

NMBM Seaview Low Income Housing Development

Draft Environmental Impact Report: Volume 1- Main report and Appendices A-J

Report Prepared for

Nelson Mandela Bay Municipality



Report Number 373512/5

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Report Prepared by

 **srk** consulting

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Volume 1- Main report and Appendices A-J

Nelson Mandela Bay Municipality

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Executive Summary

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by Nelson Mandela Bay Municipality (NMBM). The opinions in this Report are provided in response to a specific request from NMBM to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

List of Abbreviations

AIA	Archaeological Impact Assessment
BA	Basic Assessment
BID	Background Information Document
BLMC	Biodiversity Land Management Classes
CBA	Critical Biodiversity Areas
DAFF	Department of Agriculture, Forestry and Fisheries
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DEIR	Draft Environmental Impact Report
DMR	Department of Mineral Resources
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECBCP	Eastern Cape Biodiversity Conservation Plan
ECPHRA	Eastern Cape Provincial Heritage Resources Authority
EIA	Environmental Impact Assessment
FSR	Final Scoping Report
FTE	Full time Employment
HIA	Heritage Impact Assessment
IAPs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
LVFT	Low Volume Flush Toilet
PIA	Palaeontological Impact Assessment
NEMA	National Environmental Management Act
NFA	National Forests Act
NMBM	Nelson Mandela Bay Municipality
NWA	National Water Act
PoSE	Plan of Study for EIA
PPP	Public Participation Process
SDEA	Social Development Education and Awareness
SANBI	South African National Biodiversity Institute
SSC	Species of Special Concern
TIA	Traffic Impact Assessment
ToR	Terms of Reference
VIP	Ventilated Improved Toilet
WULA	Water Use License Application
WWTW	Waste Water Treatment Works
+ve	Positive
-ve	Negative

Glossary of Terms

Critical Biodiversity Areas	Areas that are considered irreplaceable or important and necessary in terms of meeting targets for biodiversity pattern and process.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Environmental Impact Assessment (EIA)	A study of the environmental consequences of a proposed course of action.
Indigenous vegetation	Vegetation consisting of indigenous plant species occurring naturally in an area, regardless the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Interested and Affected Party	Any person, group of persons or organisation interested in or affected by an activity, and any Organ of State that may have jurisdiction over any aspect covered by the activity.
Leach pit	A pit with an open-jointed or perforated lining through which liquid effluent seeps into the surrounding soil and which retains the solids.
Plan of Study for EIA	A document which forms part of a Scoping Report and sets out how an Environmental Impact Assessment must be conducted.
Registered Interested and Affected Party (IAP)	3An Interested and Affected Party whose name is recorded in the register opened for the application / project.
Scoping	A procedure to consult with stakeholders to determine issues and concerns and for determining the extent of and approach to an EIA, used to focus the EIA.
Scoping Report	A written report describing the issues identified to date for inclusion in an EIA.

1 Background and Introduction

The Nelson Mandela Bay Municipality (NMBM) proposes to construct a low income housing development and associated facilities in Seaview, Port Elizabeth. The project includes the construction of approximately 400 to 1000 residential units (depending on the development option chosen) and associated infrastructure to provide housing and facilities primarily to cater for the communities currently living in Zweledinga and New Rest informal settlements in Seaview. Non-forested portions of five properties in the area, namely erf 590, 238, 240, farm 28 portion 10 and 28 portion 1, making up two development options, are proposed for development.

SRK Consulting (SRK) has been appointed by the NMBM, as the independent consultants, to conduct the Environmental Impact Assessment (EIA) in terms of NEMA, as amended, and the EIA Regulations, 2010, for the proposed Seaview Housing Development, within the NMBM (see Site Locality Plan, Figure 1-1 below).

1.1 Background of the project

In terms of the National Environmental Management Act 107 of 1998 (NEMA), as amended, and the Environmental Impact Assessment (EIA) Regulations, 2010, an environmental assessment process must be undertaken for certain listed activities. The main activity associated with the proposed development is listed under GNR 545 of 18 June 2010 and as such requires a full Scoping and Environmental Impact Assessment (S&EIA). Two previous environmental authorisations (neither of which are currently valid) and an environmental impact assessment are relevant to the proposed development sites and services infrastructure. For completeness, a brief overview of these is provided below.

An environmental authorisation was issued to the NMBM under the Environmental Conservation Act (Act 73 of 1989), for the proposed development of erf 590, Clarendon Marine, for low income housing. This authorisation however lapsed prior to commencement of the development, and subsequent attempts to renew authorisation were suspended due to limitations on development posed by the National Forest Act.

An application for rezoning and subdivision of portion 1 of Farm 28, Seaview, in support of the development of a middle / high income residential development had also been lodged by CEN, an environmental consulting firm, on behalf of a private developer in 2009 (DEDEAT ref ECm1/387/M/09-17). While it is understood that the EIA process was suspended by the developer prior to obtaining authorisation, various specialist studies were completed in the process and where applicable the findings of these will be used to inform the current EIA process, with updates as required. The layout currently proposed for this site (Development Option 2) is also based on the development footprint proposed and assessed as part of the previous EIA process.

Environmental authorisation for the proposed Seaview bulk water supply project was issued by DEDEAT to the NMBM in 2009 (DEDEAT ref ECm1/386/1k/09-47). The development was however not pursued at the time and the authorisation subsequently lapsed. An application for the development, which is intended to provide water supply to the broader Seaview and Kini Bay area (including the proposed development) is therefore currently under way and the Final BAR (Ref: ECm1/C/LN1&3/M/51-2016) has been submitted to DEDEAT for decision making. It is therefore understood that authorisation of the proposed housing development may be dependent on authorisation of the above-mentioned water supply project, and water supply has therefore not been included in the scope of this assessment.

In December 2013, an application to commence the current EIA process (covering two layout options over a total of five sites) was submitted to the Department of Economic Development,

Environmental Affairs and Tourism (DEDEAT) (see Appendix A). A reference number was issued by DEDEAT on 13 February 2014. The project has subsequently gone through several unforeseen delays relating to planning, and on 20 November 2015 DEDEAT agreed to a final six-month extension for submission of a Draft Scoping Report, which was circulated for comment in May 2016, prior to issuing of a Final Scoping report (FSR) in September 2016.

The first phase of the EIA, the scoping study, has been completed and included a Public Participation Process (PPP), aimed at identifying issues and concerns of Interested and Affected Parties (IAPs). The objective of the Scoping Study was to identify those issues and concerns that must be investigated in more detail, and included a Plan of Study for the EIA. The Final Scoping Report and Plan of Study was approved by DEDEAT on 21 October 2016 (see Appendix B).

The second phase of the EIA commences with the Draft Environmental Impact Report (this report). The aim of this report is to present the results of investigations of the issues and concerns identified in the Scoping Study, identify and assess the potential impacts of the development and provide recommendations with the objective of minimising negative environmental impacts and maximising benefits.

1.2 Applicant Details

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1.3.1 SRK Profile and Expertise of Relevant Environmental Assessment Practitioners (EAP's)

SRK is a South African founded international organisation of professionals providing a comprehensive range of consulting services, expert advice and solutions to the natural resource industry, public sector and other niche sectors. SRK provides focused advice and solutions requiring specialised services, mainly in the fields of the environment and development, exploration, mining, water, rail and civil-geotechnics. Established in 1974, the SRK Group employs over 1500 people operating from about 40 established practices in Africa, Asia, Australasia, Europe, North and South America. SRK is registered as a member of the Consulting Engineers South Africa (CESA) and has a formal quality management system that is ISO9001 certified.

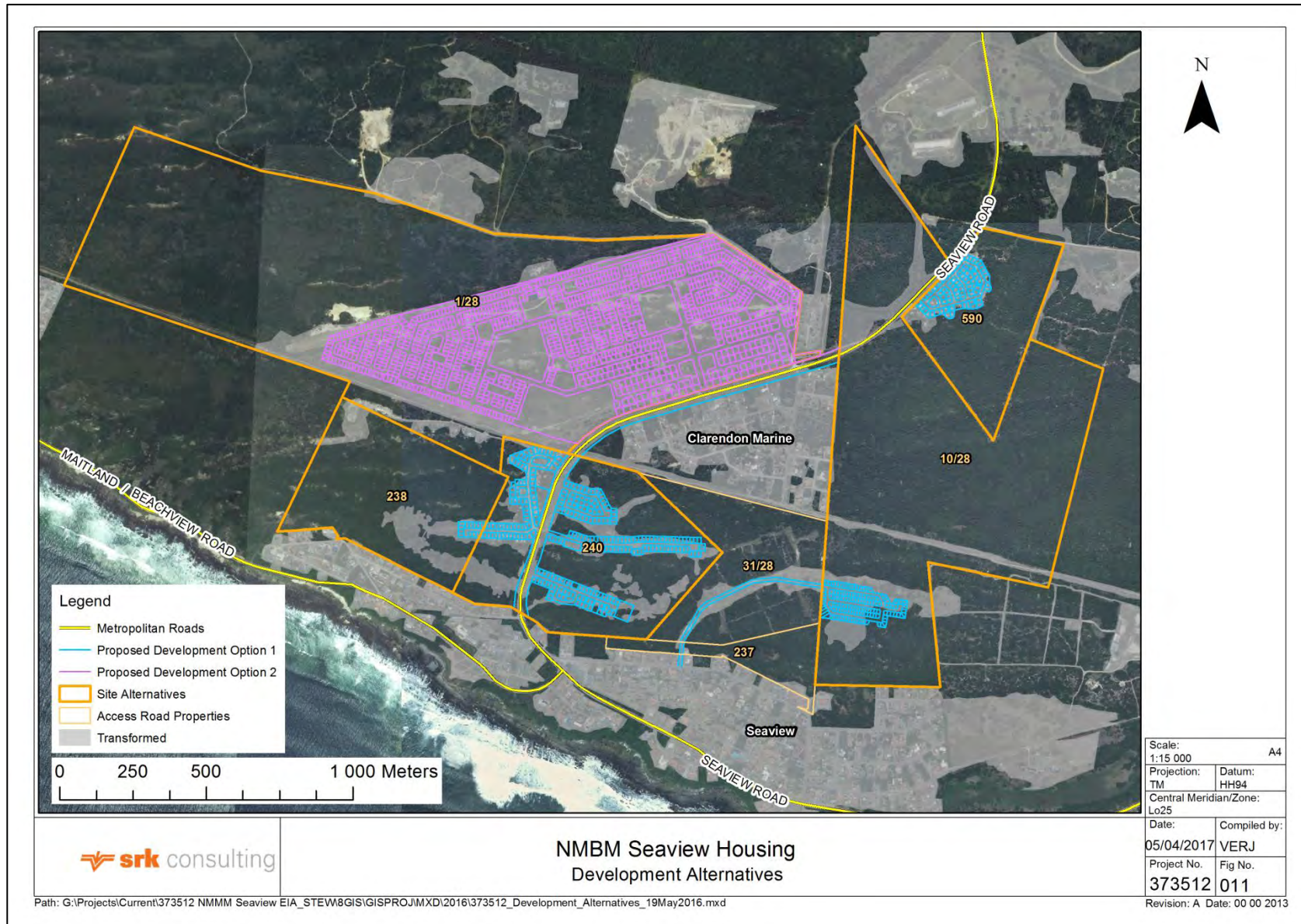


Figure 1-1: Locality of the proposed development for layout options 1 and 2

Project Manager: Nicola Rump, MSc, EAPSA

Nicola Rump is a Principal Environmental Scientist and has been involved in environmental management for the past 10 years working on South African and international projects including EIAs and ISO 14001 auditing for a variety of activities. Her experience includes Basic Assessments, Environmental Impact Assessments, Environmental Management Plans, Environmental Auditing and Stakeholder Engagement.

Project coordinator: Tanya Speyers, BSc Hons.

Tanya is an Environmental Scientist with 5 years' experience in Basic Assessments, Environmental Impact Assessments, Water Use Licence Applications and Environmental Control Officer Work.

Project Director and Internal Reviewer: Rob Gardiner, MSc, MBA, Pr Sci Nat

Rob Gardiner is the Principal Environmental Scientist and head of SRK's Environmental Department in Port Elizabeth. He has 23 years environmental consulting experience covering a broad range of projects, including Environmental Impact Assessments (EIA), Environmental Management Systems (EMS), Environmental Management Programmes (EMPr), and environmental auditing. His experience in the development, manufacturing, mining and public sectors has been gained in projects within South Africa, Lesotho, Botswana, Angola, Zimbabwe, Suriname

Box 1: Environmental Assessment Practitioner expertise

1.4 Statement of SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK's fee for conducting this EIA process is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the Report(s) or the EIA process.

As required by the legislation, SRK has completed and submitted a declaration of interest, as part of the EIA application form. A copy of this is included in Appendix A of this report and the qualifications and experience of the individual practitioners responsible for this project are detailed above.

1.5 Legal requirements pertaining to the Proposed Project

The environmental legislation which is applicable to the authorisation of the proposed project is summarised in this Section.

1.5.1 National Environmental Management Act (Act No. 107 of 1998) (NEMA)

NEMA provides for co-operative environmental governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of the State, as well as to provide for matters connected therewith. Section 2 of NEMA establishes a set of principles that apply to the activities of all organs of state that may significantly affect the environment. These include the following:

- Development must be sustainable;
- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised; and

- Responsibility for the environmental health and safety consequences of a policy, project, product or service exists throughout its life cycle.

Section 28(1) states that:

“Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring.”

If such degradation/pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of
- minimising these risks;
- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution; and
- Remediating the effects of the pollution.

Legal requirements for this project

The NMBM has a responsibility to ensure that the proposed housing development construction activities and the EIA process conform to the principles of NEMA. The proponent is obliged to take action to prevent pollution or degradation of the environment in terms of Section 28 of NEMA.

1.5.2 NEMA EIA regulations

2010 EIA Regulations

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities that may not commence without an environmental authorisation or existing activities in respect of which an application for environmental authorisation is required. In this context, EIA Regulations contained in four General Notices in terms of NEMA (GN R 543, 544, 545 and 546) came into force on 18 June 2010.

GN R 543 lays out two alternative authorisation processes. Depending on the type of activity that is proposed, either a Basic Assessment process or a Scoping and EIA process is required to obtain environmental authorisation. GN R 544 lists activities that require Basic Assessment, while GN R 545 lists activities that require Scoping and EIA. The regulations for both alternative processes stipulate that:

Public participation must be undertaken at various stages of the assessment process;

- The assessment must be conducted by an independent Environmental Assessment Practitioner;
- The relevant authorities respond to applications and submissions within stipulated time frames; and
- Decisions taken by the authorities can be appealed by the proponent or any other interested and affected party.

2014 EIA Regulations

The 2014 revision of the EIA regulations came into effect on 8 December 2014. Although the project's application for environmental authorisation was made under the 2010 EIA regulations and therefore remains subject to the procedural requirements thereof, the assessment is also required to take into account all relevant equivalent or additional listed activities in terms of the 2014 EIA regulations.

GN R982 of the EIA Regulations lays out two alternative authorisation processes. Depending on the type of activity that is proposed, either a Basic Assessment (BA) process or a S&EIR process is required to obtain EA. Listing Notice 1 (GNR 983) lists activities that require a BA process, while Listing Notice 2 (GNR 984) lists activities that require S&EIR. Listing Notice 3 (GNR 985) lists activities in certain sensitive geographic areas that require a BA process.

The activities triggered by the proposed Seaview development are listed in Table 1-1 below.

Table 1-1: Listed activities potentially triggered by the proposed development

2010/2014 Listed activities	Description
<p>GNR 545 Item 15: Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for: (i) linear development activities; or (ii) agriculture or afforestation where activity 16 in this Schedule will apply.</p>	<p>The development will entail the transformation of undeveloped land exceeding 20 ha to residential use.</p>
<p>GNR 984 Item 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	
<p>GNR 546 Item 12: The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.</p>	<p>The development may involve clearing of 300 square metres or more of vegetation where 75% constitutes indigenous vegetation (or has not been legally cleared in the last 10 years). Option 1 will involve clearing of vegetation in a CBA as identified in the NMBM Bioregional Plan.</p>
<p>GNR 985 Item 12: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (a) In Eastern Cape: ii. Within critical biodiversity areas identified in bioregional plans</p>	
<p>GNR 546 Item 13: The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: (1) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), in (c) In Eastern Cape: ii. Outside urban areas, the following: Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</p>	<p>Clearing of one hectare of vegetation where 75% constitutes indigenous vegetation within 5 km of the Island Nature Reserve.</p>
<p>GNR 546 Item 4: The construction of a road wider than 4 metres with a reserve less than 13,5 metres. (a) in Eastern Cape ii) outside urban areas in ee) critical biodiversity areas gg) areas within 5 km from any other protected areas identified in terms of NEMPAA</p>	<p>Road widths within and providing access to the development will be between 10m and 12 m and within 5 km of the Island Nature Reserve.</p>
<p>GNR 985 Item 4: The development of a road wider than 4 metres with a reserve less than 13,5 metres b) Eastern cape ii) Outside urban areas in ee) critical biodiversity areas gg) areas within 5 km from any other protected areas identified in terms of NEMPAA</p>	

Legal requirements for this project

The proposed new low income housing development includes the listed activities as described above. As such, the proponent is obliged to conduct an Environmental Impact Assessment for the proposed activity in accordance with the procedure stipulated in GN R 545.

1.5.3 National Heritage Resources Act (Act No. 25, 1999) (NHRA)

The protection and management of South Africa's heritage resources is controlled by the National Heritage Resources Act 25 of 1999. The enforcing authority for this act is the South African Heritage Resources Agency (SAHRA). In terms of the Act, historically important features such as graves, trees, archaeological artefacts/sites and fossil beds are protected. Similarly, culturally significant symbols, spaces and landscapes are also afforded protection. In terms of Section 38 of the National Heritage Resources Act, SAHRA can call for a Heritage Impact Assessment (HIA) where certain categories of development are proposed. The Act also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is deemed adequate, a separate HIA is not required.

The Act requires that:

“...any person who intends to undertake a development categorised as the ... or any development or other activity which will change the character of a site exceeding 5 000 m² in extent or involving three or more existing erven or subdivisions thereof must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development...”

Legal requirements for this project

ECPHRA has been notified of the proposed housing project as per the requirement of the National Resources Heritage Act, and phase 1 Archaeological and Palaeontological Impact Assessments have been conducted for all the proposed development sites. The reports of these studies have been made available to the heritage authorities for comment. The specialists did not identify the need for destruction permit applications at this stage.

1.5.4 National Forests Act: (Act No. 84 of 1998) (NFA)

The NFA promotes the sustainable use and development of forests, and provides special measures for the protection of certain forests and trees. Section 3(3) of the National Forest Act (NFA) sets out principles to guide sustainable forest management. The principles of the Act in Section 3 include that *“...natural forests may not be destroyed save in exceptional circumstances where, in the opinion of the Minister, a proposed new land use is preferable in terms of its economic, social or environmental benefits”*. This prescribes that no development affecting forests may be allowed unless “exceptional circumstances” can be proven.

In terms of Section 7 of the National Forests Act:

- 1) No person may –
 - a) Cut, disturb, damage or destroy any indigenous tree in a natural forest; or
 - b) Possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any tree, or any forest product derived from a tree contemplated in paragraph (a), except in terms of –
 - i) A licence issued under subsection (4) or section 23; or

- ii) An exemption from the provisions of this subsection published by the Minister in the Gazette on the advice of the Council.

The definition of “natural forest” in the NFA is as follows (Section 2(1)): ‘A natural forest means a group of indigenous trees whose crowns are largely contiguous or which have been declared by the Minister to be a natural forest under section 7(2)’

Thus in terms of the NFA, all indigenous forests are protected and no trees may be cut, damaged or removed without a licence from DAFF (or a delegated authority). If not satisfied that proper consideration has been given to the protection of a forest, DAFF has the legal right to refuse a licence, even if authorisation for development has been granted by another sphere of government.

Legal requirements for this project

A forest survey has been undertaken as part of this EIA to confirm the boundaries of the forest areas on the proposed alternative sites as per the Department of Agriculture, Forestry and Fisheries (DAFF) request. The survey results have been sent to DAFF for comment. Forest identified during the survey is protected in terms of the National Forests Act and will require authorisation from DAFF to destroy.

1.5.5 Notice of the List of Protected Tree Species under the National Forests Act, 1998 (GN R 716, 7 September 2012)

Government Notice 716 provides a schedule listing all protected tree species in South Africa. In terms of section 15 (1) of the National Forests Act, 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. The published list includes white milkwood (*Sideroxylon inerme*), which is found on the site. In order to destroy or remove protected species, a permit must first be obtained from DAFF.

Legal requirements for this project

Milkwood and any other protected species as listed in GN R 716, will require permits from DAFF before removal, damage or destruction.

1.5.6 Notice of the Lists of Critically Endangered, Endangered, Vulnerable and Protected Species 2007 (GNR 151, 23 February 2007)

Government Notice 151 provides a schedule listing all protected flora and fauna species in South Africa in terms of section 56 (1) of the National Environmental Management: Biodiversity Act No. 10 of 2004. In terms of section 57 of the Act a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7.

Legal requirements for this project

An ecological study was undertaken and several protected species were found to be present/potentially present, which will require a permit from DEDEAT for removal

1.5.7 Cape Nature and Environmental Conservation Ordinance of 1974

Schedules 1 to 4 of the ordinance list endangered and protected flora and fauna species.

An ecological study was undertaken and a number of protected species were identified on the development sites. Certain activities such as the clearing or damaging of endangered flora require a permit from DEDEAT.

1.5.8 National Water Act (Act No. 36 of 1998) (NWA)

The National Water Act 36 of 1998 provides for the promotion of efficient, sustainable and beneficial use of water in the public interest; for the facilitation of social and economic development; for the protection of aquatic and associated ecosystems and their biological diversity; and for the reduction and prevention of pollution and degradation of water resources. The Act also provides for emergency situations where pollution of water resources occurs. Section 21 of the Act describes activities that will require prior permitting before these activities may be implemented, including any changes to the river course and banks, changes to water flows and the discharge of water containing waste.

Legal requirements for this project

A wetland study has been undertaken as part of the EIA and has confirmed that no watercourses are present in the area that would trigger the requirement for a Water Use Licence Application (WULA) for the project.

1.6 Approach to the EIA

The approach taken in this study is guided by the principles of Integrated Environmental Management (IEM) as described in the IEM guidelines published by the Department of environmental Affairs and Tourism in 1992 (now known as the Department of Environmental Affairs). The approach is therefore guided by the principles of transparency which are aimed at encouraging decision-making. The underpinning principles of IEM are:

- Informed decision making;
- Accountability for information on which decisions are made;
- A broad interpretation of the term “environment”;
- Consultation with IAPs;
- Due consideration of feasible alternatives;
- An attempt to mitigate negative impacts and enhance positive impacts associated with the proposed project;
- An attempt to ensure that the social costs of the development proposals are outweighed by the social benefits;
- Regard for individual rights and obligations;
- Compliance with these principles during all stages of the planning, implementation, and decommissioning of the proposed development or activity; and
- Opportunities for public and specialist input in the decision-making process.

The study has also been guided by the requirements of the EIA Regulations set out in terms of the National Environmental Management Act (NEMA).

The EIA process consists of two phases, as depicted in Figure 1-2 below. The broad objectives of the EIA are to:

- Inform the broadest possible range of Interested and Affected Parties (IAPs) about the proposed project and the EIA process followed;

- Obtain contributions from IAPs and stakeholders (including the applicant, consultants, relevant authorities and the public) and ensure that all issues, concerns and queries raised are fully documented and addressed in this report;
- Identify and assess significant impacts associated with the proposed development;
- Formulate mitigation measures to minimise impacts and enhance benefits; and
- Produce a Final Environmental Impact Report (EIR), including a Draft Environmental Management Programme, that will provide all the necessary information for the Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) to decide whether (and under what conditions) to authorise the proposed development.

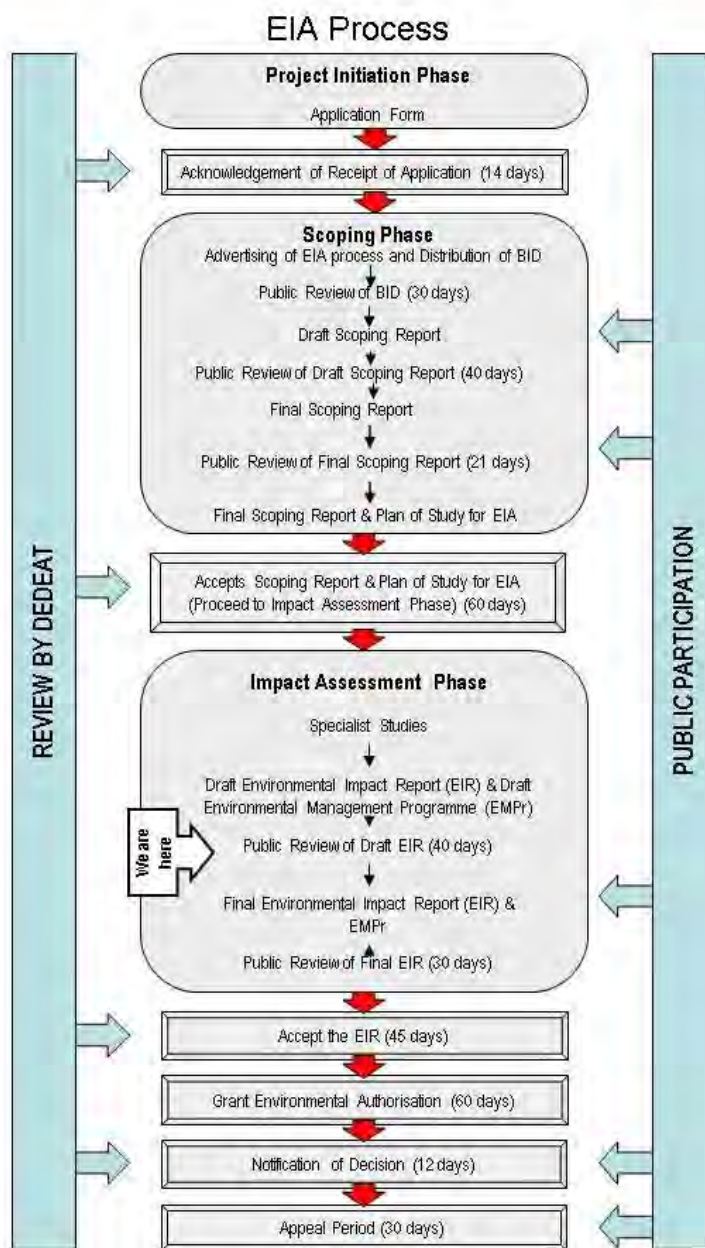


Figure 1-2: EIA Process

1.7 Assumptions and Limitations

The following assumptions have been made during the Scoping Study and in the compilation of this document:

- That the development is intended to primarily cater for existing residents of informal settlements in Zweledinga and New Rest, with capacity to cater for future growth of those communities where possible, and at the most may include residents (yet to be identified) from small communities surrounding Seaview, should the layout allow for this;
- While the potential housing yield of Farm 1/28 based on developable space exceeds the current requirement, current plans are to develop this property only to the extent that is justifiable based on the need and desirability of the development as outlined in Section 2.1;
- That, due to the cost of preparing detailed designs and plans, such detailed design/ planning information would only be developed in the event of environmental authorisation being granted. As such, it is anticipated that, as is typically the case in an EIA process, the EIA will assess broad land uses.

Notwithstanding these assumptions, it is our view that this Draft Environmental Impact Report provides a good description of the proposed development and the significance of potential impacts.

Relevant assumptions and limitations listed by each of the specialists in their studies are listed below.

Paleontological

It is not possible to predict the buried fossil content of an area other than in general terms, based on the depositional environments of the formations and the fossils that have been found. In particular, the important fossil bone material is generally sparsely scattered in most deposits and much depends on spotting this material as it is uncovered during digging i.e. by monitoring excavations.

Aquatic assessment

The assessment is based on information collected during two site visits undertaken over a one month period (March 2017) during a dry period in terms of rainfall. These factors can influence the quality and accuracy of the data collected. However, every attempt was made to collect the types of information necessary to assist in the assessment of the status and potential impacts of the aquatic resources on site.

Socio-economic

The following assumptions regarding the construction phase of the proposed housing development are made:

- The construction of the housing development is planned to commence in 2019 contingent on the project receiving all necessary regulatory and environmental approval.
- The anticipated duration of the construction phase for Option 1 of the development is approximately 12 months.
- The anticipated duration of the construction phase for Option 2 of the development is approximately 24 months.
- The total investment into the establishment of the housing development and associated infrastructure for each option is as follows:
 - Option 1: R 34 410 687 of construction spending.

- Option 2 (Leach Pits): R 72 365 188 of construction spending.
- Option 2 (Waterborne sanitation): R 97 504 846 of construction spending.
- All of the direct expenditure will be spent within the South African economy.
- Only South African expenditure is considered in this analysis.
- All of the construction spend will be incurred in South Africa.
- The construction of the housing development will employ an estimated number of between 88 (Option 1) and 150 (Option 2) during the construction phase of the project.

The assumptions regarding the operational phase of the project used in the modelling exercise are as follows:

- The housing development is anticipated to be occupied immediately by residents following completion of the construction phase. Based on this, the housing development is anticipated to open in the early part of 2020 (Option 1) and 2021 (Option 2).
- Following the construction of the housing development the following annual costs are anticipated:
 - For Option 1, R 225 200 for the labour, equipment and fittings for a period of 30 years.
 - For Option 2 (Leach Pits), R 277 000 for the labour, equipment and fittings for a period of 30 years.
 - For Option 2 (Waterborne), R 450 000 for the labour, equipment and fittings for a period of 30 years.
- Approximately 3 people will be permanently employed to perform maintenance on the housing development and associated infrastructure with Option 1.
- Approximately 4 people will be permanently employed to perform maintenance on the housing development and associated infrastructure with Option 2 (Leach pits) while 5 people will be permanently employed with Option 2 (Waterborne).

1.8 Structure of this report

This report is divided into eight chapters:

Chapter 1 Background and Introduction

Introduces the Scoping Study, and the legal context, for the proposed low income housing development.

Chapter 2 Description of Development Proposal

Describes the various components of, and the motivation for, the proposed low income housing development.

Chapter 3 Nature of the Affected Environment

Provides an overview of the affected biophysical and socio-economic environment in the project area.

Chapter 4 The Public Participation Process

Describes the Public Participation Process (PPP) followed, and the issues & concerns that have been raised by Interested and Affected Parties (IAP's).

Chapter 5 Assessment of Environmental Impacts

Describes the potential positive and negative environmental impacts of the proposed low income housing development.

Chapter 6 Findings, Evaluations and Recommendations

Concludes and summarises the findings and recommendations of the Environmental Impacts Study.

Chapter 7 Draft Environmental management Programme

Stipulates the environmental management guidelines that should be implemented in the planning, design, pre-construction, construction and operation stages of the proposed development.

Chapter 8 The Way Forward

Describes the next steps in the EIA process.

Chapter 9 References

Cites any texts referred to during preparation of this report

Appendices

Supporting information presented in various appendices.

Note that Appendix K (Specialist Reports) is bound separately as Volume 2 of the DEIR, and will not be provided again with the FEIR.

2 Description of the development proposal

2.1 Motivation for Proposed Activity

Housing and service delivery is also a key challenge facing the Nelson Mandela Bay Municipality (NMBM). According to the NMBM's Built Environmental Performance Plan (2015/16) the NMBM has a housing backlog of 72,411 units (49,000 backyard shacks and 23,411 in informal areas) and identified the provision of quality housing and the structured upgrading of informal settlements as one of their main objectives. The proposed provision of housing for residents of informal settlements in the Seaview area is also listed as one of the priority projects for Ward 40 in the NMBM's 2016/17-20/21 IDP (15th Ed). The IDP aims to provide basic sanitation to all communities in the NMBM by 2021.

The NMBM has identified five potential sites (making up two layout options) to provide housing for the informal settlements of Zweledinga and New Rest which are located to the north and north-west of Seaview. The Municipality is focused on the provision of sustainable integrated human settlements, which means the provision of housing must be accompanied by the provision of other services and amenities required to improve the socio-economic conditions of the residents of that area (i.e. access to community facilities such as educational, entertainment, cultural, health, sports and welfare services). Therefore, the focus of this project is on creating an integrated sustainable settlement which reflects the vision of new initiatives in the NMBM.

2.2 Detailed description of the proposed project

The Nelson Mandela Bay Municipality (NMBM) proposes to develop low income residential units and associated infrastructure in Seaview. Two development options are provided, option 1 entailing development of approximately 478 units on non-forested patches on erf 590, 238 and 240 as well as portion 10 of farm 28, and option 2 involving development of up to approximately 1050 units on portion 1 of farm 28. The development will provide formal housing for the residents of Zweledinga and New Rest informal settlements located on erven 590, 238 and 240. Should the layout option selected allow for it and the need arise, additional beneficiaries from small communities surrounding the Seaview area may also be accommodated in the proposed development. Additional detail in this regard is however not available. The NMBM proposes to undertake the development on municipal and state-owned land (erf 590,238 and 240 and Farm 28 portion 10, Seaview – Development Option 1) and in the instance that this is not feasible to consider development on alternative land parcels (Development Option 2) (Refer to Figure 1-1 for details of the affected properties). These options are further discussed in Section 2.3.2. Two options for on-site sanitation are also proposed for the development and detailed in Section 0. Access to the developable area of farm 10/28 is proposed via the access track through erf 237 and farm 31/28, connecting onto Aliwal road in Clarendon Marine. The rest of the sites can be accessed off Seaview Road.

Table 2-1: Farm name and property portions comprising the study area

Farm Number	Property portion	Landowner	Size (ha) – transformed area	Size (ha) – development footprint	Layout option #
Erf 590, Clarendon Marine (Location of Zweledinga settlement)	N/A	NMBM	3.964	3.271	1
Erf 238, Clarendon Marine	N/A	NMBM	4.481	0.43	1

Farm Number	Property portion	Landowner	Size (ha) – transformed area	Size (ha) – development footprint	Layout option #
Erf 240, Clarendon Marine (Location of New Rest settlement)	N/A	NMBM	18.031	13.545	1
Farm 28, Seaview	Portion 10	NMBM	11.365	3.578	1
Farm 28, Seaview	Portion 31	James Shamley	2.87	0.74	1 (access road)
Erf 237	N/A	NMBM	0.546	0.048	1 (access road)
Farm 28, Seaview	Portion 1	Stu Davidson	75.279	66.11	2

Various site alternatives for the development proposal were identified during an initial pre-screening exercise in 2010 based on current land use, presence of natural forest, proximity to the current informal settlements and presence of degraded / transformed land. Of these sites, five were selected based on land ownership (municipal) and landowner support, for further assessment.

The landowners of the privately owned properties had all been consulted by the NMBM regarding their willingness to sell their properties for the purpose of the proposed development, and indicated in-principle support to proceed with an EIA with their property as a site alternative.

Using the five sites proposed, two development options were identified. The combined development of erven 590,240 and 238 and Portion 10 of Farm 28, is proposed as Development Option 1 as the proposed development is too large to be accommodated on one property alone (as a result of limited developable areas due to forest on the properties) and will therefore require the development of non-forested areas on each of these properties. This will result in a yield that slightly exceeds the latest demand estimates (as per the NMBM's 2014 Social Development Education and Administration survey) but could only accommodate limited future expansion of these communities. These properties are largely municipally owned however private land (Portion 31 of Farm 28) will be required to accommodate an access road to portion 10 of Farm 28. This presents a potential risk if landowner permission is not obtained. Development Option 2 can accommodate the entire development (and will allow for future expansion) on Portion 1 of Farm 28, however this will require the municipality to purchase the land, which will increase the development cost of the project.

The total development footprint for option 2 is approximately 66 ha, whereas that for option 1 (including new access roads) is significantly smaller, at approximately 19 ha.

2.2.1 Housing and associated land uses

Qualifying beneficiaries will receive a fully state subsidised formal structure (Free basic house/RDP) of 45 m². Beneficiaries will depend entirely on being housed by the state without any expectation of making financial contributions towards the house/services/ transfer/ registration costs for the property to be received. Houses will be typical RDP structures on a minimum erf size of 250 m² to accommodate the sanitation services on each erf. The houses will consist of one shower and sink per dwelling (no bath). Various internal layouts are possible for the RDP houses. One of these layouts is illustrated in Figure 2-1. General specifications of standard RDP houses as proposed for the development) are:

- Fully State Subsidised Housing – for beneficiaries earning up to R3,500 per month;
- Each unit >40 m², and costing approximately R160,000 each to build;
- Beneficiaries will depend entirely on being housed by the state without any expectation of making financial contributions towards the house/services/ transfer/ registration costs for the property to be received; and

- Units will be free standing.

The proposed Option 1 development will include areas zoned as public open space (both parks and natural/ indigenous vegetation), as well as community purposes zoning to make provision for uses such as a crèche or church and special purpose zoning (for facilities such as a waste transfer station). Due to the topography of the sites, a number of stormwater detention ponds are required to facilitate drainage. As developable space is a key constraint for this option, provision for community facilities is limited.

Development Option 2 makes provision for development of facilities such as a crèche, church, primary school, sports fields, businesses, waste transfer station, open space and a taxi area.

Details of the two development options are provided in Section 2.3.2

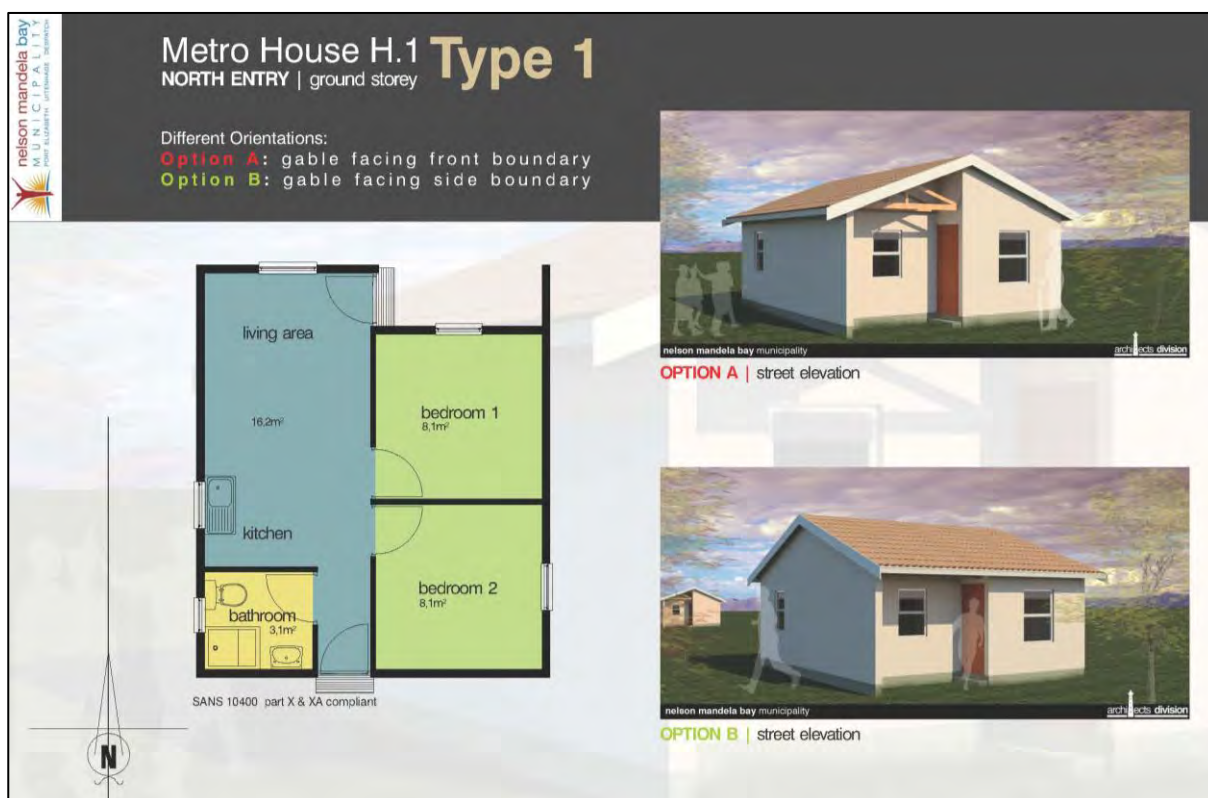


Figure 2-1: Typical example of a free standing single storey RDP house

2.2.2 Bulk Services

A preliminary design report was compiled by Gilgal addressing the bulk services for the development. The report is included under Appendix H1 and letters from the relevant NMBM services departments regarding the capacity for provision of bulk services are included under Appendix J.

Water

The development will connect onto the proposed Seaview bulk water supply scheme, which is intended to augment water supply for the broader area. An environmental Basic Assessment process is currently underway for this project (DEDEAT Ref No: ECm1/C/LN1&3/M/51-2016) separately to this EIA process. Refer to Appendix J for the NMBM letter confirming the capacity of the proposed supply scheme to service this development (located in zone 5). The NMBM has confirmed that no other water supply options are available for the area. The proposed bulk water pipeline will run along the old Seaview Road.

Alignments for the required connections to the bulk water supply infrastructure are shown in the water infrastructure design drawings in Appendix H1. All water mains are located in road reserves at 2.5m from the erf boundaries. The proposed water mains consist of pipe diameters ranging from 50mm to 110mm. Water demand of 500 l/erf/day was assumed in the design calculations in accordance with the NMBM Water Division's Design Requirements.

The Average Annual Daily Demand (AADD) for Option 1 development is estimated at 239 kl/day or 2.77 l/s. Peak water demand for the 478 erven development is estimated to be 3.5 times AADD which equates to a flow of 9.68l/s. For Development Option 2 which consists of 1050 erven, the AADD is 525 kl/day or 6.08 l/s. Peak water demand for the development is 21.27 l/s.

Sanitation

No wastewater treatment works currently exists in the Seaview area, and existing communities make use of on-site sanitation. For the formal developments this largely consists of septic tanks, and for Zweledinga this mostly comprises home-built pit latrines, the majority of which are unhealthy and physically unsafe. The community have dug these toilets due to a lack of any other alternative services. Water is supplied to a few standpipes located throughout the informal settlement. In New Rest communal chemical toilets are provided and are serviced by a Municipal appointed service provider. The community have expressed dissatisfaction with this service. Connection onto existing bulk sanitation services therefore is not possible and due to space and topographic limitations, sanitation options to service the proposed development are limited. While numerous options in this regard were investigated, the conclusion was reached that on-site sanitation was the only viable option.

Various sanitation alternatives were initially considered and are further discussed in Section 0. Two options for on-site sanitation were considered feasible dependant on the development option chosen. Due to space considerations Development option 2 has the ability to accommodate a package plant (as an alternative to leach pits) however Development option 1 does not have the necessary space for a package plant due to the surrounding forest. Makhetha Development Consultants (MDC) were appointed by the NMBM to assess alternative options in this regard, and the resultant recommendation was for on-site Low Volume Flush Toilets with leach pits. MDC's report detailing this study (which included soil percolation testing) is provided in Appendix I. Further to this study Gilgal has provided updated details for the package plant. Refer to Appendix H1 for a copy of Gilgal's Preliminary Design report, as well as the technical proposal for the package plant.

Stormwater

Some of the proposed sites on Erf 240 and Farm 10/28 for Option 1 are located in water logged (depressions) areas. This will result in sites located in depressions not being able to be developed. These sites will be flooded during heavy rainfall seasons especially after the development has been completed as there will be more stormwater runoff. Some of these sites will therefore be utilized as stormwater detention earth ponds (Refer to design drawings in Appendix H1). The ponds will be designed to be play areas during dry seasons. This will result in a reduction in the number of erven to be used for residential purposes.

Grid inlets and catchpits will be installed at low points on the roads as well as before intersections and at approximately 80 m intervals.

Development option 2 does not have any stormwater drainage problem as the slope allows for good stormwater drainage. There might however be a need for stormwater control measures i.e. detention pond or discharge outlets at the lowest point of the catchment area to manage the discharge. The stormwater system of the proposed roads will drain into the proposed bulk stormwater detention ponds located at lowest areas within the development.

Electricity

Off grid photovoltaic (PV) systems have been installed by the NMBM on the individual informal structures in Seaview. This system provides lighting and cell phone charging facilities to the informal homes. With the development of formal housing, electricity will be supplied from the Seaview sub-station by means of an overhead power line, and the housing design will include the NMBM standard specifications for low income housing such as solar geysers. Due to load growth in the Seaview area the Nelson Mandela Bay Municipality will upgrade the line to a 22kV underground cable which will be sufficient to supply the power requirements for Seaview, including the proposed development. Where possible other energy saving technologies (such as solar street lighting) will be installed. Refer to Appendix J for comment from the NMBM Department of Electricity and Energy.

Waste

Solid waste generated by individual households in operational phase will be collected weekly as per the NMBM's waste collection schedule. Both development options make provision for waste transfer stations to service the surrounding area (this need was raised by the NMBM's Public Health Directorate – see Appendix J). A single transfer station site is provided for Option 2 and two smaller sites are provided for in Option 1 (one along Seaview road on erf 240 and another on Farm 10/28).

2.2.3 Access

Access to all the sites except Portion 10 of Farm 28 will be off Seaview road. It is proposed that portion 10 be accessed via Aliwal Road in Seaview. A 12 m road reserve will need to be constructed to connect the development with Aliwal road. This new access route will follow the footprint of the transformed area (See layout in Appendix H1). The preliminary layouts proposed allow for 12 m wide road reserves within the residential areas, to allow for access by municipal service vehicles such as waste removal and servicing of leachpits.

The 6m wide roads will consist of barrier kerbs and channels on the upper side and mountable kerbs and channels on the lower side. The 4 and 5m wide roads will consist of mountable kerbs and channels on both sides. 10m Radius bellmouths will be constructed at the intersections with adjoining roads. The road works will include trimming and shaping of verges.

Sidewalks will be constructed on the upper side of the road. The width of sidewalks will be 1.2m wide for the 4m roads, 1.5m wide for the 5m roads and 1.8m wide for the 8m roads.

A road servitude through Farm 31/28 will be required for access road to portion 10/28 proposed development. As Farm 31/28 is privately owned. The road servitude will need to be procured by the NMBM.

2.2.4 Relocation Process

The relocations will be undertaken by the municipality's housing unit, the Social Development Education and Administration (SDEA) sub-directorate. If space is limited as with Development Option 1, the relocation will be done in-situ in a phased manner. The details of the NMBM's standard relocation procedure have been included in Appendix J.

2.2.5 Decommissioning

As the development is proposed to be permanent, decommissioning of either buildings or infrastructure is not anticipated. Should decommissioning be required for any unexpected reason, all structures without an ongoing use will be dismantled and removed from the site, for either re-use elsewhere (where possible) or recycling, or if neither of these options are possible, disposal at a waste landfill site.

2.3 Project Alternatives

2.3.1 Location alternatives

Alternative locations for the housing for the New Rest and Zweledinga residents were considered in other parts of the metropolitan area. Settlements to address housing backlogs have been proposed at St Albans (since found to be undevelopable), Witteklip, Kuyga and Rocklands (NMBM Spatial Development Framework, 2015). However, apart from the environmental authorisations required to make two of these sites developable, they have been proposed to accommodate beneficiaries in those areas, and significant expansion of the proposals would be required to accommodate the resident of New Rest and Zweledinga. Another area where housing could potentially be provided is within the Zanemvula Project, located in the Chatty Valley, which is a major Municipal and National Department of Human Settlements project to address current housing backlogs and the relocation of people residing below flood lines in the metropolitan area. Other alternatives may include Khayamnandi or Motherwell Extensions 29, 30 and 31, however, this area is more than 20 km from the existing settlements of New Rest and Zweledinga. Therefore, due to the high daily transportation costs for the current residents of New Rest and Zweledinga to reside in the Chatty Valley and travel to work in the greater Seaview area, such resettlement is not deemed viable for such a community from a socio-economic perspective.

2.3.2 Site alternatives

Various site alternatives in the Seaview area were identified during an initial pre-screening exercise in 2010 based on current land use, presence of natural forest, proximity to the current informal settlements and presence of degraded / transformed land. Of these sites, five were selected for further assessment through the EIA process, based on two site alternatives as discussed below. The layout designs for these development options are preliminary and still subject to the outcomes of specialist studies, public participation, and detailed engineering designs, and at this stage are intended to provide an indication of the potential development capacity of the properties.

Development Option 1 – four sites combined

As the majority of land falls within the DAFF forestry layer, development is likely to be constrained to the transformed areas as shown in Figure 3-7. Option 1 therefore proposes the utilisation of the disturbed areas on Erf 590, Erf 238, Erf 240 and portion 10 of Farm 28 for the development of formal housing in order to meet the required number houses. It is therefore proposed that the development be split between these properties. The proposed land uses for each of the erven, as per the preliminary layouts provided in Figure 2-2 - Figure 2-4 are described briefly in the tables below.

Table 2-2: Erf 238 and Erf 240 proposed land uses

Zoning	Land Use	No of Erven	Area in m ²	% Allocation
Residential	Subsidised Housing	263	73,957	17.18
Special purposes/community	All Purposes	2	4,837	1.12
Public Open Space (Active)	Park	3	5,458	1.27
Public Open Space (Passive)	Natural Land	3	290,694	67.53
Special purposes	Stormwater ponds	6	1,910	0.44
Special purposes	Waste Transfer Station	1	2,845	0.66
Transportation 1	Roads (12 m wide)		50,750	11.79
Total		278	430,451	100

Table 2-3: Erf 590 proposed land use

Zoning	Land Use	No of Erven	Area in m ²	% Allocation
Residential	Subsidised Housing	76	20,206	9.91
Special purposes	Stormwater ponds	1	846	0.41
Public Open Space (Active)	Park	5	1,891	0.93
Public Open Space (Passive)	Natural Land	1	171,173	83.96
Transportation 1	Roads (12 m wide)		9,766	4.79
Total		83	203,882	100

Table 2-4: Portion 10 of Farm 28 proposed land use

Zoning	Land Use	No of Erven	Area in m ²	% Allocation
Residential	Subsidised Housing	128	17,549	8.58
Public Open Space (Passive)	Natural Land	1	16,870	82.5
Special purposes	Stormwater ponds	1	314	
Special purposes	Waste transfer station	1	622	
Transportation 1	Roads (12 m wide)		9,737	7.77
Total		131	204,482	100

Development Option 2 – Farm 28 portion 1

The second option under consideration is the purchase of Portion 1 of Farm 28 which contains approximately 75 ha of previously transformed land to the east of the property. The transformed area will be sufficient to contain the entire development, and provide capacity for future expansion to accommodate community growth. A preliminary layout for the proposed development of this site is based on the footprint area assessed and proposed for residential development through the EIA previously conducted on the site (CEN, 2012), and is provided in Figure 2-5. Based on that previous EIA, indications are that this portion of the site is most suitable for residential development from a biophysical perspective. However there are cost implications as the property is privately owned.

Based on the 250 m² minimum erf size to accommodate on-site sanitation via leach pits, preliminary indications are that the developable area of the property could yield up to 950 single residential (RDP) sites, as well as a number of larger sites for partially subsidised and bonded housing. Community facilities such as a primary school, churches, crèches, a sports field, areas for businesses, a taxi area, a waste transfer site, and various public open spaces could also be accommodated in the layout, as per the details provided in Table 2-5. Depending on the sanitation option developed, the site in the south-eastern corner of the property would either be allocated for a package plant wastewater treatment works and associated reed beds, or left as open space. This development yield exceeds the current housing requirement from the New Rest and Zweledinga communities and would allow for future population growth which could be accommodated via future phases of the development as and when the need arises (the initial phase being to develop housing and facilities to meet the current need only).

This development option would also free up the areas on erf 590, 238 and 240 currently inhabited by the beneficiary communities, and management of the resultant open space would be required to prevent future in-migration to these areas. It is proposed that these areas are rehabilitated to facilitate regrowth of natural forest in the area.

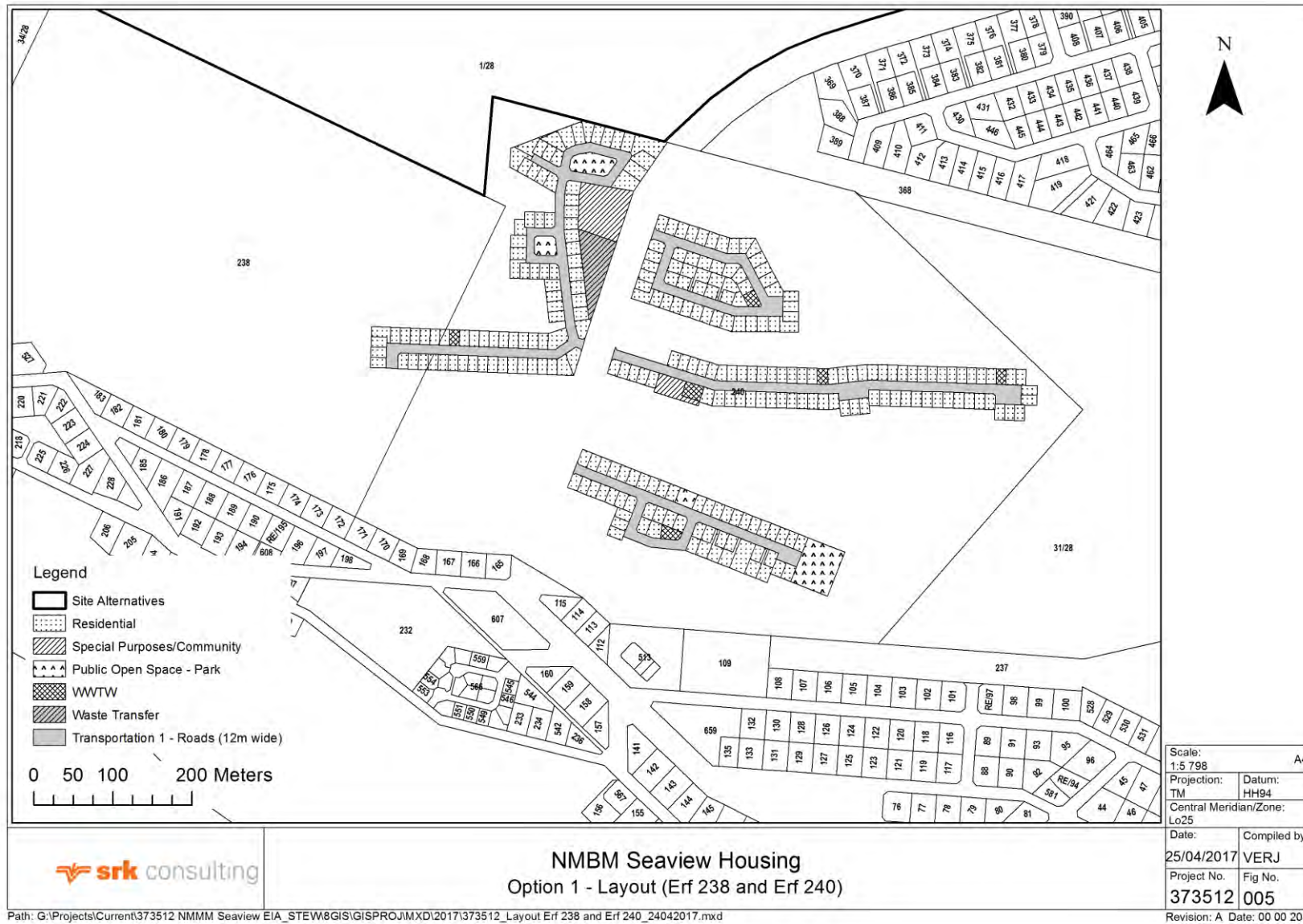


Figure 2-2: Preliminary proposed development layout for erf 238 and 240, Clarendon Marine

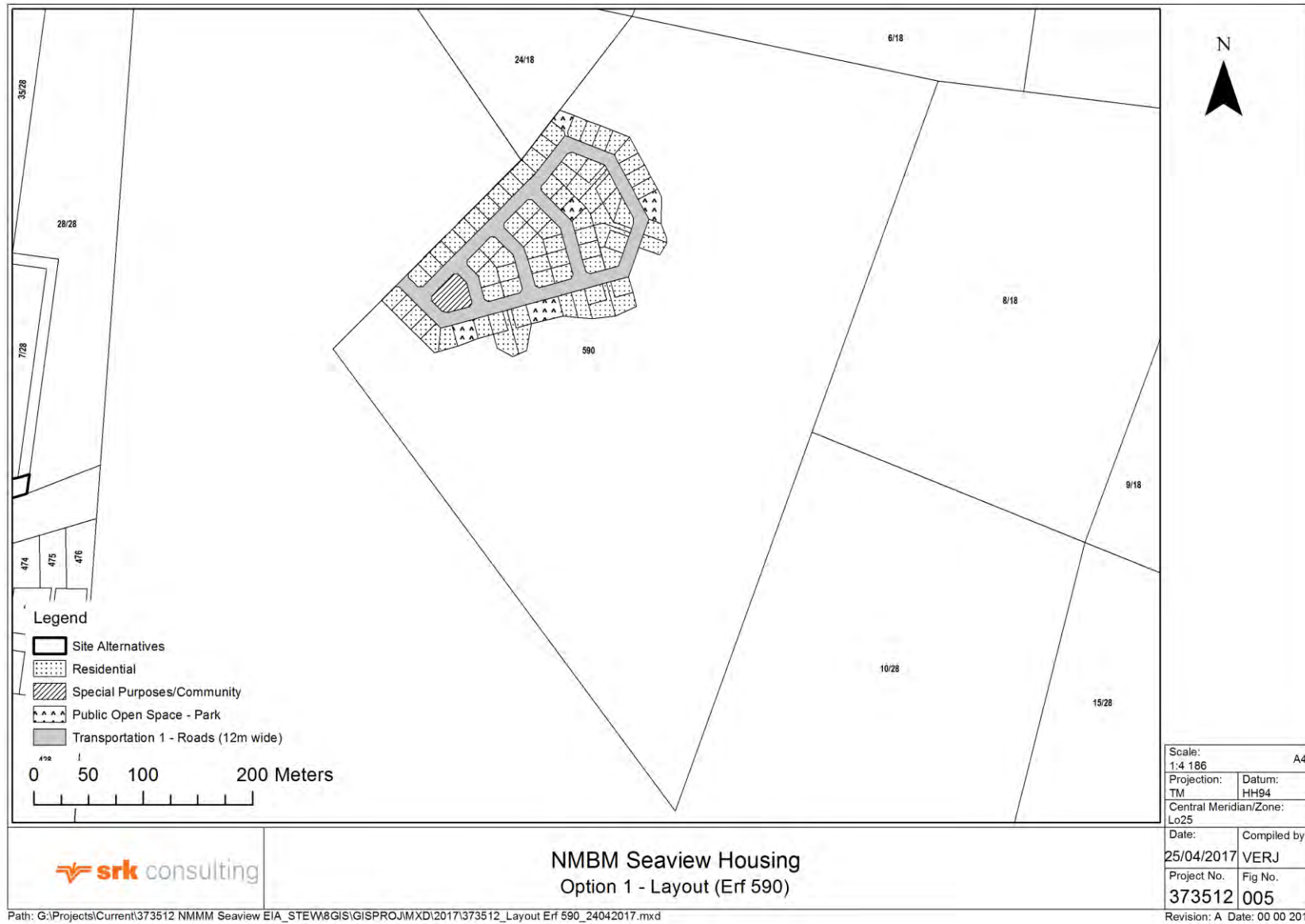


Figure 2-3: Preliminary proposed development layout for erf 590, Clarendon Marine

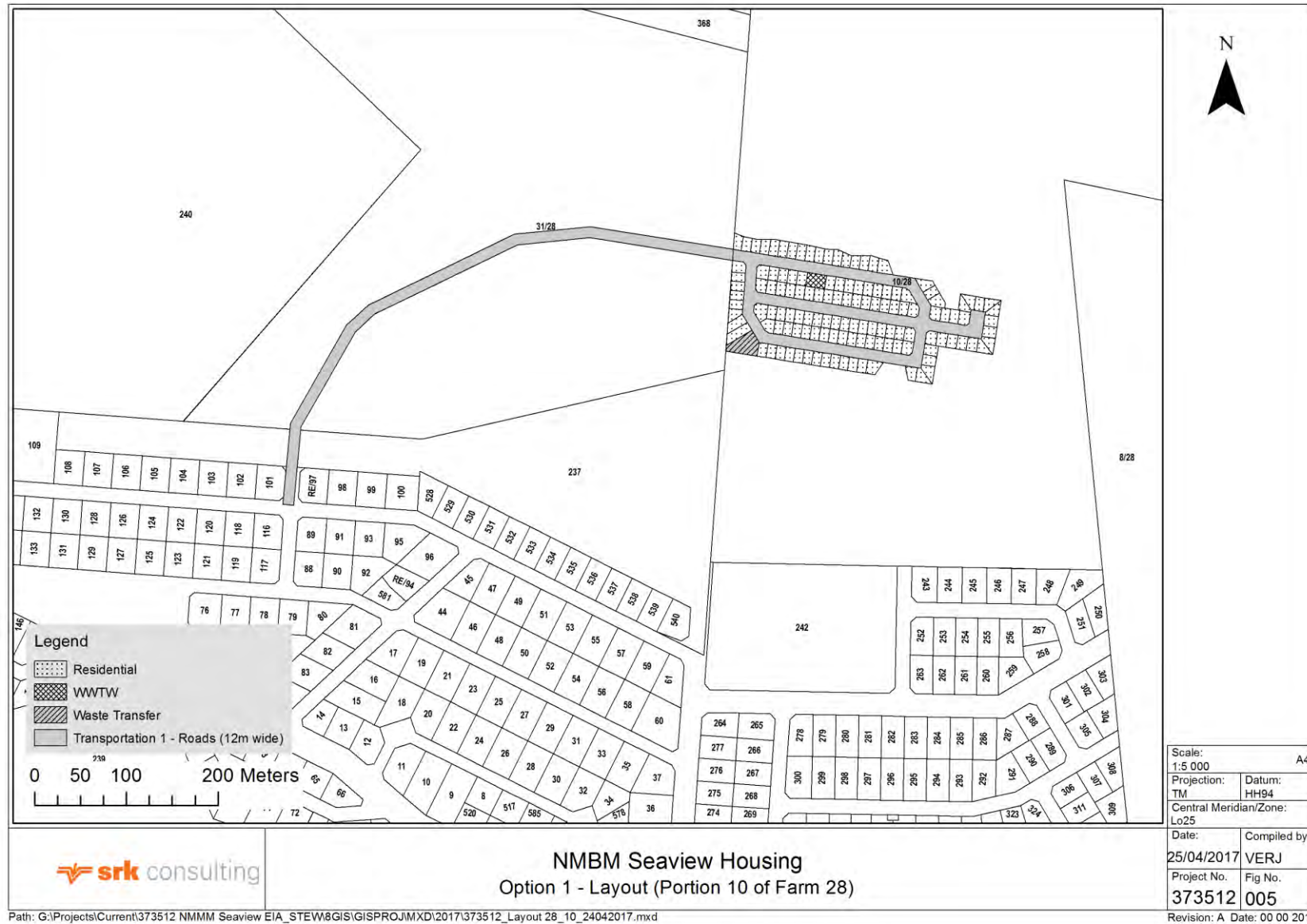


Figure 2-4: Preliminary proposed development layout for Farm 28 portion 10, Seaview

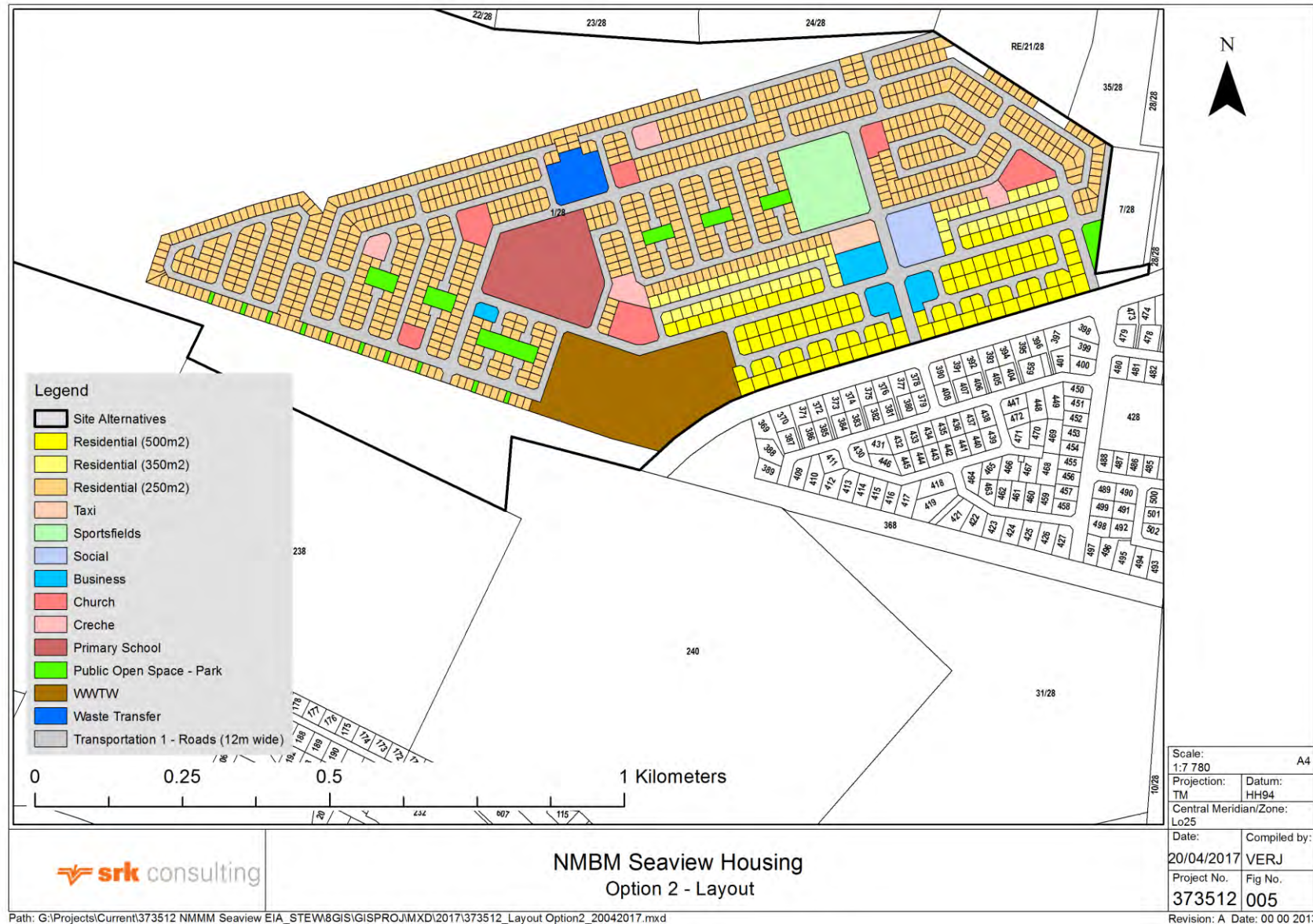


Figure 2-5: Preliminary proposed development layout for Farm 28 portion 1, Seaview (development option 2)

Table 2-5: Portion 1 of Farm 28 proposed land use

Land Use	No of Erven	Area in m ²
Residential (250 - 500 m2 erven)	1117	320462
School	1	28021
Creche	4	7529
Business	3	10684
Social (community facilities)	1	7516.75
Church	6	17065
Waste Transfer station	1	7133
Open space / WWTW (depending on sanitation option)	1	47475
Public Open Space / park	7	9819
Sportsfield	1	17825
Taxi rank	1	3184
Roads (12 m wide)		205498
TOTAL	1143	

2.3.3 Sanitation alternatives

Due to the lack of bulk sewerage infrastructure in Seaview, which places a constraint on any further development in this area, Manong and Associates were appointed by the NMBM to conduct detailed investigations for bulk sewerage infrastructure potentially to service the whole area. These investigations revealed a lack of available and suitable land in the area for this purpose. Makhetha Development Consultants (MDC) were subsequently appointed to investigate feasible sanitation alternatives for both development options 1 and 2 (Makhetha Development Consultants, 2016). A Full Water Borne Sanitation, Ventilated Improved Toilets (VIP) Toilets and Low Volume Flush Toilets (LVFT) with various methods of waste disposal were considered (Refer to Appendix H2 for the MDC sanitation report). A summary of these technology alternatives that were considered during this sanitation investigation is given in Table 2-6.

Table 2-6: Comparison of various sanitation alternatives considered (Source: MDC, 2016)

Sanitation Option	Advantages	Disadvantages
Full waterborne sanitation	Well known and well understood	Requires sewerage reticulation – maintenance
	Very old and known technology	Flushes with 9 to 10 litres of water per flush (consumption)
	Experience in installing and managing the system	No infrastructure to connect to
		Needs full or package treatment plant – maintenance and operation
		Permission to build treatment plant already denied
		Remoteness will impact on maintenance and operations
VIP Toilets	No water required	Cannot normally be installed in the house
	Established and known technology	Need extensive user education with repeated intervention
	Very low unit maintenance	Subject to abuse due to ease of “dumping” rubbish into the pit

Sanitation Option	Advantages	Disadvantages
		Difficult to de-sludge without appropriate equipment
Low Volume Flush Toilets	Use less water than conventional sewerage to flush – 1.5 to 3 litres	Relatively new technology in South Africa
	Can be installed in the house	Need change of attitude and willingness to try new things
	Designed to flush effectively whether from a cistern or pour	Need shallow sewers if communal septic tanks are used
	Can be connected to communal septic tank or individual leach pits	Limited suppliers – competitive tendering limited
	Tested extensively by WRC	
	Tried and tested elsewhere from the 1980's (examples cited)	
Chemical toilets	Low construction capital	operational costs ,increase due to required chemicals and regular emptying
		need extensive user education with repeated intervention
Biogas Digester System	low construction capital	Technology not fully understood by community using it most of the time, resulting in malfunctions: need extensive user education with repeated intervention.
	biogas bi-product may be used as an energy source when properly designed and operated	
Septic Tank		Considerable construction capital.
		soak-away susceptible to blockage
		considerable space required
		require periodic sludge removal resulting in high maintenance costs
Communal conservancy tank		Considerable construction capital
		Considerable space required
		require periodic sludge removal resulting in high maintenance costs

Based on the comparison above, MDC concluded that Low Volume Flush Toilets (LVFTs) would be the only viable option for on-site sanitation for development Option 1.

Soil percolation tests were also undertaken as part of the investigation, the results of which showed that the minimum requirements for on-site percolation would be exceeded. Based on this, as well as the comparison of technologies summarised above, MDC concluded that individual leach pits (on each property) will function well in the area (for both development options).

An investigation was conducted for the provision of a package plant in a previous EIA conducted for Portion 1 of Farm 28 and is considered as an alternative option to the LVFT's for development option 2 (space does not allow this for option 1).

An overview of the two proposed alternatives for sanitation – LVFTs for development options 1 and 2, and a package plant as an alternative for development option 2 – is provided below, and further

technical detail of both options is provided in the preliminary design report and sanitation technical reports in Appendix H.

Sanitation Option 1- Low Volume Flush Toilets with leach pits

LVFTs use significantly less water (1-3 L per flush) than a full-flush toilet. All pipework shall comprise 100 mm diameter pipes up to distances of 35 m. Longer distances will be treated individually and designs based on slopes etc. The minimum erf size required would be 250 m² to ensure adequate separation from the individual leach pits. A schematic layout of the design is provided in Figure 2-6 and further layout and designs by Gilgal are included in Appendix H1.

Low Volume Flush Toilets will be drained to a leach pit located on each property. Special modifications will be made to the leach pit to accommodate additional water from the sink and the shower and will comprise dual pits (See Figure 2-7). 100 mm diameter on site drains will be connected to each dual leach pit. This is deemed to be possible due to the sandy nature of the soil and possible higher percolation rates. A groundwater study of the proposed development sites has confirmed that LVFTs and leach pits are considered to be a suitable sanitation solution for the area (see Appendix K7 for groundwater study report).

The advantages of the system are that the pits are easy to construct, there is no sewerage system, and there will be longer desludging periods than septic tanks due to leaching. The disadvantages are that there will be many individual tanks to be handled at desludging time, the contents are dryer than those of septic tanks, and separate handling of sullage is recommended unless the percolation rates are very high. It is proposed that the leach pits are desludged by the NMBM at 5-10 year intervals.

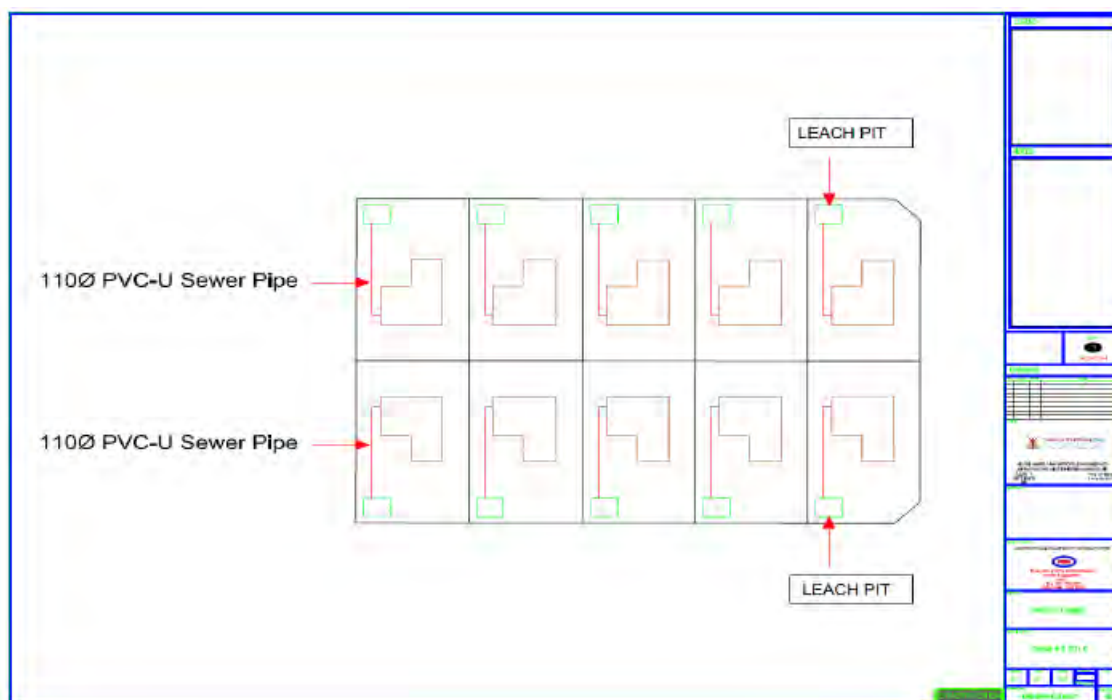


Figure 2-6: Schematic layout of Low Volume Flush toilets connected to leach pits (Source: MDC 2016)

Community institutions will be provided with low volume flush toilets connecting, depending on size of institution, to either a small septic tank discharging to a soak pit or to a conventional septic tank discharging to a French drain (see Figure 2-8).

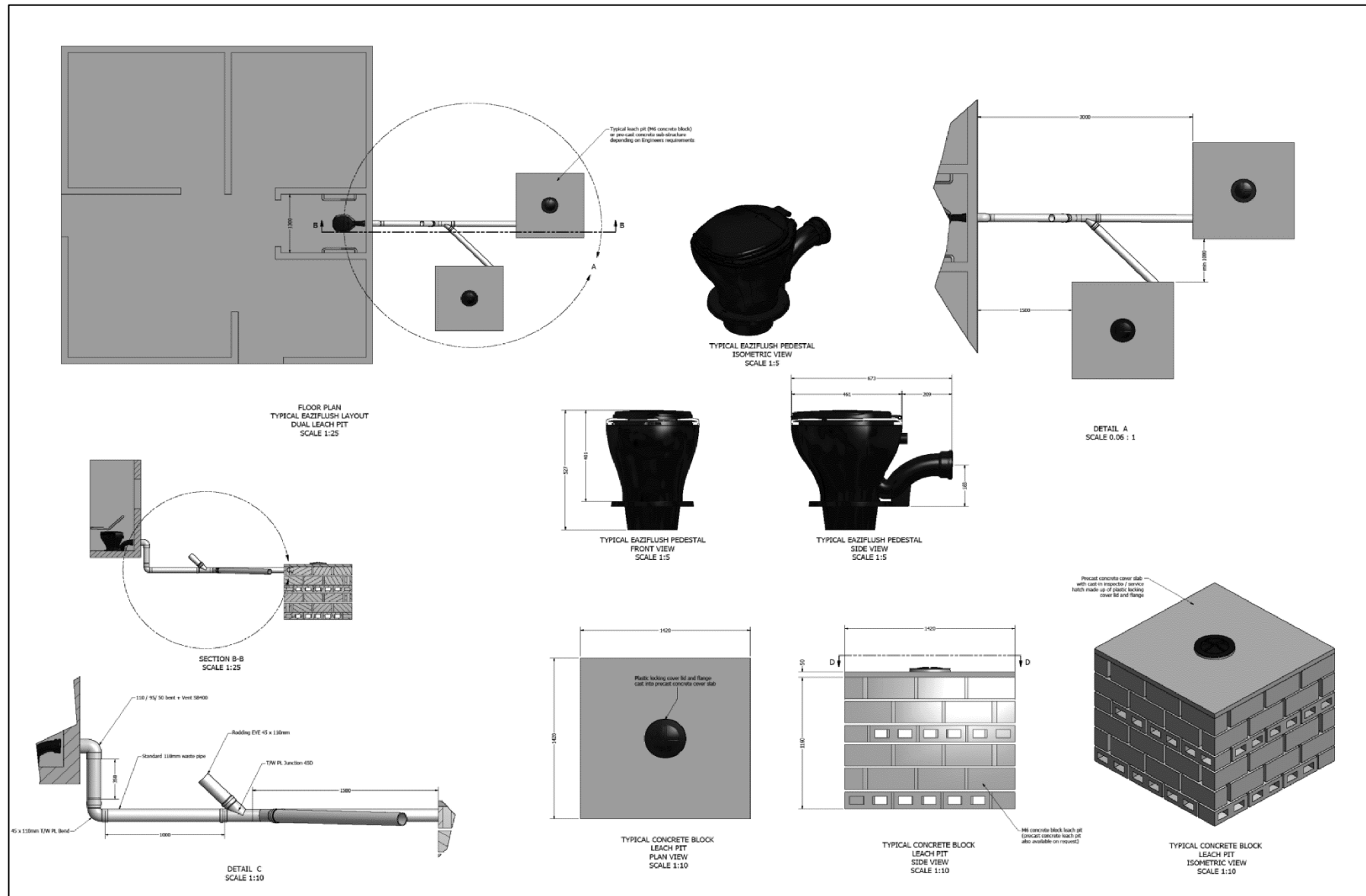


Figure 2-7: Proposed sanitation design for individual houses connected to dual leach pits (Makhetha 2016)

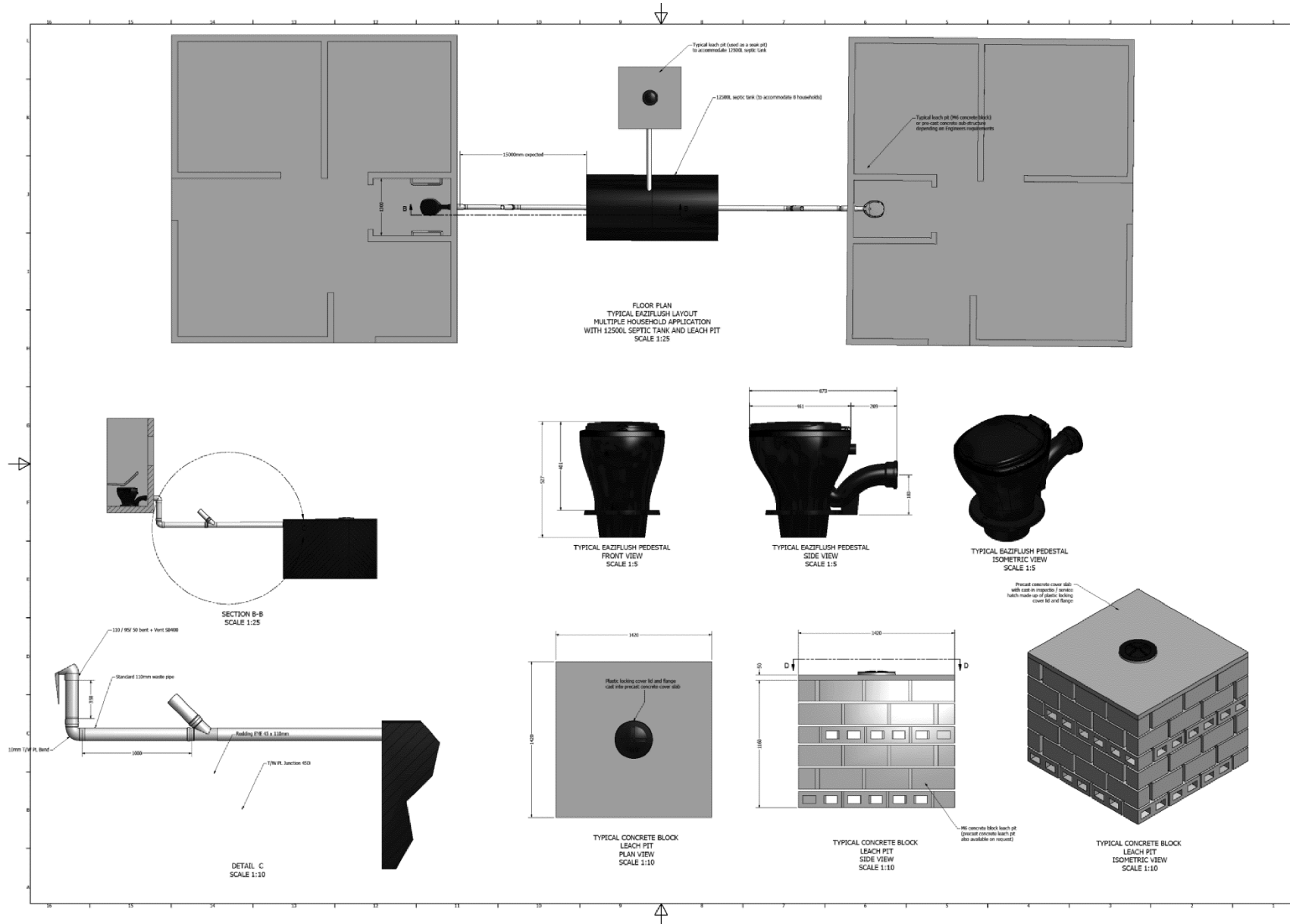


Figure 2-8: Proposed sanitation design for institutional buildings (leach pit with septic tank) (Makhetha 2016)

Sanitation Option 2 - Package plant (waterborne sanitation)

Effluent from Portion 1 of Farm 28 could also be treated in an on-site package plant, as an alternative to leach pits. The topography of this land allows for the reticulation to gravitate to the proposed package plant treatment works to be located at the lowest side of this land towards the south, along Seaview road (see Figure 2-5 for proposed layout). The pumping system might be required at the connection point at the treatment plant.

Anticipated Average Dry Weather Flow is 551 kl/d, based on which the size of the proposed Waste Water Treatment Plant was calculated. The proposed package treatment plant would have the process capacity to treat 551 kl/day and hydraulically accommodate the Peak Wet Weather Flow of 48.5 l/s. For further detail on the design specifications and process proposed, refer to the Preliminary Design Report and wastewater treatment works proposal in Appendix H3.

The wastewater treatment plant process will consist of a Head of works, single aerobic-anoxic reactor, Secondary Settling Tank (SST), Return Activated Sludge (RAS) recycle from the SST to the aerobic-anoxic reactor and chlorine disinfection. A layout and process flow diagram of the proposed plant is given in Appendix H1. Pill chlorination is proposed and sludge will be wasted from the reactor surface on a daily basis by hand. The system is designed to have a sludge age varying from 15 days to 25-day sludge age and a sludge drying bed area of 800m².

The proposal is that the final effluent from the chlorination basin will be discharged through a series of maturation channels downstream of the treatment plant. The channels are constructed as informal structures that are shaped with the natural contours on site. The channels are approximately 3 m wide with maximum water depth of 300 mm. Defined overflow structures will be spaced at regular intervals. These channels will be planted with reeds and act as a polishing mechanism after which the final effluent will dissipate naturally into the sandy formation. Effluent polishing takes place throughout the reed bed channel. Due to the reeds and the additional contact time, the residual chlorine is removed from the effluent by the time it leaves the reed beds.

The treatment process consists of the following steps:

- The raw sewage gravitates or is pumped to the head of works.
- The screenings and grit is stored in a closed container and transported once a week to a licensed waste disposal site.
- The sewage gravitates from the Head of Works into the aerobic-anoxic reactor, which consists of a single basin reactor for aerobic nitrification and anoxic denitrification.
- The mixed liquor is then pumped from the aerobic-anoxic reactor to the SST by the Horizontal aerator.
- Scum is drawn of the reactor surface and gravitated to the sludge-drying beds.
- The effluent flows over the v-notches in the secondary settling tank, and gravitates to the disinfection tank.
- The RAS is returned to the aerobic-anoxic reactor.
- A constant draw-off of sludge from the SST to the sludge drying beds is proposed. Sludge will be wasted from scum box in Clarifier and scum draw off on reactor, which is then gravitated to the sludge drying beds.
- In the chlorine disinfection tank, pill chlorination takes place, where the required chlorine concentration is maintained by adding a specified amount of chlorine tablets.
- Effluent polishing takes place throughout the reed bed channel.

3 Description of the Affected Environment

This chapter provides a description of the natural and socio-economic environments that could potentially be impacted by the proposed Seaview Housing Development

3.1 Geology & Topography

The geology of the area mainly comprises aeolian sands of the Schelmuhoek Formation (Algoa Group). These sands overlie the older Nanaga Formation (Algoa Group) to the north and also the older Kleinrivier Formation (Gamtoos Group) to the south

The Schelmuhoek Formation is the youngest formation of the Algoa Group and occurs up to six kilometres inland from the coast. It comprises windblown, unconsolidated, calcareous quartz sand with intercalated lenses of strandloper middens and isolated very immature soil horizons. The absence of clasts distinguishes it from the beach deposited sands. Dune sand accumulations of up to 140 m thick have been measured.

The Nanaga Formation to the west of Port Elizabeth comprises mainly unconsolidated sand/sandstone that is whitish to yellowish, or reddish in some places. The sand/sandstones are calcareous in nature due to the high content of shell fragments.

The Kleinrivier Formation of the Gamtoos Group (this group representing the oldest known rocks known in the south-eastern Cape Province) is exposed along the coast.

Soils on site can generally be described as coastal sands and sandy soils. This group accommodates, primarily, the coastal sands and sandy soils of the Algoa and St Francis Bay areas. The greater part of this area is composed of dunes and is generally unsuitable for use as agricultural land.

The slope of development option 1 is generally flat and varies between 0.5% and 3%. Some areas are located at low points what will result in stormwater ponding problems. The topography of Option 2 land is gently sloping in one direction from one end to the opposite end, with slope varying between 3% and 8%.

3.2 Hydrology

Due to the undulating nature of the terrain, it is possible that wetlands may be present within and close to the development area. In general, the sites slope to the south; and the main drainage direction of inferred surface water and shallow groundwater is therefore assumed to be to the south, towards the sea.

A specialist assessment was undertaken by SRK Consulting to identify and delineate any riparian and wetland areas on and within 500 m of any of the development areas (as this may trigger the requirement for water use licenses (WULAs). Desktop assessment of the relevant special information revealed that a number of wetlands or other watercourses are thought to occur on or within 500 m of the proposed development site. The specialist assessment and site visit (specifically assessing the areas flagged as possible wetlands in the desktop information) however revealed no evidence of wetlands, other watercourses or aquatic environments to be present within this area. It was therefore concluded that no impacts on aquatic environments are anticipated to result from the proposed development (either option).

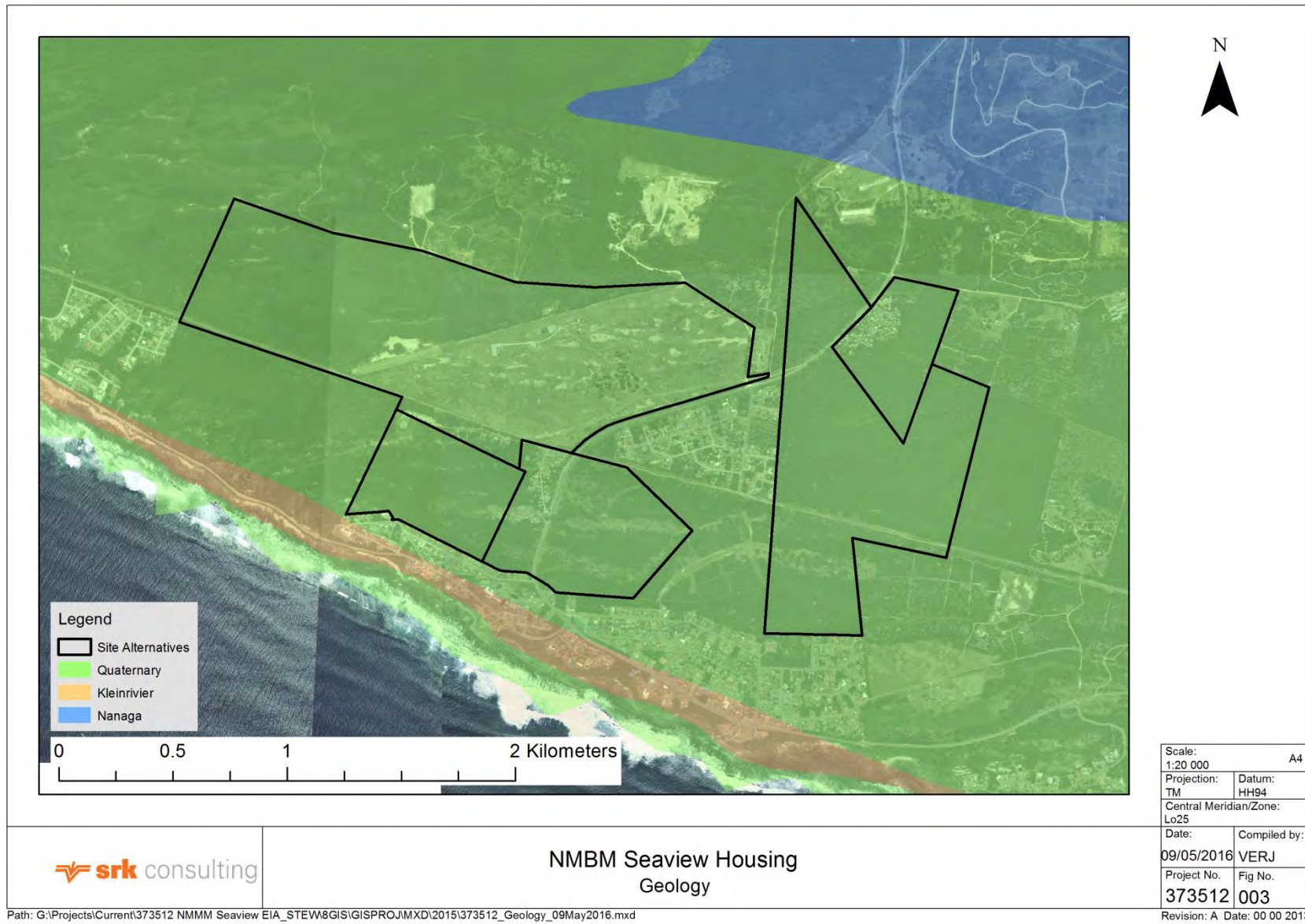


Figure 3-1: Geology of the study area

3.3 Current land use

Portion 1 of Farm 28 is zoned for agricultural purposes (Agriculture Zone 1). Approximately 76 ha in the eastern portion of the site has been cleared and is mostly used as pasture for horses. Existing structures include an informal landing strip and two hangers, a single dwelling for the owner and a store. The remainder of the site (66 ha) is unutilised and consists largely of fynbos-thicket vegetation with alien infestation in places.

Erven 238 and 240 are largely undeveloped and covered by forest. A small portion of land has been transformed largely due to the presence of the New Rest informal Settlement which stretches over both properties. Erf 590 similarly is largely covered by forest apart from the Zweledinga informal settlement which is situated in the western corner of the site.

Portion 10 of Farm 28 is currently undeveloped with a transformed area of approximately 11 ha. The property is dominated by forest.

The surrounding area is largely undeveloped, the main exceptions being the nearby Seaview and Clarendon Marine residential areas. The Island Forest Nature Reserve and Seaview Game Park (protected areas) are situated to the west and east of erf 590 respectively. Evidence of historical and possibly current quarrying activities is present north of Farm 1/28.

3.4 Palaeontology

A palaeontological assessment was undertaken by Mr John Pether. For reference the full report can be found in Appendix K3.

Both Option 1 and Option 2 for the proposed housing sites are situated on the coastal slope between ~40 to 100 m asl. which is comprised of vegetated aeolian dune ridges of the Schelm Hoek Formation (Figure 4). The depth of earth works entailed in the development is limited to a few metres, the deeper holes being made to accommodate the sanitation system. The Schelm Hoek Formation is expected to have a fossil background typical of aeolianites, viz. various land snails, tortoise, rodent and mole bones and ostrich eggshell are fairly common. Small land snails and tiny rodent fossils also reflect the palaeoenvironments such as the vegetation type.

Larger animal bones (antelopes, zebra, rhino, elephant, pigs, ostrich etc.) are sparsely scattered on palaeosurfaces with aeolianites. In an Aeolian accumulation, the lowermost parts tend to contain more fossil bones; on the eroded palaeosurface formed on older aeolianites. The interdune areas between dune ridges may host deposits associated with vleis, pans and springs which are richly fossiliferous, including fossil plant material and aquatic snails and frogs.

3.5 Archaeology

An archaeological assessment was undertaken by Ms Celeste Booth of the Albany Museum. For reference the full report can be found in Appendix K4.

The proposed Development Option 2 area was surveyed on foot and owing to the impenetrable vegetation of Development Option 1 the accessible roads were followed and spot checks conducted along the existing internal gravel roads where exposed surface areas allowed for investigation, these were very few over most of the area. Photographs and the GPS co-ordinates were taken using a Garmin Oregon 650. The relevant GPS coordinates have been plotted on Google Earth generated maps.

The proposed Development option 1 sites could not be thoroughly surveyed on foot owing to the mostly impenetrable dense forest and transformed vegetation cover. Attempts were made to follow the access roads that are clearly visible on older maps, however, most these internal roads are

overgrown and/or have been closed off with vegetation growth. Despite the area not being conducive to the walk-through survey and previous disturbances it is likely that coastal archaeological heritage resources and sites will be uncovered, especially within the undisturbed areas.

A few scatters of *Donax serra* (SV2_MS1 and SV2_MS2) were observed within two exposed surface areas on the property proposed for Development Option 2. Most of the landscape has been transformed or disturbed and the remaining is covered in dense dune vegetation cover.

The *Donax serra* (white mussel) scatters may indicate the presence of archaeological coastal occupation usually collected along sandy beach areas, the closest being towards the Maitlands River mouth area. No grading has been allocated to the isolated scatters of *Donax serra* as the material documented is not a holistic representation of archaeological heritage resources that would occur below the vegetation cover and which may be uncovered during bush clearing and excavation activities. Therefore, it is recommended that an archaeologist be appointed to monitor the vegetation clearing and excavation activities of the proposed development to identify any potential sites and assess the sites' significance.

3.6 Vegetation of the study area

A number of ecological studies have been undertaken on the various sites making up the development proposal, both as part of this EIA and previous studies (see Appendix K6 for study reports). The subsections below provide an overview of the findings of these studies, as well as the conservation planning and legislative context of the area and vegetation types found on the sites.

3.6.1 National Vegetation Context

Mucina and Rutherford

Mucina and Rutherford (2006) have developed the National Vegetation map as part of a South African National Biodiversity Institute (SANBI) funded project: "It was compiled in order to provide floristically based vegetation units of South Africa, Lesotho and Swaziland at a greater level of detail than had been available before." The map was developed using a wealth of data from several contributors and has allowed for the best national vegetation map to date, the last being that of Acocks developed over 50 years ago. This is a Regional scale mapping tool presented at 1:250 000 and supplies a general idea of vegetation types in the area which forms the base of finer scale bioregional plans such as STEP. This SANBI Vegmap project has two stated main aims:

- to determine the variation in and units of southern African vegetation based on the analysis and synthesis of data from vegetation studies throughout the region, and
- to compile a vegetation map to accurately reflect the distribution and variation on the vegetation and indicate the relationship of the vegetation with the environment. For this reason the collective expertise of vegetation scientists from universities and state departments were harnessed to make this project as comprehensive as possible.

Mucina and Rutherford (2006) define the following vegetation types that occur within the identified sites and from which source these descriptions are derived:

Algoa Dune Strandveld

Algoa Dune Strandveld occurs in a narrow coastal strip from the Tsitsikamma River to the Sundays River Mouth in the Eastern Cape. Vegetation consists of tall dense thickets on dunes dominated by stunted trees shrubs, and lianas. The conservation status is least threatened with a target of 20% in the Final Conservation Assessment and Plan for the NMBM (2010). About 4% is statutorily conserved in various reserves. More than 10% has been transformed by cultivation, urban development and road building.

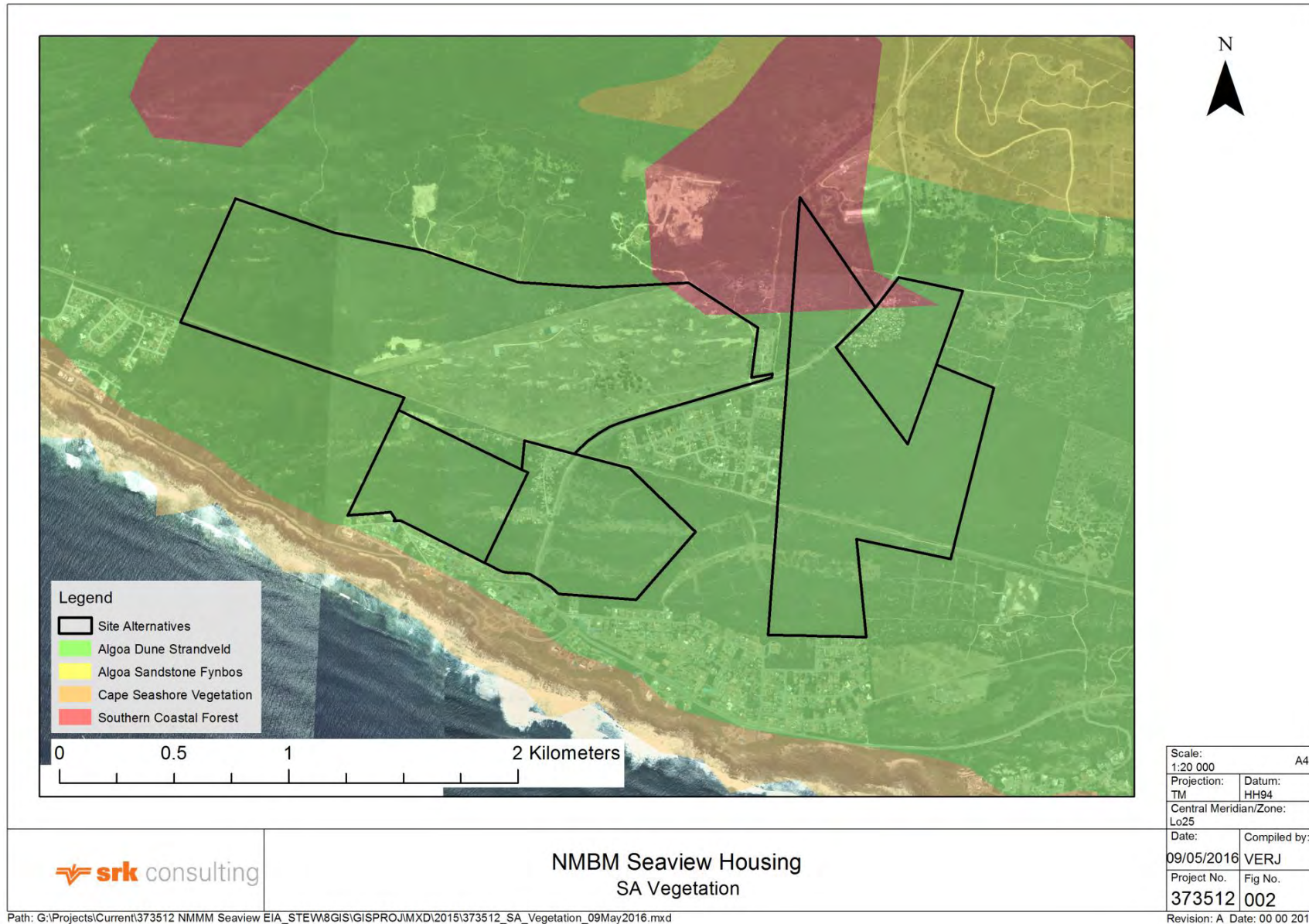


Figure 3-2: Vegetation of the study area (Mucina and Rutherford)

Southern Coastal Forest

Southern Coastal Forest is found on the coastal plains between Alexandria and Van Stadens River canyon and on coastal dunes of the Eastern Cape. This vegetation type is generally characterised by low forests dominated by *Celtis Africana*, *Sideroxylon inerme*, *Mimusops caffra*, and *Dovyalis rotundiflora*. The eastern regions have well developed low-tree and shrub as well as herb layers. This vegetation type is classified as Least Threatened with a target of 40% in the Final Conservation Assessment and Plan for the NMBM (2010).

Subtropical Thicket Ecosystem Project (STEP)

The Subtropical thicket Ecosystem Project (STEP) aims to identify priority areas that would ensure the long-term conservation of the subtropical thicket biome and to ensure that the conservation of this biome is considered in the policies and practices of the private and public sector that are responsible for land-use planning and the management of natural resources in the region (Pierce et al. 2005). STEP (Figure 3-3) identifies four vegetation types in this region.

Sardinia Bay Forest Thicket

The thicket clumps present are typical of Algoa Dune Thicket; the matrix is a forest characterized by Cape ash (*Ekebergia capensis*) and coral trees (*Erythrina caffra*). The conservation status is listed as Vulnerable in the Final Conservation Assessment and Plan for the NMBM (2010).

Bushy Park Indian Ocean Forest

Forest, mostly short (< 10 m tall) (see above) growing on old dune soils; yellowwood (*Afrocarpus falcatus*) locally common and coral tree (*Erythrina caffra*) is typically present; smaller trees and shrubs often spiny. This vegetation type is listed as Critically Endangered in the Final Conservation Assessment and Plan for the NMBM (2010).

Algoa Dune Thicket

Milkwood (*Sideroxylon inerme*) and candlewood (*Pterocelastrus tricuspidatus*) trees are dominant while waxberry (*Morella cordifolia*) shrubs are abundant and the rare succulent, *Cotyledon adscendens* is characteristic. Algoa Dune Thicket is categorised as Vulnerable in the Final Conservation Assessment and Plan for the NMBM (2010).

Alexandria Secondary Mosaic

A mosaic of relict forest patches (Alexandria Indian Ocean), thicket and grassland.

3.6.2 Local Vegetation Context

Nelson Mandela Bay Municipality Bioregional Plan

The northern section of Erf 590 is vegetated with Bushy Park Indian Ocean Forest (a solid forest type as opposed to a mosaic, which is classified as critically endangered, and deemed by DAFF to be protected in terms of the National Forests Act, 1998) and the remainder with Sardinia Bay Forest Thicket (a thicket-forest mosaic, which is classified as vulnerable, but potentially also protected in terms of the National Forests Act, 1998).

The northern sections of Farm 28 portion 1 and 10 consist of Sardinia Bay Forest Thicket. The endangered St Francis Dune Fynbos Thicket Mosaic dominates the south of these properties making these areas potentially undevelopable. Erf 240 is also vegetated by St Francis Dune Fynbos Thicket mosaic as is Erf 238 which also touches on the endangered Schoenmakerskop Rocky Shelf Fynbos (Refer to Figure 3-6).

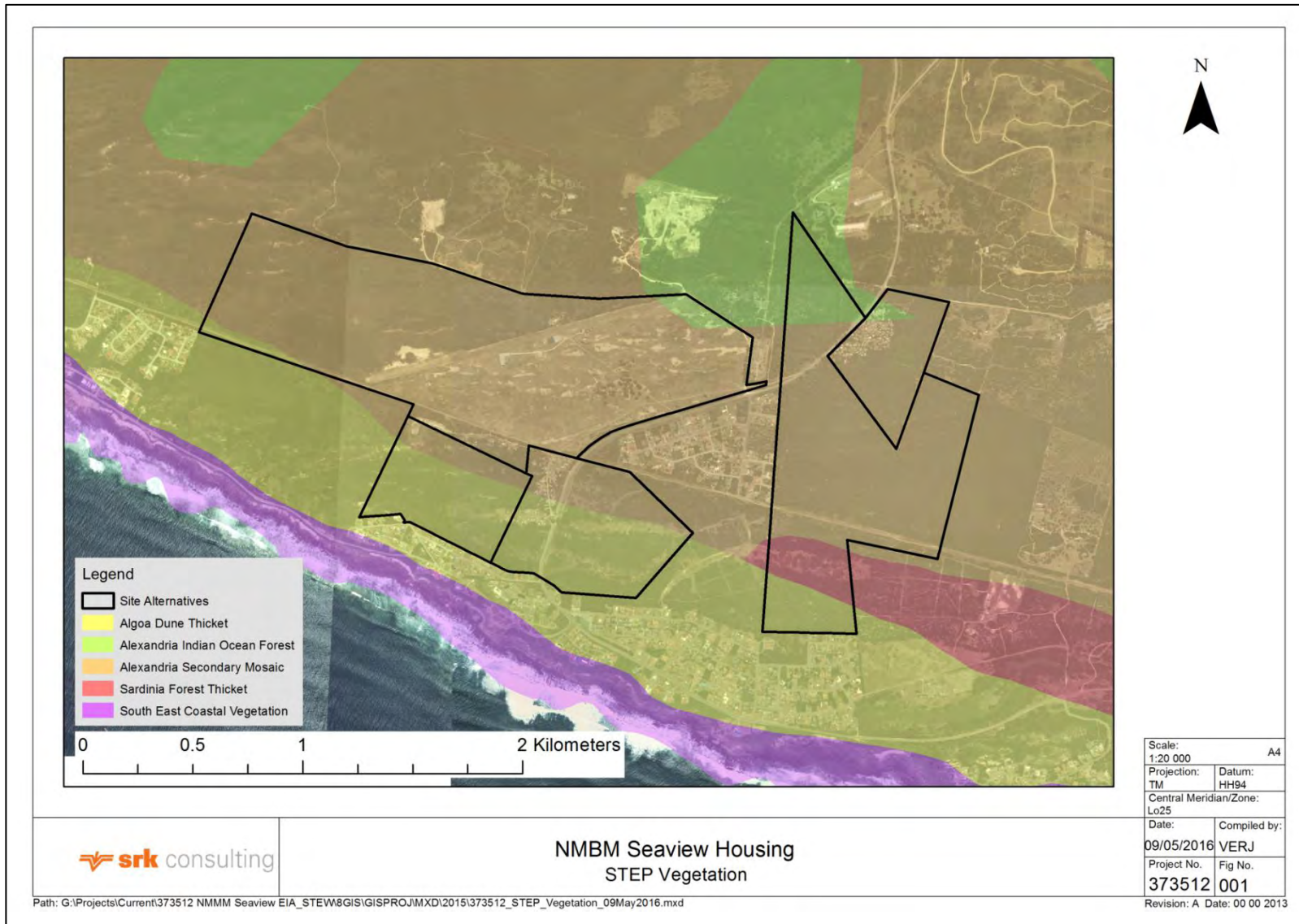


Figure 3-3: Vegetation of the study area (STEP)

The housing development will take place on Sardinia Bay Forest Thicket and St Francis Dune Fynbos Thicket Mosaic only. The vegetation types for each of the properties are outlined below.

Sardinia Bay Forest Thicket

Sardinia Forest bay Thicket comprises Indian Ocean Forest (typically <3.5m tall) dominated by thicket clumps typical of Algoa Dune Thicket. The matrix is forest characterized by Cape ash (*Ekebergia capensis*) and coral trees (*Erythrina caffra*) and is present on aeolian sand.

St Francis Dune Fynbos Thicket Mosaic

This vegetation type is typically found on sands of marine origin and consists of clumps of Algoa Dune Thicket, with dwarf cape beech (*Rapanea gilliana*), within a matrix of fynbos typically confined to shallower soils. Typical fynbos species include *Agathosma apiculata*, *Carpobrotus deliciosus*, *Carpobrotus edulis*, *Chrysanthemoides monilifera*, *Diospyros lycioides*, *Erica chloroloma*, *Metalasia aurea*, *Metalasia muricata*, *Morella quercifolia*, *Osteospermum imbricatum*, *Passerina falcifolia*, *Passerina obtusifolia*, *Rhus crenata* and *Syncarpha argentea*. The dune thicket is found in deeper, moister sands and typical species include *Carissa bispinosa*, *Cassine tetragona*, *Chrysanthemoides monilifera*, *Euclea natalensis*, *Rhus laevigatum*, *Rhus longispina* and *Scutia myrtina*.

Schoenmakerskop Rocky Shelf Fynbos

Stunted and wind-pruned Thicket clumps, of Algoa Dune Thicket with dwarf cape beech (*Rapanea gilliana*), within a matrix of fynbos typically with buchu (*Agathosma stenopetala*) and ericas (*Erica chloroloma*) present. *Brunsvigia striata* is also typical. The vegetation type is present on dune sand underlain by cross-bedded white quartzitic sandstone.

Bushy Park Indian Ocean Forest

Vegetation is up to 3m tall. Yellowwood (*Afrocarpus falcatus*) is locally common, within a matrix of thicket lumps typical of Algoa Dune Thicket Milkwood (*Sideroxylon inerme*) and candlewood (*Pterocelastrus tricuspidatus*) trees are dominant, Waxberry (*Morella cordifolia*) are abundant. Smaller trees and shrubs are often spiny. Present on moderately fertile aeolianite/calcareous sandstone/sand on south facing slopes.

3.6.3 Description of Vegetation on the development sites

Vegetation surveys have been conducted in previous years on several of the proposed sites (see reports in Appendix K6). The findings of these together with the forest survey (which included vegetation descriptions of the proposed development sites for option 1) and recently conducted ecological site inspection by SRK in 2017 are summarised below. A number of protected species were found on all sites (refer to comprehensive species lists in Jacobsen report for development option 2, and CEN 2016 forest report for development option 1, both in Appendix K6), for which destruction permits would be required from DEDEAT.

Development option 2 - Farm 28 Portion 1

The site has been transformed and consists largely of grassland with stands of *Eucalyptus* along the edges of the grassed area and the road. A variety of fynbos species occur on the western half of the site, growing across an undulating dune field. Species noted during the 2017 site visit by SRK included *aizoon rigidum*, *chironia baccifera*, *Jamesbrittenia microphylla*, *hermannia sp.*, *Muraltia heisteria*, *Helichrysum dasyanthum*, *metalasia muricata*, and *Hebenstretia integrifolia*,

Development option 1

The sites proposed for option 1 consist of a mixture of occupied areas and undeveloped spaces. The undeveloped areas of option 1 (sections of Erf 240, 237, Farm 31/28 and Farm 10/28) are characterised by thicket and open grassed areas mixed with invasive species in the dune slacks and

forest on the ridges/high lying area. Typical species noted on all sites included *Searsia glauca*, *Vachellia karroo*, *Carpobrotus sp.*, *Zanthoxylum capense*, *Asparagus sp.*, *Metalsia muricata* and invasive *Solanum sp.* Specific descriptions of each site are provided below.

Erf 238 and 240

Three development areas are proposed on Erf 240 / 238. The northernmost area comprises a relatively wide valley between forested ridges to the north and south, which converge in an easterly direction forming a closed and sheltered valley. The ridges and slopes (particularly the south-facing slopes) are covered in dense forest while the valley is a mix of thicket species and forest clumps, with some open areas covered in a grassy/fynbos mosaic. The entrance to the site has been used as a dumping ground and invasive species such as *Ricinus communis*, *Agave sisalana* and *Acacia Cyclops* were observed. Indigenous species include *Searsia glauca*, *Osteospermum moniliferum* and *Carpobrotus sp.* A large number of *Vachellia karroo* trees occur in the valley, and some of the forest clumps have tall forest trees (e.g. ~7 m high milkwood trees). Tree felling has taken place in some sections.

The undeveloped site proposed in the middle of Erf 240 is a relatively narrow east-west valley between two forested dune ridges to the north and south. The western extent of the valley has been disturbed, and has large stands of alien trees (*Eucalyptus sp.* and *Acacia cyclops*). Dumping of rubble and household waste also takes place. The valley comprises a mix of open grassy areas with alien trees and some ruderals, with remnant clumps of forest trees and forest in early stages of succession, especially further to the east.

The southernmost site on Erf 240 is a relatively wide valley. The north-facing slope of the southernmost ridge has a gentle gradient with forest on the ridge top. The valley has several open areas with a grassy/fynbos mix, and large swathes of *Osteospermum moniliferum*. A large stand of *Eucalyptus* trees occurs at one point. Clearing of *Acacia* trees appears to be taking place. The south facing slopes of the northern ridge are dominated by forest vegetation

Farm 31/28 and 10/28

An abandoned access track runs north and north-east from Van Renen Road through erf 237 and Farm 31/28. It is proposed that this old track be the location of the access road to the Farm 10/28 housing development. Initially, the path is flanked by a narrow band of alien trees, with forest on either side. The path opens into a valley that runs east-west. The track opens into a wider more open area where alien trees dominate. In places, the previously disturbed sections along the track and in the valley have been colonized by pioneer forest species and/or are a mosaic of forest/thicket species (i.e. forest in succession). In others, wide open grassy patches are found with alien trees. As for the remainder of the site, forest occurs on dune ridges and steep slopes, particularly along the south-facing slopes. Vegetation grades to that more typical of thicket in a westerly direction and on the southernmost ridge.

Erf 590

Erf 590 is a section of forest that has been cleared for the establishment of an informal settlement. Apart from a band of *Eucalyptus* trees along Seaview Road on the western side of the settlement, the settlement (and development site) is predominantly nestled in forest. A species survey was previously undertaken for the whole site by SRK in 2009, the findings of which are included in Appendix K6.

3.6.4 Distribution of forest

DAFF has developed maps showing areas it considers to contain natural forest (and therefore be protected in terms of the National Forest Act). These areas do not necessarily exclude transformed areas and are mapped at a relatively high level, however are used as a screening tool to indicate the

possible presence of forest based on historical distribution. The DAFF forest layer, indicating currently transformed areas relative to the project sites are shown on Figure 3-7, which indicates forest to be prevalent over much of the proposed development area.

This does not necessarily correspond with the vegetation classifications provided via the other more fine-scale vegetation mapping tools consulted (e.g. the NMBM bioregional plan), which shows much of the erven in the southern part of the development area to be dominated by fynbos thicket mosaic rather than forest.

To supplement this information and verify the distribution of forest on the specific areas proposed for development, a forest mapping survey was conducted by specialists in August 2016.

The specialists mapped the presence and condition of forest on and around the development sites for option 1 (Farm 1/28 has been previously transformed and does not contain forest) in terms of the following categories:

1. Forest (which occurs mostly on dune ridges and slopes), classified as the following:
 - a. Succulent vegetation absent or confined to low growing *Crassula* species in understory;
 - b. Vegetation layering distinct
 - c. Presence of tall woody trees with a crown cover of at least 75%;
2. A forest/thicket mosaic vegetation type (occurring in inter-dune valleys/troughs), and classified as the following:
 - a. Presence of succulent vegetation such as *Aloe spp.*, *Cotyledon spp.*, *Crassula spp.* etc.
 - b. No distinct layering in vegetation structure;
 - c. Woody vegetation dominated by stunted tree layer and large shrub component.
3. Forest in early stages of succession and/or where forest remnants are found. Low level alien vegetation invasion occurs in these areas
4. Disturbed forest with more than 50% alien vegetation invasion

A map of the survey area showing these classifications is provided in Figure 3-4, and these mapped areas are shown relative to the areas proposed for development in Figure 3-5. With regards to determining whether vegetation that was described in this survey as forest/thicket mosaic and/or forest succession/forest remnants should be considered as forest, the specialists concluded that, based on the available policy guidelines, areas mapped as forest, forest/thicket mosaic and forest in succession should be regarded as 'forest' as per the National Forest Act, and must be avoided in land use planning.

3.7 Fauna

An assessment of flora and vertebrate fauna was conducted by Mr N.H.G. Jacobsen on portion 1 of Farm 28 over the period 6-17 September 2008 as part of a previous EIA for the site, the findings of which are summarised below. For more detailed descriptions and full species lists, please refer to the specialist study reports in Appendix K6.

The presence of four mammal species including Bushbuck *Tragelaphus scriptus*, Scrub Hare *Lepus saxatilis*, Common Molerat *Cryptomys hottentotus* and Striped Mouse *Rhabdomys pumilio* were confirmed and a further 18 species are likely to occur.

According to the findings of the report a total of 24 bird species were recorded and an additional 43 species could be expected to occur. None of the bird or mammal species recorded are rare or threatened (Friedman and Daly, 2004), although 3 species are data deficient (*Crocidura flavescens*, *Suncus infinitissimus*, and *Amblysomus hottentotus*). None of the reptiles or amphibians expected to occur on site are listed in the Red Data Books – Reptiles and Amphibians (Branch 1988, Minter, Burger, Harrison, Braack, Bishop & Kloepfer, 2004).

A total of 29 reptile and four amphibian species are predicted to occur, the latter with one exception requiring shallow pools of water to breed in. It is anticipated that such pools may be seasonally available in depressions in the grassland area.

Although no fauna were observed during the site visit, typical coastal forest resident species would be expected to occur on the proposed development sites for option 1. These include Vervet monkey, bushpig and small antelope such as bushbuck and blue duiker. Caracul and various snake species common to the area would also be expected to occur. Numerous birds, including Fork-tailed drongo, Knysna turaco, Cape Robin-chat, Cape white-eye, Southern double-collared sunbird, Collared sunbird, Southern Boubou, Puffback shrike, Paradise flycatcher, Bar-throated apalis, Sombre greenbul, Namaqua dove, Laughing dove, and Jackal buzzard, would also be expected.

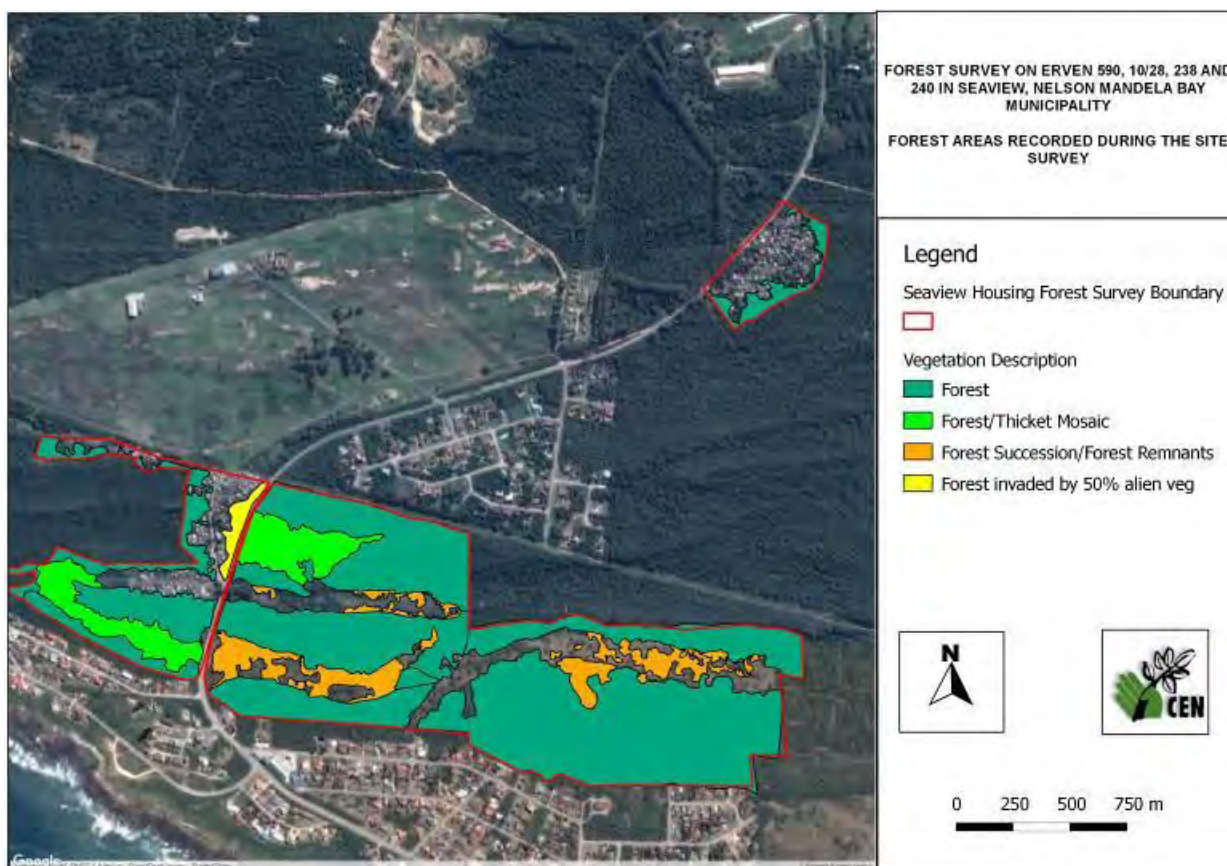


Figure 3-4: Map showing forest survey area and vegetation classifications (source: CEN, 2016)

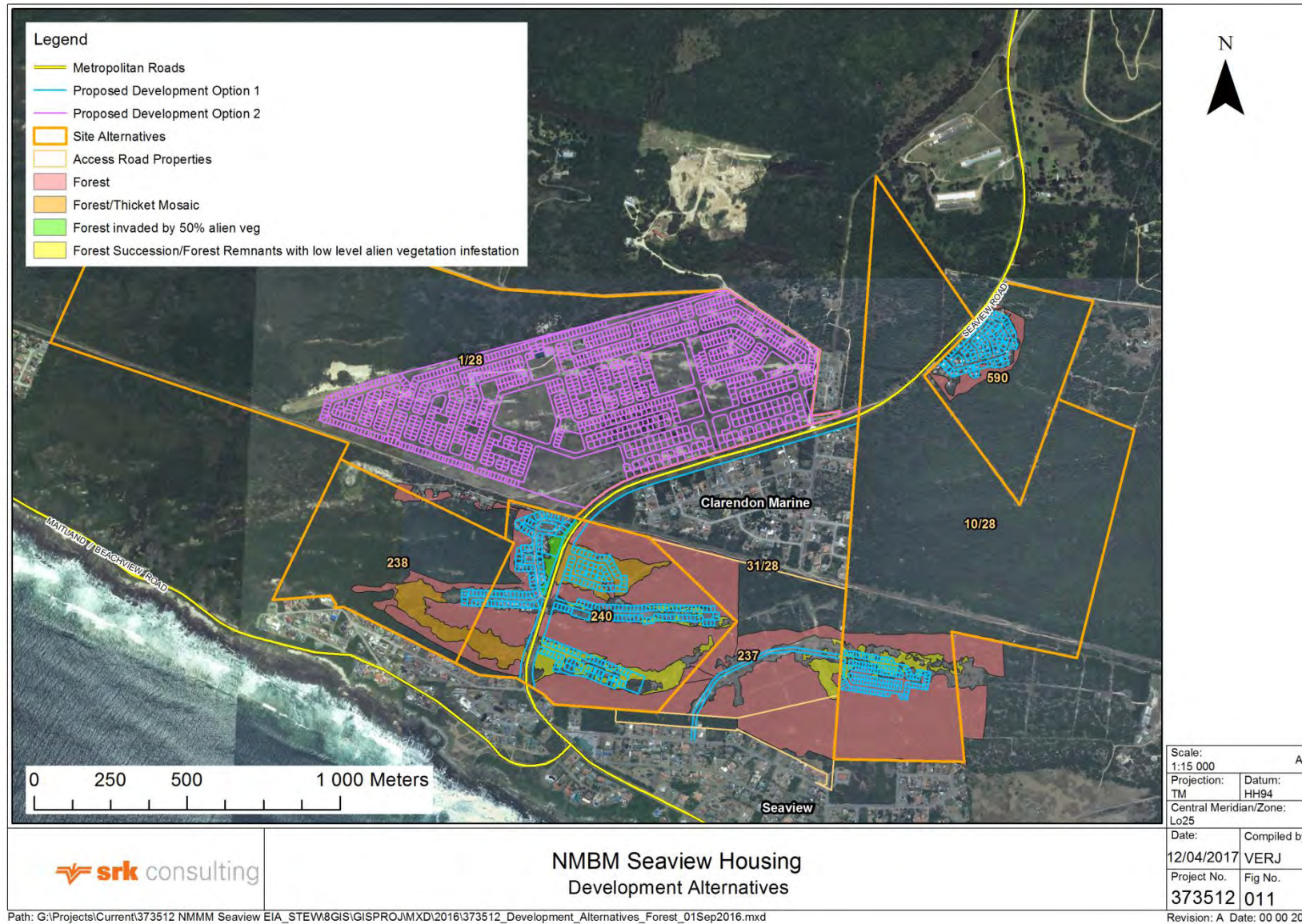


Figure 3-5: Proposed development layout relative to CEN forest mapping classifications

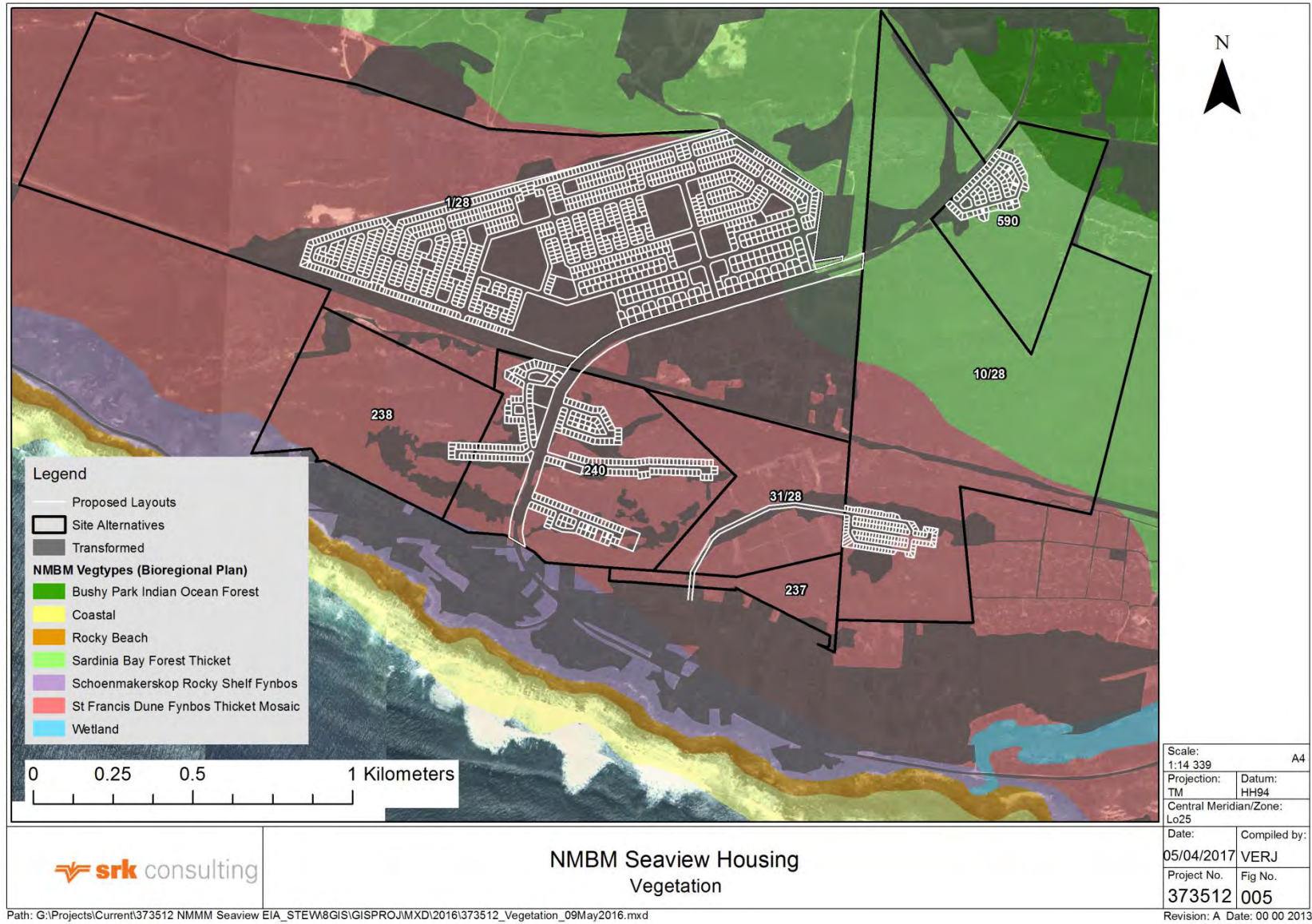


Figure 3-6: Vegetation of the study area as per the NMBM bioregional plan

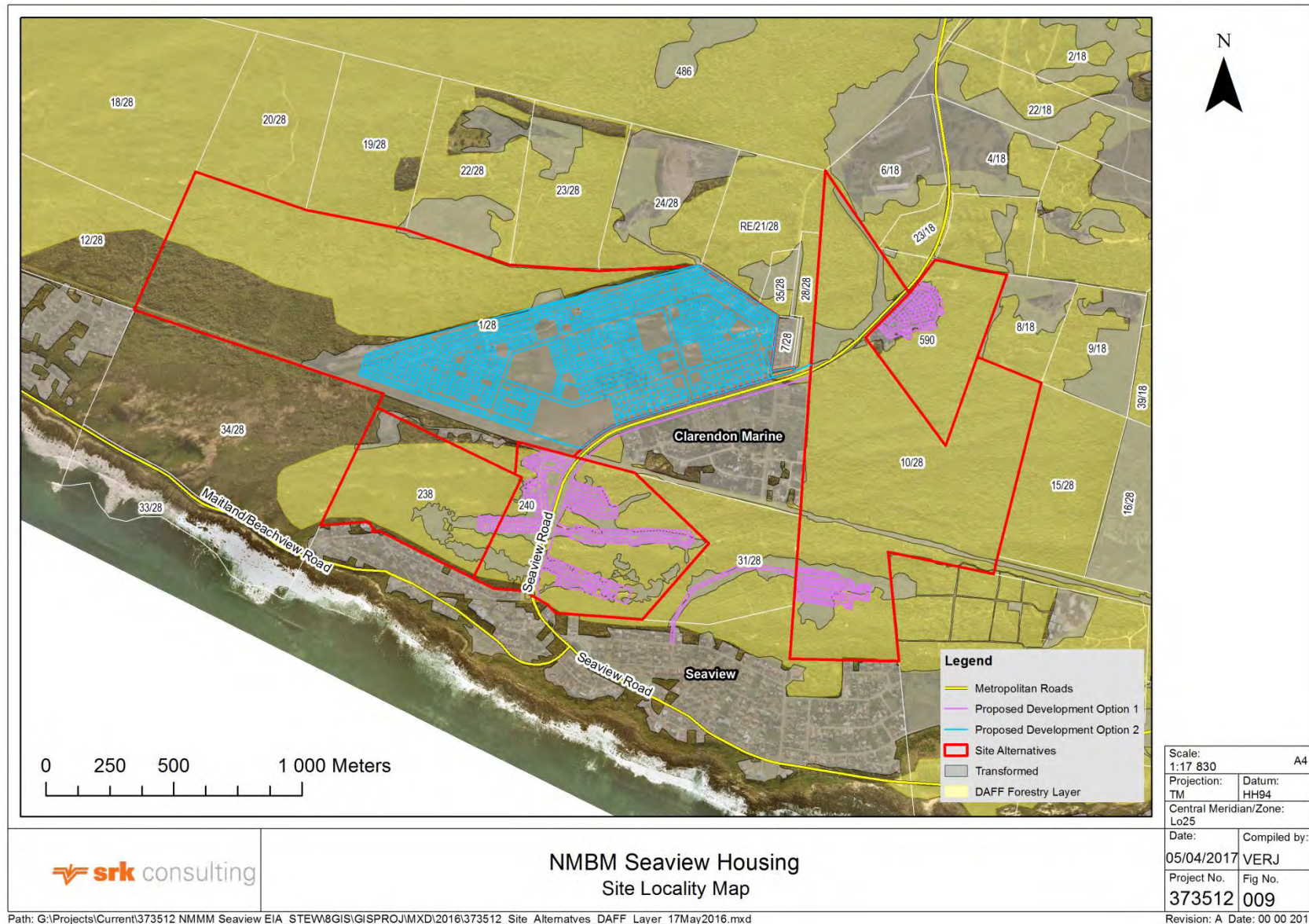


Figure 3-7: Proposed development areas relative to transformed areas and DAFF forest layer

3.8 Conservation Planning Tools

3.8.1 Eastern Cape Biodiversity Conservation Plan (2007)

The Eastern Cape Biodiversity Conservation Plan (ECBCP) is responsible for mapping areas that are priorities for conservation in the province, as well as assigning land use categories to the existing land depending on the state that it is in (Berliner et al. 2007).

Critical Biodiversity Areas (CBAs) are defined by Berliner et al. (2007) as: “CBAs are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning”. These areas are classified as natural to near-natural landscapes. In addition to the CBA’s the ECBCP also defines Other Natural Areas (ONA) as well as Transformed Areas.

3.8.2 Nelson Mandela Bay Municipality Final Bioregional Plan (2014)

The NMBM Bioregional Plan (2014) is a gazetted spatial plan that shows terrestrial and aquatic features that are critical for conserving biodiversity and maintaining ecosystem functioning. These areas are referred to as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). Management objectives relating to each of the CBA categories and descriptions of these categories (as per the NMBM Bioregional Plan) are provided in Table 3-1. In addition, the Bioregional plan provides a profile of priority biodiversity in the bioregion, outlines other measures for effective management of biodiversity, and includes recommendations for review, monitoring and updating. The Bioregional Plan is underpinned by the Conservation Assessment and Plan for the Nelson Mandela Bay Municipality (SRK Consulting 2010), a systematic biodiversity plan that was developed according to established protocols, and maps the priority areas for conservation at a finer scale than the ECBCP.

Table 3-1: Description of the Critical Biodiversity Area categories (Source: SRK, 2014)

Category	Code	Description	Land Management Objective
Protected Area 1	PA 1	Protected areas managed by SAN Parks, provincial or local authorities, parastatals (e.g. NMMU), or the private sector. Includes National Parks, Provincial, Local and Private Nature Reserves.	To be maintained as Protected Areas.
Protected Area 2	PA 2	National Parks, Provincial, Local, Private Nature Reserves pending declaration.	To be declared and maintained as Protected Areas.
Critical Biodiversity Areas	CBAs	All <i>Critically Endangered</i> habitats, ecological process areas, ecological corridors, habitats for Species of Special Concern, and some <i>Endangered</i> , <i>Vulnerable</i> or <i>Least Threatened</i> habitats.	Such areas must be managed for biodiversity conservation purposes and incorporated into the protected area system.
Ecological Support Area 1	ESA 1	Agricultural land that plays an important role in ecosystem functioning and / or provides connectivity between natural areas.	Such areas must be maintained for extensive agricultural purposes and managed to promote ecological connectivity.
Ecological Support Area 2	ESA 2	Areas severely disturbed or transformed by human activities (e.g. mining), requiring restoration or rehabilitation.	Such areas must be restored or rehabilitated to support ecological connectivity. Such areas must not be developed.

The purpose of the Bioregional Plan is to provide a map of biodiversity priorities and accompanying guidelines to inform land-use planning, environmental assessment and authorisations and natural resource management by a range of sectors whose policies and decisions impact on biodiversity.

A small isolated portion of land located on erf 240 is marked as a CBA as the area potentially contains SSC. The northern boundaries of Erf 590 and Portion 10 of Farm 28 lie adjacent to a CBA, ecological support area as well as the Island Forest Nature Reserve and Seaview Game Park Protected areas). The Bioregional Plan recommends the following minimum buffers between CBAs and development nodes:

- 100 m around CBAs in forested areas outside urban areas;
- 30 m around CBAs in forested areas inside urban areas;
- 100 m around Protected areas; and
- 50 m around CBAs in other biomes.

According to the NMBM SDF (2009), the proposed development sites all fall within the Seaview and Clarendon Marine urban edge area. Refer to Figure 3-8 for representation of these CBA's and recommended buffer areas around CBAs and protected areas. A map showing the proposed development layout relative to environmentally sensitive features, based on the available spatial information, is provided in Figure 3-7.

3.9 Socio-economic profile

Urban – Econ was commissioned by SRK Consulting to conduct a Socio-Economic Impact Assessment (SEIA) to identify the impacts of the proposed development and provide recommendations to reduce any negative impacts. Projection of the initial impacts and multiplier effects are usually done by employing an input-output model or a General Equilibrium Model. In this case the economic impact assessment made use of the economic models based on the Eastern Cape Social Accounting Matrix (SAM) developed in 2006 and adjusted to represent 2015 figures.

As part of the data collection process for the socio-economic impact assessment of the proposed housing development a review of planning documents was undertaken including the NMBM IDP, NMBM Metropolitan Spatial Development Framework (MSDF) and the NMBM Built Environment Performance plan (BEPP) as well as a number of research documents.

In New Rest and Zweledinga the average monthly household income is approximately R 1 459 and R 1 500. These figures are notably lower than those of the surrounding suburbs of Seaview (R 17 212) and Clarendon Marine (R 15 600). These figures are also low when compared to the NMBM average of R 9 456. According to Census 2011 (StatsSA, 2012) poverty levels within Zweledinga and New Rest are high. The review of the employment profile of the area indicates that 47.3% of the population in Zweledinga are employed while only 23.91% are employed in New Rest

The area surrounding the proposed development is comprised of almost exclusively of low density, free standing residential units. The area is not noted as a development growth node in the Nelson Mandela Bay Municipality, and, the area surrounding the development has not seen a significant degree of property development recently. NMBM classifies the area surrounding the development (Seaview, Clarendon Marine and Kini Bay) in the MSDF as a “coastal villages” with limited non-residential functions.

In addition to the SEIA, Impact Consulting was appointed by the NMBM to conduct stakeholder engagement and update demographic statistics for the New rest and Zweledinga settlements. A population and household survey was conducted during the month of December 2016. The survey covered the New Rest, Zwelidinga, Seaview farms and surrounding area.

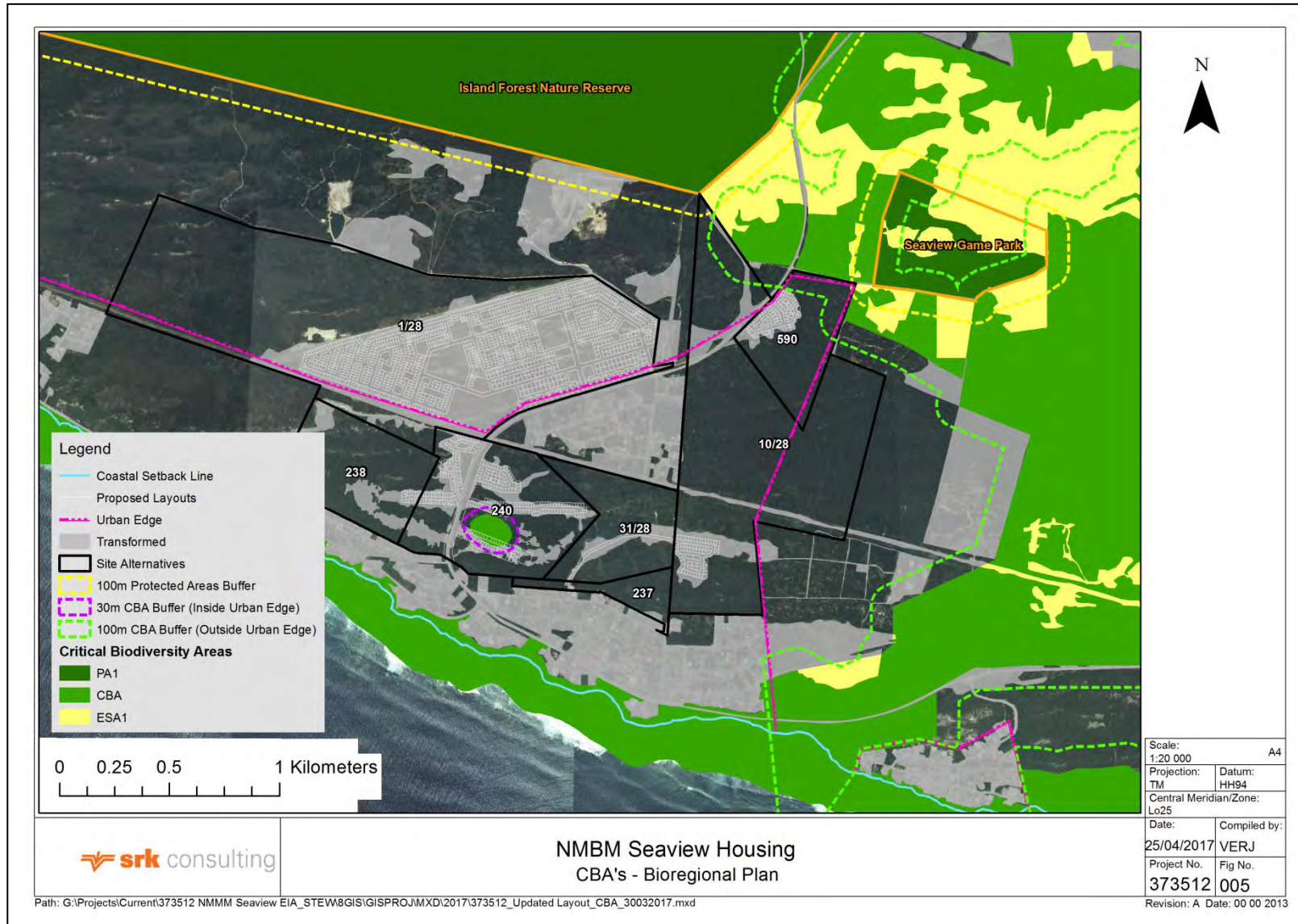


Figure 3-8: Distribution of CBAs over the development sites, indicating minimum recommended buffer areas as per NMBM Bioregional Plan (SRK, 2014)

The process commenced on the 12th of December 2016 and was concluded on the 23rd of December 2017. A door-to-door verification process was conducted for the project to count the number of freestanding shacks currently in existence in both communities (see Table 3-3 below for details), and the number of individuals living under each shack. The full report can be found in Appendix E6.

Table 3-2: Population and housing numbers survey results (Impact Consulting, 2017)

	2013	2017	Variance	% Change
Population size	643	904	261	40.59
No. of households	345	320	-25	-7.25
No. of shacks	290	430	140	48.28

The number of shacks that are listed in Table 3-2 above are a reflection of the number of freestanding (detached) shacks. Shacks that are attached (semi-detached) were counted as one (a single unit), irrespective of the number of doors or individuals living inside. The majority of the attached (semi-detached) shacks have an average of three out leading doors and only a small handful have four to five out leading doors. The number of physical shacks (freestanding and attached) in both communities, as of March 2017 was 430 (215 in both communities).

Table 3-2 shows how over the past four years the total population size of the Seaview (and surrounding farms) Informal Settlement has grown by 40.59%. The number of households shows a decline of 7.25% and the total number of freestanding shacks have increased by 48.28%. Included in the 2017 figures are the individuals/families (43 individuals, 12 households) living in the Seaview farms which were not accounted for in the 2013 year.

Impact Consulting held informal engagements with the beneficiaries during the process of the shack number and dwellers verification. Several issues were recorded including:

- The people who are renting shacks in New Rest and Zweledinga are in fear that the original owners of the shacks will come and claim their houses once development commences and they will be left without houses. Some of them have been living and renting the shacks for over 10 years now and consider themselves as part of the community;
- There are community members who are below the age of 21 (some under 18) years who are household leaders/bread winners and are in fear that they might not qualify due to the age requirements for housing subsidy; and
- There are community members who are living alone and have no dependants who are in fear of not qualifying for the housing subsidy.

The total population of the Seaview informal settlements as of December 2016 was reported to be 904 individuals (504 residing in New Rest, 357 in Zweledinga and 43 on farms in the Seaview area), making up 320 households (160 situated in New Rest, 148 in Zweledinga and 12 in the Seaview farms). Total number of individuals from age 0 to 18 were 325; from age 18 and above were 547 (322 between ages 18 and 35; 225 from age 35 and upwards); and 32 were non-responsive (either left space blank, filled in an incorrect age/date of birth or scribbled on the form). 43.74% of the population comprised of males, 50.88% females and 1.77% non-responsive (either did not fill their gender or ticked both male and female).

Table 3-3: Population dynamics in Zweledinga and New Rest (Impact Consulting, 2017)

	Zweledinga	New Rest	Total
Male	163	245	408
Female	191	246	437
Total population	357	504	861
Number of households	148	160	308
Number of shacks	215	215	430
Employed	169	120	189
Unemployed	57	83	140
Students/Learners	49	5	54
Retirees	0	1	1

The majority of residents of the Seaview informal settlements obtain livelihoods for themselves and their families through a combination of part-time or casual employment, income-generating activities and state grants. Those who are in formal, full-time employment are almost all employed locally – as domestic workers, cashiers, packers and cleaners at local retail businesses, gardeners or labourers and as private security or in government employment (The Island reserve, cleaning companies with municipal tenders etc.). Some residents obtain casual employment (one or two days per week) in the above jobs (Cherry, 2013).

In 2013 it was documented that there were 45 pit latrines in Zweledinga, and 37 in New Rest, dug by residents themselves with many residents going into the forest. The Community Organisation Resource Centre (CORC) survey in 2011 indicated that between 38% and 56% of residents 'use the bush' to relieve themselves (Cherry, 2013).

(Cherry, 2013) noted that New Rest and Zweledinga are plagued by the health problems common to poor communities in South Africa: tuberculosis, HIV/AIDS, high blood pressure and diabetes. Residents complain that the mobile clinic does not come regularly (once per month rather than once per week).

4 Public Participation

The Public Participation Process (PPP) forms a key component of the EIA process. The objectives of the PPP are outlined below, followed by a summary of the approach taken, and the issues raised thus far.

4.1 Objectives and Approach

The overall aim of the PPP is to ensure that all Interested and Affected Parties (IAPs) have adequate opportunities to provide input into the process. More specifically, the objectives of the PPP are as follows:

- Identify IAPs and notify them of the proposed project and of the EIA process;
- Provide an opportunity for IAPs to raise issues and concerns; and
- Provide an opportunity for IAPs to review the Environmental Impact Report prior to its finalisation.

4.2 Public Participation Activities

The Public Participation Process that was undertaken to solicit public opinion regarding the proposed activity has included the following activities so far:

- Advertisement of the proposed development in “The Herald” newspaper on 5 March 2014 (see Appendix B);
- Distribution of the Background Information Document (BID) commencing on 6 March 2014 to identified Interested and Affected Parties (IAPs), stakeholders and neighbouring residents. A copy of the BID is attached in Appendix C, and the list of notified parties is given in Appendix D;
- Preparation of a Draft Scoping Report (DSR) including a Plan of Study for EIA;
- Collation of public and IAP comments on the BID and advert, and incorporation of these into the DSR;
- Inclusion of original correspondence from IAPs (Appendix E) in the DSR;
- Distribution of the DSR to public venues, and making it available on SRK’s website, for review by IAPs for a 40 day comment period (27 May – 7 July 2016), and submission to relevant authorities;
- Distribution of the Executive Summary of the DSR, including the Comments & Responses Table, to all IAPs registered for this process;
- Placement of on-site posters, advertising the EIA process;
- Preparation of the Final Scoping Report (FSR) including a Plan of Study for EIA;
- Collation of public and IAP comments on the DSR, and incorporation of these into the FSR;
- Inclusion of original correspondence from IAPs (Appendix E) in the FSR;
- Distribution of the FSR to public venues, and making it available on SRK’s website, for review by IAPs for a 21 day comment period (26 August – 16 September 2016);
- Distribution of the Executive Summary, including the Comments & Responses Table, to all IAPs registered for this process;

- Submission of the FSR to DEDEAT for approval of the Plan of Study for EIA and a decision regarding authorisation to proceed to the Impact Assessment phase of the EIA.
- Informing the new ward councillor (ward 40) of the project;
- Appointment of a social facilitator by NMBM and consultation with beneficiary communities via two public meetings (one in Zweledinga and one in New Rest) – see minutes in Appendix E5;
- Attendance of project progress meetings by representatives from the two beneficiary communities;
- Preparation of the Draft Environmental Impact Report (DEIR)(this report);
- Collation of public and IAP comments on the FSR, including translation of comments received from the beneficiary communities into English, and incorporation of these into the DEIR;
- Inclusion of original correspondence from IAPs (Appendix E) in the DEIR;
- Distribution of the DEIR to public venues, and making it available on SRK's website, for review by IAPs for a 40 day comment period (2 May – 12 June 2017); and
- Distribution of the Executive Summary, including the Comments & Responses Table, to all IAPs registered for this process, and distribution of a Xhosa version of the Executive Summary to the beneficiary communities.

The following activities that must still be conducted as part of the Assessment process:

- A public open day to present the findings of the DEIR to be held between 17h30 and 19h30 on 23 May 2017 at the Seaview Community Hall (Da Gama Road, Seaview);
- A community meeting to present the findings of the DEIR to the beneficiary communities;
- Preparation of the Final Environmental Impact Report (FEIR);
- Collation of public and IAP comments on the DEIR, and incorporation of these into the Final Environmental Impact Report (FEIR), including translations into English if required.
- Distribution of an Executive Summary of the FEIR, including the Comments & Responses Table, to all IAPs registered for this project;
- Distribution of the FEIR to public venues, and making it available on SRK's website, for review by IAPs during a 30 day comment period;
- Submission of the FEIR to DEDEAT for decision; and
- Notifying all registered IAPs of DEDEAT's decision.

4.2.1 Availability of Draft Environmental Impact Report

The Executive Summary of this DEIR has been distributed to registered IAPs. A printed copy of this report will be available for public review at the Walmer Library (Main Road, Walmer, Port Elizabeth).

The report can also be accessed as an electronic copy on SRK Consulting's webpage via the 'Public Documents' link: <http://www.srk.co.za/en/page/za-public-documents>

Comments on the Draft Environmental Impact Report must reach SRK by **17h00 on 12 June 2017**. Any comments received will be integrated into the Final Environmental Impact report.

4.2.2 Registered IAPs and issues raised

A list of commenting IAPs, relevant authorities and stakeholders is included in Table 4-1, along with the reference number assigned to each comment sheet submitted by that particular IAP (where relevant). These reference numbers correspond with those in the comments and responses tables

A complete list of all notified and registered IAPs, relevant authorities and stakeholders appear in Appendix D, while copies of the original numbered correspondence received from IAPs are included as Appendix E.

Table 4-1: Commenting Authorities, Stakeholders & IAPs

Name & Surname	Organisation	Comment ref no
N Gerber	DEDEAT	63
N Quvile	DAFF	40
S Dzhivani	DAFF	73
M Bloem	DWS	68
Deidre Thompson (nee Watkins)	DMR	71
N Littleton	Surrounding landowner	30; 59; 80
DM Davis	Surrounding landowner	13
Johannes Family Trust (Theo Johannes)	Surrounding landowner	31
Hannes Nel	Surrounding landowner	11
ACB Gouws	Surrounding landowner	3
VE Rengecas	Surrounding landowner	1; 77
R Hirstle	Surrounding landowner	4
SF van Greunen	Surrounding landowner	26
H & M Kleinhans	Surrounding landowner	38
DS Visser	Surrounding landowner	21; 62
KP Cloete	Surrounding landowner	37
AB Carstens	Surrounding landowner	46
C Fehrsen	Surrounding landowner	35; 64
AR Topliss	Surrounding landowner	20; 58
E Gerber	Surrounding landowner	34; 57; 69
R Ferreira	Surrounding landowner	36
C Nelson	Surrounding landowner	14
AC Visagie	Surrounding landowner	7
J De Swart	Surrounding landowner	8
A Brown	Surrounding landowner	27
CM Tunley	Surrounding landowner	32
R Halgreen	Surrounding landowner	25
Estate late J Faustino	Surrounding landowner	41
D.O. Eales	Surrounding landowner	17
Sonia Keown (Seaview Guest Farm Trust)	Surrounding landowner	10
JH Pearson	Surrounding landowner	44
Mr ECJ Webb & Mrs J Ellis	Surrounding landowner	52; 55
JAB Dos Dantos	Surrounding landowner	51

Name & Surname	Organisation	Comment ref no
Jerome Kotze	Kini Bay Village Association	23
Ian and Nicki Moore	Kini Bay Village Association	81; 82
Mzukisi Sijovu	Local Resident	54
Mary Smith	Local Resident	54
Nonthuthuzelo Steven	Local Resident	54
Nosipho Gqoboza	Local Resident	54
Nomfusi Daweti	Local Resident	54
Thobeka Mlonyeni	Local Resident	54
Ncediswa Goeda	Local Resident	54
Thembinkosi Jerry	Local Resident	54
Ntombekhaya Futuse	Local Resident	54
Brenda Lizo	Local Resident	54
Jane Manisa	Local Resident	54
Sindiswa Mengo	Local Resident	54
Gavin Smit	Local Resident	24; 70
Errol & Janice Howard	Local Resident	18
Bertus & Barbara de Jager	Local Resident	15; 16
HS du Plessis	Local Resident	12; 53; 76
JJ van Rooyen	Local Resident	9
Keith & Wendy Lyons	Local Resident	28
Earnest Haze	Local Resident	29
EK Pienaar	Local Resident	33
Rene Spalding	Local Resident	42
L Denny	Local Resident	43; 60
EL Merrick	Local Resident	45; 61
EM Bosman	Local Resident	47
Errol Terblanche	Local Resident	48
Chris Bosch	Local Resident	55
Cheryl van Eekelen	Local Resident	65
Edward Hill	Local Resident	66
Joy Clark	Local Resident	72
K Benn	Local Resident	74
Vicky Knoetze	Erstwhile Ward 40 councillor	22; 79
Lloyd Edwards	Dendrological Society	2
Janice Gibb	Seaview Predator Park	19
Warren Leonard	Warren Maintenance	50
Alon Rathbone	Property Scene	78
Gary Sean Davis	Van Niekerk Fisheries	49
Darryl Nortje	Newco Technologies	39
Paul de Villiers	Seaview Residents Association	67
Various residents	New Rest & Zwelendinga	75

Table 4-2: Comments and Responses Table on BID

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
Comments relating to the process		
HS Du Plessis (53)	SRK must comply with erecting notice boards 100m from affected residents and adverts in The Herald or Die Burger.	Newspaper advertisements have been placed – refer to Section 4.2 of the FSR for details. On-site posters were placed during the scoping process, indicating the availability of the draft report.
M Njovu, M Smit, N Steven, N Grobler, N Daweti, M Thobeka, N Goeda, T Jerry, N Futuse, B Lizo, J Manisa, S Mengo (54)	Lack of consultation with residents of informal settlements.	While communication regarding the specifics of the proposed development has been held with the recipient communities as part of the EIA process (see meeting minutes in Appendix E of the DEIR). It is SRK's understanding that the NMBM has engaged with the beneficiaries regarding the proposed project over the last few years and that in-principle support has been confirmed. It is also noted that the project is in response to pressure from these communities for formal housing and services. Further community consultation will be undertaken during the public review period.
Comments relating to design		
G & V Rengecas (1); JP van Speyk (5); HS du Plessis (12); A Carstens (46); ECJ Webb & J Ellis (52)	Considering the number of residents in New Rest and Zwelidinga areas, the need for 600 units is overestimated.	The original proposal was for approximately 600 units to allow for future growth of these communities. Due to space limitations however, this number has been reduced to approximately 470 units for Development Option 1. Development Option 2 will allow for additional units to accommodate future growth.
R Hirstle (4)	Will there be a green boundary between existing residences and the proposed development?	The proposed layout options, as depicted in Appendix G of the FSR, are all designed to ensure impacts on existing forest are minimised.
JP van Speyk (5)	A permanent solution of one proper and serviced development to accommodate all must be found.	Within the environmental constraints of each of the sites, this is what is proposed. Development Option 2 allows for a consolidated development to accommodate all recipients.
G & V Rengecas (1); R Hirstle (4); A Topliss (20); GS Davis (49)	Design will allow for informal settlements to be developed. How will future additions of shacks to these houses be monitored?	NMBM - the design will not allow for informal settlements to be developed but rather the development of low income residential areas to accommodate beneficiaries from the informal settlements. The addition of structures without an approved building plan is illegal, however the NMBM recognises that controlling this in communities such as these can be problematic. It is recognized that the clearing of vegetation and installation of basic services infrastructure in the area may attract additional dwellings that are not part of the formal relocation process. The NMBM proposes to manage the risk through site inspections to monitor and address any illegal dwellings, as well as establishing a team of community representatives as whistle blowers in this regard.
JP van Speyk (5); HS du Plessis (12)	Solar lights and geysers and container ablutions would be eco-friendly	The design allows for on-site ablutions for each property. Detail regarding use of solar energy has not yet been confirmed.

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
JD Gibb (19)	Sandy soil is mostly undulating and soft which makes it expensive to build on.	Slope has been taken into account in the preliminary layout, and appropriate stormwater management measures have been included. Excessively steep areas have been avoided.
A Topliss (20)	A buffer zone of non-residential buildings should be put into the plans e.g. school, church, playground etc.	Areas for land-uses such as these are included in the preliminary layout (see Appendix H1 of the DEIR)
A Topliss (20)	Erf 240 is not large enough.	The development proposal for option 1 is to include transformed areas on erf 238, 240, 590 and 28/10, to meet the housing requirement.
A Topliss (20)	According to The Herald (10/03/14) the RDP houses will be off the grid. What will be used for cooking and heating?	That article was based on a previous development proposal. The current proposal is for the houses to be connected to the NMBM electricity grid.
A Topliss (20)	What will happen to the existing shacks?	The existing shacks will be demolished and the material recycled or disposed of.
ECJ Webb & J Ellis (52)	The three properties, owned by the NMBM and shown on the locality map, can be utilised without acquiring additional ground.	Due to the presence of protected forest on these sites, the developable area is largely limited to previously transformed areas. Erf 590 and 28/10 do not provide sufficient developable space given the requirements of the proposed layout, which includes larger erven to allow for on-site sanitation. Consequently Development Option 1 includes development of transformed areas on erf 238, 240, 590 and 28/10.
G & V Rengecas (1); A Topliss (20)	The combination of Erf 10/28 and Erf 590 should provide sufficient land to accommodate the residents.	
C L Neilson (14)	Erf 590 should be selected as it already has residents residing there.	
M Njovu, M Smit, N Steven, N Grobler, N Daweti, M Thobeka, N Goeda, T Jerry, N Futuse, B Lizo, J Manisa, S Mengo (54)	Residents of informal settlements do not want to be relocated.	Agreed. The need for providing formal housing in the Seaview area is so that residents in the existing informal settlements are not relocated.
Comments relating to the environment		
G & V Rengecas (1); ECJ Webb & J Ellis (52)	General concern of impact of development on environment.	Biophysical impacts on the environment were assessed in the impact assessment phase – see Section 5 of the DEIR.
G & V Rengecas (1); H Ferreira (36); R Spalding (42)	The area protected 'green belt' / commonage and may not be developed.	The development proposal is primarily limited to already transformed areas and will avoid forest where possible.
S Keown (10); B de Jager (15); B de Jager (16); JD Gibb (19); TH Johannes (31); D Nortje (39); N Quvile (40)	Area is protected coastal forest / bush / thicket and conservation area.	
JW Kotze (23); GB Smit (24)	Within the 1km coastal zone – refer to NMBM's Coastal Management Programme.	The proposed development is outside the coastal setback line (see Figure 3-8)
GB Smit (24)	Development will impact coastal dune system.	

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
N Littleton (30)	Concern regarding integrity of Baviaans Island Reserve.	Ecological impacts have been assessed in the EIA, however it is noted that the development is to cater for residents already living in informal settlements in the area, and as such is likely to indirectly reduce impacts on protected areas.
G & V Rengecas (1); JP van Speyk (5); H Terblanche (6); A Topliss (20); K & W Lyons (28); N Littleton (30); C Fehrsen (35); H Ferreira (36); R Spalding (42); W Leonard (50)	There are indigenous trees and plants such as coastal fynbos and Milkwoods on the proposed land. How will the indigenous flora be protected?	The proposed layout is largely restricted to transformed areas (see Figure 3-7). Where required, the necessary permits will be obtained for destruction of protected flora.
G & V Rengecas (1); H Terblanche (6); A Topliss (20); K & W Lyons (28); H Ferreira (36); R Spalding (42); W Leonard (50)	There are many animals and birds in the area which will be displaced by the development. How will the indigenous fauna be protected?	Ecological impacts have been assessed in the EIA and measures to mitigate impacts proposed see impact assessment in Section 5.5 of the DEIR.
A Carstens (46)	Seaview houses a sensitive butterfly colony similar to those in the Alexandria forests.	
C Bosch (55)	Wildlife will be hunted as food source.	
N Quvile (40)	DAFF's position remains that natural forests may not be destroyed save in exceptional circumstances. Residential housing does not qualify as an exceptional circumstance. Suitable alternative land must be sourced.	Noted. The current development proposal is limited to previously transformed areas, which do not contain forest, where possible.
N Quvile (40)	The area between the airport and Maitland River is among the five largest forest complexes in the country and is threatened by increasing fragmentation. Natural forest is the rarest terrestrial biome and must receive strict protection.	
N Quvile (40)	Any approval would be in contradiction with Section 3 of the National Forests Act. DAFF is acting on various approvals of such developments granted after April 1999.	
N Quvile (40)	A botanist experienced in identifying natural forest must be appointed to map forest pockets on the proposed site.	Noted. Forest mapping has been included in the EIA to ground-truth the aerial imagery – see forest survey report in Appendix K6.
Comments relating to social impacts		
A Topliss (20); C Bosch (55)	Presence of informal residents has led to increase in illegal drug and alcohol sales and prostitution.	The development proposal is to formalise these settlements. As such, we do not expect this to materially affect the occurrence of social ills such as (but not limited to) selling of drugs or prostitution. This impact was assessed as part of the SEIA (see section 5.6 of the DEIR).

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
Comments relating to the economy		
R Spalding (42)	Will the residents of the development pay rates and taxes?	The residents will be subject to the NMBM's standard policy for rates and taxes.
G & V Rengecas (1); JP Swart (8); DM Davis (13); A Topliss (20); DS Visser (21); K & W Lyons (28); N Littleton (30); D Tunley (32); EK Pienaar (33); E Gerber (34); C Fehrsen (35); R Spalding (42); L Denny (43); A Carstens (46); C Bosch (55)	Development will lead to depreciation of property values in area. House rentals will be affected. Resale will be problematic. Reduced rates and taxes for NMBM.	These impacts were assessed as part of the SEIA (see section 5.6 of the DEIR). The development proposal is to accommodate residents already living in informal settlements in the area.
G & V Rengecas (1); DM Davis (13); B de Jager (15); B de Jager (16); E & J Howard (18); A Brown (27); K & W Lyons (28); E Haze (29); N Littleton (30); KP Cloete (37); D Nortje (39); A Carstens (46); GS Davis (49); W Leonard (50); ECJ Webb & J Ellis (52); C Bosch (55)	Lack of employment opportunities in the area.	
R Spalding (42)	Development will deter investment in area.	
G & V Rengecas (1)	What impact will the development have on the upscale hotel proposed to replace the old Seaview Hotel?	
JP Swart (8); N Littleton (30);	Home security will need to be upgraded at cost of owner.	
JP Swart (8); C L Neilson (14); B de Jager (15); B de Jager (16); JD Gibb (19); D Nortje (39)	Development will affect tourism. December rental will be lost.	

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
G & V Rengecas (1); H Terblanche (6); JP Swart (8); DS Visser (21); K & W Lyons (28); D Tunley (32); C Fehrsen (35); EM Bosman (47); GS Davis (49); W Leonard (50); ECJ Webb & J Ellis (52); C Bosch (55)	Danger of escalation of crime. No police station.	
Comments relating to safety concerns		
JP van Speyk (5) HS du Plessis (12); DM Davis (13)	Danger of high fire risk. Refuse dumped and set alight without tending to fire.	The provision of formal houses to existing residents is likely to reduce the risk of fires typically associated with informal housing. The development will include electrical connections which would reduce the use of fire for cooking and heating. Waste management for the development will be subject to the NMBM's waste collection policy. These impacts have been addressed in section 5.10 and 5.14 of the DEIR.
JP van Speyk (5)	No pavements, verges or streetlights along tar road to Seaview. Pedestrians must walk on the road facing traffic.	Traffic Safety impacts have been assessed as part of the TIA and mitigation measures proposed to manage these impacts (see Section 5.7 of the DEIR).
JP van Speyk (5)	Pedestrian and road traffic from Greenbushes to and from Seaview Spar Complex can be heavy and dangerous.	
EK Pienaar (33); D Nortje (39); L Denny (43); EM Bosman (47)	Service delivery protest and riots will affect all residents. Risk of damage to property, roads and burning of tyres.	As the proposal is to provide housing and services to these residents, it is anticipated that service delivery protests will cease.
Comments relating to health concerns		
H Terblanche (6)	Health risk – livestock	It is unclear what this concern relates to
HS du Plessis (12)	Residents should in the interim be provided with bucket system and refuse containers until housing can be provided.	Noted.
N Littleton (30); KP Cloete (37)	Use of septic tanks for large population with poor herd immunity in confined area on sloped sand dune will lead to frequent outbreaks of communicable diseases. Soak-aways can cause contaminated water flowing to lower areas.	The sanitation solutions proposed are discussed in Section 2.2.2, and potential impacts on groundwater have been assessed as part of the EIA (see section 5.8 and report in Appendix K7).
Comments relating to pollution		
C Fehrsen (35); C Bosch (55)	Stray animals will tear refuse bags and spread communicable diseases.	The development proposal will be subject to waste management as per the NMBM's integrated waste management plan. Waste management impacts have been assessed as part of the EIA (see section 5.10 of the DEIR).
G & V Rengecas (1); H Terblanche (6) HS du Plessis (12); A Topliss (20); EK Pienaar (33)	Lack of pride in the environment, illegal dumping and littering will be prevalent. No refuse collection point or refuse bins in area.	

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
H Terblanche (6) A Topliss (20); Pienaar (33)	Burning of refuse and rubble leads to air pollution being spread due to prevailing winds.	
JP Swart (8)	General pollution concerns	
G & V Rengecas (1); JP Swart (8); A Topliss (20); EK Pienaar (33); E Gerber (34); C Fehrsen (35)	Danger of increased noise pollution.	Noise impacts relating to construction has been assessed as part of the EIA (Section 5.13 of the DEIR). During operation, increased noise relative to the current situation is considered to be unlikely.
C Fehrsen (35)	Smoke from fires for household cooking and cleaning will hover over Seaview Village.	The development will include electrical connection, therefore the use of fire for cooking and lighting will be reduced.
Comments relating to infrastructure		
G & V Rengecas (1); E & J Howard (18); K & W Lyons (28); E Haze (29)	Lack of sufficient schools in the area.	The proposed layout includes provision for community facilities as per the relevant planning requirements.
K & W Lyons (28)	Lack of medical facilities in area.	
E & J Howard (18)	Lack of recreational amenities in area.	
E & J Howard (18); K & W Lyons (28); N Littleton (30); R Spalding (42)	Road system unable to support additional traffic.	It is anticipated that the recipient's current arrangements with regard to transport will remain, and significant increases in traffic for option 1 is therefore not expected. The on-site sanitation proposed will only require occasional emptying (every 5-10 years). A TIA has been conducted as part of the EIA to assess impacts on traffic (see Section 5.7 and appendix K2 of the DEIR).
G & V Rengecas (1); A Brown (27); K & W Lyons (28); E Haze (29); N Littleton (30); KP Cloete (37); A Carstens (46); ECJ Webb & J Ellis (52)	Lack of public transport in the area. How will people commute to work and school?	
KP Cloete (37)	Damage to roads by addition traffic and tanker trucks used to empty septic tanks.	
JW Kotze (23)	Lack of funds for maintenance of provincial and municipal roads.	
G & V Rengecas (1); R Hirstle (4); JP van Speyk (5) DM Davis (13); E & J Howard (18); K & W Lyons (28); E Haze (29); N Littleton (30); KP Cloete (37); GS Davis (49); W Leonard (50)	Is the existing infrastructure adequate to support the proposed development? Will existing infrastructure be upgraded to accommodate the increased pressure?	
		The development will largely connect onto existing services and will make use of on-site sanitation. Water supply will be via a proposed scheme for the greater area.

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
G & V Rengecas (1); R Hirstle (4); JP van Speyk (5) DM Davis (13); E & J Howard (18); JW Kotze (23); GB Smit (24); K & W Lyons (28); E Haze (29); N Littleton (30); H Ferreira (36); GS Davis (49); W Leonard (50)	No sewerage system / waste management infrastructure in area. Existing properties use septic tanks with French drains.	On-site sanitation is proposed as described in Section 2.2.2.
H Terblanche (6)	Higher elevation of Erf 238 in comparison to existing property below – sewerage.	
H Ferreira (36)	Where will NMBM be getting the funds for the provision of necessary services?	As the project as listed as a priority action in the NMBM IDP (2015), it is assumed the funds will be allocated from the budget for housing provision and service delivery.
Comments relating to visual impact		
B de Jager (15); B de Jager (16); D Nortje (39)	Can those who receive these houses maintain them in keeping with the aesthetics of the area?	This is a universal issue with subsidised housing and is outside the scope of this project to assess. It is noted though that the proposed development may be an aesthetic improvement on the current informal settlement.
Comments relating to suggested alternatives		
JP van Speyk (5); HS du Plessis (12)	The combination of Erf 240 and 28/31 should be selected as it already has a police station, school site zoning, two entrances and is close to shopping amenities.	The sites included in this application were chosen based on a number of factors including ownership (government owned or willingness of the landowner to sell), location relative to the existing informal housing, and available transformed areas for development. Assessment of additional alternatives does not form part of this application.
TH Johannes (31)	Erf 1/20 has already been disturbed and should be selected for the housing development.	
K & W Lyons (28)	Alternate land is available where alien vegetation occurs.	
N Littleton (30); KP Cloete (37); R Spalding (42); W Leonard (50)	Housing development should be built in Greenbushes.	Many of the recipients are employed in the Seaview area and relocating them elsewhere would result in a significant increase in their commuting time and expenses.
R Spalding (42)	Housing development should be built in Missionvale.	
N Quville (40)	DAFF requests the outcome of the investigation of alternative land portions such as Portions 1 and 10 of Farm 28.	These portions are included in the application and their suitability has been assessed via the EIA.
Comments of a general nature		
DM Davis (13)	Two previous EIAs were refused and were for high income housing. What has changed?	We are not able to comment on unspecified EIA's.

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
G & V Rengecas (1)	The residents of New Rest and Zweledinga are claiming squatters' rights and have no land claim which needs to be accommodated.	The housing recipients will be subject to the NMBM's policy and procedures in this regard.
G & V Rengecas (1); R Spalding (42)	More people are moving into New Rest and Zweledinga since the development became known. What controls are in place to guard against influx of unemployed people hoping to get housing?	Houses are allocated to beneficiaries according to the NMBM's housing policy. It is generally agreed that the provision of housing is a relatively insignificant contributing factor, whereas job opportunities are a more significant driver, for the influx of people to an area. .
KP Cloete (37)	The development is not suitable for an upmarket coastal village.	The development is in line with government policy in support of integrated residential development, as well as the principle of housing people close to their places of work.

Table 4-3: Comments and Responses Table on DSR

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
Comments relating to the process		
C van Eekelen (65)	Lack of consultation all round.	Several opportunities are provided throughout the process to comment as per the EIA regulations. Refer to Figure 1-2 and Section 4.2.
E Hill (66)	Lack of consultation as only information received has been via printed media.	
A Merrick (61)	How can this development be approved if it was denied to prior developers wanting to erect upmarket houses and complexes?	It is unclear which particular project(s) is / are being referred to, however it is noted that each environmental authorisation process is considered separately on its own merits and therefore cannot be assumed to have any bearing on the authorisation prospects for the current proposal.
DEDEAT (63)	It is contradictory that it is stated that a separate application is underway for the Seaview Bulk Water Supply and the indication that water supply has not been included in the scope of this assessment even though it is mentioned that authorisation may be dependent on authorisation of the water supply project.	The NMBM confirmed that the proposed Seaview Bulk Water Supply project, for which the Basic Assessment is currently in the pre-application stage, is planned to supply the Seaview housing project (see letter in Appendix I). The NMBM has also confirmed that no other options for water supply are available for the project. Based on the screening work conducted in the pre-application phase of that assessment, and to a lesser extent the lapsed environmental authorization for an earlier design of the same bulk water supply project, SRK is of the view that environmentally acceptable alternatives have been identified and that bulk water supply via these pipelines is environmentally feasible.
DEDEAT (63)	The process flow diagram does not indicate a PPP for the FEIR. An acceptable timeframe for the Department is 30 days.	Noted and amended to include a 30 day comment period.
DEDEAT (63)	Page 49 of the DSR indicates a 14-day comment period which is in contradiction with Figure 1-2 whereby a 21 day comment period is indicated. The Department requires a minimum period of 21 days for commenting on the FSR.	Noted and amended in the FSR. A 21 day comment period has been provided on the FSR.

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
DEDEAT (63)	No formal PPP has been conducted by SRK with the residents of New Rest and Zweledinga. Such must be conducted throughout the remainder of the assessment process.	Consultation with the affected communities has been undertaken as part of the EIA process during the public review period of the FSR, and reported in the DEIR. This consultation will be facilitated by a Social Facilitator (Impact Consulting), appointed by the NMBM. In addition to this, outside of the EIA process, it is noted that the NMBM has engaged with the beneficiaries regarding the proposed project over the last few years. It is also noted that the project is in response to pressure from these communities for formal housing and services.
DEDEAT (63)	The proposal for rehabilitation plans for the areas currently occupied by the informal settlements should option 2 be the preferred option to be authorised, must be included in the FSR and Plan of Study for the EIR	Should Option 2 be authorised, all existing shacks and infrastructure will be removed from these settlement areas as residents are relocated. The EIA provides recommendations for rehabilitation of existing development footprints in the event of Option 1 not being authorised (see Section 7.4.22 of the DEIR).
DEDEAT(63)	The Plan of Study for the EIR must include a Bulk Services Report addressing water sewerage, stormwater management, waste management, electricity supply etc.	A preliminary design report addressing the aspects mentioned is provided as Appendix H1 of the DEIR. Letters confirming capacity from the various municipal departments are included in Appendix I.
DEDEAT (63)	Public open space management, as well as management of community facilities including the provision of schools, a clinic and community centre is also to be included in the plan of study.	The management of public open spaces and community facilities will be based on municipal policies and standards for the management of public open spaces and community facilities. [NMBM] Provision and maintenance of schools and community facilities is not within the NMBM's mandate, however provision has been made in the layout for such facilities, which would be developed and maintained by the relevant provincial department. The NMBM will however at all times endeavour to secure the timeous development of community facilities.
DWS (68)	The following development activities may trigger a water use authorisation: <ul style="list-style-type: none"> • Upgrade of existing bulk water services; • Installation of new sanitation services; • Installation of 22 kV underground cabling; • Construction of a 12 m road reserve to connect the development with Aliwal Road; and • Any other associated infrastructure or structures that forms part of the development. 	The aquatic specialist study has confirmed no water courses to be present on or within 500 m of the development sites, and that no Water Use License applications (WULAs) will be required.
DWS (68)	List provided of all information that should be submitted as part of the water use application.	Should WULAs be required, this information will be included in the applications.

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
Comments relating to design		
A Topliss (58)	Is the Applicant aware of the double storied fireproof houses being built in Pretoria? They are R100,000 cheaper than the present RDP houses.	[NMBM] The NMBM is not aware of such products but are continuously seeking alternative solutions to provide housing alternatives that are acceptable to beneficiary communities. The comment is noted and will be investigated.
Comments relating to the environment		
N Littleton (59)	With the exception of site 28, all proposed sites are covered with endangered and protected vegetation An objection has already been lodged with DAFF. They would be concerned about the integrity of the Baviaans Island Reserve	DAFF has been notified and been provided with the opportunity to comment (see list of IAPs in Table 4.1). A forest survey has been conducted (see report in Appendix K6 of the DEIR) to confirm the distribution of forest in the area. SRK have to date not identified potential risks to the Island Nature Reserve that would occur over and above those that already exist, due to the proposed development. The reasonably foreseeable risks, and recommended management measures are provided in Section 5.5.
C Fehrsen (64)	Damage to the Coastal Forest Belt, the current affected areas where damaged by the proposed recipients themselves.	The development is planned to take place on portions of land where the forest has been transformed by previous activities. Refer to Figure 3-7 which shows the transformed areas.
Comments relating to social impacts		
N Littleton (59)	Indigent and unemployed population will bring in many social evils not currently in the area. Is the city prepared to ensure that the Seaview Police Station will be adequately staffed?	The development proposal is to accommodate residents already living in informal settlements in the area. Increased negative socio-economic impacts on surrounding areas relative to the current situation are therefore considered to be unlikely. These impacts have been assessed through a socio-economic study (see Section 5.6). It is also noted that social evils cannot necessarily be categorically linked to indigent communities.
C Fehrsen (64)	Presence of shebeens with new housing.	[NMBM] The establishments of all liquor outlets, including taverns are highly regulated in terms of the Liquor Act, as well as the NMBM Liquor Outlet Policy and will apply to the proposed development.
C Fehrsen (64)	Additional dwellings will be erected resulting in an unplanned increase in population. Building directorate cannot enforce building law in such areas.	[NMBM] Building plans will have to be submitted and approved in terms of Section 7 of the Building Standards Act prior to commencement of construction on site. These designs will have to comply with SANS 10400 as well as SANS 204. The Building Inspectorate will have to commence the project, and once completed issue an occupation certificate prior to the building being handed over to the owner's, in terms of Section 14 of the Act..
Comments relating to the economy		
E Gerber (57) N Littleton (59) L Denny (60) D Visser (62) C Fehrsen (64)	Proposed project will have a negative impact on house market values as the area will be undesirable. Will the government have funds available to pay the shortfall? What options are available as recourse should values decrease as a direct proven result?	Potential impacts on surrounding property values and security have been assessed via a socio-economic study as part of the EIA (see Section 5.6 of the DEIR). [NMBM] There is currently no documented and empirical evidence of lower-income residential

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
N Littleton (59) A Merrick (61)	Where are all the residents going to find employment?	<p>developments negatively impact on surrounding property values. Research in this regard has recently started, but the associated reports and findings are not available to the NMBM at this stage. The NMBM is not obligated to provide reimbursement for depreciation in property value.</p> <p>The proposed project is aimed at the improvement of the living conditions and quality of life of residents living in existing informal settlements and is not intended as a destination area for people living in other parts of the city. It will at most accommodate some of the other smaller settlements in the immediate surrounds of Seaview/ Clarendon Marine.</p> <p>Social surveys conducted in the two informal settlements in Seaview have shown that an average of approximately 55% of the residents are employed within 14km of their place of residence. These results will be reviewed as part of the current EIA.</p> <p>There is no empirical evidence that the formalisation of informal settlements contributes to increases in crime and consequential increases in private expenditure on security. The beneficiary community are already living in the area.</p>
N Littleton (59)	Extra funds will have to be spent on private security costs.	
Comments relating to safety concerns		
E Gerber (57)	Danger of residents rioting.	As the proposal is to provide housing and services to these residents, it is anticipated that service delivery protests will be reduced.
L Denny (60)	Danger of protestors sealing off all access routes. Saying that the proposed project will solve the protesting issue is naïve.	
E Gerber (57) A Merrick (61) D Visser (62)	Crime in the area has increased to a dangerous level and the proposed project will exacerbate it.	Crime is linked to broader socio-economic problems that are difficult to assess or mitigate within the scope of the EIA. As the development proposal is to provide formal housing and services for informal residents in the area, an increase in crime is not expected to result specifically as a result of the provision of houses. This potential impact has been investigated as part of the proposed socio-economic study (see Section 5.6 of the DEIR).
Comments relating to health concerns		
N Littleton (59)	A septic tank system for a large population with poor herd immunity on a confined area on a sloped sand dune is going to cause major community health issues.	The sanitation solutions proposed are discussed in Section 2.2.2, and potential impacts on groundwater have been assessed as part of the EIA through a groundwater specialists study (see Section 5.8 of the DEIR), It is our assumption is that providing the DWS's on-site sanitation protocols are adhered to, which are the subject of the proposed groundwater study, that secondary impacts on community health from this source would be addressed.
E Hill (66)	<p>With the properties footprint being small and the proposed location of the tanks to be in a similar position on each plot, the ground area will become saturated and a mess.</p> <p>No mention is made of the emptying of the tanks and who bears the responsibility and cost.</p>	

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
DWS (68)	The expected impact(s) cause by existing and proposed septic tank French drain system for sanitation purposes will be cumulative and long term on both the surface and groundwater. The soil percolation assessment / geotechnical report must be developed to provide accurate impacts caused by such infrastructure on the water source. The chances of pollution of water resources will be higher if this system is utilised.	
DWS (68)	The Department does not support the proposed sanitation system of a septic tank, leaching into the ground, but rather the alternative of a package plant system.	
L Denny (60)	The proposed development will cause sand and dust to come across to suburb.	Impacts relating to dust will be assessed in the DEIR and management measures proposed in the EMPr.
L Denny (60)	Are there legal remedies should health and stress issues occur as a result of any factor relating to the housing development e.g. dust, sewerage, noise pollution?	Potential impacts relating to the concerns mentioned have been assessed as part of the EIR (see Sections 5.10, 5.11 and 5.13 of the DEIR), and mitigation measures will be provided, which may become conditions of any authorization provided for the project. The relevant municipal bylaws will also apply to the proposed development.
DWS (68)	Integrated waste management must be dealt with in accordance with the NEM:WA (59 of 2008)	Waste impacts have been assessed as part of the EIR (see Section 5.10 of the DEIR). The NMBM's integrated waste management plan will apply. Input has also been received from the NMBM's Waste Management department regarding waste removal (see Appendix I of the DEIR).
Comments relating to pollution		
E Gerber (57) L Denny (60) C Fehrsen (64)	Proposed project will lead to increased noise pollution, disturbance of the peace and tranquillity.	Noise impacts relating to construction have been assessed as part of the EIA. During operation, the relevant NMBM noise control bylaws will apply.
C Fehrsen (64)	Hovering smoke in the air through burning of tyres, wood for heating purposes (coastal forest belt will supply such needs).	The development will include electrical connections which would reduce the use of fire for cooking and heating, and it is therefore anticipated that impacts relating to burning of wood and tyres will decrease, and it is not proposed that these specific impacts will be assessed in the EIA.
C van Eekelen (65)	Increase of rubbish and health issues due to presence of taxi ranks.	The development proposal will be subject to waste management as per the NMBM's integrated waste management plan. Waste management impacts have been assessed as part of the EIR (see Section 5.10 of the DEIR). Sanitation solutions proposed are discussed in Section 2.2.2.
DWS (68)	The report states that there is a possibility of wetlands present and/or close to the development areas and activities such as contaminated run-off, waste water from construction activities, sedimentation etc. may lead to pollution of these water bodies.	A wetland/aquatic specialist study was conducted to determine the presence of any water courses on or close to the site, and assess potential impacts in this regard (see report in Appendix K5). No watercourses are predicted to be affected by the development.

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
DWS (68)	Any oil or grease (including petroleum products) spillage on site, must be properly managed to prevent any contamination of water resources. An emergency response protocol must be developed to ensure that such spillages are immediately attended to and the site properly rehabilitated.	Mitigation measures for the management and prevention of spills are included in the DEIR, and potential impacts resulting from spills have been assessed (Section 5.9).
Comments relating to infrastructure		
DEDEAT (63)	The provision of bulk services must be proven (capacity vs demand, as well as plans for augmentation or expansion) and cannot be part of any “Assumptions and Limitations”.	Supporting letters confirming capacity from the relevant NMBM departments are provided in Appendix I of the DEIR.
DEDEAT (63)	Further alternatives for sewage treatment as proposed should option 2 be the preferred site for the development must be included in the FSR. The leach pits and their impact with a high density residential low-cost housing development have not been suitably explained.	The option of a package plant is discussed as an alternative for development option 2 under Section 2.3.3. Impacts relating to the proposed sanitation have been assessed as part of the EIR, taking into account the findings of the groundwater specialist study (Section 5.8 of the DEIR).
DWS (68)	All details of sewer infrastructure such as sewer lines, sewer manholes and connections as well as any sewer pump stations must be properly investigated and assessed to assist in decision on the type of sewer infrastructure suitable.	The Plan of Study for the EIA includes the development of a Preliminary Design report, covering the infrastructure requirements (Appendix H1 of the DEIR). Note that as the proposed development includes on-site wastewater treatment, connection to bulk sewer infrastructure will not be required.
DEDEAT (63)	Could the NMBM not confirm that solar geysers will be provided for each unit as well as a rainwater tank with sufficient capacity, and with the required plumbing to supply each unit with water for flushing toilets etc. in order to begin reducing the impacts on services of such low cost housing projects?	[NMBM] solar geysers are standard design inclusions on NMBM low income housing projects
E Gerber (57)	Everyone has to travel to where they want to be, so the concept of people staying close to their workplace is not appropriate.	Disagree. It makes sense from a town planning, socio- economic, and environmental sustainability perspective to locate people close to their work places.
A Merrick (61)	The proposed entrance to the development cannot handle the amount of traffic in and out of the development, as well as noise factor.	It is unclear as to which development option this refers to. Four entrances to Development option 1 are proposed. A traffic impact assessment has been undertaken as part of the EIA (see Section 5.7 of the DEIR).
N Littleton (59) L Denny (60)	The Seaview road connecting it to the N2 will need to be upgraded and broadened to cope with extra traffic.	A traffic impact assessment has been undertaken as part of the EIA (see Section 5.7 of the DEIR).
C Fehrsen (64) C van Eekelen (65)	Existing road infrastructure of Seaview Village does not suit heavy vehicles such as refuse removal, busses, human waste removal trucks and cannot cope with additional traffic.	The proposed road design will be sized to accommodate the required waste removal and public transport vehicles. A traffic impact assessment has been undertaken as part of the EIA (see Section 5.7 of the DEIR).

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
N Littleton (59)	Probable that unexpected influx of residents will overwhelm the infrastructure and social structures.	Houses are allocated to beneficiaries according to the NMBM's housing policy. It is generally agreed that the provision of housing is a relatively insignificant contributing factor, whereas job opportunities are a more significant driver, for the influx of people to an area. Impacts relating to potential influx have been assessed as part of the socio-economic assessment in the EIA (see Section 5.6 of the DEIR).
C van Eekelen (65)	Suburb is all without street lights and visibility will be poor.	Street lighting will be provided as per the NMBM's standard for housing developments.
N Littleton (59)	An urban powerline will have to be created as Seaview is still reliant on a farm line, creating frequent power outages.	Power supply for the proposed development will be via a connection as described in Section 2.2.2 (see letter confirming this in Appendix I of the DEIR).
N Littleton (59)	Increased water supply will have to be required with more piping being laid down from the current reservoir. Possible a larger reservoir will need to be created.	It is proposed that water supply to the development will be supplied via the proposed Seaview Bulk Water Supply project, as described in Section 2.2.2 (see letter confirming this in Appendix I).
N Littleton (59)	Proposed project will require an exclusive sewerage line with pump stations to be erected.	On site sanitation is proposed as described in Section 2.3.3.
C van Eekelen (65)	Mention of solar panels, however an increase in residents in the low income housing development leads to cable theft as well as illegal electricity connections.	Electrical connection will be provided as discussed in Section 2.2.2. (see letter confirming this in Appendix I of the DEIR).
Comments relating to visual impact		
L Denny (60)	I object to option 2 as it will destroy the view from my back deck and therefore affect the property values	Potential impacts on property values that may result from visual impacts have been assessed as part of the socio-economic study in the EIA (see Section 5.6 and Appendix K1 of the DEIR).
Comments relating to suggested alternatives		
E Gerber (57) L Denny (60)	The residents should be relocated to an area where the peace and safety of local rate paying residents will not be interrupted.	[NMBM] The relevant municipal bylaws and other public safety measures will apply, as they do to any development. As the housing recipients already reside in informal settlements in the area and as the proposed development entails improvement of living conditions of existing informal settlement, this impact is considered to be unlikely, but have been assessed as part of the socio-economic study as part of the EIA (see Section 5.6 and Appendix K1 of the DEIR).
A Topliss (58)	The Beachview Resort is unused and has sufficient infrastructure, dwellings and cleared vegetation. This would be the ideal location to place rdp houses. The applicant should utilise what it already has and save time and money. Should the Applicant choose not to use the Beachview Resort on permanent basis, it should be used on a temporary basis to house residents while their shacks are being demolished and removed, giving greater control over the process.	[NMBM] Utilisation of the Beachview resort is currently under legal review and at this stage cannot be considered as an alternative within the project implementation timeframes.

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
N Littleton (59)	Most logical, cost-effective and practical solution is to build the housing estate in Greenbushes.	The need for providing formal housing in the Seaview area is so that residents in the existing informal settlements are not relocated elsewhere.
Comments of a general nature		
DEDEAT (63))	Comment regarding resettlement planning will be required from the NMBM.	The NMBM's standard relocation procedure will be followed (see Appendix J) and will be communicated to the affected communities beforehand via the channels set up for this purpose.

Table 4-4: Comments & Responses Table on FSR

Commentator & comment no.	Issues raised	Response (SRK unless otherwise specified)
Comments relating to the process		
DMR (71)	The only impact for the DMR would be for surface usage applications.	The DMR will continue to be notified as a commenting authority on the process.
K Benn (73)	General lack of consultation as all affected residents of Seaview should have received written notification. Appendix D of FSR (List of notified and registered IAPs) does not contain a list of all Seaview Clarendon Marine residents.	The EIA Regulations do not require SRK to individually notify every potential IAP. Notifications were distributed to all IAPs who we are legally required to notify directly, as well as any other relevant potential IAP or stakeholder SRK was aware of. Should any additional parties wish to be registered as IAPs, they are welcome to provide their contact details to SRK.
List of New Rest and Zwelendinga residents (75)	The EIA process must not delay the urgent construction of the housing development.	The completion of the EIA is a legal process and must reach its conclusion (and authorisation must be granted) before any construction can legally take place.
H du Plessis (76)	The onsite posters should have been erected two years ago.	All advertising of the EIA process, including erecting onsite posters, have been done in accordance with the requirements of the EIA Regulations, 2010.
V Rengecas (77)	The FSR only contains the few comments raised on the DSR and none of the original objections raised.	Appendix E of the FSR (and this report) contains all IAP comments received as part of the EIA process to date. Summarised comments and responses are also provided in Section 4.2.2 of the EIR. Please provide copies of the specific comments that have been omitted if this is the case.
V Rengecas (77)	Concern that the Executive Summary of the FSR does not adequately express the concerns of local residents and trust that the competent authority will read all documentation and not just the FSR.	The purpose of the Executive Summary is to provide a brief overview of the report. DEDEAT is provided with a complete copy of each report for their consideration.
V Rengecas(77)	The backlog of housing jumped from 46161 (DSR) to 72411 (FSR) when the same source of information is quoted.	The numbers cited in the FSR executive summary should be referenced as the NMBM Built Environmental Performance Plan. This has been corrected.
A Rathbone (78) I & N Moore (81)	Requests registration as IAP.	Noted and effected.
V Knoetze (79)	Requests removal as IAP	Noted and effected.

Comments relating to design		
G Smit (70)	Concern regarding increase in the number of residences planned. Should be a maximum of 200.	Latest estimates of the number of houses required to accommodate existing residents of the informal settlements is approximately 430 (see Impact Consulting Stakeholder Engagement Report in Appendix E). Layout option 2 would allow for higher housing yields, but it is understood that these would be developed as and when the need arises.
DAFF (73)	The large open area on Erf 28/1 is best suited for the development as it will avoid impact on natural forest and provides ample space for future expansion.	This area is included as layout option 2 in the EIA process, which will determine the most environmentally favourable option. It must be noted that this land is not owned by the NMBM.
K Benn (73)	Will the properties be subject to same building regulations as the Seaview township?	It is unclear what building regulations are being referred to, however the development will be subject to NMBM's standard regulations for residential areas and will deal with building contraventions in a manner similar to other formally planned suburbs in the City.
List of New Rest & Zwelendinga residents (74)	We want the housing development to be located solely on Portion 10 of Farm 28.	This property is included as one of the sites making up layout option 1 in the EIA process, which will determine the most environmentally favourable option. As this property is predominantly forest, the area available for development of housing is limited
List of New Rest & Zwelendinga residents (74)	The following will form part of the housing development: <ul style="list-style-type: none"> • Community Hall; • Sports field; • Church; • School; • Clinic; • Crèche; • Library; and • Land for projects. 	NMBM has made provision in the layout of development option 1 for public open space (both parks and natural/ indigenous vegetation), as well as community zoning to make provision for uses such as a crèche or church and special purpose zoning. Due to space limitations, provision of additional facilities in Option 1 would result in a reduction in the number of houses that can be accommodated. Development option 2 includes provision for a crèche, church, primary school, sports fields, businesses, open space and a taxi area.
N Littleton (80)	Requests the data of both the low volume flush toilets and package wastewater treatment plant.	Descriptions of both sanitation systems proposed are provided in Section 2.3.3 of the DEIR and the Preliminary Design report and technical reports on the two sanitation options in Appendix H.
Comments relating to the environment		
G Smit (70)	Current residents of the informal settlements already negatively impact the environment by littering, hacking trees for heating and cooking; and harvesting of seafood along the rocks.	It is believed that the development of formal housing would alleviate many of these issues with the provision of formal services such as waste management, electricity and potable water.

DAFF (73)	Natural forest covers large parts of the properties surrounding two existing informal settlements, which are valuable because of the rarity of the forest biome. They form part of one of the very few large forest complexes in the country, contain a high biodiversity and red data species, and provide high value ecosystem services. DAFF will not issue licenses for the destruction of natural forest for residential erven.	Noted. The proposed layouts have attempted to limit the development to transformed patches only. A forest mapping survey has been undertaken, the results of which have been sent to DAFF for comment, and are included in Appendix K6.
K Benn (73)	Are there any procedures in place to enforce the law should intended residents cut down indigenous protected trees and vegetation?	The current legislation regarding damage to protected species and forest, would continue to apply. The implementation thereof during operation of the proposed development is outside the scope of the EIA, however during construction the contractors will be monitored for any contraventions of environmental legislation as per the stipulations of the EMPr (See Section 7.4.15).
DAFF (73)	Intrusion of the settlement areas into open corridors within natural forest is undesirable. It is difficult to control the impact of residents on the surrounding forests, and the prevention of illegal settlement intrusion.	The proposed layout (option 1) is where possible limited to areas that are already inhabited by the informal settlements, with additional areas as required to accommodate the housing numbers required. Impacts of residents on surrounding natural forest are therefore unlikely to increase in the inhabited areas (and possibly other areas that would be accessible to residents) and could potentially decrease as residents will be provided with municipal electricity supply, eliminating the need for firewood for heating and cooking.
DAFF (73)	The responses to DAFF's comments on the DSR are incorrect as the current layouts will likely intrude into natural forest in several locations, especially on the land northwest of Seaview circled in red.	The proposed layout (Option 1) has attempted to avoid forested areas based on aerial imagery available at the time. A forest mapping survey of these areas has subsequently been undertaken (see Appendix K6) and sent to DAFF for comment, based on which any required changes to the layout will be considered. Comment has not yet been received.
DAFF (73)	It is difficult to distinguish between natural forest and Rooikranz invasives. A specialist botanist must survey the area and map out natural forest.	A forest survey was conducted by a botanist from CEN in October 2016. This included groundtruthing the transformed areas/forest edge. A copy of the report is included in Appendix K6 and has been sent to DAFF separately for comment.
DAFF (73)	Where Rooikranz is occurring, a transition from invasives to natural forest is taking place in some areas. New forest species are sprouting under some invasives and will grow back to natural forest within decades.	A forest survey was conducted by a botanist from CEN in October 2016. This included groundtruthing the transformed areas/forest edge. A copy of the report is included in Appendix K6 and has been sent to DAFF separately for comment.
K Benn (73)	What effect will high density leach toilets have on the environment and coastline when seeping into underlying groundwater and limestone? Similar applications have been turned down due to the negative environmental impact of high density septic tanks.	A groundwater survey was conducted and is included in Appendix K7. The study concluded that the risk of groundwater contamination was low, based on the sanitation design proposed (see section 5.8).

K Benn (73)	Study carried out by Professor Shirley Cowley for proposed burial park on lower Seaview Road should be referred to when investigation impact on forest and vegetation.	A forest mapping survey has been undertaken as part of the EIA, the report for which is included as Appendix K6 of the EIR. This report has made reference to the most relevant available literature relating to the area.
H du Plessis (76)	The FSR does not address the shifting dunes and rising sea-levels cause by Global Warming and strong winds. All new properties must be at least 300m from the high water mark (Act 24 of 2008 Coastal Management Act, AfriCoast Engineers).	The proposed sites are all located in excess of 300m of the high water mark
H du Plessis (76)	Suggests that SRK take note of 'Eastern and Southern Cape Coasts' by Roy Lubke and Irene de Moore for the area involved.	The DEIR has made reference to the most relevant available literature relating to the specific study area. The reference cited was consulted, however it provides more broad scale descriptions than are generally required to inform an EIA.
Comments relating to social impacts		
E Gerber (69)	Current Zweledinga residents already causing heavy noise pollution.	The NMBM's noise control bylaws will apply.
K Benn (73)	Disturbance of peace and tranquility in coastal holiday / retirement village.	The NMBM's noise control bylaws will apply.
K Benn (73)	How will the influx of newcomers building informal houses adjacent to the area be controlled? Will the structures be removed?	[SRK] the primary motivation of the project is to provide current residents of informal settlements in the area with formal housing and services. Key to this will be controlling influx of additional shack dwellers, by way of careful scheduling of relocations and construction. [NMBM] The NMBM proposes to conduct regular site inspections to police land invasions activities as part of their function of proper Beneficiary Management and in line with the municipality's land invasion policy. A team within the community is then established to work in conjunction with the land invasion officers, to act as whistle blowers and therefore reduce the risk of land invasion.
K Benn (73)	Will there be control over livestock?	The existing municipal bylaws relating to livestock will apply.
J Clark (72) H du Plessis (76)	No retail, medical or educational centres close by. The development is too far from existing centres for intended residents.	The housing development is intended to cater mainly for existing residents of the Zweledinga and New Rest settlements, and the proposed layout includes for the required social facilities as per the planning guidelines.
Comments relating to the economy		
E Gerber (69) J Clark (72)	Proposed development will negatively impact property values. Market related valuations should be performed on all affected properties before development and a certificate issued to property owners.	Assessment of the potential impact on property values has been included as part of the Socio-economic impact assessment – for details please refer to Section 5.6 and Appendix K1 for the full report.

G Smit (70) J Clark (72) H du Plessis (76)	Lack of work opportunities in the area. Current economic downturn will decrease employment opportunities in the area.	This is a problem in many areas of the NMBM. In a 2013 study it was noted that many of the housing beneficiaries were employed locally. The proposed development would create work opportunities (primarily during construction but also during operation), however the risk of influx of job-seekers to the area also exists. Both of these impacts have been assessed as part of the socio-economic impact assessment (see Section 5.6 and Appendix K1).
K Benn (73)	Will the intended residents have the resources to maintain the leach toilets?	According to the engineering design report (see Appendix H1) the leach pits will require clearing every 5-10 years, which will be undertaken by the NMBM. No other maintenance requirements are mentioned. The low maintenance requirement is one of the key reasons for the leach pits being proposed as opposed to other sanitation solutions.
K Benn (73)	Who will be responsible for cleaning and maintenance of leach toilets? Failure to clear blockages may result in unsanitary conditions.	
Comments relating to safety concerns		
G Smit (70)	Lack of employment opportunities in the area will lead to increased crime.	The formal housing development is for existing residents of the area and there is therefore considered to be unlikely to expect that crime would increase as a result of the development. The socio-economic impact assessment has taken the potential (actual or perceived) increase in crime into account in the assessment – see Section 5.6 and Appendix K1 of the DEIR.
H du Plessis (76)	Stu Davidson property is within a 1km radius of both settlements. He participates in aerobatic displays and flies very low over the area. Act and Approval for Civilian Aircraft hours.	It is unclear what the concern being raised is. Presumably the property referred to is Farm 28 portion 1, which is one of the development site options considered in this EIA. Should this site be developed it will no longer be available for aviation.
DAFF (73)	Natural forest forms a protective buffer in case of fire danger.	The value of natural forest from this and other perspectives is recognised and the proposed design has attempted to minimise impacts on forest.
Comments relating to infrastructure		
E Gerber (69)	Development should be located to an area with existing infrastructure. This will lighten the burden on the taxpayer.	The existing residents do not want to be removed from the Seaview area. The provision of infrastructure is discussed in Section 2.2.2 and details are provided in the Preliminary Design Report (Appendix H1).
J Clark (72)	Current infrastructure not set up for additional housing development.	
J Clark (72)	Area is not on main municipal sewerage system.	The entire Seaview area is not on the municipal sewerage system. Provision will be made for a sanitation system to be in place (two options are provided). This is discussed in Section 2.3.3 of the DEIR.
K Benn (73)	Will each house be provided with at least 500 litre water tanks?	The development will be connected to the municipal water supply system. For details refer to section 2.2.2 and the Preliminary Design Report (Appendix H1) of the DEIR.
K Benn (73)	Will there be weekly refuse removal? Will refuse be controlled by the Council?	The development will be subject to the NMBM's regular waste collection schedule (weekly collections). Impacts relating to waste management are described in Section 5.10 of the DEIR.

H du Plessis (76)	The needs of the two settlements must be addressed with correct water supply and plumbing, but not be encouraged to expand. Even the construction process will put a strain on the scarce resources in the area.	The provision of infrastructure is discussed in Section 2.2.2. Confirmation has been obtained from the relevant municipal departments regarding provision of services to the proposed development, copies of which are provided in Appendix I of the DEIR.
Comments relating to roads and transport		
G Smit (70) H du Plessis (75) I & N Moore (82)	Lack of formal means of transport in the area.	A Traffic Impact Assessment has been undertaken as part of the EIA, the findings of which are reported in Section 5.7, and the full report is attached as Appendix K2 of the DEIR. Recommendations regarding any upgrades or modifications to roads to accommodate the proposed development and any public transportation requirements are included in the study.
J Clark (72)	No bus route should be put along narrow road between Mount Pleasant and Seaview.	
J Clark (72)	Roads not built for major traffic.	
K Benn (73)	Van Renen (as main access point) was never constructed for high volumes of traffic and cannot accommodate heavy construction vehicles. It will lead to increase of traffic accidents, endanger pedestrians, increase noise and dust. Can the main access not be moved to a main road?	
K Benn (73)	Will taxi areas be constructed along the proclaimed Seaview Main Road 422?	
Comments relating to visual impacts		
E Gerber (69)	Visual impact will affect property values.	The socio-economic impact assessment has included comment on potential impacts on property values. See section 5.6 of the DEIR and Appendix K1 for the full study report.
J Clark (72)	Negative visual impact of development on the landscape.	It is unclear which site this comment relates to, however it is noted that the informal housing already exists in the area, and the replacement of this with formalised housing is unlikely to result in increased visual impacts as it would be more in keeping with the aesthetics of the surrounding residential areas. It is also noted that (for option 1) the forest surrounding the pockets of proposed housing is anticipated to provide a certain degree of visual shielding. Impacts on sense of place (influenced by visual impacts) have been assessed as part of the Socio-economic impact assessment (see Section 5.6 of the DEIR and Appendix K1).
Comments relating to suggested alternatives		
E Gerber (69) G Smit (70)	Sufficient vacant land in Greenbushes to accommodate development. Transport is available and more economically friendly.	The NMBM has acquired land in the Seaview area for housing development and many of the housing beneficiaries work in the Seaview area. Relocation outside the Seaview area is therefore not being considered as part of this EIA. According to the socio-economic study (Appendix K1), employment levels are higher in New Rest and Zweledinga than in the NMBM on average, although income levels

H du Plessis (76) I & N Moore (82)	Development should rather be located closer to the Metro where amenities, work opportunities and better infrastructure are available.	are reported to be lower.
J Clark (72)	Rather provide decent living conditions for settlements between Seaview and Clarendon Marine.	The development proposal is to provide housing and associated services, in terms of the NMBM policy, for the housing beneficiaries.
Comments of a general nature		
E Gerber (69)	The decision is made on behalf of residents by a controlling authority. More consideration should be given to current, tax-paying residents.	The EIA process provides an opportunity for all IAPs to be notified and comment on the process, so that any specific concerns of an environmental nature can be addressed via the EIA.
E Gerber (69)	Squatters should be satisfied with housing, even if the housing is not provided in their preferred location.	Provision of formal housing for qualifying beneficiaries is part of the NMBM's mandate. The location of the housing will be determined by the outcome of the EIA process, which takes both environmental and socio-economic considerations into account.

5 Assessment of Environmental Impacts

The identification of potential impacts of the proposed activity is based on the following factors:

- The legal requirements;
- The nature of the proposed activity;
- The nature of the receiving environment; and
- Issues raised during the public participation process.

Considering the factors listed above, the following environmental impacts were identified which could potentially result from the proposed housing development:

- Impacts on heritage resources;
- Terrestrial ecological impacts;
- Socio-economic impacts;
- Impacts on aquatic environments;
- Impacts on traffic safety and flow;
- Waste management impacts;
- Visual impacts;
- Impacts on groundwater quality;
- Stormwater and erosion impacts;
- Fire safety risks; and
- Construction related impacts.

Several of the impacts listed above require specialist input and separate studies have therefore been commissioned as part of the EIA phase. The details of these studies are listed in Table 5-1 below. The impacts not requiring specialist input will be discussed and rated by the EAP.

Table 5-1: Details of specialist studies completed to date

Study	Specialist	Volume 2 Appendix no
Socio-economic	Matthew Keeley – Urban-econ	K1
Traffic	Cary Hastie – Engineering Advice and Services	K2
Palaeontological	John Pether	K3
Archaeological	Celeste Booth – Albany Museum	K4
Aquatic	Karissa Nel - SRK	K5
Forest survey	Belinda Clark - CEN	K6
Ecological	SRK Consulting, CEN, Jacobsen	K6
Groundwater	Riona Kruger - SRK	K7

5.1 Impact Rating Methodology

The assessment of impacts will be based on the professional judgement of specialists at SRK Consulting, fieldwork, and desk-top analysis. The significance of potential impacts that may result

from the proposed development will be determined in order to assist the Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) in making a decision.

The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur. The criteria used to determine impact consequences are presented in Table 5-2 below.

Table 5-2: Criteria used to determine the Consequence of the Impact

Rating	Definition of Rating	Score
A. Extent– the area over which the impact will be experienced		
None		0
Local	Confined to project or study area or part thereof (e.g. site)	1
Regional	The region, which may be defined in various ways, e.g. cadastral, catchment, topographic	2
(Inter) national	Nationally or beyond	3
B. Intensity– the magnitude of the impact in relation to the sensitivity of the receiving environment		
None		0
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. Duration– the time frame for which the impact will be experienced		
None		0
Short-term	Up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years	3

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Table 5-3: Method used to determine the Consequence Score

Combined Score (A+B+C)	0 – 2	3 – 4	5	6	7	8 – 9
Consequence Rating	Not significant	Very low	Low	Medium	High	Very high

Once the consequence has been derived, the probability of the impact occurring will be considered using the probability classifications presented in Table 5-4.

Table 5-4: Probability Classification

Probability– the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall **significance** of impacts will be determined by considering consequence and probability using the rating system prescribed in the table below.

Table 5-5: Impact Significance Ratings

Significance Rating	Possible Impact Combinations	
	Consequence	Probability
Insignificant	Very Low &	Improbable
	Very Low &	Possible
Very Low	Very Low &	Probable
	Very Low &	Definite
	Low &	Improbable
	Low &	Possible
Low	Low &	Probable
	Low &	Definite
	Medium &	Improbable
	Medium &	Possible
Medium	Medium &	Probable
	Medium &	Definite
	High &	Improbable
	High &	Possible
High	High &	Probable
	High &	Definite
	Very High &	Improbable
	Very High &	Possible
Very High	Very High &	Probable
	Very High &	Definite

Finally, the impacts will also be considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The system for considering impact status and confidence (in assessment) is laid out in the table below.

Table 5-6: Impact status and confidence classification

Status of impact	
Indication whether the impact is adverse (negative) or beneficial (positive).	+ ve (positive – a ‘benefit’)
	– ve (negative – a ‘cost’)
Confidence of assessment	
The degree of confidence in predictions based on available information, SRK’s judgment and/or specialist knowledge.	Low
	Medium
	High

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- **Insignificant:** the potential impact is negligible and will not have an influence on the decision regarding the proposed activity/development.
- **Very Low:** the potential impact is very small and should not have any meaningful influence on the decision regarding the proposed activity/development.
- **Low:** the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development.

- **Medium:** the potential impact should influence the decision regarding the proposed activity/development.
- **High:** the potential impact will affect the decision regarding the proposed activity/development.
- **Very High:** The proposed activity should only be approved under special circumstances.

Practicable mitigation measures will be recommended and impacts will be rated in the prescribed way both with and without the assumed effective implementation of mitigation measures. Mitigation measures will be classified as either:

- **Essential:** must be implemented and are non-negotiable; or
- **Optional:** must be shown to have been considered and sound reasons provided by the proponent, if not implemented.

5.2 Description and rating of potential impacts

The sub-sections below provide descriptions and ratings for the anticipated impacts of the proposed development during the construction and operation phases. As the development is anticipated to be permanent, no decommissioning is proposed, however should decommissioning be required for any reason, the impacts and mitigation measures required are anticipated to be largely similar to those during construction. The no-go option (i.e. no development and continuation of the current situation of informal settlements) has been rated as well where relevant.

The significance ratings and management recommendations provided below are based on those provided by the relevant specialists, or by SRK. For additional detail on the specialist findings please refer to the full specialist study reports in Appendix K (bound separately as Volume 2 of the EIR).

5.3 Archaeological Impacts

SRK Consulting appointed Ms Celeste Booth of Booth Heritage Consulting to conduct a Phase 1 archaeological survey as part of the Environmental Impact Assessment (EIA) for the proposed development. A copy of the report is included in Appendix K4.

No archaeological heritage remains were observed within the areas proposed for Development Option 1. This is mainly due to the areas being covered in dense forest and transformed vegetation cover. However, it is not unlikely that coastal archaeological heritage remains and sites would be uncovered during bush clearing and excavation activities.

A few scatters of *Donax serra* were observed within two exposed surface areas on the property proposed for Development Option 2. Most of the landscape has been transformed or disturbed and the remaining is covered in dense dune vegetation cover.

The general area is considered as having a low archaeological heritage significance, however, it must be noted that the proposed development areas fall within the very sensitive archaeological coastal area and it is highly likely that archaeological coastal occupation remains and sites will be uncovered during bush clearing and excavation activities.

Overall, the specialist indicated that Development Option 2 is preferred as the area has already been previously disturbed, and there is a higher likelihood of in-situ archaeological sites being present in the densely vegetated areas of development option 1. The impact significance ratings provided however are the same for both development options. With effective mitigation, a low positive impact may result, as any currently undocumented archaeological resources could be made available for recording and preservation if required, adding to archaeological knowledge of the area.

It is also recommended that if the current layout is changed, an archaeological walk-through survey of the changes must be conducted and further mitigatory recommendations may be made if necessary.

5.3.1 Potential Impact A1: Damage or destruction of archaeological resources

Damage or destruction to archaeological resources on the site may occur due to earthworks and excavations during construction or during maintenance activities or casual excavations by residents or visitors to the area during operation.

Table 5-7: Significance rating of impact A1 and mitigation measures during construction – Development option 1 & 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Low	Long term	Low	Probable	Low	-	High
Management Measures								
<ul style="list-style-type: none"> All construction work must be monitored. A person must be trained as a site monitor to report to the foreman when archaeological sites are found; If any concentrations of archaeological material are exposed during construction, all work in that area should cease and it should be reported immediately to the Albany museum so that the required investigations can be undertaken; Construction managers/foremen should be informed, before construction starts, on the possible types of heritage sites which may be encountered during construction; and It would be preferred that a professional archaeologist be appointed to monitor the vegetation clearing to identify any archaeological coastal remains and sites. 								
After Management	Local	Low	Long term	Low	Probable	Low	+	High

Table 5-8: Significance rating of impact A1 and mitigation measures during operation – Development option 1 & 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Low	Long-term	Low	Possible	Very Low	-	High
Management Measures								
<ul style="list-style-type: none"> If any concentrations of archaeological material are exposed during maintenance or any other activities, all work in that area should cease and it should be reported immediately to the Albany museum so that the required investigations can be undertaken; The NMBM must erect signage that informs the residents and visitors to the Seaview housing project of the archaeological heritage of the area. 								
After Management	Local	Low	Long term	Low	Possible	Very Low	+	High

The no-go option will see no positive or negative impacts on archaeological resources.

5.4 Palaeontological Impacts

SRK consulting appointed Mr John Pether to conduct a Phase 1 Palaeontological Impact Assessment (PIA) to determine whether there are any indications that the proposed site is of paleontological importance. A copy of the report is included in Appendix K3.

This impact assessment refers to the occurrence of sparse, high value vertebrate fossil bone material in the Schelm Hoek Formation and thus applies to both Option 1 and Option 2. The fossil bones are sparse, but those that have been found in the coastal aeolianites are of profound scientific value and of international interest. The vertebrate fossils (bones) that may be destroyed/lost (or found) are likely to be additions to the latest Quaternary fauna of the region.

5.4.1 Potential Impact P1: Damage or destruction of palaeontological resources during construction

Damage or destruction to palaeontological resources on the site may occur due to earthworks and excavations during construction. In consideration of the relatively limited depth of bulk earthworks (cf. quarrying/mining) and that a major fossil find of international significance is not expected, the palaeontological sensitivity is rated as LOW. No preference of development option is indicated.

It is recommended that a practical monitoring and mitigation programme is implemented during the Construction Phases of the proposed housing development. Appendix 3 of the PIA report outlines monitoring by construction personnel and general Fossil Find Procedures for various scenarios. In the event of possible fossil and/or archaeological finds, the contracted archaeologist or palaeontologist must be contacted. For possible fossil finds, the palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established.

With effective mitigation, a very low positive impact may result, as any currently undocumented palaeontological resources could be made available for recording and preservation if required, adding to palaeontological knowledge of the area

Table 5-9: Significance rating of impact P1 and mitigation measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Low	Long term	Low	Possible	Very low	-	High
Management Measures								
<ul style="list-style-type: none"> • Identify and appoint stand-by palaeontologist should paleontological finds be uncovered by earthworks; • Construction personnel to be alert for rare fossil bones and follow “Fossil Finds Procedure”; • Cease construction on (chance) discovery of fossil bones and protect fossils from further damage; • Contact appointed palaeontologist providing information and images; • Palaeontologist will assess information and establish suitable response, such as the importance of the find and recommendations for preservation, collection and record keeping; and • Exposed fossiliferous sections in earthworks recorded and sampled by appointed palaeontologist. 								
After Management	Local	Low	Long term	Low	Possible	Very low	+	High

No impacts are anticipated during operation and the no-go option is not anticipated to result in any impacts.

5.5 Terrestrial ecological impacts

An ecological study was undertaken by SRK Consulting, based on available desktop information, as well as on-site verification (in April 2017). The study aimed to provide updates where required to previous ecological studies that had been undertaken on some of the development sites (study reports attached as Appendix K6), and supplement these with information relating to the

development sites not previously assessed. A forest mapping survey of the proposed development sites was also conducted by CEN as part of this EIA (see Appendix K6 for survey report), with the aim of mapping and categorising the forest on and around the sites, and provide input for further discussions with DAFF regarding development of these sites. The forest survey report also includes descriptions of the vegetation found on each of the proposed development sites for option 1.

5.5.1 Potential Impact E1: Loss of vegetation/habitat destruction

Construction

Indigenous vegetation will need to be cleared in order to prepare the site for installation of services, and construction of houses. While its extent is larger (approximately 66 ha vs 22 ha for option 1), Development option 2 is limited to previously transformed areas and is largely grassland however Development Option 1 entails pockets of development between patches of forest (some of which is pristine) and / or other indigenous vegetation and will therefore result in greater edge effects on vegetation and habitats bordering on these pockets, as well as fragmentation of habitat, both of which will exacerbate the impact on vegetation and habitat. As the loss will be permanent, the duration is rated as long term.

Table 5-10: Significance rating of impact E1 during construction and mitigation measures – Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long-term	Medium	Definite	Medium	-	High
Management Measures								
<ul style="list-style-type: none"> • Keep vegetation clearance to the absolute minimum; keeping the width and length of the earth works to a minimum; • No-Go/ open space areas must be clearly demarcated/ clearly marked (i.e. with danger tape) before any construction activities commence on site and appropriate measures implemented to ensure compliance; • Clearing must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once); • Vehicles and/ or plant and personnel shall only be permitted within the demarcated construction areas, or on existing roads and/ or access tracks between demarcated areas. • No clearing of vegetation, abstraction, storage, disposal or mixing of any substance (e.g. water, cement, petroleum etc.) may take place outside the demarcated construction area without prior approval of the ECO • Ensure that vehicles stick to existing tracks and transformed areas as far as possible; • No fires permitted on site; • Harvesting or removal of any plant material, other than for rescue purposes and for the clearing of vegetation for construction, is strictly prohibited 								
After Management	Local	Low	Long-term	Low	Definite	Low	-	High

Table 5-11: Significance rating of impact E1 during construction and mitigation measures – Development option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Low	Long-term	Low	Definite	Low	-	High
Management Measures								

• As for option 1								
After Management	Local	Low	Long-term	Low	Definite	Low	-	High

Operation

If suitable mitigation measures are not put in place during operation the housing development may encroach on the natural vegetation adjacent to the sites by way of littering, bush clearing, felling and foraging activities. As development option 1 is divided into pockets amongst the forest, edge effects will be more significant for this development option.

Table 5-12: Significance rating of impact E1 during operation and mitigation measures – Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long-term	Medium	Probable	Medium	-	High
Management Measures								
• Monitor the surrounding area for signs of dumping of waste, harvesting of indigenous vegetation, destruction of natural forest, and invasion of additional informal residences, and take action to prevent these activities.								
After Management	Local	Low	Long-term	Low	Probable	Low	-	High

Table 5-13: Significance rating of impact E1 during operation and mitigation measures – Development option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long-term	Medium	Possible	Low	-	High
Management Measures								
• As for option 1								
After Management	Local	Low	Long-term	Low	Possible	Very low	-	High

5.5.2 Potential Impact E2: Disturbance of fauna

Construction

Noise, habitat destruction and habitat fragmentation as a result of construction activities may displace and disturb local fauna, potentially including species of special concern e.g. *Chrysoritis thysbe whitei*. Clearing and disturbance of the soil during construction will also promote the growth and spread of invasive alien vegetation on the site. As development option 1 is adjacent to CBAs and entails greater fragmentation of habitat and edge effects, potential impacts on fauna, including SSC, are anticipated to be higher for this option than for development option 2.

Table 5-14: Significance rating of impact E2 during construction and mitigation measures – Development Option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Short-term	Low	Definite	Low	-	High
Management Measures								
<ul style="list-style-type: none"> Limit all activities to within the construction footprint area, which must be demarcated prior to commencement of clearing; No hunting, poaching or otherwise harming of wildlife on and around the site; Check for animals before clearing of site and clear vegetation in a phased manner in order to allow any fauna to migrate to adjacent areas safely; Ensure that no animals are harmed or trapped during construction activities; No wildlife may be removed from the site or surrounding areas unless approved by the ECO in conjunction with the appropriate permits obtainable from DEDEAT; and Educate workers on site about the protection of all fauna on site. 								
After Management	Local	Low	Short-term	Low	Definite	Low	-	High

Table 5-15: Significance rating of impact E2 during construction and mitigation measures – Development Option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Low	Short-term	Low	Definite	Low	-	High
Management Measures								
<ul style="list-style-type: none"> As for option 1 								
After Management	Local	Low	Short-term	Low	Possible	Very Low	-	High

Operation

During operation, noise and other anthropogenic impacts on the development site(s) will again disturb and displace fauna in the surrounding habitat. Most species will be able to migrate to other areas further from the site, provided suitable habitat is available (which appears to be the case). There is also a risk that fauna may be subjected to illegal hunting or harvesting, and development option 1 especially would cause additional areas to become accessible and therefore vulnerable to such activities. Human – wildlife conflict, most likely to involve monkeys, may also increase with option 1 as a greater extent of overlap with potential monkey habitat is involved. Impacts on connectivity and movement of fauna between forest patches may result as a consequence of the housing development. While it is likely that these impacts are already happening to an extent, development of additional areas (option 1) would make currently more remote areas of the sites more accessible, increasing the intensity and probability of impacts on fauna.

Table 5-16: Significance rating of impact E2 during operation and mitigation measures – Development Option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long-term	Medium	Probable	Medium	-	High
Management Measures								
<ul style="list-style-type: none"> Educate residents about the protection of all fauna on site, and who to contact for safe removal of any fauna from the site if required; Monitor the surroundings for signs of encroachment, and take measures to prevent this 								
After Management	Local	Medium	Long-term	Medium	Possible	low	-	High
No-go	Local	Low	Long-term	Low	Definite	low	-	High

Table 5-17: Significance rating of impact E2 during operation and mitigation measures – Development Option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Low	Long-term	Low	Possible	Very low	-	High
Management Measures								
<ul style="list-style-type: none"> As for option 1 								
After Management	Local	Low	Long-term	Low	Possible	Very low	-	High

5.5.3 Potential Impact E3: Loss of Species of Special Concern (SSC)

Construction

Clearing and disturbance of the soil during construction will result in loss of vegetation, including SSC which have been identified to be present within both development site options. It will also promote the growth and spread of invasive alien vegetation on the site, resulting in additional indirect effects on SSC, which may be out-competed by the faster growing alien invasive vegetation. Permits for destruction or relocation of protected plant species may also be required from DEDEAT. As Option 2 involves a greater area to be cleared, and includes a number of fynbos SSC that may not be suitable for relocation, it is anticipated that the impact on SSC will be greatest for this site. The impact on protected forest trees is assessed separately under impact E4.

Table 5-18 Significance rating of impact E3 during construction and mitigation measures – Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	High	Long-term	High	Possible	Medium	-	Medium
Management Measures								
<ul style="list-style-type: none"> Any protected species which need to be destroyed require the necessary permits, which must be obtained from DEDEAT for those species protected under the relevant legislation; 								

<ul style="list-style-type: none"> • SSC that require removal are to be marked by the ECO/ a botanist and removed (search and rescue) prior to construction; and • SSC are to be sent to the NMBM’s municipal nursery at Settlers Park. 								
After Management	Local	Low	Long-term	Low	Probable	Low	-	Medium

Table 5-19: Significance rating of impact E3 during construction and mitigation measures – Development option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long-term	Medium	Definite	Medium	-	Medium
Management Measures								
<ul style="list-style-type: none"> • As for option 1 								
After Management	Local	Low	Long-term	Low	Definite	Low	-	Medium

Operation

If suitable mitigation measures are not put in place during operation the development may further destroy vegetation, including SSC adjacent to the sites by way of littering, dumping, bush clearing, felling and foraging activities.

Table 5-20: Significance rating of impact E3 during operation and mitigation measures – Development option 1 & 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long-term	Medium	Possible	Low	-	Medium
Management Measures								
<ul style="list-style-type: none"> • Educate residents about the need to protect the natural vegetation; • Provide adequate waste collection facilities 								
After Management	Local	Medium	Long-term	Medium	Improbable	Low	-	Medium

5.5.4 Potential Impact E4: Destruction of forest

A forest mapping survey was undertaken by specialists CEN during August 2016, the full report for which is included as Appendix K6. The survey mapped various categories of forest, based on the presence of other vegetation types (e.g. thicket), and level of invasion by alien invasive vegetation. The study focussed on the areas on and around the sites proposed for development (only those sites for development option 1 were mapped as the site for development option 2 does not contain forest), based on recent aerial imagery and ground-truthing.

Construction

Preliminary development layouts (Appendix H1) have as far as possible accommodated the forested areas so that development is proposed within existing transformed areas and the destruction of forest is thereby reduced. It does however overlap with some of the areas mapped as forest, forest/thicket mosaic and forest succession/ forest remnants (see Figure 3-5), and therefore

potentially protected in terms of the National Forest Act. This presents a major constraint to development option 1, as it may not be possible to meet the housing requirement if these areas are excluded from the layout. The ultimate decision with regard to whether all of these areas are deemed to be protected forest, and in what instances clearing of these areas may be permitted, remains with DAFF. In instances where unavoidable destruction of forest or trees is required permit applications in this regard will be submitted to DAFF. This impact (based on the currently presented layout) has been rated as of high significance for option 1, due to the potential legal constraints in terms of the NFA and DAFF permitting system, as opposed to from a purely ecological perspective.

As no impacts on forest are anticipated for development option 2, no rating is provided for this option.

Table 5-21: Significance rating of impact E4 and mitigation measures – Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	High	Long term	High	Probable	High	-	Medium
Management Measures								
<ul style="list-style-type: none"> • Damage or destruction of any protected forest or trees must be avoided (through modifications to the proposed layout where required), and where this is not possible, the necessary destruction permits must be obtained in advance from DAFF; • Protected forest clumps to be conserved (as per the site layout approved by DAFF) must be demarcated prior to site clearing and all personnel on site must be educated on the importance of the protection of forest on site. Note that damage or destruction to these areas may incur penalties from DAFF. 								
After Management	Local	High	Long term	High	Possible	Medium	-	Medium

Operation

If suitable mitigation measures are not put in place during operation the development may encroach on the surrounding forest through bush clearing, dumping of rubble, collection of firewood, and foraging activities. Development of housing in the patches surrounded by forest will open up additional areas (which are currently relatively inaccessible) to these “edge effects” resulting from increased human activity in the area. It is noted however that the beneficiary communities are already living amongst the forest on erf 590 and 238 / 240, and that the surrounding forest is to an extent already being impacted on in this manner (the no-go option would therefore see continuation of this existing impact). Provision of formal services, notably electricity supply, is anticipated to decrease the need for firewood for lighting and cooking.

Development option 2 is anticipated to result in a positive impact on the forested areas surrounding and currently occupied by the informal settlements of New Rest and Zweledinga, as it would entail relocation of residents from these areas and rehabilitation of the sites. The significance of the impact would strongly be influenced by how these sites are managed to facilitate forest rehabilitation and prevent re-occupation, dumping of rubble, and invasion by alien invasive vegetation.

Table 5-22: Significance rating of impact E4 and mitigation measures – Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long-term	Medium	Probable	Medium	-	Medium
Management Measures								

<ul style="list-style-type: none"> • Educate community members on the importance of forest and its protection status; • Monitor areas surrounding the development for signs of encroachment, dumping and wood cutting, and prevent these activities; and • Regular municipal waste collection. 								
After Management	Local	Medium	Long term	Medium	Possible	Low	-	Medium
No-go	Local	Medium	Long-term	Medium	Definite	Medium	-	High

Table 5-23: Significance rating of impact E4 and mitigation measures – Development option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long-term	Medium	Possible	Low	+	Medium
Management Measures								
<ul style="list-style-type: none"> • Rehabilitation of forest in previously inhabited areas (Zweledinga and New Rest), including: <ul style="list-style-type: none"> ○ Management of alien invasive vegetation ○ Monitor and prevent dumping and re-establishment of informal housing in these areas 								
After Management	Local	Medium	Long term	Medium	Probable	Medium	+	Medium

5.5.5 Potential Impact E5: Impacts on conservation targets and CBAs

Clearing of vegetation for construction of the proposed development will result in loss of habitat which may be of conservation concern, potentially impacting on the NMBM's performance in terms of conservation targets for the particular vegetation types involved. As most of the areas proposed for development have already been transformed, the impact on the NMBM's conservation targets will be insignificant.

A small CBA, containing SSC, on erf 240 and the associated buffer overlaps with and occurs between two pockets proposed for development. Given the likely edge effects associated with a residential development, it is unlikely that this CBA will maintain meaningful ecological integrity should option 1 be developed. Development option 2 is not anticipated to result in significant impacts on CBAs.

Table 5-24: Significance rating of impact E5 and mitigation measures during construction – Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	High	Long-term	High	Definite	High	-	High
Management Measures								
<ul style="list-style-type: none"> • Keep vegetation clearance to the absolute minimum; keeping the width and length of the earth works to a minimum; • No-Go/ open space areas must be clearly demarcated/ clearly marked (i.e. with danger tape) before any construction activities commence on site and appropriate measures implemented to ensure compliance; • Clearing must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once); • Vehicles and/ or plant and personnel shall only be permitted within the demarcated construction areas, or 								

<p>on existing roads and/ or access tracks between demarcated areas.</p> <ul style="list-style-type: none"> No clearing of vegetation, abstraction, storage, disposal or mixing of any substance (e.g. water, cement, petroleum etc.) may take place outside the demarcated construction area without prior approval of the ECO No fires permitted on site; A search and rescue operation should be undertaken prior to vegetation clearing to remove and relocate SSC from the site. 								
After Management	Local	Medium	Long term	Medium	Definite	Medium	-	Medium

Table 5-25: Significance rating of impact E5 and mitigation measures during operation – Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long-term	Medium	Definite	Medium	-	High
Management Measures								
<ul style="list-style-type: none"> Fencing to prevent access from the adjacent development areas to CBAs; Educate community members on the importance of conservation of CBAs; Monitor areas bordering on CBAs for signs of encroachment, hunting, dumping and wood cutting, and prevent these activities; and Regular municipal waste collection. 								
After Management	Local	Low	Long term	Low	Probable	Low	-	Medium

5.6 Socio-economic impacts

A specialist study was undertaken by Urban-econ to assess the socio-economic impacts of the proposed development. A copy of the report is provided in Appendix K1.

During the construction phase, the proposed development will have both positive and negative effects on the socio-economic environment. The project is anticipated to make a contribution towards the national and local economy. Employment positions will be generated by the project in the national economy through multiplier effects. The housing development will also increase household earnings for those individuals working on the project. The increase in household earnings is also likely to improve the standards of living of the affected households albeit temporarily.

The proposed housing development will also potentially result in negative direct, secondary and cumulative impacts on the local community, specifically areas surrounding the sites where the proposed development is to be built. The main factors that will cause this negative impact are (1) the influx of workers and (2) visual/noise disturbances that would be created by the construction activities that could adversely impact property prices.

The operation of the proposed housing development will generate new business sales and create several sustainable Full Time Equivalent (FTE) employment positions due to ongoing maintenance costs. These new business sales and employment opportunities will likely be created in the local economy, which will positively influence local government revenue and the standard of living of the affected households. There will also likely be the expansion of the property market.

Aside from the stimulation of the local and national economy, the project could lead to some negative perceived changes to the sense of place. This is related to the potential changes to the

aesthetics and visual resources of the area which could negatively influence the market values of properties within a defined radius of the proposed development.

Overall, due to its increased size and value, development option 2 is anticipated to have greater economic benefits at the national and local level than development option 1. The differences between the development options in most cases however (except where indicated via separate rating tables) do not affect the impact significance ratings. A summary of the gains and losses predicted to result from the development options assessed is provided in Table 5-26.

Table 5-26: Summary of socio-economic gains and losses for the proposed housing development (Urban-econ, 2017)

Impact	Total gains	Total Losses	Net effect
Construction (once off)			
Production			
Option 1	R 92.89 million	None	Positive
Option 2 (Leach Pit)	R 195.34 million	None	Positive
Option 2 (Waterborne)	R 263.20 million	None	Positive
Employment			
Option 1	200	None	Positive
Option 2 (Leach Pit)	385	None	Positive
Option 2 (Waterborne)	466	None	Positive
Household income			
Option 1	R 11 million	None	Positive
Option 2 (Leach Pit)	R 24 million	None	Positive
Option 2 (Waterborne)	R 32 million	None	Positive
Government Revenue	Increases through property rates (additional residential property) and taxes, VAT and taxes from salaries.	Potential decrease in property rates and taxes if surrounding suburbs affected by development.	Positive
Sense of place	None	Noise, increased traffic from construction vehicles and changes to the landscape	Negative
Social conflicts	None	Slight increase	Negative
Operation			
Production			
Option 1	R 430 000	None	Positive
Option 2 (Leach Pit)	R 530 000	None	Positive
Option 2 (Waterborne)	R 850 000	None	Positive
Employment			
Option 1	3	None	Positive
Option 2 (Leach Pit)	5	None	Positive
Option 2 (Waterborne)	6	None	Positive

Household income			
Option 1	R 140 000	None	Positive
Option 2 (Leach Pit)	R 180 000	None	Positive
Option 2 (Waterborne)	R 290 000	None	Positive
Health and Safety	Increased access to sanitation, water, garbage collection and safe housing.	None	Positive
Impacts on the local property market	Expansion of the formal property market by between R 41 million – R 95 million.	Reduction in the value of existing cumulative property sales by between R 589 200 and R 1.6 million	Positive
Government Revenue	Increased investment and rise in property values (and taxes) due to additional properties	Loss in property taxes through potential reduced residential values	Positive
Influx of people searching for housing	None	Potential increase in people in search of housing recreating informal housing	Negative

Assessment of the net effect of the proposed development from a socio-economic perspective, indicates that the project would generate greater socio-economic benefits during both the construction and operational phases than the potential losses that could occur as a result of its establishment. Stimulation of production, employment, government revenue and household income as a result of the investment in the project and its subsequent operations are predicted to outweigh possible property value reductions as a result of changes in the areas aesthetic and visual resources.

The positive effects generated by the project will not entirely offset many of the negative impacts. These include impacts on the sense of place and property values that could occur during both construction and operation and crime and social conflicts in the area that could be created during only the construction phase. These impacts will manifest either temporarily or over the long term. These impacts are however not predicted to be highly significant and can be traded off for the net positive impact created by the project in terms of production, employment, government revenue, development benefits and households' earnings. This means that when compared with the no-go option, the proposed housing development is associated with greater socio-economic benefits.

5.6.1 Potential Impacts S1: Temporary stimulation of the national and local economy during construction

The proposed housing development will cost R 34 million (development option 1), R 72 million (development option 2 with leach pit sanitation) or R 98 million (development option 2 with water borne sanitation) (2017 prices) to establish depending on option selection. This expenditure on the project will stimulate the local and national economies albeit for a temporary period of up two years (Option dependant).

The greatest effects on production and Gross Domestic Product per region (GDP-R) stimulated during construction activities will be created through the multiplier effects, specifically through a combination of production and consumption induced effects. The former refers to the impact generated along backwards linkages when the project creates demand for goods and services

required for construction and subsequently stimulates the business sales of the suppliers of inputs that are required to produce these goods and services. The latter refers to the effects of household spending which is derived from an increase in salaries and wages directly and indirectly stimulated by the project's expenditure. Although the magnitude of the benefits will be dependent on capital expenditure (i.e. greatest for development option 2 with water-borne sanitation), the overall impact significance rating remains the same for all development options, as indicated below.

Table 5-27: Significance rating of impact S1 and management measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	National	High	Short term	High	Definite	High	+	High
Management Measures								
<ul style="list-style-type: none"> The developer should encourage the contractor to increase the local procurement practices and promote the employment of people from local communities, as far as feasible, to maximise the benefits to the local economies; and The developer should engage with local business organisations to investigate the possibility of procuring construction materials, goods and products from local suppliers where feasible. 								
After Management	National	High	Short term	High	Definite	High	+	High

5.6.2 Potential Impacts S2: Temporary increase in employment in the national and local economies during construction

The proposed development is anticipated to create approximately 88 (development Option 1) or 150 (development Option 2) direct Full Time Equivalent (FTE) employment positions over the course of the development. Given the size of the construction sector within the municipality it is anticipated that there will be sufficient local labour to satisfy the demand for between 88 and 150 construction workers.

Beyond the direct employment opportunities that will be created by the project during the construction phase the development will also have a positive spin-off effect on the employment situation in other sectors of the national and local economies. Through the procurement of local goods (i.e. consumption induced effects) the project will support additional FTE employment, to the tune of approximately 112 (development Option 1), 235 (development Option 2 with leach pit sanitation), 316 (development Option 2 with waterborne sanitation). Based on these figures the total contribution of the proposed housing development towards employment creation in South Africa is estimated at 200 (Option 1), 385 (Option 2), 466 (Option 2 Waterborne) FTE employment positions. The impact significance rating provided below is applicable to all development options.

Table 5-28: Significance rating of impact S2 and management measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	National	Medium	Short term	Medium	Definite	High	+	High
Management Measures								
<ul style="list-style-type: none"> Recruit local labour as far as feasible; Employment labour-intensive methods in construction where feasible; Sub-contract to local construction companies particularly SMMEs and BBBEE compliant enterprises 								

where possible; and <ul style="list-style-type: none"> Use local suppliers where feasible and arrange with the local SMMEs to provide transport and other services to the construction crews. 								
After Management	National	High	Short term	High	Definite	High	+	High

5.6.3 Potential Impacts S3: Temporary increase in household earnings during construction

The proposed development will create a total of 200 (Option 1), 385 (Option 2), 466 (Option 2 Waterborne) direct, indirect and induced FTE employment positions during construction, generating R 11 million (development Option 1), R 24 million (development Option 2 with leach pit sanitation) and R 32 million (development Option 2 with waterborne sanitation) of revenue for the affected households in the country through direct, indirect and induced effects depending on the development option. Of this figure it is estimated that between R 3.6 million (Option 1), R 7.6 million (Option 2) and R 10.3 million (Option 2 Waterborne) will be paid out in the form of salaries and wages to those individuals directly employed during the construction phase. The remaining values of between R 7.7 million (Option 1), R 16 million (Option 2) R 21.7 million (Option 2 Waterborne) in households’ earnings will be generated through indirect and induced effects resulting from project expenditure.

Although temporary, this increase in household earnings will have a positive effect on the standard of living within these households and will be similar for both development option 1 and 2.

Table 5-29: Significance rating of impact S3 and management measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	National	Medium	Short term	Medium	Probable	Medium	+	High
Management Measures								
<ul style="list-style-type: none"> Recruit local labour as far as feasible to increase the benefits to the local households; Employ labour intensive methods in construction where feasible; Sub-contract to local construction companies where possible; and Use local suppliers where feasible and arrange with local SMMEs and BBBEE compliant enterprises to provide transport, catering and other services to the construction crews. 								
After Management	National	Medium	Short term	Medium	Probable	Medium	+	High

5.6.4 Potential Impacts S4: Temporary increase in government revenue during construction

The construction of the proposed housing development will generate revenue for the government during the construction period through a combination of personal income tax, VAT, companies tax etc. Additional government revenue will also be earned through corporate income tax. Government earnings will be distributed by national government to cover public spending which includes amongst others the provision and maintenance of transport infrastructure, health and education services as well as other public goods. No management measures are proposed.

Table 5-30: Significance rating of impact S4

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	National	Low	Short term	Low	Definite	Low	+	High

5.6.5 Potential Impacts S5: Negative changes to the sense of place

A community’s sense of place is developed over time as it embraces the surrounding environment, becomes familiar with its physical properties and creates its own history (Lynch, 1981). The sense of place is created through the interaction of a number of different factors such as the areas visual resources, its aesthetics, climate, culture and heritage as well as the lifestyle of individuals that live in and visit the area (Steele, 1981). Most importantly, it is a highly subjective matter and dependent on the demographics of the population that resides in the area and their perceptions regarding trade-offs.

During the construction of the proposed housing development there are likely to be noise impacts caused by the movement of vehicles as well as construction activities on site. These impacts are anticipated to occur primarily during the day with some limited illumination from the site being experienced during the night. The presence of this noise is likely to alter the way the surrounding environment is experienced by households in the area. As construction activities progress and the footprint of the development grows, the visual impact will also become more apparent and the sense of place experienced by households residing within the visually affected area will be altered further.

It is anticipated that households residing on properties within +/- 500 m from the construction of the housing development will experience the greatest disruption in their sense of place during the construction period. The sense of place at the properties located beyond the immediate site of the proposed housing development will likely be unaffected.

The two development options will affect the sense of place in different ways. Option 1 is likely to have a slight impact to the sense of place in Seaview during construction as it is located near the northern areas of Seaview. There will likely be a larger impact on the Reinett Road and Van Renen Road as the areas of development are close to these roads. There will also be a slight impact on Clarendon Marine because of proximity to the site.

Option 2 is likely to have a larger impact on Clarendon Marine than Seaview. Farm 1/28 is directly opposite Clarendon marine where there are currently very few residential developments.

Table 5-31: Significance rating of impact S5 and mitigation measures – Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Short term	Very low	Probable	Very low	-	High
Management Measures								
<ul style="list-style-type: none"> • Natural areas that are not affected by the footprint should remain as such. Efforts should also be made to avoid disturbing such sites during construction; • Construction activities should be kept to normal working hours according to the Noise Control Regulations in terms of the Environmental Conservation Act (Act 73 of 1989); • Activities that may disrupt neighbours must be preceded by notice being given to the affected neighbours at least 24 hours in advance; and • Equipment that is fitted with noise reduction facilities must be used as per operating instructions and maintained properly during site operations. 								

After Management	Local	Low	Short term	Very low	Possible	Insignificant	-	High
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Table 5-32: Significance rating of impact S5 and mitigation measures – Development option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	High	Short term	Low	Probable	Low	-	High
Management Measures								
<ul style="list-style-type: none"> Same as for option 1 								
After Management	Local	Medium	Short term	Very low	Probable	Very low	-	High

5.6.6 Potential Impacts S6: Temporary increase in social conflicts associated with the influx of people during construction

Despite the Nelson Mandela Bay Municipality being sufficiently diversified to supply the required workforce for the construction of the proposed development, it is unlikely that this workforce will be completely drawn from the surrounding area. Some workers involved in the construction of the proposed development will likely be traveling to the site on a daily basis.

The influx of construction workers and job seekers into the area could result in social conflicts between the local population, existing construction workers currently operating in the area and this new workforce. Likewise, the influx of job seekers could potentially lead to a temporary increase in the level of crime, illicit activity, waste and possibly a deterioration of the health of the local community through the spread of infectious diseases.

Table 5-33: Significance rating of impact S6 and mitigation measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Low	Short term	Very low	Probable	Very Low	-	High
Management Measures								
<ul style="list-style-type: none"> Establish a management forum comprising key stakeholders to monitor and identify potential problems that may arise due to the influx of workers to the area; Assign a dedicated person to deal with complaints and concerns of affected parties; Litter collection bins should be provided and appropriately placed within the contractor's site camp and on site, and should be regularly cleared; and Ensure the list used to allocate housing is followed so that no additional informal housing is built during construction of the low-cost housing. 								
After Management	Local	Low	Short term	Very low	Improbable	Insignificant	-	High

5.6.7 Potential Impacts S7: Sustainable increase in production and GDP nationally and locally during operation

The total impact on production in the country as a result of the housing developments operations (largely from labour for maintenance of the development and the associated infrastructure) will

equate to between R 430 000 (Option 1), R 530 000 (Option 2) and R 850 000 (Option 2 Waterborne) in 2017 prices per annum. Industries that will experience the greatest stimulus from the project will include real estate and business services, manufacturing, transport and storage and trade and accommodation.

Due to the annual spending on labour and procurement of local goods and services required in the maintenance of the proposed housing development, almost all of these new business sales will be generated on an annual basis in the Nelson Mandela Bay Municipality through the multiplier effects. Only a very small proportion of the annual production resulting from the development operations will be accounted for in other parts of the country.

It is estimated that the project will directly generate a total impact (through direct, indirect and induced effects) on the national GDP-R of R 220 000 (Option 1), R 280 000 (Option 2) and R 450 000 (Option 2 Waterborne) per annum in 2017 prices. This impact is likely to have the similar extents, durations, magnitudes and significance for development options 1 and 2.

Table 5-34: Significance rating of impact S7 and management measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	National	Low	Long term	High	Definite	High	+	High
Management Measures								
<ul style="list-style-type: none"> The operator responsible for the maintenance of the housing development should as far as possible, procure materials, goods and products required for the operation of the facility from local suppliers. 								
After Management	National	Medium	Long term	Very high	Definite	Very High	+	High

5.6.8 Potential Impacts S8: Creation of sustainable employment positions nationally and locally during operation

The ongoing maintenance and monitoring of the associated infrastructure will create two (Option 1), four (Option 2) and five (Option 2 Waterborne) permanent employment positions all of which will be retained for the lifespan of the development. Aside from the direct employment opportunities, the development will support one FTE employment position (no matter the option selected) created through the production and consumption induced effects. Due to the spatial allocation of procurement spending and direct employment created, most of the indirect positions will also be created within the local area.

Table 5-35: Significance rating of impact S8 and management measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Low	Long term	Low	Definite	Low	+	High
Management Measures								
<ul style="list-style-type: none"> Where possible, local labour should be considered for employment so as to increase the positive impact on the local economy; and As far as possible, local small and medium enterprises should be approached to investigate the opportunities to supply maintenance services. 								

After Management	Long	Medium	Long term	Medium	Definite	Medium	+	High
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5.6.9 Potential Impacts S9: Improved standards of living for households benefiting from employment during operation

The creation of the FTE employment positions throughout the country will generate R 140 000 (Option 1), R 180 000 (Option 2) and R 290 000 (Option 2 Waterborne) of additional personal income (2017 prices), which will be sustained for the entire duration of the development's lifespan. The sustainable income generated as a result of the project's operation will positively affect the standard of living of all benefitting households, and will be similar for all development options.

Table 5-36: Significance rating of impact S9 and management measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Low	Long term	Low	Probable	Low	+	High
Management Measures								
<ul style="list-style-type: none"> Where possible, local labour should be considered for employment so as to increase the positive impact on the local economy; and As far as possible, local small and medium enterprises should be approached to investigate the opportunities to supply maintenance services. 								
After Management	Local	Medium	Long term	Medium	Probable	Medium	+	High

5.6.10 Potential Impacts S10: Sustainable increase in national and local government revenue during operation

The proposed development will, through salaries and wages payments, contribute towards both local and national government revenue. This will occur at a national level with the revenue derived from the payment of salaries and wages to permanent employees involved with the maintenance of the housing development and associated infrastructure will contribute to the national fiscus. Although it is impossible to trace exactly how such revenue is allocated, any additional revenue generated means that national governments can increase its spending on public goods and services. There is also a potential increase in the rates and taxes that the municipality will be receiving once they provide services to the New Rest and Zweledinga communities. The impact is likely to be similar for development options 1 and 2.

Table 5-37: Significance rating of impact S10 and management measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	National	Low	Long term	High	Probable	High	+	High
Management Measures								
<ul style="list-style-type: none"> Municipality to ensure services are delivered and maintained in order to maintain the collection of property tax. 								

After Management	National	Low	Long term	High	Probable	High	+	High
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5.6.11 Potential Impacts S11: Improvement in Health and Safety for housing beneficiaries during operation

The proposed development will likely decrease the dangers that are currently associated with informal settlements such as flood risks, fire risks, health risks, crime risks, and poor service delivery. The negative effects the residents are currently facing would likely be addressed with this development. The formalisation of the informal settlements would decrease health and safety concerns in the area as there are currently no sanitation, water or energy provisions to the informal settlements. The suitability of the informal settlements in terms of access for emergency services is unknown and is thus another cause for health and safety concerns. The impact is anticipated to be similar for both development options, and is assigned a medium negative significance for the no-go option / status quo.

Table 5-38: Significance rating of impact S11 and management measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long term	Medium	Probable	Medium	+	High
Management Measures								
<ul style="list-style-type: none"> • Effective enforcement of municipal by-laws to manage any unlawful construction of new informal housing in the area; • Sound construction of leach pits to avoid leakages and spillages (If this option is chosen); • Provision of timely garbage collection services to avoid disease and pollution risk; and • Effective staffing of the Seaview Police Station to address any crime in the area. 								
After Management	Local	High	Long term	High	Probable	High	+	High
No-go	Local	Medium	Long term	Medium	Definite	Medium	-	High

5.6.12 Potential Impacts S12: Positive impacts on the sense of place during operation – removal of informal settlements

Based on the literature reviewed, as well as interviews with local property agents operating in the areas, there are likely to be positive impacts on the surrounding area as a result of improving the poor conditions of the informal settlements and formalising the housing in the area. This will likely be felt in the area directly adjacent to the informal settlement such as Clarendon Marine and the north-western areas of Seaview. Based on the literature formalising the informal settlements/ poor quality housing might increase the confidence in the area for future potential buyers as a positive development in the area.

The impact would vary depending on the development option. Option 1 suggests improvement of existing areas of Zweledinga and New Rest and proposes a replacement of the informal settlements with new housing, increasing the value of surrounding properties because of a positive change to the sense of place. Option 2 suggests a complete removal of the informal settlement area and a relocation to Farm 1/28. The potential positive impacts derived from this option include the removal

of the informal settlements and rehabilitation of the vegetation. This will likely improve the sense of place for properties in close proximity to the informal areas.

Table 5-39: Significance rating of impact S12 and management measures – development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Low	Long term	Low	Probable	Low	+	Medium
Management Measures								
<ul style="list-style-type: none"> Meet with the affected owners and discuss their concerns over property and land values, as well as educate and inform them on the potential impacts that could ensue from replacing informal settlements and the positives of such an endeavour; Educate the local residents as to the goals of the municipality in reducing informal housing in the region; and Ensure that regular inspections occur to eliminate any reintroduction of informal housing to the area with strict enforcement of by-laws. 								
After Management	Local	Medium	Long term	Medium	Probable	Medium	+	Medium

Table 5-40: Significance rating of impact S12 and management measures – development option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long term	Medium	Probable	Medium	+	Medium
Management Measures								
<ul style="list-style-type: none"> As for Option 1 								
After Management	Local	High	Long term	High	Probable	High	+	Medium

5.6.13 Potential Impacts S13: Additional value in the local property market from new housing units during operation

The introduction of low-cost housing to the area will expand the formal property market increasing the supply base of residential properties in the property market pool. Whereas previously, households residing in informal settlements could not impart formal value on their property, all households will now obtain title deeds and therefore own their own property and participate in the formal property market.

It is thus assumed that the development of low income housing in Ward 40 will likely expand the local formal property market by between R 41 million (option 1) and R 95 million (option 2) – based on the assumption that the conservative market value of one RDP property is R 100 000. This development will expand the available supply of low-cost housing significantly for both development options.

Table 5-41: Significance rating of impact S13 and management measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long term	Medium	Probable	Medium	+	Medium
Management Measures								
<ul style="list-style-type: none"> NMBM to ensure services are delivered and maintained and that public spaces are kept clean. 								
After Management	Local	High	Long term	High	Probable	High	+	Medium

5.6.14 Potential Impacts S14: Negative impacts on sense of place during operation – housing in areas where none currently exists

The literature indicates that due to the concern for a change in sense of place some residential properties can experience a perceived negative impact from the perspective of those in properties surrounding the social housing development.

Both options entail the development of low-cost housing on areas where housing is not currently present. It is important to note however, that this land is already transformed through human activity and the environment is not considered “pristine”. This is likely to impact negatively on some property owners’ sense of place in the surrounding areas of Clarendon Marine and Seaview.

Certain visual impacts will remain for the entire operation of the development. This means that although the effect on the sense of place could be relatively small considering the population to be affected, the duration of the impact increases more significant especially for Option 2 which is directly across from Clarendon Marine in an area without extensive housing developments. The total number of properties likely to observe a change in sense of place for option 1 is 25 (within 200 m radius of the housing development). This accounts for 6% of the properties in Seaview and 2% of the properties in Clarendon Marine. Development option 2 consolidates the informal housing into one area and thus is unlikely to impact the suburb of Seaview in any meaningful way. There is however, a possibility of a reduction in the sense of place in the suburb of Clarendon Marine (affecting properties within 200 m radius of the housing development amounting to 46% of those in Clarendon Marine).

Negative changes in sense of space could potentially lead to a reduction in the market value of residential housing in the surrounding area (for additional detail on this please refer to the Socio-economic impact assessment report in Appendix K1).

Table 5-42: Significance rating of impact S14 and mitigation measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long term	Medium	Probable	Medium	-	Medium
Management Measures								
<ul style="list-style-type: none"> As far as possible, contractors should be encouraged to remove as little vegetation as possible during construction; and Ensure that regular inspections occur to eliminate any reintroduction of informal housing to the area with strict enforcement of by-laws. 								

After Management	Local	Low	Medium term	Very low	Probable	Very low	-	Medium
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5.6.15 Potential Impacts S15: Influx of people seeking an opportunity to obtain housing

The development of social housing may increase the number of people coming into the area seeking a home. This however, will not be a high probability occurrence as the main driver of migration to new areas is economic opportunities. The lack of commerce and industry in the area indicates the area does not have strong pulling forces for employment seeking labourers. Key to managing this impact will be rehabilitation and monitoring of the currently occupied areas should development option 2 be pursued, to avoid development of additional informal housing in these areas once the current residents have been relocated.

There is a sentiment among home owners that crime generally increases once social or low-cost housing is developed, however there is no evidence available to support this. It could in fact rather be seen as a tool of economic development, that can often help to lower an area's crime rate (Goetz, *et.al.*, 1996). This impact is unlikely to significantly change based on either development option 1 or 2.

Table 5-43: Significance rating of impact S15 and mitigation measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Low	Medium term	Very Low	Probable	Very low	-	High
Management Measures								
<ul style="list-style-type: none"> • Ensure the list used to allocate housing is followed so that no additional informal housing is built after construction of the low-cost housing; • Effective enforcement of municipal by-laws to manage any unlawful construction of new informal housing in the area; • Rehabilitation and monitoring of currently inhabited areas should development option 2 be pursued, to avoid re-occupation of these areas; and • Effective staffing of the Seaview Police Station to address any crime in the area. 								
After Management	Local	Low	Low	Very Low	Possible	Insignificant	-	High

5.7 Traffic

A Traffic Impact Assessment (TIA) was conducted by Engineering Advice and Services to assess the impacts on traffic flow and safety and provide recommendations to decrease negative impacts. Traffic counts and assessment of the current condition of the relevant access roads for both development options were undertaken, as well as modelling of predicted increases in traffic. The specialist also made recommendations regarding management measures to improve road safety to accommodate the additional pedestrian and vehicular traffic.

The study found that the affected intersections operate at acceptable Levels of Service (LOS) in terms of capacity under existing background traffic conditions (2017), and that the additional traffic generated from either development option would have minimal impact on operational capacity at the affected intersections up to 2022. Recommendations are however provided regarding configurations for affected intersections, as well as pedestrian sidewalks between the development areas and

Seaview village, to ensure safety is not compromised. For further details on this please refer to the traffic impact assessment report in Appendix K2.

Overall, the specialist indicated a preference for development option 2 from a traffic perspective, as although this option entails a greater number of houses, it is limited to a single site, which would be preferable from a traffic flow and safety perspective given that vehicular and pedestrian activity is restricted to one formalised location. The no-go option is not anticipated to result in any impacts apart from continuation of the current negative safety impacts due to the lack of pedestrian facilities along Seaview road to accommodate pedestrians from the informal settlements. In view of the findings of this study, it is recommended that:

- Should option 2 be implemented:
 - The access to the proposed development at Jill Street be configured as indicated in the TIA report with the cost of the upgraded junction being met by the Municipality;
 - Pedestrian facilities be provided between Jill Street and Seaview Village as indicated in the TIA report with the cost of the facilities being met by the Municipality
- Should option 1 be implemented:
 - Access to the components of development Option 1 must be formalised and suitable advanced warning measures provided, vehicle speeds are controlled at 60km/h and sight distance improved on the approaches to the north and south entrances to New Rest as indicated in the TIA report;
 - Suitable formal public transport and pedestrian facilities must be provided at the entrances to erf 590 and 240 as indicated in the TIA report;
 - Suitable pedestrian facilities must be provided along Aliwal Road;
 - A pedestrian sidewalk be provided along Seaview Road between erf 240 and Seaview;
 - Vehicular and pedestrian access to the proposed Waste Transfer Station on erf 240 must be gained from the internal roads (and not from Seaview road).
- Suitable measures to accommodate construction traffic and protect road users (both vehicular and pedestrian) must be taken during implementation.

5.7.1 Potential impact T1: Increased Traffic on existing roads during construction

The increase in construction related traffic on the access roads around the proposed development areas will lead to a temporary increase in traffic congestion. Traffic counts conducted as part of the assessment however revealed that the existing roads are able to accommodate the predicted increases.

Table 5-44: Significance rating of impact T1 and mitigation measures -Development options 1 and 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Short term	Very low	Definite	Very low	-	High
Management Measures								
<ul style="list-style-type: none"> • Create awareness of presence of construction traffic; • Restrict construction vehicle operations to low-volume periods; and • Combine delivery of resources to minimise trips. 								
After Management	Local	Medium	Short term	Very Low	Definite	Very low	-	High

5.7.2 Potential impact T2: Deterioration of Road Condition during construction

The increase in construction related traffic on the access roads around the proposed development areas will lead to increased wear and tear on the roads, and a resultant deterioration in their condition if adequate maintenance and repairs are not effected.

Table 5-45: Significance rating of impact T2 and mitigation measures - Development options 1 and 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Short term	Very low	Definite	Very low	-	High
Management Measures								
<ul style="list-style-type: none"> Record condition before commencement; Repair immediately; Monitor during construction and if required; and Effect repairs after construction. 								
After Management	Local	Medium	Short term	Very low	Definite	Very Low	-	High

5.7.3 Potential impact T3: Increased traffic safety risks due to conflict with general traffic during construction

The increase in construction related traffic on the access roads around the proposed development areas will lead to a potential increase in traffic safety risks, especially during peak travel times, especially for development option 1 where access to numerous development sites will be required. For Option 2 this impact mainly pertains to the Jill Street intersection.

Table 5-46: Significance rating of impact T3 and mitigation measures -Development options 1 and 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Short term	Very Low	Definite (option 1) Probable (Option 2)	Very low	-	High
Management Measures								
<ul style="list-style-type: none"> Create awareness of presence of construction traffic; Restrict construction vehicle operations to low-volume period; and Combine delivery of resources to minimise trips. 								
After Management	Local	Medium	Short term	Very low	Definite (option 1) Probable (Option 2)	Very Low	-	High

5.7.4 Potential impact T4: Increase in Traffic volumes on existing roads during operation

Traffic volume for development Option 1 will increase by:

- 20 Additional peak hour vehicle trips will make use of Van Renen, Aliwal and Albany Roads;

- 81 Additional peak hour vehicle trips will make use of Seaview Road

Additional vehicle trips will make use of Seaview Road and impact on the Jill Street intersection and additional pedestrian activity will occur at the Seaview Road / Jill Street intersection for Development option 2. Upgrading of the relevant roads for option 1 may result in an improvement on current traffic flows on those roads.

Table 5-47: Significance rating of impact T4 and mitigation measures - Development options 1 and 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	High
Management Measures								
<ul style="list-style-type: none"> • Upgrade Van Renen, Aliwal and Albany Roads if necessary to accommodate additional volumes – Option 1 • Upgrade Jill Street intersection to accommodate additional volumes – Option 2 								
After Management	Local	Low	Long term	Low	Definite	Low (+ve option 1; -ve option 2)	+ /-	High

5.7.5 Potential impact T5: Increased pedestrian volumes on existing roads during operation

The proposed development will result in an increase in pedestrian traffic to and from the development sites, especially in the case of development option 1, where residents will walk along Van Renen, Aliwal and Albany Roads between the development sites.

Table 5-48: Significance rating of impact T5 and mitigation measures - Development options 1 and 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	High
Management Measures								
<ul style="list-style-type: none"> • Repositioning of access road to Farm 10/28 to the west (optional) – Option 1 • Provision of pedestrian facilities – Option 2 								
After Management	Local	Low	Long term	Low	Definite	Low	-	High

5.7.6 Potential impact T6: Increased pedestrian and traffic volumes on existing roads leading to potential pedestrian safety concerns during operation

Increased pedestrian and vehicular traffic due to the development could result in possible collisions and safety concerns. It is however recognised that the primary housing beneficiaries are already resident in the area, and currently do not have access to sidewalks, so the proposed mitigation measures may result in an improvement of the current situation in this regard.

Table 5-49: Significance rating of impact T6 and mitigation measures -Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long term	Medium	Probable	Medium	-	High
Management Measures								
<ul style="list-style-type: none"> Provision of Sidewalk along affected roads 								
After Management	Local	Medium	Long term	Medium	Probable	Medium	+	High

Table 5-50: Significance rating of impact T6 and mitigation measures -Development option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	High
Management Measures								
<ul style="list-style-type: none"> Provision of formal embayments and turn-around facilities at entrances. 								
After Management	Local	Low	Long term	Low	Definite	Low	+	High
No-go option	Local	Medium	Long term	Medium	Definite	Medium	-	High

5.7.7 Potential impact T7: Deterioration in Road condition during operation

The increased traffic associated with the operation of the proposed development due to public transport, service and personal vehicles, will result in increased wear and tear on existing roads (Van Renen, Aliwal and Albany Roads for option 1 and Seaview road for both options), which may require upgrades to accommodate this traffic. The proposed upgrades could potentially result in an improvement on the current road conditions.

Table 5-51: Significance rating of impact T7 and mitigation measures -Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	High
Management Measures								
<ul style="list-style-type: none"> Upgrade of Van Renen, Aliwal and Albany Roads if necessary 								
After Management	Local	None	Long term	Very Low	Definite	Very Low	+	High

Table 5-52: Significance rating of impact T7 and mitigation measures -Development option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	High

Management Measures								
<ul style="list-style-type: none"> Upgrade of Seaview Road if necessary 								
After Management	Local	Low	Long term	Low	Probable	Low	+	High

5.7.8 Potential impact T8: Intersection and link capacity reduction during operation

The additional trips generated as a result of the development may reduce the capacity of intersections and link roads such as the Seaview Road/Jill Street intersection to accommodate the additional traffic.

Table 5-53: Significance rating of impact T8 and mitigation measures -Development options 1 & 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long term	Medium	Probable Definite	Medium	-	High
Management Measures								
<ul style="list-style-type: none"> Reposition access road to Farm 10/28to the west (optional) – Option 1 Upgrade Jill Street intersection to accommodate additional volumes – Option 2 								
After Management	Local	Low	Long term	Low	Definite	Low (-ve option 1; +ve option 2)	- / +	High

5.7.9 Potential impact T9: Conflict with pedestrians and public transport at existing entrances during operation

Should no pedestrian and public transport facilities be provided for the proposed development, the risk of possible collisions between public transport vehicles and pedestrians at community entrances would increase.

Table 5-54: Significance rating of impact T9 and mitigation measures -Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long term	Medium	Probable	Medium	-	High
Management Measures								
<ul style="list-style-type: none"> Provision of formal embayments and turn-around facilities at entrances 								
After Management	Local	Low	Long term	Low	Definite	Low	-	High

Table 5-55: Significance rating of impact T9 and mitigation measures -Development option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	High
Management Measures								

• Provision of formal public transport facility at entrance to development								
After Management	Local	Medium	Long term	Medium	Probable	Medium	-	High

5.7.10 Potential impact T10: vehicle conflict at proposed entrances with marginal sight distance during operation

The proposed entrances of access roads onto Seaview road for development option 1 would pose a traffic safety risk due to the marginal sight distances for drivers. From this perspective development option 2 would be preferred.

Table 5-56: Significance rating of impact T10 and mitigation measures -Development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long term	Medium	Probable	Medium	-	High
Management Measures								
• Provision of Advanced warning measures and improvement of shoulder sight distance								
After Management	Local	Low	Long term	Low	Probable	Low	-	High

5.8 Impacts on groundwater

A Groundwater investigation was undertaken by a specialist from SRK Consulting (see report in Appendix K7). The assessment included a hydrocensus of surrounding boreholes, drilling to determine depth to groundwater, and sieve analysis to determine specific soil types, to determine the risk of groundwater contamination in terms of the guidelines presented in the Department of Water Affairs and Forestry document, "A Protocol to Manage the Potential of Groundwater Contamination from on Site Sanitation", March 2003. The assessment concluded the risk to the aquifer as a result of the proposed leach pit sanitation solution in general is low, specifically with regards to bacterial pollutants. The risk to nitrates and phosphates may be higher, as the sands create an ineffective barrier. According to the DWAF Groundwater Protocol document, low-flush or pour flush on-site latrines (leach pits) are anticipated to produce a hydraulic output that constitutes a low risk of contamination of soils or groundwater. However, under certain conditions, the risk may increase and the potential exists that pollutants from the sanitation system may reach groundwater users (e.g. humans). These conditions include:

- A rise in water table, potentially during periods of higher rainfall;
- An increase in pollution loads, resulting in a pollution load that is greater than the permeability of the sands.

It is anticipated that the risks and mitigation measures associated with impacts relating to on-site waterborne sanitation as proposed as an alternative for development option 2 will be lower than those for the leach pits. The reason for this is that the design criteria for the system (see Appendix H3 for treatment works technical proposal) is that the effluent from the treatment works that will be discharged to the reed beds for further cleaning will be treated to the DWS general limits for discharge to watercourses. Apart from the reed beds, the system will be fully enclosed, made up of reinforced concrete. Although the contamination risks associated with this system are anticipated to

be lower, a single impact rating has been provided for both systems, in accordance with the conservative approach to impact assessment.

5.8.1 Potential Impact G1: Pollutants from Sanitation System Reaching Groundwater Receptors during operation

Table 5-57: Significance rating of impact G1 and mitigation measures – both development and sanitation options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long-term	Medium	Possible	Low	-	Medium
Management Measures								
<ul style="list-style-type: none"> The sanitation system must be designed and maintained according to its design criteria; Three monitoring boreholes must be installed down-gradient of the proposed settlements. These must be monitored for bacteria, nitrate and phosphate in order to establish if they are being attenuated efficiently. 								
After Management	Local	Low	Long-term	Low	Possible	Very low	-	Medium

5.9 Stormwater Impacts

5.9.1 Potential Impact SW1: Spread of pollution and erosion during construction

Vegetation clearing and disturbance of soils during construction will leave the ground vulnerable to erosion by water and wind. This could lead to increased sediment load in stormwater runoff, potentially clogging the receiving stormwater infrastructure. Loss of topsoil and erosion will also limit the potential for vegetation growth in these areas, leading to further erosion. There is a risk of downstream erosion and sedimentation if undeveloped cleared areas are not properly rehabilitated during and after the construction phase. There is also a risk of contamination of soils and stormwater as a result of spills or leaks of hazardous materials such as fuels, paints, solvents and cement during construction.

Table 5-58: Significance rating of impact SW1 and mitigation measures – Development Options 1 & 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Short-term	Low	Possible	Very low	-	High
Management Measures								
<ul style="list-style-type: none"> Phased clearing of vegetation to take place; Revegetation to take place as soon as possible; All soil stockpiles to be monitored for erosion; Construction materials that can potentially pollute stormwater such as cement and fuels to be properly contained; Any erosion noted as a consequence of construction activities is to be rehabilitated immediately; Hazardous materials to be stored and handled over impermeable surfaces, and any spills collected for disposal at a waste landfill site; Contaminated wastewater to be collected for disposal at a waste landfill site. 								

After Management	Local	Low	Short-term	Very low	Improbable	Insignificant	-	High
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5.9.2 Potential Impact SW2: Spread of pollution, flooding and erosion during operation

Some of the proposed sites on Erf 240 and Farm 10/28 for Option 1 are located in water logged (depressions) areas. This will result in these sites being flooded during heavy rainfall seasons especially after the development has been completed as there will be more stormwater runoff if control measures are not put in place.

An increase in the extent of hardened surfaces from the development will increase the impermeable surface area and lead to reduced ground absorption of stormwater and increased surface water runoff. This will result in an increase in the quantity and velocity of stormwater leaving the site and could result in soil erosion and downstream sedimentation impacts if there is improper storm water management design. Runoff also has the potential to transport potential contaminants (generated from new potential development contamination point sources as well as roads) away from the site into downstream natural environments

Table 5-59: Significance rating of impact SW2 and mitigation measures – both development Options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long term	Medium	Possible	Low	-	Medium
Management Measures								
<ul style="list-style-type: none"> Professionally compiled stormwater management and erosion plan to be in place and implemented; Detention pond or discharge outlets to be constructed at the lowest point of the catchment area to manage stormwater discharge if required. Adequate number of waste receptacles and regular waste collection; Regular maintenance and clearing of stormwater infrastructure to prevent blockages; and Sanitation systems to be properly maintained so that no leakages occur. 								
After Management	Local	Low	Long term	Low	Improbable	Very low	-	Medium

5.10 Waste management Impacts

Lack of adequate waste management during both construction and operation could result in spread of litter, illegal dumping, contamination of soil and water resources, and increased prevalence of scavengers at the site.

Currently no formal waste collection service is provided to the residents of Zweledinga and New Rest although an informal waste transfer station is located along the Seaview road. Dumping is also an existing problem on the sites (development option 1), and would need to be closely managed as further development would make additional areas surrounding the development areas more accessible and therefore vulnerable to dumping of litter and rubble.

During construction, the waste generated will largely be construction waste (rubble, cement waste, packaging, small amounts of hazardous materials), with small amounts of domestic waste from workers on-site. It is anticipated that on-site chemical toilets will be used for sanitation during construction, and it must be ensured that the contents thereof are properly disposed of. During

operation, waste generated by the residences/businesses and facilities proposed on the site could result in the impacts mentioned above if not adequately managed. Waste entering the stormwater system may also result in blockages and downstream contamination.

5.10.1 Potential Impact W1: Spread of waste during construction

Table 5-60: Significance rating of impact W1 and mitigation measures – both development Options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Short-term	Very low	Probable	Very Low	-	High
Management Measures								
<ul style="list-style-type: none"> • Sufficient weather and scavenger-proof bins (with lids, to prevent the escape of litter) shall be provided, and be easily accessible at all points where wastes are generated; • Waste receptacles/skips to be provided for construction waste; • Bins/skips are to be emptied on a regular basis, and proof of proper disposal at a registered waste disposal site to be provided; • Proof of servicing of chemical toilets to be provided; • The site to be kept waste free – all waste to be disposed of in the correct receptacle at the end of each day; • Where possible waste to be recycled. 								
After Management	Local	Low	Short-term	Very low	Improbable	Insignificant	-	High

5.10.2 Potential Impact W2: Spread of waste during operation

Table 5-61: Significance rating of impact W2 and mitigation measures – both development Options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long term	Medium	Probable	Medium	-	High
Management Measures								
<ul style="list-style-type: none"> • Regular (weekly) waste collection service to be provided; • Regular inspections of the surrounding areas for signs of dumping and educating community members to inform the NMBM of such activities. 								
After Management	Local	Low	Long term	Low	Possible	Very low	-	High
No-go	Local	Low	Long term	Low	Definite	Low	-	High

5.11 Air Quality Impacts

5.11.1 Potential Impact AQ1: Dust generation during construction

Windblown dust from material stockpiles and cleared areas, and vehicle entrainment on dirt access roads may affect residents of Seaview by creating a nuisance impact. Excess dust could also reduce visibility along Seaview Road creating safety concerns.

Table 5-62: Significance rating of impact AQ1 and mitigation measures – Both Development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Low	Short-term	Very Low	Probable	Very Low	-	High
Management Measures								
<ul style="list-style-type: none"> • Clear vegetation in a phased manner; • Areas to be cleared of vegetation or topsoil shall be cleared only when required, and shall be rehabilitated immediately on completion of the construction activity in that area; • Access roads should be kept to a minimum and their length and width should be minimised to reduce the surface area from which dust can be generated; • When transporting fine materials, dust tarps should be installed on vehicles; • Limit speeds on access and internal roads to 40kmph; • When necessary, appropriate dust control measures (such as wetting of soil and covering of stockpiles) shall be implemented; • Potable water is not to be used for dust control; and • Maintain a complaints register to monitor levels of nuisance experienced by neighbours and respond to complaints by increasing the frequency and/or intensity of the dust suppression. 								
After Management	Local	Low	Short-term	Very Low	Possible	Insignificant	-	High

5.12 Visual impacts

5.12.1 Potential Impact V1: Visual impact during construction

The Development option 1 sites are located in forested areas that will remain intact and are therefore expected to provide some degree of visual shielding during construction. Development option 2 covers a large open not shielded by vegetation and is situated directly opposite the existing residential area of Clarendon Marine.

During construction, dust resulting from vegetation clearing and earthworks may also be visible from a distance and will impact different areas depending on the development option chosen although Development option 2 is likely to create a greater dust impact due to its size. These impacts have also been taken into account in the socio-economic impact assessment (sense of place).

Table 5-63: Significance rating of impact V1 and mitigation measures – development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Low	Short term	Very low	Probable	Very low	-	Medium
Management Measures								
<ul style="list-style-type: none"> • Disturbance to the natural vegetation to be kept to the minimum; • Dust control measures such as wetting and covering of stockpiles to be implemented when necessary; and • Effective waste management. 								
After Management	Local	Low	Short term	Very low	Possible	Insignificant	-	Medium

Table 5-64: Significance rating of impact V1 and mitigation measures – development option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Short term	Very Low	Definite	Very Low	-	Medium
Management Measures								
<ul style="list-style-type: none"> As for Option 1 								
After Management	Local	Low	Short term	Very Low	Probable	Very Low	-	Medium

5.12.2 Potential Impact V2: Visual impact during operation

Portions of Erf 590, 240 and 238 are currently occupied by informal houses which border the Seaview Road. As the proposed development (Option 1) will take place in transformed /previously occupied areas which are visible from the Seaview Road it is anticipated that the construction of formal houses (or in the case of Development Option 2, management of these areas to prevent additional in-migration) will have a positive visual impact.

The forested areas that will remain on the site are also expected to provide some degree of visual shielding. The development will however be provided with lighting, which may be perceived negatively by surrounding residents. These impacts have also been taken into account in the socio-economic impact assessment (sense of place).

Table 5-65: Significance rating of impact V2 and mitigation measures – development option 1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Low	Long term	Low	Probable	Low	-	Medium
Management Measures								
<ul style="list-style-type: none"> Effective waste management; The NMBM must maintain infrastructure and services in the new settlement; The NMBM must monitor and prevent the spread of additional informal housing in surrounding areas. 								
After Management	Local	Low	Long term	Low	Possible	Very low	-	Medium
No-go	Local	Low	Long term	Low	Definite	Low	-	Medium

Table 5-66: Significance rating of impact V2 and mitigation measures – development option 2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	Medium
Management Measures								
<ul style="list-style-type: none"> Effective waste management; The NMBM must maintain infrastructure and services in the new settlement; The NMBM must monitor and prevent re-occupation of vacated areas of New Rest and Zweledinga; 								

<ul style="list-style-type: none"> Rehabilitation of informal settlement areas once the current residents have been relocated. 								
After Management	Local	Low	Long term	Low	Probable	Low	-	Medium
No-go	Local	Low	Long term	Low	Definite	Low	-	Medium

5.13 Noise

Construction activities will generate noise due to the operation of machinery and vehicles, potentially causing a temporary nuisance to residents living closest to the proposed development sites in Seaview and Clarendon Marine. This may also affect fauna in the vicinity, causing it to move into adjacent natural areas, which are plentiful around the development sites.

During operation, noise generated from the communities may again cause disturbance to residents of Seaview and Clarendon Marine who are in close proximity to the development areas. While noise disturbance is subjective and can be difficult to control in residential areas, the NMBM noise control bylaws provide legal recourse for offenders. It is noted however that the beneficiary communities are already living in informal settlements in the area, and that the noise impact is therefore not anticipated to increase significantly relative to current levels. The reduction in housing density that will be associated with formalisation of the housing may also lead to a decrease in noise.

5.13.1 Potential Noise N1: Noise disturbance during construction

Table 5-67: Significance rating of impact N1 and mitigation measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Short term	Very Low	Probable	Very Low	-	High
Management Measures								
<ul style="list-style-type: none"> Construction to be limited to normal working hours on weekdays and Saturdays; Should after-hours work be required, residents will be informed before-hand; Equipment that is fitted with noise reduction facilities must be used as per operating instructions and maintained properly during site operations; A complaints record must be kept to record any complaints lodged resulting from noise disturbance 								
After Management	Local	Low	Short term	Very Low	Possible	Insignificant	-	High

5.13.2 Potential Noise N2: Noise disturbance during operation

Table 5-68: Significance rating of impact N2 and mitigation measures – both development options

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Medium	Long term	Medium	Possible	Low	-	Medium
Management Measures								
<ul style="list-style-type: none"> Strict implementation of the NMBM noise control bylaws. 								

After Management	Local	Low	Long term	Low	Possible	Very Low	-	Medium
No-go option	Local	Low	Long term	Low	Possible	Very Low	-	High

5.14 Fire safety risks

As the proposed development areas are surrounded by natural vegetation, the risk of bush fires spreading to the proposed residential areas must be considered. As much of the surrounding vegetation is indigenous forest however, it is not susceptible to burning. The alien invasive vegetation (such as Rooikranz) growing in certain areas amongst the forest, however, is.

There is also a risk of fires originating from within the development, spreading to the surrounding vegetation.

5.14.1 Potential Fire F1: Fire risk during construction

During construction fires may be caused by construction workers if proper fire management measures are not in place and are not communicated to those on site.

Table 5-69: Significance rating of impact F1 and mitigation measures – Development option 1&2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Low	Short term	Very low	Possible	Insignificant	-	High
Management Measures								
<ul style="list-style-type: none"> No fires on or around the site allowed; Smoking is not be permitted on site; Sufficient fire-fighting equipment to be maintained and be accessible on sites at all times. 								
After Management	Local	Low	Short term	Very Low	Improbable	Insignificant	-	High

5.14.2 Potential Fire F2: Fire risk during operation

Currently there are no fire management facilities at the informal housing developments, and access for fire fighting vehicles is limited. Furthermore, as the communities do not currently have access to electricity, wood or paraffin are the main energy sources, with the associated fire risk. With the provision of formalised housing and associated facilities, including electricity, and design of the proposed development in compliance with the legal safety requirements, the risk of fires and the spreading thereof (potentially to surrounding residential areas) will be reduced.

Table 5-70: Significance rating of impact F2 and mitigation measures – Development option 1&2

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+	Confidence
Before Management	Local	Low	Long term	Low	Possible	Very Low	+	Medium
Management Measures								
<ul style="list-style-type: none"> The NMBM must maintain infrastructure and services in the new settlement; 								

<ul style="list-style-type: none"> The NMBM must monitor and prevent re-occupation of vacated areas of New Rest and Zweledinga; Rehabilitation of informal settlement areas once the current residents have been relocated. 								
After Management	Local	Low	Long term	Low	Definite	Low	+	Medium
No-go	Local	Medium	Long term	Medium	Probable	Medium	-	High

5.15 Cumulative impacts

SRK is not aware of any other similar development proposals in the Seaview area, and given the constraints from a forest and serviceability perspective, other large-scale development plans are considered to be unlikely. As the beneficiaries of the proposed development are already resident in the area, and therefore many of the impacts anticipated to result from a new housing development of this nature are likely to be already occurring.

The only area that is anticipated to result in cumulative impacts is traffic at a localised level, as the proposed development will result in changes in access routes and possibly volumes, potentially affecting traffic safety and flow, as well as road condition. This cumulative impact has however already been taken into account in the traffic impact assessment, which is based on cumulative predictions.

5.16 Assessment of alternatives

The impact assessment provided above has where relevant provided relative significance ratings for the two development site alternatives (option 1 and 2) assessed, and specialists have been asked to provide comment as to their preferred option. These are summarised in Table 5-71 below in order to make recommendations regarding the environmentally and socially preferred alternative.

Table 5-71: Overall comparison of alternatives assessed based on key impact categories

Impact category	Development option 1	Development option 2 with leach pits	Development option 2 with waterborne sanitation
Traffic	Not preferred	Preferable from a traffic flow and safety perspective as vehicular and pedestrian activity is restricted to one formalised location	
Socio-economic	Not preferred	Preferred due to higher economic benefits	Most preferred due to highest economic benefits
Ecological	Not preferred due to presence of forest (a potential fatal flaw) and CBAs	Strongly preferred due to the absence of forest	
Archaeological	Not preferred due to higher likelihood of in situ archaeological sites	Preferred as the area has been previously disturbed	
Palaeontological	No preference		
Groundwater	No site preference indicated due to similar geology and soil characteristics	Preferred due to lower contamination risks	

While two sanitation alternatives are provided for development option 2 (leach pits and an on-site waterborne sewage system), this does not significantly influence the impact assessment, and it is anticipated that the final preference in this regard will depend on the relative technical considerations of the two systems. Both sanitation alternatives proposed for development option 2 are considered to be feasible from an environmental perspective provided they are operated and maintained within the

design criteria. No technologically viable sanitation alternative to leach pits was found to be available for development option 1 (options considered in this regard are described in Section 2.3.3), and leach pits are therefore proposed should this option be authorised.

From an archaeological, ecological, socio-economic and traffic perspective, site development option 2 (Farm 28 portion 1) is preferred, as summarised in Table 5-71. None of the specialists indicated a clear preference for development option 1. While none of the alternatives assessed have been found to be fatally flawed from an environmental perspective, a number of concerns relating to the two site development options are noted below.


Site development option 1

- The final conclusion on the feasibility of development option 1 would depend primarily on the ability of the proposed layout to accommodate protected forest while still meeting the required housing yield;
- The technical acceptability of the proposed sanitation solution (leach pits) to DWS, given the results of the groundwater study, is yet to be confirmed;
- A concern relating to development of Farm 28 portion 10 specifically is the proposed access route to the site through Farm 28 portion 31, for which an agreement between the landowner and the NMBM would need to be reached;
- As development option 1 would entail re-development of the areas that are currently inhabited by the housing beneficiaries, these communities would need to be relocated to another development site before the re-development could take place. In some cases this may involve two relocations before the household receives their permanent accommodation.

Site development option 2

- Although development option 2 involves a greater area and higher residential yield (which favours it from a socio-economic perspective), it must be noted that as this site is not currently owned by the NMBM, and an agreement would need to be reached with the landowner regarding sale of this property should this development option be pursued. The affordability of this site option to the NMBM is outside the scope of this EIA process.
- As this site can accommodate significantly more than the required housing yield for the current residents of New Rest and Zweledinga informal settlements, it is anticipated that additional beneficiaries from surrounding areas may also be accommodated on this site as and when the need arises. Who these potential beneficiaries are and the details of any such arrangement is unknown, and consequently the acceptability of this to the communities involved has not been addressed as part of this EIA, although the increased housing yield has been taken into account in this assessment. The layout proposed for this development option indicates the development potential for Farm 1/28, the full extent of which would only be developed as and when the need arises. It is anticipated that this would take place in a phased manner, although detail of the phasing is not available at this stage.
- Development option 2 would also entail relocation of the residents of New Rest and Zweledinga from the areas they currently occupy, leaving these areas vulnerable to re-occupation by residents from elsewhere, and dumping of waste and rubble. Preventing and managing this situation would therefore be key to the success of this development option and would include measures such as removal of all housing material from these sites, rehabilitation of disturbed areas and monitoring of these sites to ensure early detection of re-occupation and dumping.

Based findings of the EIA and the comparison of alternatives as summarised above, site development option 2 is concluded to be the environmentally preferred option, primarily due to the absence of protected forest on this site. The presence of forest presents a significant constraint for development option 1 to accommodate the number of houses required.



6 Findings, Evaluations and Recommendations

This chapter evaluates the impact of the proposed Walmer housing development based on the findings of the Environmental Impact Assessment. The principal findings are presented in this chapter, followed by a discussion of the key factors DEDEAT will have to consider in order to make a decision in the interests of sustainable development.

6.1 Environmental Impact Statement

6.1.1 Evaluation

The evaluation is undertaken in the context of:

- The information provided during the EIA;
- The assumptions made for this EIR;
- The recommended mitigation measures, which it is assumed will be effectively implemented;
- The assessments provided by the specialists; and
- The practicality of the recommendations for mitigation.

The evaluation and the basis for the subsequent discussion are represented concisely in Table 6-1 below, which summarises the potentially significant impacts and their significance ratings before and after application of mitigation and/or enhancement measures.

Table 6-1: Summary of significance ratings for potential impacts of the proposed Seaview housing development, Options 1 and 2

Impact group	Impact Description	+/-	Significance without management		Significance with management	
			Option 1	Option 2	Option 1	Option 2
	CONSTRUCTION					
Archaeological	A1: Destruction of archaeological resources	-/+	Low (-ve)	Low (-ve)	Low (+ve)	Low (+ve)
Paleontological	P1: Destruction of palaeontological resources	-/+	Very low (-ve)		Very Low (+ve)	
Ecology	E1: Loss of vegetation and habitat	-	Medium	Low	Low	Low
	E2: Disturbance of fauna	-	Low	Low	Low	Very Low
	E3: Loss of SSC	-	Low	Medium	Low	Low
	E4: Destruction of forest	-	High	N/A	Medium	N/A
	E5: Impact on CBAs	-	High	N/A	Medium	N/A
Socio-economic	S1: Temporary stimulation of the national and local economy	+	High		High	
	S2: Temporary increased employment in the national and local economies	+	High		High	
	S3: Temporary increase in household earnings	+	Medium		Medium	
	S4: Temporary increase in government revenue	+	Low		N/A	
	S5: Negative changes to the sense of place	-	Very low	Low	Insignificant	Very low

Impact group	Impact Description	+/-	Significance without management		Significance with management	
			Option 1	Option 2	Option 1	Option 2
	S6: Temporary increase in social conflict associated with influx	-	Very low		Insignificant	
Traffic	T1: Increased Traffic on existing roads	-	Very Low		Very low	
	T2: Deterioration of Road Condition	-	Very Low		Very Low	
	T3: Increased traffic safety risks due to conflict with general traffic	-	Very Low		Very Low	
Stormwater	SW1: Spread of pollution and erosion	-	Very Low		Insignificant	
Waste	W1: Spread of Waste	-	Very Low		Insignificant	
Air Quality	AQ1: Dust generation	-	Very Low		Insignificant	
Visual	V1: Visual impact	-	Very Low		Insignificant	Very Low
Noise	N1: Noise disturbance	-	Very Low		Insignificant	
Fire	F1: Fire risk	-	Insignificant		Insignificant	
OPERATION						
Archaeology	A1: Destruction of archaeological resources	-/+	Very low (-ve)		Very low (+ve)	
Ecology	E1: Loss of vegetation/habitat destruction	-	Medium	Low	Low	Very Low
	E2: Disturbance of fauna	-	Medium	Very Low	Low	Very Low
	E3: Loss of Species of Special Concern (SSC)	-	Low		Low	
	E4: Destruction of forest	-/+	Medium (-ve)	Low (+ve)	Low (-ve)	Medium (+ve)
	E5: Impacts on conservation targets and CBAs	-	Medium	N/A	Low	N/A
Socio-economic	S7: Sustainable increase in production and GDP nationally and locally	+	High		Very High	
	S8: Creation of sustainable employment positions nationally and locally	+	Low		Medium	
	S9: Improved standards of living for households benefiting from employment	+	Low		Medium	
	S10: Sustainable increase in national and local government revenue	+	High		High	
	S11: Improvement in Health and Safety for housing beneficiaries	+	Medium		High	
	S12: Positive impacts on the sense of place – removal of informal settlements	+	Low	Medium	Medium	High
	S13: Additional value in the local property market from new housing	+	Medium		High	
	S14: Negative impacts on sense of place – housing in areas where none currently exists	-	Medium		Very low	
	S15: Influx of people seeking an opportunity to obtain housing	-	Very Low		Insignificant	

Impact group	Impact Description	+/-	Significance without management		Significance with management	
			Option 1	Option 2	Option 1	Option 2
Traffic	T4: Increased traffic volumes on existing roads	-/ +	Medium(-ve)		Low (+ve)	Low (-ve)
	T5: Increased Pedestrian Volumes on Existing Roads	-	Medium		Low	
	T6: Increased pedestrian and traffic volumes on existing roads leading to safety concerns	-/+	Medium (-ve)		Medium (+ve)	Low (+ve)
	T7: Deterioration in road condition	-/+	Medium (-ve)		Very Low (+ve)	Low (+ve)
	T8: Intersection and link capacity reduction	-/+	Medium (-ve)		Low (-ve)	Low (+ve)
	T9: Conflict with pedestrians and public transport at existing entrances	-	Medium		Low	Medium
	T10: Vehicle conflict at proposed entrances with marginal sight distance	-	Medium	N/A	Low	N/A
Groundwater	G1: Pollutants from Sanitation System Reaching Groundwater Receptors	-	Low		Very low	
Stormwater	SW2: Spread of pollution, flooding and erosion	-	Low		Very low	
Waste	W2: Spread of Waste	-	Medium		Very Low	
Visual	V2: Visual impact during operation	-	Low	Medium	Very Low	Low
Noise	N2: Noise impact	-	Low		Very Low	
Fire	F2: Fire risk	-	Very low		Low	
NO-GO OPTION						
Ecology	E2: Disturbance of fauna	-	Low		N/A	N/A
	E4: Destruction of forest	-	Medium	N/A	N/A	N/A
Socio-economic	S11: Improvement in Health and Safety for housing beneficiaries	-	Medium		N/A	N/A
Traffic	T6: Increased pedestrian and traffic volumes on existing roads leading to safety concerns	-	Medium		N/A	N/A
Waste	W2: Spread of Waste	-	Low		N/A	N/A
Visual	V2: Visual impact	-	Low		N/A	N/A
Noise	N2: Noise disturbance	-	Very Low		N/A	N/A
Fire	F2: Fire risk	-	Medium		N/A	N/A

6.1.2 Principal findings and key decision making factors

Key observations with regard to the overall impact ratings, assuming mitigation measures are effectively implemented, are highlighted below. Unless otherwise indicated, the findings relate to all development alternatives assessed.

- The significance of predicted impacts on *archaeological* and *palaeontological* resources, resulting from destruction of heritage resources mainly during construction, is predicted to be LOW and VERY LOW (-ve) respectively prior to mitigation. With mitigation however, positive

(LOW and VERY LOW) impacts could potentially result due to preservation of currently undocumented heritage resources;

- Negative **Ecological** impacts (for both site options) are predicted to result from clearing of vegetation and habitat, disturbance of fauna, and loss of species of special concern. The significance of these impacts is predicted to range from MEDIUM to LOW (VERY LOW with mitigation) during construction, and LOW during operation. Impacts on Critical Biodiversity Areas (CBAs) adjacent to the proposed development areas, especially for development option 1, are predicted to be HIGH (MEDIUM with mitigation).
- Site development option 1 is expected to result in a HIGH (-ve) impact on protected **forest** due to destruction of trees and edge effects. With mitigation this could be reduced to MEDIUM, however forest destruction permits would be required to support the current proposed development layout. Obtaining DAFF's support for this layout while still meeting the housing requirement could prove to be challenging and remains a significant constraint for this development site option. Development of site option 2 could result in a LOW to MEDIUM (+ve) impact on forest, as the communities currently living amongst the forest patches would be relocated, assuming the vacated areas are successfully rehabilitated.
- The **socio-economic** impacts during construction, although temporary, are predicted to be largely positive, with HIGH to MEDIUM (+ve) impacts anticipated to result from stimulation of the economy, creation of employment opportunities, and increased household earnings. VERY LOW (-ve) impacts are predicted to result from changes to sense of place and increases in social conflict associated with an influx of workers.
- During operation, the **socio-economic** impacts are again predicted to be predominantly positive, with a VERY HIGH (+ve) impact on production and GDP predicted. Other significant impacts (MEDIUM to HIGH (+ve) with enhancement, would result from employment, improved standards of living, increased government revenue, improved health and safety for housing beneficiaries, improved sense of place due to removal of the informal settlements, and additional value to the housing market. Negative impacts of VERY LOW to INSIGNIFICANT significance (with mitigation) are predicted to result from sense of place due to development of currently undeveloped areas, and influx of additional housing seekers.
- Impacts on **traffic** during construction are expected to result from increased traffic, affecting traffic flow, deterioration of roads, and increased safety risks, and are predicted to be of VERY LOW (-ve) significance.
- Impacts on **traffic** during operation are expected to again result from increased traffic, affecting traffic flow, deterioration of roads, and increased safety risks, especially given the predicted increase in pedestrian and public transport vehicle volumes. These are predicted to be of MEDIUM (-ve) significance prior to mitigation, reduced to MEDIUM to LOW (-ve), or LOW (+ve)(in cases where road upgrades are included) significance with mitigation.
- Impacts on **groundwater** as a result of spread of contamination from the proposed sanitation solutions (either option) during operation are predicted to be VERY LOW, after mitigation.
- **Other impacts** anticipated to result include spread of pollution and erosion associated with stormwater, spread of waste, visual impacts, dust generation during construction, noise disturbance, and fire risks. All are predicted to be VERY LOW to INSIGNIFICANT (-ve) during construction, and LOW to VERY LOW (-ve) during operation, after mitigation.
- The **no-go option** (i.e. no development and continuation of the informal settlements in the area) would see continuation of the current negative impacts associated with it. These include: MEDIUM (-ve) impacts as a result of fire risk, destruction of forest, risks to the health and safety of residents of the informal settlements, and traffic safety risks; LOW (-ve) impacts resulting from disturbance of fauna, spread of waste and visual impacts; and VERY LOW (-ve) impacts resulting from noise.
- While the predicted impacts associated with the **development alternatives** assessed are largely similar, development option 2 is preferred from an environmental perspective, primarily due to the lack of forest on this site. This site is also preferred from a traffic, archaeological, and socio-economic perspective. Pending further comment from DAFF and DWS however, no fatal flaws relating to development option 1 have been conclusively identified.

6.1.3 Authorisation opinion

In terms of Section 31 (n) of NEMA, the EAP is required to provide an opinion as to whether the activity should or should not be authorised. In this section a qualified opinion is ventured and in this

regard SRK believes that sufficient information is available for DEDEAT to make a decision, in consultation with the relevant commenting authorities (notably DAFF and DWS).

Given the findings of the impact assessment as summarised above, it is the EAP's opinion that while both development options are potentially environmentally acceptable provided the mitigation measures listed are effectively implemented, development option 2 is environmentally preferred. The following key considerations relating to development of each site option are noted:

Development option 1:

- A key concern relating remains that, based on comment received from DAFF to date, it appears unlikely that, based on the current layout proposed, a suitable compromise between meeting the objectives of DAFF and the National Forest Act, and those of the NMBM in terms of housing provision for the current residents of Zweledinga and New Rest informal settlements can be reached;
- Should such a compromise be possible however, while it would remain less preferred from a traffic, socio-economic, archaeological and ecological perspective, site development option 1 would remain a feasible option, provided mitigation measures are successfully implemented.

Development option 2:

- As the property is privately owned, an agreement of sale would need to be reached between the NMBM and the landowner. The affordability of such a land purchase to the NMBM has not yet been established (but is outside the scope of this EIA);
- The development potential (and most sustainable use of resources) of erf 28/1 significantly exceeds the current housing need to accommodate the residents of New Rest and Zweledinga. The possibility therefore remains that additional residents from other surrounding areas would also be accommodated on this site. The details of these potential additional beneficiaries are however unknown at this stage and therefore have not been addressed as part of this EIA;
- A number of the positive impacts anticipated to result from development of this site would be as a result of removal of the informal settlements from the area and successful rehabilitation of the areas they currently occupy, to prevent re-occupation. Should this not be achieved, these impacts would not be realised, and the current negative (no-go) impacts would offset many of the predicted positive impacts of the development of this site.

6.2 Recommendations

The specific recommended mitigation measures are presented in the impact assessment (Section 5) and are recorded in the Draft Environmental Management Programme (Section 7) of this report.

Key recommendations, which are considered essential, are:

- Damage or destruction of any forest trees must be avoided, and where this is not possible, the necessary destruction permits must be obtained in advance from DAFF;
- Protected forest clumps to be conserved (as per the site layout approved by DAFF) must be demarcated prior to site clearing and all personnel on site must be educated on the importance of the protection of forest on site;
- Should option 2 be implemented, rehabilitation of forest in previously inhabited areas (Zweledinga and New Rest), including:
 - Management of alien invasive vegetation
 - Monitor and prevent dumping and re-establishment of informal housing in these areas

- Effective enforcement of municipal by-laws to manage any unlawful construction of new informal housing in the area;
- NMBM to conduct regular site inspections to police land invasions activities, in conjunction with a team established from within the community to act as whistle blowers;
- NMBM to meet with the affected owners and discuss their concerns over property and land values, as well as educate and inform them on the potential impacts that could ensue from replacing informal settlements and the positives of such an endeavour;
- NMBM to ensure services are delivered and maintained and that public spaces are kept clean and well maintained;
- Monitoring boreholes must be installed down-gradient of the settlements / package plant. These must be monitored for bacteria, nitrate and phosphate to establish if they are being attenuated efficiently. Corrective actions to be implemented if this is found not to be the case;
- The sanitation system must be designed, operated and maintained according to its design criteria;
- Should option 2 be implemented:
 - The access to the proposed development at Jill Street be configured as indicated in the TIA report;
 - Pedestrian facilities be provided between Jill Street and Seaview Village as indicated in the TIA report;
- Should option 1 be implemented:
 - Access to the components of development must be formalised and suitable advanced warning measures and traffic controls provided as indicated in the TIA report;
 - Suitable formal public transport and pedestrian facilities must be provided at the entrances to erf 590 and 240 as indicated in the TIA report;
 - Suitable pedestrian facilities must be provided along Aliwal Road;
 - A pedestrian sidewalk must be provided along Seaview Road between erf 240 and Seaview;
 - Vehicular and pedestrian access to the proposed Waste Transfer Station on erf 240 must be gained from the internal roads (and not from Seaview road).
- Suitable measures to accommodate construction traffic and protect road users (both vehicular and pedestrian) must be taken;
- The necessary destruction / relocation permits for protected species must be obtained from DEDEAT prior to commencement of vegetation clearing;
- Plant Species of Special Concern that require removal are to be marked by a botanist and removed (search and rescue) and sent to the NMBM's municipal nursery at Settlers Park, prior to construction;
- Educate community members on the importance of forest and CBAs and their protection status;
- Monitor areas surrounding the development (and especially CBAs) for signs of encroachment, dumping and wood cutting, and prevent these activities;
- Regular municipal waste collection from all development areas;
- Keep vegetation clearance to the absolute minimum; keeping the width and length of the earth works to a minimum;
- No-Go/ open space areas must be clearly demarcated before any construction activities commence on site and appropriate measures implemented to ensure compliance;
- Clearing must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once) to allow fauna to migrate to other areas;
- Fencing to prevent access from the adjacent development areas to CBAs;
- Increase the local procurement practices and promote the employment of people from local communities, as far as feasible, to maximise the benefits to the local economies;
- During maintenance of the development, as possible, procure materials, goods and products required for the operation of the facility from local suppliers;
- Effective staffing of the Seaview Police Station to address any crime in the area.

6.3 Programme of Activities

The key activities and the provisional timetable required to achieve the objectives of the Environmental Impact Assessment study are summarised in Table 6-2 below.

Table 6-2: Estimated target dates for key activities in the EIA process

Stage / Activity	Target Dates	
	Start	End
Public Comment Period for Draft EIR (40 days)	28 April 2017	12 June 2017
Public Comment Period for Final EIR (30 days)	10 July 2017	9 August 2017
Submit Final EIR to DEDEAT for a decision	10 August 2017	

6.4 Public Participation Process

The registered Interested and Affected Parties (IAPs) will be kept up to date on the progress by being notified of the availability of reports for comment. A public open day to present the findings of the DEIR will be held (during the public comment period) between 17h30 and 19h30 on 23 May 2017 at the Seaview Community Hall (Da Gama Road, Seaview)

7 Draft Environmental Management Programme

This chapter presents a draft Environmental Management Programme (EMPr) that describes how the environmental aspects identified in the Environmental Impact Report (EIR) should be managed in the event of environmental authorisation being granted. Although the EMPr is written as if the project has been authorised, this approach in no way presupposes that the project will be approved. Rather, the style of writing is aimed at providing a clear picture to the Department of Economic Development, Environmental Affairs & Tourism (DEDEAT), other organs of state, and IAPs, regarding the management of environmental aspects associated with the design, construction and operational activities of the proposed development.

The preceding chapters in this EIR form an integral part of the EMPr as they provide details of the Environmental Assessment Practitioner(s) (EAP) who compiled the EMPr, details regarding the sensitivity of the affected environment, the issues and concerns raised by Interested and Affected Parties (IAPs), the findings of the impact assessment, and mitigation measures proposed by the EAP and/ or relevant specialist(s). As such, while the EMPr provides a list of environmental specifications aimed at mitigation of the identified impacts, and in a more general sense compliance with environmental legislation, the preceding Chapters are particularly useful for understanding the importance of the measures proposed here.

In the event that the application is authorised by DEDEAT, then this EMPr will be finalised according to the conditions specified in the Environmental Authorisation.

The EMPr stipulates the environmental standards to be adhered to by the parties involved in the various phases of the project life cycle of the project. As such the draft EMPr comprises of a section for each of the following project life cycle phases:

- Pre-construction (Section 7.3);
- Construction activities (including rehabilitation) (Section 7.4);
- Operation (Section 7.5)..

Where appropriate each section provides a description of the environmental aspects associated with that phase, the roles & responsibilities for implementation of the EMPr, timeframes, and monitoring requirements.

7.1 Roles and Responsibilities

The general roles and responsibilities of various parties associated with the proposed development are outlined below.

7.1.1 The Developer: NMBM

The NMBM shall ultimately be responsible for the implementation of the EMPr. They shall appoint a representative, the Responsible Person (RP), who shall:

- a. Ensure that the contractor is duly informed of the EMPr and associated responsibilities and implications of this EMPr;
- b. Monitor the contractor's activities with regard to the requirements outlined in the EMPr;
- c. Act as a point of contact for local residents and community members;
- d. Ensure that the contractor remedies problems in a timely manner and to the satisfaction of the authorities; and

- e. Notify the authorities and the Environmental Control Officer (ECO) should problems arise that are not remedied effectively, or of any change in the development or changes in project specification that could significantly impact negatively on the environment.

7.1.2 The Contractor

The contractor(s) must ensure that all aspects of the contract comply with both this EMPr and other relevant environmental legislation. In addition to any other responsibilities, the contractor(s) shall be responsible for the following:

- a. Appointing an Environmental Representative (on site), who irrespective of other duties, will also be responsible to oversee all activities associated with the contract;
- b. Ensuring that the Environmental Representative has the means with which to carry out his/her tasks;
- c. Ensuring all activities on the site are undertaken in accordance with the EMPr;
- d. Informing all employees and sub-contractors of their roles and responsibilities in terms of the EMPr;
- e. Ensuring that all employees and sub-contractors comply with this EMPr; and
- f. The contractor has a duty to demonstrate respect and care for the environment in which they are operating. They will be responsible for the cost of rehabilitation, to the satisfaction of the ECO, of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation.

7.1.3 The Contractor's Environmental Representative

The Contractor's Environmental Representative (ER) shall be responsible for implementation of this EMPr and any other environmental requirements that may be identified by the ECO, and agreed to by the NMBM, during the course of the contract. The ER shall have received basic environmental awareness training, either as part of this contract, or previously. In addition to any other responsibilities, the general duties of the ER are as follows:

- a. Ensuring that all personnel (including sub-contractors) are duly informed of the requirements contained in this EMPr, and the associated responsibilities and implications of this EMPr;
- b. Ensuring that all records needed to demonstrate compliance with the EMPr requirements are obtained, safely stored, and are readily available for inspection by the ECO and/ or NMBM. These records are detailed in this EMPr;
- c. Consulting with the ECO regarding interpretation of the EMPr and any other aspects of the contract that may impact significantly on the environment;
- d. Ensuring that all personnel (including sub-contracted personnel) demonstrate respect and care for the environment in which they are operating;
- e. Acting as a point of contact for local residents and community members; and
- f. Ensuring that a reporting system is in place and that community representatives can be informed of the correct procedures to lodge complaints.
- g. It is anticipated that these ER duties would be assigned to a member of the on-site personnel that would ordinarily be appointed for the duration of construction related activities by the Contractor, and that these ER duties would be in addition to the other (possibly primary) responsibilities of that person.

7.1.4 The Environmental Control Officer

An Environmental Control Officer (ECO), who is a qualified environmental professional with the relevant environmental expertise, and independent of the developer, shall be appointed for the duration of the construction activities. The ECO's duties are as follows:

- a. Being familiar with the environmental management requirements contained in this EMPr as well as the Environmental Authorisation;
- b. Undertaking the pre-construction and post-construction site inspections, which may result in recommendations for additional clean-up and rehabilitation measures;
- c. Monitoring the contractor's activities with regard to compliance with the requirements outlined in the EMPr, by way of monthly audits, and reporting on the findings of these audits to the developer and relevant authorities (if required in terms of the Environmental Authorisation);
- d. Providing ad-hoc environmental advice, including environmental legal requirements, to the NMBM and the Contractor(s) regarding issues that may arise during the Contract; and
- e. Submit a post-construction Audit Report to the contractor for comment prior to submission to the relevant authorities' archives. Comments from the relevant parties will be included in the Final Audit Report.

7.2 Environmental Procedures and Specifications

The contractor(s) is deemed to have familiarised themselves with all legislation pertaining to the environment, including any provincial or local government ordinances applicable to the contract.

It should be kept in mind that good housekeeping goes beyond the employment of sensible construction methods to ensure safety on site, but includes care for and preservation of the environment.

7.2.1 Compliance Auditing

- a. The appointed ECO and Contractor's ER shall conduct a pre-construction site inspection to identify sensitive environments (and protected vegetation, which should be avoided, or if this is not possible, permits obtained from the relevant authorities for its disturbance or removal), no-go areas, locations of site camps, etc.;
- b. The ECO shall prepare a pre-construction audit report, which will include photographs of the general condition of the key features of the site. These photographs shall be used for comparison purposes on completion of the contract, i.e. after rehabilitation of construction areas;
- c. The ECO shall conduct monthly site audits of all construction related activities;
- d. On completion of construction activities, the ECO shall conduct a site inspection, together with the Contractor's ER. Any items requiring attention shall be included in an Post-Construction Audit Report; and
- e. On completion of the defects liability period, the ECO shall accompany a NMBM representative and the Contractor with a view to determining whether outstanding matters from the Post-Construction Audit Report have been adequately addressed.

7.2.2 Community Liaison

- a. The ER shall act as community liaison officer and his/ her contact details shall be displayed on the contractor's board;
- b. A complaints register (including the action taken in response to the complaint) shall be kept on site by the ER; and
- c. All complaints received shall be forwarded to the ECO and the NMBM. All issues raised should be appropriately addressed and recorded.

7.2.3 Environmental Incidents

- a. The ER shall maintain a register of all environmental incidents occurring as a result of the activities associated with the contract. Environmental incidents that shall be recorded include (but are not limited to):
 - o Fires;
 - o Accidents;
 - o Spills of hazardous materials, contaminating soil or water resources;
 - o Non-compliances with applicable legislation; and
 - o Non-compliances with this EMPr
- b. Each environmental incident shall be investigated by the ECO and an environmental incident report shall be forwarded to the Contractor(s) and the NMBM. Such incident report shall be presented within five working days of the incident occurring;
- c. Environmental incident reports shall include (as a minimum) a description of the incident, the actions taken to contain any damage to the environment, personnel, or the public, and the actions taken to repair/ remediate any such damage; and
- d. Prescribe additional measures that may be required to remediate damage resulting from the incident and/ or to prevent similar incidents occurring in the future.

7.2.4 Training

The Contractor(s) is responsible for ensuring that the sentiments of the EMPr are conveyed to all personnel (including sub-contracted personnel). It is recommended that regular training sessions/toolbox talks (including basic environmental awareness training at induction) be conducted to fulfil this purpose. Training registers shall be kept as proof for auditing purposes. The environmental training should, as a minimum, include (but not be limited to) the following:

- a. The importance of conformance with all environmental policies;
- b. The environmental impacts, actual or potential, of the proposed activities;
- c. The environmental benefits of improved personal performance;
- d. Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with this EMPr, including associated procedures and emergency preparedness and response requirements;
- e. The potential consequences of departure from specified operating procedures; and
- f. The mitigation measures required to be implemented when carrying out their work activities.

7.2.5 Record Keeping

- a. The engineer and the contractor shall continuously monitor the contractor's adherence to the approved impact prevention procedures and the engineer shall issue to the contractor a notice of non-compliance whenever transgressions are observed. The contractor must document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the engineer in the monthly audit reports and to the relevant authority; and
- b. Copies of the Environmental Authorisation and EMPr for the proposed development shall be kept on site and made available for inspection by visiting officials from the relevant environmental departments.

7.2.6 Compliance and Penalties

- a. The contractor shall act immediately when a notice of non-compliance is received and correct the cause of the non-compliance. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and an oral report given at the monthly site meetings;
- b. Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Therefore any avoidable non-compliance, dependant on severity, shall be considered sufficient grounds for contact to be made with relevant provincial or national authorities; and
- c. The engineer's decision with regard to what is considered a violation, its seriousness and the action to be taken against the contractor shall be final. Failure to redress the cause shall be reported to the relevant authority. The responsible provincial or national authorities shall ensure compliance and impose penalties relevant to the transgression as allowed for within their statutory powers.

7.3 Pre-construction & Design Phase

7.3.1 Vegetation

- a. Any protected species which need to be destroyed require the necessary permits, which must be obtained from DEDEAT for those species protected under the relevant legislation;
- b. SSC that require removal are to be marked by the ECO/ a botanist and removed prior to construction;
- c. SSC are to be sent to the NMBM's municipal nursery at Settlers;
- d. Damage or destruction of any protected forest or trees must be avoided, and where this is not possible, the necessary destruction permits must be obtained in advance from DAFF; and
- e. Protected forest clumps to be conserved (as per the site layout approved by DAFF) must be demarcated prior to site clearing and all personnel on site must be educated on the importance of the protection of forest on site. Note that damage or destruction to these areas may incur penalties from DAFF.

7.3.2 General

- a. No-Go/ open space areas must be clearly demarcated/ clearly marked (i.e. with danger tape) before any construction activities commence on site and appropriate measures implemented to ensure compliance;
- b. Professionally compiled stormwater management and erosion plan to be in place and implemented; and
- c. If the current layout is changed, an archaeological walk-through survey of the changes must be conducted and further mitigatory recommendations may be made if necessary.

7.4 Construction Phase

7.4.1 Site Demarcation and Vegetation Clearing

- f. The location and layout of the construction camp is to be determined in consultation with the ECO;
- g. Construction activities should be limited to the area to be developed, which should be clearly demarcated.
- h. Any remaining undisturbed patches of indigenous vegetation/forest must be identified as No-Go areas and demarcated with barrier netting;
- i. Vehicles and/ or plant and personnel shall only be permitted within the demarcated construction areas, or on existing roads and/ or access tracks between demarcated areas;
- j. No clearing of vegetation, storage, disposal or mixing of any substance (e.g. water, cement, petroleum etc.) may take place outside the demarcated construction area without prior approval of the ECO;
- k. Clearing of vegetation should be kept to a minimum, keeping the width and length of the earth works to a minimum;
- l. Clearing must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once);
- m. Where feasible, the clearing of indigenous vegetation shall be avoided and site construction areas shall be located where the natural habitat has been previously transformed;
- n. Indigenous and rescued flora should be preserved for use during rehabilitation; and
- o. Harvesting or removal of any plant material, other than for rescue purposes and for the clearing of vegetation for construction, is strictly prohibited. Staff shall only assist with the (necessary) removal of important plant species if requested to do so, under supervision

7.4.2 Access

- a. Construction workers shall be prohibited from entering areas of the site that fall outside the work area; and
- b. No indiscriminate driving shall occur around access roads and construction areas or areas outside the boundary of the site;

7.4.3 Ablution Facilities

- a. The use of natural areas as toilets is prohibited. Adequate ablution facilities must be provided;

- b. The RP shall designate an area on the site for the placement of portable chemical toilets;
- c. Toilets are to be provided by the contractor for workers at a ratio of at least 1 toilet per 20 workers or as per specifications of the supplier, and must be situated in close proximity to all work areas;
- d. Toilets shall be maintained and properly equipped and shall be serviced regularly by a reputable contractor and the contents shall be removed to a licensed disposal facility; and
- e. Service certificates (confirming proper disposal of chemical toilet waste/emptying of conservancy tanks) must be filed by the contractor for inclusion in the audit reports.

7.4.4 Eating/Break Areas

- a. Designated areas should be identified for workers to assemble during breaks where conditions are safe and waste facilities and drinking water are available;
- b. No cooking of food shall be permitted on or around the site;
- c. Sufficient weather and vermin proof portable bins (with lids) shall be provided. The contractor shall be responsible for the disposal of domestic waste generated as a result of work activities; and
- d. Littering is strictly prohibited. Litter shall be disposed of in the on-site bins.

7.4.5 Materials Handling

Delivery

- a. The contractor shall inform sub-contractors and delivery drivers (e.g. of concrete, sand etc.) of procedures and restrictions in terms of the EMPr, and shall only use designated access roads and material storage areas;
- b. All loads shall be secured/ enclosed to prevent spillage during transport;
- c. All manufactures and/or imported material shall be stored within the Contractors camp, all lay down areas outside of the construction camp shall be subject to the Engineer's approval; and
- d. The contractor shall be responsible for clean-up resulting from failure of sub-contractors to properly contain materials.

Stockpiling

- a. Any excess subsoil (i.e. spoil material) shall be spoiled in a pre-identified location in collaboration with the ECO. Failing that, excess material should be removed to a registered waste disposal facility;
- b. No stockpiles are to be stored in demarcated no-go areas
- c. The Contractor shall ensure that the material does not blow or wash away; and
- d. All stockpiles shall be protected from erosion, stored on flat areas where run-off will be minimised, and if necessary surrounded by a bund wall.

7.4.6 Fuel Storage and Dispensing

- a. The contractor shall take all reasonable steps to prevent the pollution of soil and/ or water resources by fuels and oils as a result of his activities;

- b. Hydraulic oil and temporary fuel supply shall be dispensed over drip-trays which rest on sand in order to prevent spills from making direct contact with the soil;
- c. In the event of spillage, the contaminated soil shall be removed and disposed of, timeously, at a registered waste landfill site at the contractor's cost. Proof of disposal shall be kept for auditing purposes;
- d. In the event that storage of fuels or oils in quantities greater than 1,000 L be required, then these storage areas shall be surfaced with impermeable material and include secondary containment (bunding) capable of holding 110% of the maximum storage capacity;
- e. The banded areas will drain to a water tight sump and/or oil trap from where it can be removed off-site for disposal;
- f. All hydrocarbon storage facilities will not be permanent and will be removed on completion of the construction phase;
- g. Drip trays shall be in place under all fuel bowsers and leaking equipment/vehicles;
- h. Drip trays shall be regularly cleaned of any spills and contaminated rain water collecting in them (if required) and the spill material collected and disposed of as hazardous waste; and
- i. Storage drums should be clearly marked for the correct fuel types;

7.4.7 Control of Environmentally Hazardous Materials

- a. All hazardous materials shall be stored away from watercourses and drains, and be handled over an impermeable surface at all times;
- b. Hazardous liquids (such as paints and fuels) shall be stored over a banded area to contain any leaks, and drip trays shall be in place under all fuel bowsers and stationary plant/vehicles;
- c. Solvents and chemicals should be stored in accordance with regulations/ guidelines;
- d. Appropriate spill kits should be available in areas in the proximity of drains;
- e. Should any spills of hazardous materials (including petrochemicals) occur, all contaminated soil shall be removed (at the contractor's expense) and disposed of as hazardous waste and the area suitably rehabilitated. Proof of disposal shall be retained for auditing purposes;
- f. Any material that is used to soak up spills (and is therefore contaminated) must be disposed of at a registered waste disposal facility, and the proof of disposal be retained for auditing purposes;
- g. Transport and disposal of hazardous waste shall be comply with the relevant legislation, including (but not limited to) the use of authorised waste transporters;
- h. All personnel shall be trained and educated during induction on the handling of hazardous substances on site, and dealing with spills or leaks; and
- i. A dry chemical or CO₂ fire extinguisher should be present / hung on the outside of the building or near the pump of the fuel tanks.

7.4.8 Concrete and Cement Batching

- a. Where possible, ready-mix cement shall be used;
- b. Where necessary, the ECO shall designate an area where concrete batching is to take place (on an impermeable surface). Concrete and cement batching shall not be permitted outside these designated areas;

- c. Stormwater must be diverted away from cement batching areas by the means of temporary earth berms in order to prevent contamination should high rainfall be experienced;
- d. No spillage of cement or cement-contaminated water into soil will be permitted. Any contaminated soil will be removed and disposed of at a registered waste disposal site;
- e. Cement mixers shall be placed on trays and no cement mixing will take place on the soil surface or permeable surfaces

7.4.9 Equipment Maintenance

- a. The optimum functioning of all vehicles, equipment, tanks and machinery shall be ensured through the implementation of a programme of scheduled maintenance;
- b. No routine maintenance of earth moving equipment and vehicles shall occur on site;
- c. Should on-site emergency repair work be required to remove immovable equipment or vehicles, this should be conducted over an impermeable surface to collect any liquid spillage;
- d. Leakage from equipment shall be prevented by regular inspection and repair; and
- e. Should a leak or equipment malfunction be detected, the appropriate personnel shall immediately be informed and every effort made to prevent further leakage.

7.4.10 Waste Management

- a. Excess excavated material that cannot be used for backfill should not be allowed to accumulate on site and should be disposed of at a formal landfill site or suitable spoil site identified in conjunction with the ECO;
- b. Sufficient weather and scavenger-proof bins (with lids, to prevent the escape of litter) shall be provided, and be easily accessible at all points where wastes are generated;
- c. Waste receptacles/skips to be provided for construction waste;
- d. The site shall be kept clean and free of litter, and no litter from the site shall be allowed to disperse to surrounding areas;
- e. All personnel shall be instructed to dispose of all waste in the proper manner;
- f. No on-site burning, burying or dumping of any waste materials, litter or refuse shall occur;
- g. The Contractor shall identify and separate materials that can be re-used or recycled to minimise waste e.g. metals, packaging and plastics, and provide separate marked bins for these items;
- h. A dedicated waste management area must be established for the segregation of waste during the construction phase;
- i. All construction materials (e.g. bags of cement) must be suitably stored and protected, so that they do not become damaged and unusable;
- j. The Contractor shall be responsible for the regular disposal (at suitable and licensed municipal waste disposal facilities) of all waste generated as a result of the construction. Waste disposal slips shall be kept for auditing purposes;
- k. No dumping within the surrounding area shall be permitted, and no waste may be buried or burned on site;

- i. Where potentially hazardous substances are to be disposed of, a safe disposal slip shall be kept on record as proof of final disposal; and
- m. Waste should not be allowed to accumulate on site. The frequency of collections will be such that waste containment receptacles do not unduly accumulate or overflow.

7.4.11 Wastewater

- a. No wastewater shall be disposed of to the surrounding soil or stormwater structures;
- b. All effluent water from the camp/ office sites shall be disposed of in a properly designed and constructed system;
- c. All wastewater that is contaminated with hazardous substances shall be collected in a container and disposed of as hazardous waste. Under no circumstances shall it be allowed to enter surface or groundwater resources, including stormwater;
- d. All cement wastewater shall be collected in a container, allowed to evaporate, and the sludge disposed of as hazardous waste. Under no circumstances shall it be allowed to enter soil, surface or groundwater resources, including stormwater;
- e. Wastewater that is contaminated with soaps, detergents, grease, oils, paints and other undesirable materials shall be collected in conservancy tanks and disposed of safely into a wastewater treatment facility; and
- f. Accidental spills shall be cleared and rehabilitated as soon as possible.

7.4.12 Fire Control

- a. A fire officer shall be appointed and shall be responsible for co-ordinating rapid, appropriate responses in the event of a fire;
- b. No burning of vegetation, whether to clear the vegetation, or of cleared vegetation, shall be permitted;
- c. Smoking shall not be permitted in those areas that pose a fire hazard. Such areas include areas where vegetation is such that a fire may spread rapidly e.g. vegetation stockpiles;
- d. Smoking shall only be permitted in designated smoking areas in the site camp;
- e. No cooking or heating fires shall be permitted, except in designated areas within the construction camp. No fires, or designated fire areas, shall be permitted outside of the construction camp;
- f. Sufficient fire-fighting equipment shall be maintained and be accessible on sites at all times. In particular, such fire-fighting equipment shall be readily on hand in areas where hot work may be required; and
- g. In the event that the fire is too large for the on-site personnel to control, the Fire Brigade shall be called to extinguish it.

7.4.13 Dust Control

- a. Clear vegetation in a phased manner;
- b. To minimise dust impacts, areas to be cleared of vegetation or topsoil shall be cleared only when required, and shall be rehabilitated immediately on completion of the construction activity in that area;

- c. Access roads should be kept to a minimum and their length and width should be minimised to reduce the surface area from which dust can be generated;
- d. When necessary, appropriate dust control measures (such as wetting of soil and covering of stockpiles) shall be implemented;
- e. Potable water is not to be used for dust control
- f. Store aggregates 5 mm or less in size in enclosed structures;
- g. When transporting fine materials, dust tarps should be installed on vehicles;
- h. Limit speeds on access and internal roads to 40kmph; and
- i. Maintain a complaints register to monitor levels of nuisance experienced by neighbours and respond to complaints by increasing the frequency and/or intensity of the dust suppression.

7.4.14 Noise Control

- a. No construction to take place before 06:00 and after 18:00 from Monday to Saturday and before 08:00 and after 14:00 on a Sunday in line with NMBM noise by-law (2010);
- b. Should after-hours work or activities that may disrupt neighbours be required these must be preceded by notice being given to the affected neighbours at least 24 hours in advance;
- c. Construction staff should receive "noise sensitivity" training;
- d. An ambient noise survey should be conducted during the construction phase;
- e. Exceedances of the noise limits must be investigated and corrective actions implemented;
- f. Equipment that is fitted with noise reduction facilities must be used as per operating instructions and maintained properly during site operations; and
- g. A complaints record must be kept to record any complaints lodged resulting from noise disturbance.

7.4.15 Vegetation

- a. Keep vegetation clearance to the absolute minimum; keeping the width and length of the earth works to a minimum;
- b. Clearing must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once);
- c. Vehicles and/ or plant and personnel shall only be permitted within the demarcated construction areas, or on existing roads and/ or access tracks between demarcated areas;
- d. No clearing of vegetation, abstraction, storage, disposal or mixing of any substance (e.g. water, cement, petroleum etc.) may take place outside the demarcated construction area without prior approval of the ECO;
- e. Ensure that vehicles stick to existing tracks and transformed areas as far as possible;
- f. No fires permitted on site;
- g. Harvesting or removal of any plant material, other than for rescue purposes and for the clearing of vegetation for construction, is strictly prohibited;
- h. Monitor the surrounding area for signs of dumping of waste, destruction of natural forest, and invasion of additional informal residences; and
- i. Rehabilitation of forest in previously inhabited areas (Zweledinga and New Rest), including:

- a. Management of alien invasive vegetation; and
- b. Monitor and prevent dumping and re-establishment of informal housing in these areas.

7.4.16 Fauna

- a. No hunting, poaching or otherwise harming of wildlife on and around the site;
- b. Check for animals before clearing of site and clear vegetation in a phased manner in order to allow any fauna to migrate to adjacent areas safely;
- c. Ensure that no animals are harmed or trapped during construction activities;
- d. No wildlife may be removed from the site or surrounding areas unless approved by the ECO in conjunction with the appropriate permits obtainable from DEDEAT; and
- e. Educate workers and residents about the protection of all fauna on site.
- f. Educate residents about the protection of all fauna on site;
- g. Monitor the surroundings for signs of encroachment;

7.4.17 Palaeontology

- a. Identify and appoint stand-by palaeontologist should paleontological finds be uncovered by earthworks;
- b. Construction personnel to be alert for rare fossil bones and follow "Fossil Finds Procedure";
- c. Cease construction on (chance) discovery of fossil bones and protect fossils from further damage;
- d. Contact appointed palaeontologist providing information and images;
- e. Palaeontologist will assess information and establish suitable response, such as the importance of the find and recommendations for preservation, collection and record keeping; and
- f. Exposed fossiliferous sections in earthworks recorded and sampled by appointed palaeontologist.

7.4.18 Archaeology

- a. If the current layout is changed, an archaeological walk-through survey of the changes must be conducted and further mitigatory recommendations may be made if necessary;
- b. A professional archaeologist to be appointed to monitor the vegetation clearing to identify the extent of the occurrence of archaeological coastal remains and sites. The responsibility of the archaeologist will be to guide the developers and construction managers on the preferred method of vegetation clearing and monitor the vegetation clearing and record any archaeological scatters and sites that may be uncovered;
- c. The decision for collection and possible test-pitting and phase 2 mitigation will be the decision of the appointed archaeologist after assessment of significance. The archaeologist on assessment of the activities and the findings make further recommendations such as monitoring during excavations. The cost of appointment will be the responsibility of the developer;

- d. If concentrations pre-colonial archaeological heritage material and/or human remains (including graves and burials) are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the Eastern Cape Provincial Heritage Resources Agency (ECPHRA) (043 745 0888) so that systematic and professional investigation/excavation can be undertaken. Phase 2 mitigation in the form of test-pitting/sampling or systematic excavations and collections of the pre-colonial shell middens and associated artefacts will then be conducted to establish the contextual status of the sites and possibly remove the archaeological deposit before development activities continue; and
- e. A person must be trained as a site monitor to report any archaeological sites found during the development. Construction managers/foremen and/or the Environmental Control Officer (ECO) should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

7.4.19 Traffic

- a. Create awareness of presence of construction traffic,
- b. Restrict construction vehicle operations to low-volume periods;
- c. Combine delivery of resources to minimise trips; and
- d. Record condition of roads before commencement, repair immediately and monitor during construction and if required effect repairs after construction.

7.4.20 Socio-economic

- a. The developer should encourage the contractor to increase the local procurement practices and promote the employment of people from local communities, as far as feasible, to maximise the benefits to the local economies;
- b. The developer should engage with local business organisations to investigate the possibility of procuring construction materials, goods and products from local suppliers where feasible;
- c. Recruit local labour as far as feasible;
- d. Employment labour-intensive methods in construction where feasible;
- e. As far as possible, local small and medium enterprises should be approached to investigate the opportunities to supply maintenance services.
- f. Sub-contract to local construction companies particularly SMMEs and BBBEE compliant enterprises where possible;
- g. Use local suppliers where feasible and arrange with the local SMMEs to provide transport and other services to the construction crews;
- h. Establish a management forum comprising key stakeholders to monitor and identify potential problems that may arise due to the influx of workers to the area;
- i. Assign a dedicated person to deal with complaints and concerns of affected parties;
- j. Ensure the list used to allocate housing is followed so that no additional informal housing is built during construction of the low-cost housing;

- k. Ensure that regular inspections occur to eliminate any reintroduction of informal housing to the area with strict enforcement of by-laws; and
- l. Meet with the affected owners and discuss their concerns over property and land values, as well as educate and inform them on the potential impacts that could ensue from replacing informal settlements and the positives of such an endeavour.

7.4.21 Stormwater and Erosion

- a. Construction materials that can potentially pollute stormwater such as cement and fuels to be properly contained;
- b. Any erosion noted as a consequence of construction activities is to be rehabilitated immediately;
- c. All soil stockpiles to be monitored for erosion;
- d. Hazardous materials to be stored and handled over impermeable surfaces, and any spills collected for disposal at a waste landfill site;
- e. Contaminated wastewater to be collected for disposal at a waste landfill site; and
- f. Revegetation to take place as soon as possible.

7.4.22 Rehabilitation

- a. Rehabilitation should be carried out progressively throughout the construction phase;
- b. The contractor must rehabilitate the construction site, construction camp, batching areas and any other disturbed areas once construction activities have terminated;
- c. All leftover materials, waste and plant are to be removed off site and either disposed of (at a registered landfill site) or re-used;
- d. Compacted areas are to be ripped and mulched in order to ensure recovery of the natural vegetation cover. Where topsoil has been cleared, the topsoil must be re-instated prior to revegetation. A method statement must be provided and maintained by the contractor.
- e. All invasive vegetation is to be removed and disposed of at a landfill site;
- f. Flora recovered during the search and rescue operation can be used during rehabilitation;
- g. If development option 2 is chosen, the areas previously occupied by informal settlements are to be fenced off to discourage the establishment of new settlements and to allow for the regrowth of natural vegetation;
- h. Regular inspections of the fenced areas are to be made to ensure revegetation of the site is taking place and to control the growth of alien vegetation; and
- i. A site-specific rehab plan (for the forested areas) must be compiled by a suitably qualified expert.

7.5 Operational Phase

7.5.1 Vegetation

- a. Forest areas shall be maintained free of invasive alien vegetation;

- b. Educate residents so as to identify alien vegetation for firewood collection and indigenous forest for conservation; and
- c. Monitor the surrounding area for signs of dumping of waste, destruction of natural forest, and invasion of additional informal residences.

7.5.2 Traffic

- a. No development on portion 10 of farm 28 or reposition access road to the west;
- b. Provision of Sidewalk along affected roads;
- c. Upgrade of Van Renen, Aliwal and Albany Roads if necessary;
- d. Provision of pedestrian facilities along Van Renen, Aliwal and Albany Roads;
- e. Provision of formal embayments and turn-around facilities at entrances;
- f. Provision of Advanced warning measures and improvement of shoulder sight distance;
- g. Upgrade intersection to accommodate additional volumes (Development option 2);
- h. Upgrade of Seaview Road if necessary;
- i. Upgrade Jill St junction to accommodate additional volumes (Development option 2);
- j. Provision of pedestrian facilities along Seaview Road and access road; and
- k. Provision of formal public transport facility at entrance to development (Development option 2).

7.5.3 Socio-economic

- a. The operator responsible for the maintenance of the housing development should be encouraged to, as far as possible, procure materials, goods and products required for the operation of the facility from local suppliers to increase the positive impact in the local economy;
- b. Where possible, local labour should be considered for employment so as to increase the positive impact on the local economy;
- c. As far as possible, local small and medium enterprises should be approached to investigate the opportunities to supply maintenance services;
- d. Municipality to ensure services are delivered and maintained in order to maintain the collection of property tax;
- e. Effective enforcement of municipal by-laws to manage any unlawful construction of new informal housing in the area;
- f. Municipality to ensure that public spaces are kept clean;
- g. Ensure that regular inspections occur to eliminate any reintroduction of informal housing to the area with strict enforcement of by-laws;
- h. The NMBM to conduct regular site inspections to police land invasions activities. A team within the community to be established to work in conjunction with the land invasion officers, to act as whistle blowers and reduce the risk of land invasion.
- i. Provision of timely garbage collection services to avoid disease and pollution risk;
- j. Effective staffing of the Seaview Police Station to address any crime in the area;

- k. Meet with the affected owners and discuss their concerns over property and land values, as well as educate and inform them on the potential impacts that could ensue from replacing informal settlements and the positives of such an endeavour; and
- l. Educate the local residents as to the goals of the municipality in reducing informal housing in the region.

7.5.4 Waste Management

- a. Appropriate municipal refuse collection services must collect domestic refuse on a regular weekly basis in accordance with the municipal waste management specifications;
- b. Sufficient and appropriately placed weather and vermin proof litter bins with lids shall be provided at relevant community facilities as well as in strategic areas around the site for disposal of solid waste; and
- c. Regular inspections of the surrounding areas for signs of dumping and educating community members to inform the NMBM of such activities.

7.5.5 Wastewater

- a. Monitoring boreholes must be installed down-gradient of the proposed settlements. These must be monitored for bacteria, nitrate and phosphate in order to establish if they are being attenuated efficiently.

7.5.6 Noise

- a. Strict implementation of the NMBM noise control bylaws

7.5.7 Visual

- a. The NMBM must maintain infrastructure and services in the new settlement;
- b. The NMBM must monitor and prevent the spread of additional informal housing in surrounding areas.
- c. Rehabilitation of informal settlement areas once the current residents have been relocated.

7.5.8 Fire Control

- a. The NMBM must maintain infrastructure and services in the new settlement;
- b. The NMBM must monitor and prevent re-occupation of vacated areas of New Rest and Zweledinga; and
- c. Rehabilitation of informal settlement areas once the current residents have been relocated.


7.5.9 Stormwater and Erosion

- a. Adequate number of waste receptacles and regular waste collection;
- b. Regular maintenance and clearing of stormwater infrastructure to prevent blockages; and
- c. Sanitation systems to be properly maintained so that no leakages occur.

7.5.10 Wildlife

- a. No hunting, killing, capturing or snaring of wildlife is to take place on the site or the surroundings.

7.5.11 Archaeology

- a. Terms of Conditions, in the form of a ‘management strategy’ should be included in the any other relevant legal organisation associated with the proposed development. The purpose of this ‘management strategy’ would be to inform the home owners and visitors to the development of possible heritage resources on the properties and surrounds, and to prevent, or at best minimize possible damage of sites to prevent the collecting of material by residents and/or visitors. This ‘management strategy’ document (Terms of Conditions) can be compiled by the Eastern Cape Provincial Heritage Resources Authority (ECPHRA) in cooperation with the Home Owners Association or relevant organisation; and
 - b. The NMBM must erect signage that informs the residents and visitors to the Seaview housing project of the archaeological heritage of the area.
- 

8 Way Forward

The public participation process conducted during the Scoping phase has given IAPs the opportunity to assist with identification of issues and potential impacts.

The Executive Summary of this DEIR has been distributed to registered IAPs. A printed copy of this report will be available for public review at Walmer Public Library (Main Road, Walmer). The report can also be accessed as an electronic copy on SRK Consulting's webpage via the 'Public Documents' link <http://www.srk.co.za/en/page/za-public-documents>

Written comment on this DEIR should be sent by **17h00** on **12 June 2017** to:

Wanda Marais

SRK Consulting

PO Box 21842, Port Elizabeth, 6000

Email: wmarais@srk.co.za

Fax: (041) 509 4850

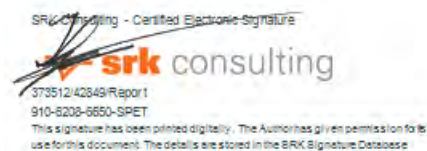
A public open day to present the findings of the DEIR will be held (during the public comment period) between **17h30 and 19h30 on 23 May 2017 at the Seaview Community Hall** (Da Gama Road, Seaview)

The Draft Environmental Impact Report (this report) has been submitted to the other relevant authorities, for comment, and to DEDEAT.

Prepared by



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Tanya Speyers BSc (Hons)
Environmental Scientist

Reviewed by



Rob Gardiner
Partner, Principal Environmental Scientist

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

9 References

- CEN. (2012). *Final Environmental Impact Report for the Proposed Rezoning and Subdivision of Portion 1 of the Farm Seaview No 28, Port Elizabeth for a Residential Development and Associated Infrastructure.*
- CEN. (2013). *An environmental sensitivity assessment of Erf 240 in Seaview.*
- CEN. (2016). *Results of a forest survey on sections of Erven 590, 10/28, 238 and 240 in the Seaview area Nelson Mandela.*
- Cherry. (2013). *Sustainable Settlements Pilot Project, Seaview.*
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- Makhetha Development Consultants. (2016). *Seaview Alternative Sanitation Investigation.*
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- Urban-econ. (2017). *Nelson Mandela Bay Metro Seaview Low Income Housing Development Socio-Economic Impact Assessment Report.*

Appendices

Appendix A: EIA Application Form and Declaration of Interest

Appendix B: DEDEAT Acceptance of FSR

Appendix C: Site photographs

Appendix D: IAP Register

Appendix E: Public Participation

Appendix E1: IAP correspondence on BID

Appendix E2: IAP correspondence on DSR

Appendix E3: Proof of Distribution of FSR

Appendix E4: IAP correspondence on FSR

Appendix E5: Records of community meetings

Appendix E6: Social Facilitator Stakeholder Engagement report

Appendix F: Site Maps

Appendix G: Title Deeds

Appendix H: Preliminary Design Reports and Drawings

Appendix H1: Gilgal Preliminary Design Report and Drawings

Appendix H2: MDC Sanitation report

Appendix H3: Package Plant Treatment Works Proposal

Appendix I: NMBM Confirmation of Services

Appendix J: NMBM Relocation Procedure

SRK Report Distribution Record

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