIA process.

Taken the above into consideration, a relatively restricted development footprint is available in the eastern portion of the property (21% of the property). Despite this relatively small footprint of 447m^2, if the initial phases of the development are not managed carefully in accordance with specialist recommendations contained in the attached EMPr, the project may have a significant environmental impact on the characteristics of the dune and associated Coastal Dune Forest / DMOSS area. The following provides a summary of the key findings of the assessment:

- The geotechnical engineer states that the most sensitive aspect of the construction process is the installation of the permanent and temporary lateral support around the development margins. A specialist piling contractor, familiar with the uMdloti coastal dune environment, was therefore appointed to design the lateral supports. The Construction Method Statement provided by the piling specialist not only ensures stability of the structure and surrounding dune environment but also safeguards the adjacent Coastal Dune Forest / DMOSS area during the initial piling done near the DMOSS boundary.
- The interface between construction activities and the adjacent Coastal Dune Forest / DMOSS area must be clearly demarcated prior to any construction activity on site. A knowledgeable ECO with the necessary experience and skills to accurately demarcate and manage the DMOSS interface must be appointed. The Phase 1 retaining structure must be constructed along this demarcated line.
- The initial construction phase poses the highest risk to the surrounding dune environment. The ECO must therefore audit the earthworks phase every two weeks (one monthly report provided). The auditing frequency can be reduced to monthly once the platforms have been established.
- eThekwini EPCPD raised concerns regarding the proximity of construction activities to the DMOSS boundary. The design of the lateral support for the structure has been done in such a way that there is a physical, boundary established at the interface between DMOSS and construction activities (retaining wall with shade cloth fence on top). Mitigation measures contained in the EMPr aim to ensure that all personnel on site are aware of the sensitive Coastal Dune Forest outside of the development footprint and the restrictions imposed.
- Two protected tree species and 228m^2 of natural forest will be cleared to accommodate the structure. A permit from DEFF must be obtained prior to this clearance taking place.
- The long-term / operational phase of House Kellerman poses a low risk to the surrounding environment. The retention of the remainder of the property (i.e. 79%) as an ecological corridor, connected to other open space areas in uMdloti, was identified as a positive impact associated with the project.

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 "*Ecological Assessment of Portion 1283 Cottonland, uMdloti, eThekwini*" April 2021 and section 5.0 of the "Palaeontological Impact Assessment". A limitation of the Geotechnical Investigation Report is that "*the rock levels at depth, but particularly along the western margin of the proposed development, have not been confirmed by drilling, as the site is inaccessible at present. Once construction access has been provided and a piling rig established, rock levels along the western margin should be proven as a matter of urgency, to allow design adjustments to be made where necessary*.[15]" This requirement has been included under section 4.3 of the EMPr.

[14] Section 7.0 of the SDP "*Ecological Assessment of Portion 1283 Cottonland, uMdloti, eThekwini*" April 2021.

[15] Section 10.4 of the Drennan Maud "Geotechnical Investigation Report for 78 North Beach Road, Umdloti: Proposed House Kellerman" April 2021.

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 7: Impact Management Outcomes Associated with House Kellerman.

Primary Impact Management Outcome: *To create a sustainable development by constraining the development footprint and associated construction activities to the lower 21% of the property.*		
#	**Impact Management Outcome**	**Measures in Place to Achieve Outcome**
1	To avoid unnecessary clearing of Coastal Dune Forest outside of the authorised development footprint.	An independent ECO must clearly demarcate the DMOSS boundary line where the first retaining structure will be constructed. A 2.8m high physical barrier will be constructed at the DMOSS interface. Measures to manage the clearance of vegetation have been included under section 4.3 of the EMPr.
2	Staff to be aware of the sensitive Coastal Dune Forest outside of the authorised development footprint and the restrictions associated with it.	Prior to any work commencing on site, an independent ECO must be appointed and conduct Environmental Awareness training as per section 5.0 of the EMPr. Should staff personnel enter the DMOSS area beyond the retaining wall or dispose of any waste or construction material into the DMOSS area, that staff member must be given a disciplinary warning.
3	To avoid any disturbance (direct or indirect) to the fore dune and beach environment in front of the property.	The fore dune in front of the development footprint is a No-Go area. Measures to prevent and manage any indirect impacts on the surrounding environment (i.e. stormwater management) have been included under section 4.3 of the EMPr.
4	Ensure dune stability during excavation of the platforms.	The Construction Method Statement prepared by the specialist piling contractor, Mega Pile, must be strictly adhered to.
5	The long-term, ongoing preservation of the open space system associated with the Coastal Dune Forest behind House Kellerman.	The remaining 79% of the property will not be developed. Management measures have been included in the EMPr to manage light pollution and alien vegetation during the operational phase.

7.4 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

Construction of House Kellerman 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 Environmental Control Officer (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 audit the earthworks phase of construction period every two weeks.
- One monthly report summarising the findings of the audits must be submitted to the applicant, Contractor and EDTEA: Compliance and Enforcement.
- The auditing frequency can then be reduced to monthly once the platforms have been established and construction commences with the top-structure. 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 construction of House Kellerman, as per the preferred layout alternative, be authorised by EDTEA. The Preferred Layout Alternative, attached under Appendix C, and the Construction Method Statement prepared by Mega Pile and attached under Appendix B must be strictly adhered to. No infrastructure or construction related activities must take place within the Coastal Dune Forest / DMOSS area leeward of House Kellerman. It is important that all staff working on site are aware of the sensitive environmental areas at the onset of construction. After mitigation, the significance of all impacts associated with the layout have "*low*" to "*very low*" significance.

The construction of the retaining wall on the DMOSS boundary line is an important design feature to physically prevent unintentional disturbance to the adjacent Coastal Dune Forest and serves to stabilise the dune slope above the development footprint. The retention of the remainder of the property (i.e. 79%) as an ecological corridor, connected to other open space areas in uMdloti, was identified as 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 House Kellerman be authorised as shown in Figure 11.

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

- The construction of House Kellerman must strictly comply with the Construction Method Statement for "Lateral Support" provided by Mega Pile (Appendix B) and the "section a-a- structural concept" diagram prepared by EPA architects (Appendix C).
- The EMPr attached under Appendix E must be adhered to during all phases of the project.
- A knowledgeable ECO with the necessary experience and skills to accurately demarcate and manage the DMOSS interface must be appointed by the applicant to ensure compliance with the EMPr.
- The ECO must monitor the earthworks phase every second week to ensure the site is stable and that there is no encroachment beyond the authorised development footprint.
- The authorised development footprint must be clearly demarcated by the Contractor, in conjunction with the ECO, to avoid unnecessary clearing of indigenous vegetation.
- Excavations exposing highly erodible sand must take place during the dry season (i.e. March – Aug).
- A permit from DEFF must be obtained prior to this clearance of the two protected tree species and the 228m^2 of natural forest.
- Sound management of surface water runoff from the platforms and other areas under construction must be put in place early in the construction phase.
- The applicant is responsible for the long-term conservation and management of the DMOSS area leeward of the structure. This includes the implementation of the "*Eradication of Alien Invasive Plant*" Management Plan (section 5.4.2 of the EMPr).

Figure 11: Location of House Kellerman at 78 North beach Road, Umdloti Showing Sensitive Environmental Areas to be Avoided During Construction.