

ENVIRONMENTAL MANAGEMENT PROGRAMME
INFILLING AND EXCAVATION OF MATERIAL AND CLEARANCE OF INDIGENOUS
VEGETATION WITHIN 100M OF THE HIGH-WATER MARK OF THE SEA AT 57
NORTH BEACH ROAD, WESTBROOK
ETHEKWINI MUNICIPALITY
DM/0003/2022



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AUTHOR OF REPORT

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1.0. PROJECT DESCRIPTION

1.1. BACKGROUND

Tyrone Bedessy proposes to construct a private residential dwelling on Portion 291 of Farm Lot 44 No. 1570, located at 57 North Beach Road, Westbrook. Construction of the house will take place within 100m of the high-water mark of the sea. More than 300m² of indigenous vegetation will be cleared to accommodate the new residential dwelling. 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) for the activities listed 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) 04 th December 2014 as amended.	During the construction of House Bedessy, a significant volume of material will be excavated on site ($\pm 3\,000\text{m}^3$). Material will be excavated within 100m of the high-water mark of the sea.
12(d)(iv) & (vi)	Listing Notice 3 (GNR324) 04 th December 2014 as amended.	During construction of House Bedessy, 675m 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. DESCRIPTION OF ACTIVITY

Tyrone Bedessy, recently purchased Portion 291 of Lot 44 No. 1570, located at 57 North Beach Road in Westbrook (Figure 1). The property is currently undeveloped. Mr Bedessy intends to develop a private residential dwelling on the property. The proposed development is comprised of the following:

- Two storey development with garages underneath the house and swimming pool (180m²),
- Garden / Landscaped area (270m²),
- Driveway and parking area (175m²), and
- Vertical Retaining Wall (19.83m long x 2.4m wide x 3.23m high)

The total development footprint is 675m². There are existing municipal bulk services available to provide the house with an electrical connection, potable water and waterborne sewage disposal.

Almost the entire property, which is 1 700m² in extent, is located within the eThekweni Durban Metropolitan Open Space System (DMOSS). Relaxation of 445m² of DMOSS is therefore required from eThekweni Environmental Planning and Climate Protection Department (EPCPD) to accommodate the development footprint. The rest of the site, 1 025m², will remain undeveloped and be retained as DMOSS.

Figure 1: Site Development Plan Showing the Preferred Layout of the Proposed Infrastructure for House Bedessy and Building Cross Sections Showing the Preferred Technology Alternative for a Vertical Retaining Wall (Source: NSA, 2022).

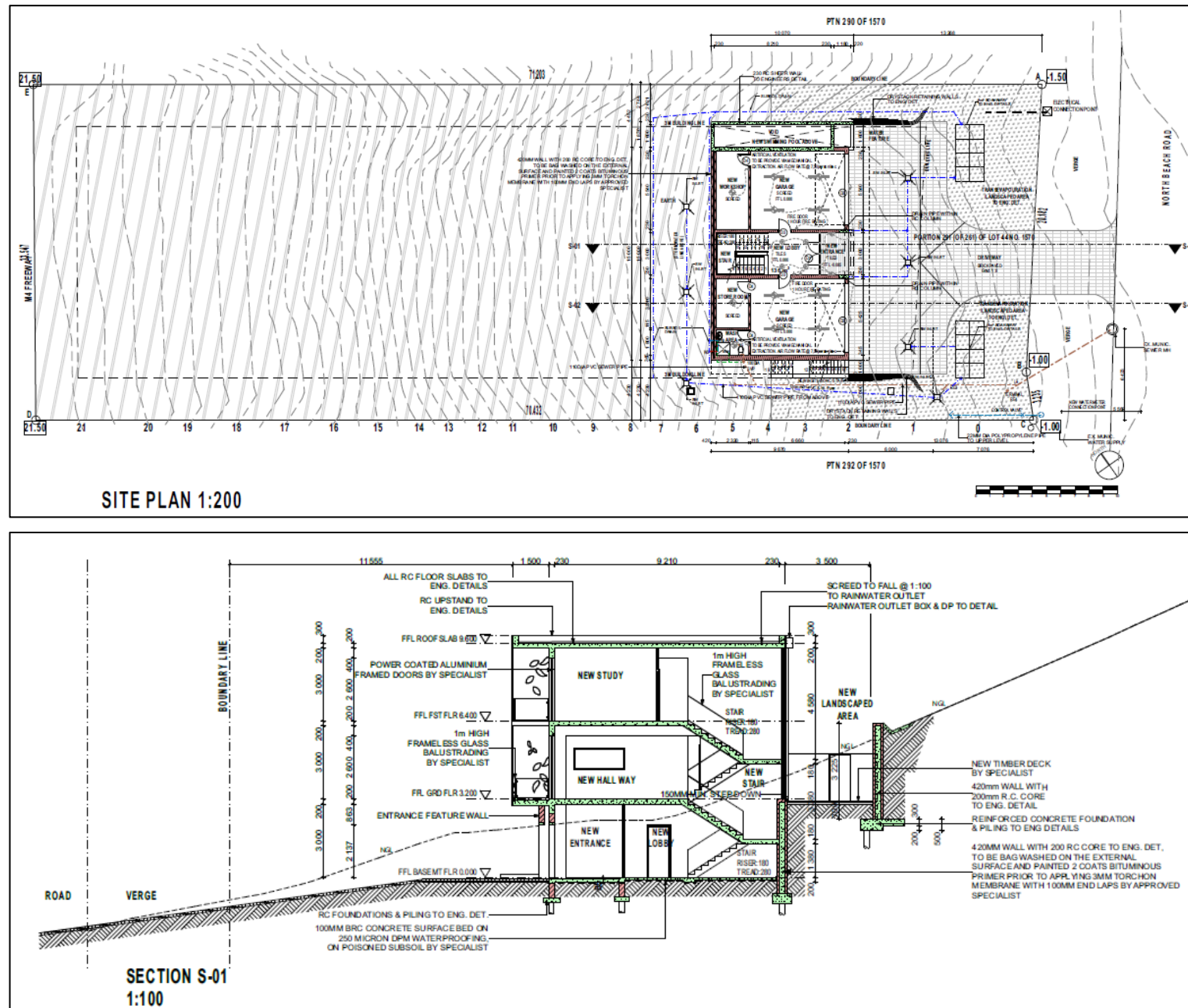


Figure 2: Map Superimposing the Proposed Activity and Associated Infrastructure on the Environmentally Sensitivities of the Study Area.



Figure 3: Location of House Bedessy at 57 North Beach Road, Westbrook Showing Sensitive Environmental Areas to be Avoided During Construction.



1.3. ENVIRONMENTAL SENSITIVITIES

The following sensitive environmental features have been identified within the study area (refer to Figures 2 & 3):

- The geology of the site is comprised of very loose, fine-grained sands which are highly susceptible to erosion if subjected to concentrated stormwater runoff. Arbitrary or excessive excavations on site may de-stabilise the dune slope creating a safety as well as an environmental risk.
- The vegetation on site is comprised of Northern Coastal Forest habitat which has been moderately disturbed. The preferred layout excludes development within the woody / forest habitat with clearance largely limited to the thicket vegetation.
- The final position of House Bedessy, as shown in Figure 1, allows for the construction of a 3.23m vertical retaining wall. The house must not be shifted westward or this will result in a higher, potentially unstable retaining wall or a stepped retaining wall with a larger footprint.
- The Coastal Vulnerability Index suggests that the study area has a “moderate” vulnerability. 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 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 Fossil Chance Find Protocol has been included in the EMPr.

The Applicant, Contractors and Staff on site must be made aware of the environmental sensitivities and associated restrictions. The restrictions must be clearly explained by the Environmental Control Officer (ECO) prior to construction commencing. An Environmental Awareness Plan has been prepared for Contractors working on site (section 5.0). The Environmental Awareness Plan will form part of the Environmental Induction training prior to work commencing.

1.4. IMPACT MANAGEMENT OUTCOMES

Considering the type of activity and the environmental sensitivities associated with the site, impact management actions were formulated during the Environmental Impact Assessment to avoid, manage and mitigate risks that were identified for the different phases of the activity including planning and design, pre-construction activities, construction activities, rehabilitation / post-construction and operational activities (where applicable). Impact management actions are in place to achieve the following impact management outcomes:

Table 2: Impact Management Outcomes

Primary Impact Management Outcome: <i>To create a sustainable development by constraining the development footprint to avoid natural forest on site and prevent the destabilisation of the dune slope.</i>		
#	Impact Management Outcome	Phase
1	To avoid unnecessary clearing of Northern Coastal Forest outside of the authorised development footprint.	Planning & Design & Construction
2	Staff to be aware of the sensitive Northern Coastal Forest outside of the authorised development footprint and the restrictions associated with it.	Pre-Construction
3	To avoid any disturbance (direct or indirect) to the fore dune and beach environment in front of the property.	Construction
4	The long-term, ongoing preservation of the open space system associated with the Northern Coastal Forest on the remainder of the property.	Planning & Design & Operation

2.0. LEGISLATION

Table 3 provides a list of legislation and municipal planning frameworks which are applicable to the activity. The holder of the Environmental Authorisation and Contractors working on site must be aware of the legal requirements and address non-compliances when they arise.

Table 3: Legislation Applicable to The Construction of House Bedessy at 57 North Beach Road, Westbrook.

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 “ <i>an environment that is not harmful to their health or wellbeing</i> ”. 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 “ <i>critically endangered</i> ” 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. There are no watercourses on the site or within 32m of the property boundary. 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. The residential dwelling has been strategically placed outside of the closed canopy Northern Coastal Forest delineated by the coastal specialist. The vegetation to be cleared is secondary in nature but does still fall within the definition of a “ <i>natural forest</i> ” ¹ . A permit from DFFE will therefore be submitted for the clearance of natural forest.
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 “ <i>moderate</i> ” vulnerability. All infrastructure proposed falls within 100m of the high-water mark of the sea and therefore the layout needs to be “ <i>economically justifiable and ecologically sustainable</i> ”, 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 “ <i>high</i> ” 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.
eThekweni 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.
eThekweni 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 “ <i>a mixed use and mixed density residential, recreation, entertainment and tourist-oriented corridor</i> ”.
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 “ <i>development in the coastal area should strive to blend in with and reflect the unique nature of the coastal environment</i> ”. 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)	-	

3.0. MONITORING REQUIREMENTS

As per the findings of the Environmental Impact Assessment, the holder of the Environmental Authorisation is responsible for appointing an independent Environmental Control Officer (ECO) to monitor the implementation of the impact management actions. Table 4 provides a summary of the monitoring requirements to ensure effective implementation of the EMPr. It is noted that the mitigation measures listed in the EMPr as well as the Conditions of the Environmental Authorisation must be adhered to.

The appointed ECO must have the following skills:

- Knowledge and understanding of constructing on dune slope environments.
- Knowledge of good practise environmental management standards.

¹ As per the definitions in the National Forest Act, a “*Natural Forest*” means “*A group of indigenous trees whose crowns are largely contiguous*”.

- Understanding of the legal context of the activity including the Duty of Care and Polluter Pays principles.
- At least 5 years' experience in the ECO field.

Table 4: Monitoring Requirements

Method of Monitoring	<p>Site inspection by ECO to monitor the implementation of the EMPr during construction and the post-construction audit.</p> <ul style="list-style-type: none"> • Visual inspections & photographs for record keeping purposes.
Frequency of Monitoring	<ul style="list-style-type: none"> • The ECO must audit the construction phase of construction one a month. • One monthly report summarising the findings of the audits must be submitted to the applicant, Contractor and EDTEA: Compliance and Enforcement. • One post-construction audit by ECO.
Mechanism for Monitoring Compliance	<ul style="list-style-type: none"> • Written monthly audit report to be submitted by the ECO after the site inspection to the Holder of Environmental Authorisation, Contractor and EDTEA: Compliance, Monitoring & Enforcement.
Program for Reporting on Compliance	<ul style="list-style-type: none"> • Prior to the Contractor commencing with construction, environmental induction training must be carried out in accordance with the Environmental Awareness Plan in section 5.0. • The register in section 6.0 must be signed by all Primary Contractors working on the site. • The roles and responsibilities of the individuals involved must be determined and the line of communication outlined by the ECO in the audit reports. • Any non-compliances with the EMPr identified during the site inspection must be reported to the relevant Contractor, who must rectify the non-compliance immediately or within a reasonable timeframe as agreed upon with the ECO. • An Environmental Audit Report, compliant with Appendix 7 of the NEMA EIA Regulations 2014 as amended, must be compiled by the ECO and submitted to the relevant parties as listed above. • Prior to construction commencing on site, the holder of the Environmental Authorisation must have an agreement with the Primary Contractors working on site as to what remedial actions must be taken should environmental damage arise on the site as a result of actions by the Contractor.

4.0. IMPACT MANAGEMENT ACTIONS

Mitigation measures provided in the tables below have been formulated during the Environmental Impact Assessment process to ensure that House Bedessy is a sustainable development, as contemplated in the principles of NEMA. The actions aim to:

- (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; and
- (ii) Comply with any prescribed environmental management standards or practices.

The tables below indicate the persons who will be responsible for the implementation of the mitigation measures / actions. Abbreviations provided below:

- Independent Environmental Control Officer *ECO*
- Engineer *ENG*
- Holder of Environmental Authorisation *DEV*
- Architect *ARC*
- Contractor *CON*

4.1. PLANNING & DESIGN

The planning and design phase for House Bedessy is nearly complete. The holder of the Environmental Authorisation must ensure that the mitigation measures provided in Table 5 are carried through to the final design.

Table 5: Impact Management Actions to be Adhered to During the Planning & Design Phase of House Bedessy.

Aspect	Impact	Mitigation / Actions	Responsible Person	Compliant (Yes / No)
Earthworks for foundation piling.	Clearance of 675m² of indigenous vegetation from within the critically endangered Northern Coastal Grasslands ecosystem.	<p>The total area of indigenous vegetation cleared from the site will be 675m². The vegetation that will be cleared is described by the specialist as “<i>thicket habitat</i>” with no distinct canopy or understorey layer. There is approximately 375m² of natural forest in the upper portions of the site which will remain. No protected species are located within the development footprint. The clearance of indigenous vegetation cannot be fully mitigated however the impact has been minimised by strategically placing the proposed residential dwelling in the eastern portion of the site, outside the natural forest. Impact management measures provided below must be put in place to ensure minimal disturbance to the remaining Northern Coastal Forest on site and also limit destabilization of the slope around the development footprint. The preferred layout has avoided the larger, woody forest habitat and concentrated development in the eastern portion of the property. The forest canopy has therefore been maintained in the preferred layout.</p> <ul style="list-style-type: none"> The forest located in the northern extent of the property must be retained. 	ARC	

		<ul style="list-style-type: none"> An “<i>Application for a License Regarding Trees in Natural Forest</i>” must be submitted to DFFE prior to any disturbance of indigenous trees in a natural forest. A Non-User Conservation Servitude must be registered across the remainder of the property (refer to Figure 3). This is to ensure the natural forest remaining on site is not developed in the long-term. 	DEV	
	Erosion of banks / dune movement during site excavations impacting surrounding Northern Coastal Forest.	<ul style="list-style-type: none"> The preferred position of the dwelling must be complied with to reduce the extent of earthworks required leeward of the dwelling (i.e. Layout Alternative 2). A vertical retaining wall is preferred to reduce the area of disturbance associated with a stepped retaining wall (i.e. Technology Alternative 2). 	ARC ENG	
Construction of House Bedessy	Encroachment into and/or disturbance of Northern Coastal Forest / DMOSS area outside of the authorised development footprint by staff or construction activities.	<p>The following must be retained in the design to prevent this impact from occurring:</p> <ul style="list-style-type: none"> The authorised development footprint must be strictly adhered to. 	ARC	
General residential activities at 57 North Beach Road.	Loss of faunal refugia and alteration of faunal ethos within a CBA and DMOSS area.	<p>The following mitigation measures must be implemented during the planning and operational phases to ensure the Northern Coastal Forest habitat and associated faunal communities are not negatively impacted in the long-term:</p> <ul style="list-style-type: none"> The architect must ensure minimal exposure of artificial light into the nearby Northern Coastal Forest during the design of House Bedessy (specifically behind the main dwelling). 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 office pod. Should a fence be erected around the property, the type of fence used must allow small mammals / faunal species to traverse through the site. 	ARC & DEV	
	Increase in hard surfaces altering localised hydrology (reduced infiltration rate and increased stormwater runoff). These changes may influence the immediate floral community and reduce ground water recharge	<p>Once constructed, significant runoff from rooftop and other hardpan surfaces will arise. The coastal specialist highlights the importance of effective stormwater management to promote percolation of stormwater. The preferred Stormwater Management Plan (SWMP 2) is to be implemented. The preferred SWMP includes the following</p> <ul style="list-style-type: none"> Use of attenuators and spreaders must be undertaken to retain surface water on site and promote percolation of stormwater into the surrounding ground. Where possible, porous or permeable attenuation chambers that promote percolation of waters into the surrounding soils must be established at points. Such systems would allow for the onsite discharge of waters into surrounding soils and accommodate smaller rainfall episodes. 	ARC, ENG & DEV	

		<ul style="list-style-type: none"> • Larger rainfall events, such as those > 1 : 2 year events should be discharged into the municipal stormwater system associated with North Beach Road. • Harvesting of rainwater must be implemented on site. • The driveway must make use of permeable paving / grass blocks to allow for some stormwater infiltration and prevent overland flow. 		
Development of House Bedessy along the coastal strip in Westbrook.	Pressure on municipal services (traffic, bulk potable water supply and sewerage disposal network) and electricity demand.	<p>The development will connect to the available waterborne sewerage network as well as the municipal water network.</p> <ul style="list-style-type: none"> • To reduce demand on the potable water supply, rainwater harvesting must be included in the design. • To reduce the electrical demand, gas or solar powered geysers and/or lights must be considered by the applicant. • Since the development is a private residential development, no upgrades are required for the existing road network. 	ARC & DEV	

4.2. PRE-CONSTRUCTION

The following actions must be undertaken prior to construction commencing on site.

Table 6: Impact Management Actions to be Adhered to During the Pre-Construction Phase of the House Bedessy Development.

Aspect	Impact	Mitigation / Actions	Responsible Person	Compliant (Yes / No)
Earthworks for foundation piling.	Clearance of 675m² of indigenous vegetation from within the critically endangered Northern Coastal Grasslands ecosystem.	<p>The clearance of indigenous vegetation cannot be fully mitigated however the measures provided below are essential to not only ensure minimal disturbance to the remaining Northern Coastal Forest on site but also to limit destabilization of the slope around the development footprint.</p> <ul style="list-style-type: none"> • The development footprint and associated access ways must be determined and cordoned from the balance of the site. • A distinct fence, using shade cloth must be established leeward of the working area to designate the development footprint (position of shade cloth fences illustrated in Figure 3). • 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. • The induction training must include: <ul style="list-style-type: none"> - An indication of the location of the environmentally sensitive areas, which includes the closed canopy forest, Milkwood trees, fore dune in front of the property and surrounding DMOSS area. - The importance of the environmentally sensitive areas. 	<p>ECO</p> <p>CON</p> <p>ECO</p>	

		<ul style="list-style-type: none"> - Restrictions associated with the environmentally sensitive areas (i.e. No Go areas). - Contingency measures if the environmentally sensitive areas are disturbed. 		
Construction of House Bedessy	Encroachment into and/or disturbance of Northern Coastal Forest / DMOSS area outside of the authorised development footprint by staff or construction activities.	<ul style="list-style-type: none"> • A shade cloth fence must be erected between construction activities and the adjacent forest / DMOSS areas (drawn in yellow in Figure 3). • The areas beyond the shade cloth fence are No Go areas. Staff and or construction material / equipment are not permitted in these sensitive areas. • 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 EMP. 	CON ECO	

4.3. CONSTRUCTION

The following mitigation measures must be adhered to during the entire construction phase.

Table 7: Impact Management Actions to be Adhered to During Construction of the House Bedessy Development.

Aspect	Impact	Mitigation / Actions	Responsible Person	Compliant (Yes / No)
Earthworks for foundation piling.	Clearance of 675m² of indigenous vegetation from within the critically endangered Northern Coastal Grasslands ecosystem.	<p>The total area of indigenous vegetation cleared from the site will be 675m². The vegetation that will be cleared includes primarily thicket vegetation such as <i>B. discolor</i>. The clearance of indigenous vegetation cannot be fully mitigated however the measures provided below are essential to not only ensure minimal disturbance to the remaining Northern Coastal Forest on site but also to limit destabilization of the slope around the development footprint.</p> <ul style="list-style-type: none"> • Excavation and clearance activities must be carried out exclusively within the extent of the property. • A phased approach to the removal of vegetation would be advantageous and must be considered by the Contractor. • Unnecessary clearance and excavation within the property must be prohibited. • No vegetation may be cleared from outside of the authorised developable area. • Where possible, all construction activities and material storage must avoid the unnecessary clearance of trees. 	CON	
	Erosion of banks / dune movement during site excavations impacting surrounding Northern Coastal Forest.	<ul style="list-style-type: none"> • The Method Statement prepared by Bramin Consulting Engineers dated 25 January 2022 and attached under Appendix C of the BAR, must be adhered to. • No construction vehicles, machinery or personnel are permitted leeward of the proposed retaining wall structure. • Earthworks to commence from the verge of North Beach Road and move in a westerly direction towards the dune slope. 	CON	

		<ul style="list-style-type: none"> • The embankment must be shored (60° slope) during the construction of the basement wall. • Any excavation exposing highly erodible soils must take place during the dry season (i.e. March – Aug). • Any large vehicle access ramps 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 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. • Should disturbance of the interface between the development and the northern forest area arise, rehabilitation interventions must be employed. These interventions must include: <ul style="list-style-type: none"> - Sculpting and stabilization of the dune using geofabrics; - Sowing an appropriate commercial seed mix (ECO to confirm); - 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). • Recommendations made in the Geotechnical Investigation must be adhered to: <ul style="list-style-type: none"> - Placement of fill over the very steep portions of the site should be avoided. - One must not add fill to slopes that are already close to the natural angle of repose of the subsoils (i.e. 28 degrees). - Fills must be benched into the existing slope with minimum bench widths of 3m. - Cut and fill slopes must be formed at angles no steeper than 1 : 1.75 and preferably at no steeper than 1: 2. - In the short term a cut slope of 1 : 1.5 may be used provided the maximum depth of cut is less than 3m. - The minimum compaction of the fills should be 93% ModAASHTO density, 	CON	
	Change in edaphic form and structure.	<p>This impact is unavoidable however the extent of change in the edaphic form and structure has been reduced by strategically locating the development in the eastern portion of the property and retaining the better quality vegetation in the western portion of the site. The following is applicable:</p> <ul style="list-style-type: none"> • The change in structure of the dune must be confined to the development footprint. 	CON	

		<ul style="list-style-type: none"> • Vegetation immediately leeward of the site must be maintained to avoid the slip of the dune and mobilization of sand on the upper slopes. • No further change in edaphic form and structure is permitted within the remaining DMOSS area in the long-term. 		
	Negative impact on local fauna residing, foraging and /or moving through the site.	<ul style="list-style-type: none"> • Should an animal be trapped within the construction site, trained personnel must be engaged where capture and release if 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. 	CON	
Construction of House Bedessy	Uncontrolled stormwater runoff eroding the site and fore dune in front of the property.	<p>The alteration of natural ground levels and compaction of soil will result in silt running off the site towards North Beach Road, especially during heavy rainfall. To reduce the volume of silt washing onto North Beach Road and the nearby beach environment, the following must be implemented:</p> <ul style="list-style-type: none"> • Sound management of surface water runoff 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. • Berms and silt fences must be erected along the lower extent of the site during construction to attenuate stormwater runoff and trap mobile silt before it washes onto the road / into the municipal stormwater system. The location of the silt fences is indicated in Figure 3). • Use of attenuators and spreaders must be undertaken to retain surface water on site and promote percolation of stormwater into the surrounding ground. • 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. 	CON	
	Greywater / hydrocarbons / chemicals washing into the formal stormwater network and polluting the associated beach environment.	<p>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.</p> <ul style="list-style-type: none"> • Any spills on site must be cleaned up immediately using the Spill Response Procedure provided in section 5.4.1. • 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 	CON	

		<p>material is separated out before the water is discharged into the surrounding environment.</p> <ul style="list-style-type: none"> • 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. 		
	Encroachment into and/or disturbance of Northern Coastal Forest / DMOSS area outside of the authorised development footprint by staff or construction activities.	<ul style="list-style-type: none"> • A shade cloth fence must be erected between construction activities and the adjacent forest / DMOSS area (drawn in green in Figure 3). • The areas beyond the shade cloth fence are No Go areas. Staff and or construction material / equipment are not permitted in these sensitive areas. • 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. • Should staff personnel enter the No-Go area beyond the shade cloth fences or dispose of any waste or construction material into the No Go areas, that staff member must be given a disciplinary warning. 	CON	
	Proliferation of exotic species within the development footprint and adjacent environmentally sensitive areas	<p>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.</p> <ul style="list-style-type: none"> • The “<i>Eradication of Alien Invasive Plant</i>” Management Plan must be implemented on site during construction (section 5.4.2 of the EMPr). • Alien invasive species must not be permitted to establish on site. 	CON	
Site Camp	Incorrect placement of the site camp indirectly impacting environmentally sensitive areas (Northern Coastal Forest and/or beach).	<ul style="list-style-type: none"> • The site camp must not be located above the main dwelling / underneath the large forest canopy. • 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. • The Contractor is responsible for the provision of potable water to all construction staff working on the site. 	CON	
Record Keeping	Proof of safe disposal & sustainably sourced material.	<p>The following documents must be retained on site for auditing purposes:</p> <ul style="list-style-type: none"> • Environmental Authorisation • Environmental Management Program • Environmental Audits for the site • A full inventory of all hazardous materials must be retained on site with the respective Material Safety Data Sheets • Safe disposal slips for waste (general, hazardous and chemical toilets) • Proof of raw material sourcing (i.e. building sand, gravel etc.) 	CON & DEV	

		<ul style="list-style-type: none"> • Environmental training registers • Record of incidents on site, including photographs (if applicable) • Any other permits, licenses or approvals that may be applicable to the site (i.e. DEFF permits). 		
Vehicles & Equipment	Disturbance to areas adjacent to construction site and contamination of environment.	<ul style="list-style-type: none"> • Major vehicle servicing is not permitted on site. Only emergency / minor repair work is permitted. • A drip tray must be used to capture any spills during emergency / minor repair work. • Construction vehicles must not be washed on site unless water can be captured in a sump and hydrocarbons / other contaminants removed prior to water being released into the surrounding environment. • No vehicles are permitted within the sensitive No-Go areas illustrated in Figure 3. 	CON	
Material Storage Areas & Stockpiles	Sedimentation risk.	<ul style="list-style-type: none"> • Material stockpiles must not exceed 2m in height, must be covered, or grassed to prevent erosion caused by exposure to heavy wind or rain. • Stockpiling of material must not take place on steep slopes where there is an opportunity for material to wash into the surrounding environment. 	CON	
Waste Management	General waste becoming a nuisance on site and blowing into environmentally sensitive areas / neighbouring properties.	<ul style="list-style-type: none"> • All waste generated on site must be disposed of in the designated waste management area. • The waste management area must not be located leeward of the main dwelling as this is directly adjacent to the large, closed canopy forest area. • General waste must be removed from site on a weekly basis to ensure there is no build up of waste in the waste management area. • 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. • All construction activities must remain within the property boundaries (i.e. leeward side of North Beach Road and not encroach on the fore dune in front of the house). This is to be strictly monitored by the ECO. • All solid waste must be disposed of at an appropriate landfill site and records of such disposal must be retained on site for auditing purposes. 	CON	
	Hydrocarbons or other liquids / chemicals entering the surrounding environment.	<ul style="list-style-type: none"> • Potentially hazardous substances² to be stored in a fenced off area that is undercover to prevent contamination of rainwater. • The hazardous storage area must not be located leeward of the main dwelling as this is directly adjacent to the large, closed canopy forest area. 	CON	

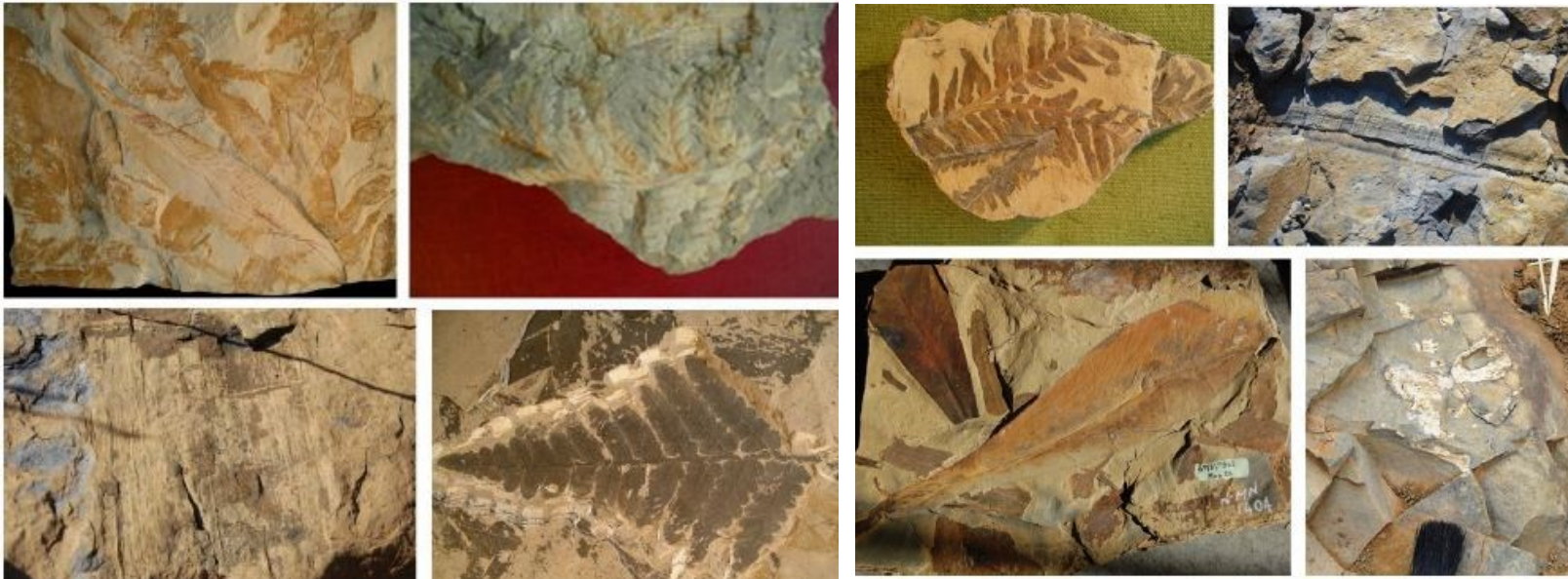
² Hazardous substances refer to substances scheduled in the Hazardous Substances Act (1973) and Hazardous Chemical Substances Regulations (1995) and include paint, oils, fuels, solvents, pesticides.

		<ul style="list-style-type: none"> • 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. • No bulk storage of fuel on site (>30m³). • Decanting of potentially hazardous substances must be carried out within the confines of a drip tray / similar or using a hand pump. • Hazardous waste must be disposed of at a registered hazardous landfill site. • Cement mixing must take place on a hard surface that is protected from stormwater runoff. 		
	Construction staff using the surrounding environment as ablutions.	<ul style="list-style-type: none"> • Ablution facilities must be accessible to all construction workers. • No pit latrines are permitted on site. • Toilets must be located within the site camp within the property boundaries (i.e. not on the fore dune in front of the house or neighbouring properties). • 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. 	CON	
Spills Incidents &	Hydrocarbons or other liquids / chemicals contaminating the surrounding environment.	<ul style="list-style-type: none"> • The ECO's environmental toolbox talk must include a spill response procedure and incident reporting so all staff know how to clean up minor and major spills (included in the Environmental Awareness Plan; section 5.0 of the EMPr). • 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. 	CON	
Dust Emissions &	Dust & emissions becoming a nuisance on site and to nearby residents.	<ul style="list-style-type: none"> • During high winds, dust suppressing 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. • All construction vehicles and equipment must be well maintained to reduce emissions generated on site. 	CON	

Noise	Noise becoming a nuisance on site and to nearby residents.	<ul style="list-style-type: none"> • All construction vehicles 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 (07:00 – 17:00). • 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. 	CON	
Cultural Heritage	Items of historical, archaeological or cultural significance destroyed or disturbed during excavations.	<ul style="list-style-type: none"> • 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. • Objects with historical, archaeological or cultural significance must not be destroyed or removed from site without prior permission from AMAFA. • Should any human remains be discovered, all work in this area must cease and the South African Police contacted for further direction. 	CON	
Palaeontological / Fossils	Fossils destroyed or disturbed during excavations.	<ul style="list-style-type: none"> • During earthworks, the following procedure must be adhered to if fossils are discovered (see photographs provided below for examples of the type of fossils that could be found on the site): <ul style="list-style-type: none"> - When excavations begin the rocks must be given a cursory inspection by the ECO or designated person. Any fossiliferous material (shells, plants, insects, bone, coal – see Figure 4) must be put aside in a protected place. This way construction activities will not be interrupted. - Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones (see below). - Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. - If there is any possible fossil material found then a qualified palaeontologist, must visit the site to inspect the selected material. - Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. - If no good fossil material is recovered then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. 	CON & ECO	

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|--|--|---|--|--|
| | | - If no fossils are found and the excavations have finished then no further monitoring is required. | | |
|--|--|---|--|--|

Figure 4: Example of fossils from the Vryheid Formation farther inland (source: Proff. Marion Bamford).



4.4. REHABILITATION / POST CONSTRUCTION

Once construction is complete on site, the Contractor and ECO must ensure that the mitigation measures listed in the table below are adhered to. This will ensure that there will be no residual impacts on the environment remaining once construction is complete.

Table 8: Impact Management Actions to be Adhered to Once Construction is Complete.

Aspect	Impact	Mitigation / Actions	Responsible Person	Compliant (Yes / No)
Post-Construction Audit	To ensure the site is stable and there are no outstanding environmental non-compliances that need to be corrected by the Contractor.	<ul style="list-style-type: none"> The ECO must carry out a post-construction inspection of the site once construction is complete. Clearance from the ECO must be obtained to ensure there are no outstanding environmental non-compliances prior to the Contractor vacating the site. The following areas must be audited by the ECO in the post-construction inspection: <ul style="list-style-type: none"> No waste / litter remaining on site; 	CON & ECO	

		<ul style="list-style-type: none"> - There is no evidence of spills or building rubble remaining on site; - There are no left over building material remaining on site; - All exposed surfaces have been rehabilitated / landscaped to avoid sediment wash away; - Stormwater management has been formalised; - There is no evidence of erosion; and - No environmentally sensitive areas, indicated in Figure 2, have been damaged. If damage is evident, rehabilitation measures must be prescribed by the ECO and carried out by the Contractor. <ul style="list-style-type: none"> • Once construction is complete, a Vegetation Report must be compiled by the ECO and submitted to eThekweni EPCPD commenting on the extent of vegetation cleared and the impact on surrounding vegetation outside of the development footprint. 	ECO	
Construction of House Bedessy	Encroachment into and/or disturbance of Northern Coastal Forest / DMOSS area outside of the authorised development footprint by staff or construction activities.	<ul style="list-style-type: none"> • Once construction is complete and the shade cloth fences are removed, the Contractor must inspect the area behind the fences and ensure there is no litter or construction material in this area prior to vacating the site. 	CON	

4.5. OPERATION

Provided that the above mitigation measures /actions are adhered to, the operational phase of House Bedessy will have a low impact on the surrounding environment. Table 9 provides mitigation measures which are ongoing through-out the lifespan of the project.

Table 9: Impact Management Actions to be Adhered to During the Operational Phase of House Bedessy.

Aspect	Impact	Mitigation / Actions	Responsible Person	Compliant (Yes / No)
Earthworks for foundation piling.	Change in edaphic form and structure.	<ul style="list-style-type: none"> • No further change in edaphic form and structure is permitted within the remaining DMOSS area in the long-term. 	DEV	
General residential activities at 57A North Beach Road.	Loss of faunal refugia and alteration of faunal ethos within a CBA and DMOSS area.	<ul style="list-style-type: none"> • The applicant is responsible for the long-term conservation and management of the forest across the remainder of the site. This area will be retained as part of DMOSS. • No infrastructure is permitted to be constructed within the remaining DMOSS area. • An Alien Invasive Plant Management Plan has been included under section 5.4.2 and must be adhered to by the applicant. 	DEV	

		<ul style="list-style-type: none"> Landscaping must not encroach into the closed canopy / woody habitat behind the retaining wall. Species used in landscaping must be species found in coastal dune habitat (to be advised by ECO). No invasive species are to be planted on site as part of the landscaping. 		
	Structure at risk of sea level risk, storm forced erosion and / or tidal inundation.	The portion of coastline adjacent to House Bedessy is considered to be of “low” coastal vulnerability. All infrastructure is located leeward of North Beach Road and outside of the sand sharing system. Other residential developments along this stretch of North Beach Road were not impacted by the 2007 storm event (return period of 1:35 years) and therefore the coastal specialist concluded that the site is “ <i>generally well protected from such event in the short to medium term</i> ” ³ . No further mitigation was provided.	DEV	

³ Section 5.2 of the SDP Ecological Assessment (October 2021).

5.0. ENVIRONMENTAL AWARENESS PLAN

This Environmental Awareness Plan describes the manner in which the holder of the Environmental Authorisation must inform all Contractors and employees of the environmental risk which may result from their work; and that the risks must be dealt with to avoid pollution or the degradation of the environment.

5.1. INDUCTION

All Primary Contractors working on the House Bedessy site must receive a copy of the Environmental Awareness Plan and sign the register attached stating that they have received a copy of the EMPr and are aware of the environmental risks. Contact details for the Environmental Control Officer (ECO) are provided below if Contractors require any clarification or assistance with the demarcation of sensitive areas (shown in Figures 2 & 3).

Table 10: Important Contact Information.

Designation	Company	Contact Person	Contact Details
Holder of the Environmental Authorisation	-	Tyrone Bedessy	To be completed on site.
Environmental Control Officer			
Primary Contractor			
Consulting Engineer	Bramin Consulting Engineers	Tasveer Singh	
Geologist	MonBolck	Rowan Shuttleworth	

5.2. ENVIRONMENTALLY SENSITIVE AREAS

Please refer to section 1.3 of the EMPr and Figure 3, which provides a description of the environmentally sensitive areas associated with House Bedessy. These areas must be demarcated and avoided during construction. Contractors must be aware of the primary Impact Management Outcome, which is ***to create a sustainable development by constraining the development footprint to avoid woody vegetation with closed canopies.***

5.3. BASIC ENVIRONMENTAL TRAINING POINTS

All staff working on site must receive basic environmental training, which includes the items listed below. Please note that the ECO must be available to conduct environmental training should the Contractor prefer.

- Context of House Bedessy and the applicability of the EA and EMPr.
- The location of environmentally sensitive features (Figure 3).
- Restrictions associated with the environmentally sensitive features.
- Waste management (general & hazardous).
- No cement mixing directly on exposed soil outside of construction footprint.
- Management of hazardous substances (paint, oil, drip trays, spills etc.).
- Sanitation (i.e. the use of toilets).
- Nuisance to neighbouring properties.

5.4. PROCEDURES FOR HANDLING ENVIRONMENTAL RISKS

All construction staff working on House Bedessy must be aware of the procedures listed below.

5.4.1. SPILL RESPONSE⁴

In the event of a spillage, the following procedure must be adhered to so that there is minimal impact on the surrounding environment. Diesel and oil are the most likely hydrocarbons that will be spilled on the site.

1. **ASSESS THE RISK**
 - WHAT was spilled; and
 - HOW MUCH was spilled.
2. **SELECT THE RELEVANT PERSONAL PROTECTIVE EQUIPMENT (PPE)**
3. **CONFINE THE SPILL**
 - Block, Divert away from sensitive environmental areas and confine spill.
 - Use absorbents or boom in Spill Kit
 - Stop the flow of the spill.
4. **STOP THE SOURCE**
5. **EVALUATE THE SPILL AND IMPLEMENT APPROPRIATE CLEAN UP**
 - Re-assess the spill and decide on most appropriate method of clean up.
 - Absorb spill using materials in Spill Kit or soil / wood chips.
 - Using a broom, rag or other material, scrub the impacted area or using a spade, dig out the contaminated soil.
6. **DECONTAMINATE**
 - All PPE must be removed and disposed of as hazardous waste if contaminated.
 - All rags / materials used during the clean up as well as the actual spilled material must be disposed of as hazardous waste.
7. **REPORTING**
 - Responsible person to determine if the spill constitutes an “incident”, see definition below.
 - All incidents must be reported as per the procedure outlined in section 5.4.3.

⁴ Seven Step Spill Procedure Accessed from Border Hazmat: Specialised Environmental Cleaning (<http://borderhazmat.co.za/7-step-spill-procedure/>). Accessed on 12th March 2021.



5.4.2. ERADICATION OF ALIEN INVASIVE PLANTS







Alien Invasive Plant (AIP) species rapidly establish in disturbed areas due to the lack of competition from other indigenous species. AIP species rapidly colonise and area and can spread to other areas outside of the development footprint. It is therefore important for construction staff to receive some training on how to identify and remove AIPs before they become a nuisance and negatively impact the rehabilitation efforts underway within the study area. The list below can also be used by the developer when eradicating AIP species during the operational phase of the development.



Notes:

- Mechanical removal of AIPs (i.e. hand pulling / slashing) is preferred above chemical control especially in the No-Go areas / Open Space System.
- All mixes given as a percentage (ml per 100 l water/diesel).
- Apply methods either by species or by area i.e. multiple areas, one species or one area, multiple species.
- Autumn and winter - basal stem and cut stump treatments, no foliar spraying.
- Spring and summer - foliar spraying can be done on suitable plants. Rule of thumb - don't spray anything over 1.5 m tall. Spray during the morning (8 am to 11 am) during calm conditions.
- NB PPE when spraying - rubber gloves, goggles, respirator, apron/chemical overall, rubber boots.
- NEVER use diesel for foliar application.
- If in doubt check the herbicide label.
- Follow up treatment/clearance is essential for effective AIP management.

Table 11: AIP species likely to be associated with the House Bedessy site.

Scientific Name	Common Name	Identification Image	Scientific Name	Common Name	Identification Image
<i>Chromolaena odorata</i> .	Chromolaena		<i>Ipomoea purpurea</i>	Morning Glory	

<i>Lantana camara</i>	Lantana		<i>Listea sebifera</i>	Soft Bollygum	
<i>Barbosa balcooa</i>	Bamboo		<i>Ricinis communis</i>	Castor Oil	
<i>Cardiospermum grandiflorum</i>	Balloon Vine		<i>Tecoma stans</i>	Yellow Trumpetbush	

<p><i>Collocasia esculenta</i></p>	<p>Elephant's Ear</p>		<p><i>Tithonia diversifolia</i></p>	<p>Mexican Sunflower</p>	
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5.4.3. REPORTING OF ENVIRONMENTAL INCIDENTS

Definitions

"Incident" as defined in NEMA	An unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property.
"Incident" as defined in NWA	Incident or accident in which a substance- (i) pollutes or has the potential to pollute a water resource: or (ii) has or is likely to have, a detrimental effect on a water resource.
"responsible person" as defined in NEMA & NWA	Includes any person who- (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control of any hazardous substance involved in the incident at the time of the incident.
"relevant authority" as defined in NEMA	(i) a municipality with jurisdiction over the area in which an incident occurs; (ii) a provincial head of Department or any other provincial official designated for that purpose by the MEC in a province in which an incident occurs; (iii) the Director-General; (iv) any other Director-General of a national department.

Procedure should an *incident*, as defined above, occur on site:

The responsible person or, where the incident occurred in the course of that person's employment, his or her employer	Complete an Emergency Incident Report (template provided in Appendix 3). The report must be sent to the following personnel within 14 days of the incident occurring. (i) the Director-General of the Department of Environmental Affairs; (ii) the Director-General of the Department of Water & Sanitation; (iii) the South African Police Services and the relevant fire prevention service; (iv) the relevant provincial head of department or municipality; (v) The relevant catchment management agency, if applicable; and All persons whose health may be affected by the incident.
The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident-	(i) Take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons; (ii) Undertake clean-up procedures; (iii) Remedy the effects of the incident; (iv) Assess the immediate and long-term effects of the incident on the environment and public health;

Should the responsible person fail to comply, or inadequately comply with a directive received by a relevant authority, there be uncertainty as to who the responsible person is; or there be an immediate risk of serious danger to the public or potentially serious detriment to the environment, a relevant authority may take the measures it considers necessary to contain and minimise the effects of the incident; undertake clean-up procedures; and remedy the effects of the incident. A relevant authority may claim reimbursement of all reasonable costs incurred by it in terms of subsection (8) from every responsible person jointly and severally.

6.0. RECEIPT OF ENVIRONMENTAL MANAGEMENT PROGRAMME & ACKNOWLEDGEMENT OF ENVIRONMENTAL RISKS

By signing this register, I confirm that I have received a copy of the Environmental Management Programme (EMPr) prepared by Confluence Strategic Development (Pty) Ltd and dated February 2022. I am aware of the environmental sensitivities of the site as shown in Figures 2 & 3 of the EMPr.

[illegible]

APPENDIX 1
EMERGENCY INCIDENT REPORT TEMPLATE

