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TOWN & REGIONAL PLANNERS

OVERSTRAND IDF: TOWARDS 2050

ENVIRONMENTAL MANAGEMENT FRAMEWORK

Munisipaliteit • U-Masipala • Municipality
OVERSTRAND

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DEFINITIONS / GLOSSARY OF TERMS

Alien Species:

Means species (plants or animals) which are not indigenous to the Fynbos Biome, including hybrids and genetically altered organisms.

Biodiversity / Biological Diversity:[1]

Biological diversity or Biodiversity is the variety of life around us - life of all kinds, from the largest animal to the smallest plant. Its complexity is measured in terms of variations at genetic, species, and ecosystem levels.

Biodiversity plays a critical role in meeting human needs directly while maintaining the ecological processes upon which our survival depends. Biodiversity is the biological and social capital which supports all our lives. It is vital for our survival and is a key measure of the health of our planet. The Western Cape's biodiversity is in a constant state of flux as it responds to natural forces and human activity. Our biodiversity and vast natural resources are under threat from global warming, pollution and escalating development.

Biodiversity is concerned with the kind of world, and the kind of land, that we want to live in and to pass on to our children and grandchildren.

Categories:

Categories relate to a larger grouping of similar, homogenous baseline information comprised of data features. Typical categories include hydrology, vegetation, geology, soils etc.

Coastal Zone:

Means the area comprising coastal public properly (mainly Admiralty Reserve and land below the High-Water Mark), the coastal protection zone (an area along the inland edge of coastal public property), coastal access land (which the public may use to gain access to coastal public property), special management areas, and coastal protected areas, the seashore, coastal waters and the Exclusive Economic Zone and includes any aspect of the environment on, in, under and above such area.

Coastal Management Programme:

Means the National or a Provincial or Municipal coastal management programme established in terms of Chapter 6 of the NEM:ICMA.

Coastal Planning Scheme:

Means a scheme that:

a) reserves defined areas within the coastal zone to be used exclusively or mainly for specified purposes; and

b) prohibits or restricts any use of these areas in conflict with the terms of the Scheme.

It is important to note that a coastal planning scheme may not create or change any rights to use land or coastal waters.

Coastal Protection Zone:

Means the coastal protection zone contemplated in section 17 of the NEM:ICMA. In essence, the coastal protection zone consists of a continuous strip of land, starting from the High Water Mark and extending 100 metres inland in developed urban areas zoned as residential, commercial, or public open space, or 1000 metres inland in areas that remain undeveloped or that are commonly referred to as rural areas. The coastal protection zone is established to manage, regulate and restrict the use of land that is adjacent to coastal public property, or that plays a significant role in the coastal ecosystem.

Conservancy:

A conservancy constitutes a voluntary agreement between landowners and the provincial government (CapeNature) to manage the environment in a sustainable manner. This is achieved by means of environmental management plans, ecological auditing, co-operation and dedication to the conservation of nature on private land.

The participants form an organisation that is bound by a constitution, with a set of guidelines drawn up by their representatives, and that is registered with CapeNature.

Cultural Heritage:

As defined in Article 1 of the World Heritage Convention Act, 1999 (Act No. 49 of 1999): monuments, architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science, groups of buildings, groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science, sites, works of man or the combined works of nature and man, and areas including landscapes and archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view. For the purpose of this EMF, features of living heritage such as mountains, rock pools, rivers, and boulders, as well as grave sites (e.g. Hoy's Graves) and archaeological features (Khoekoen middens) are also included under this definition.

Development:[2]

The term "development" encompasses that which is central to meeting basic human needs and improving the quality of life – it is fundamentally concerned with realising human potential.

The term "development" should however not be taken to simply mean "growth" – both the qualitative and quantitative economic and social dimensions are fundamental to the broader notion of development. Rampant or uncontrolled growth is often self-defeating.

EMF Regulations:

Environmental Management Framework Regulations, 2010 passed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

Ecosystem:

Means a dynamic complex of animal, plant and micro-organism communities and their non-living environment interacting as a functional unit (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003] [NEM:PAA]).

Ecosystem Services:

As defined in Section 1 of the NEM:PAA as "*environmental goods and services*" meaning:

a. "*benefits obtained from ecosystems such as food, fuel and fibre and genetic resources;*
b. *benefits from the regulation of ecosystem processes such as climate regulation, disease and flood control and detoxification; and*
c. *cultural non-material benefits obtained from ecosystems such as benefits of a spiritual, recreational, aesthetic, inspirational, educational, community and symbolic nature*;"

For the purposes of this EMF, sustainable water provision from streams, rivers, and from groundwater sources, is also included under this definition.

Environment

"Environment" (as defined in NEMA, [Act No. 107 of 1998]) means the surroundings within which humans exist and that are made up of- (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Attributes:

Environmental attributes means the quality ascribed to an element in the environment that distinguishes it in character, form or nature from other elements in the environment.

Environmental Management Focus Area:

Defined areas in which fine-scale (1:10 000 or less) mapping of environmental features / attributes is required, along with detailed land-use, natural resource management guidelines and heritage resource management guidelines where applicable.

Environmental Management Framework (EMF):

The study of the biophysical and socio-cultural systems of a geographically defined area to reveal where specific land-uses may best be practiced and to offer performance standards for maintaining appropriate use of such land.

Estuary:

A partially enclosed permanent water body, either continuously or periodically open to the sea on decadal time scales, extending as far as the upper limit of tidal action or salinity penetration. During floods an estuary can become a river mouth with no seawater entering the formerly estuarine area or when there is little or no fluvial input an estuary can be isolated from the sea by a sandbar and become a lagoon or lake which may become fresh or hypersaline. [3]

“Estuary” means the estuarine functional zone as defined in the National Estuaries Layer, available from the South African National Biodiversity Institute's BGIS website (http://bgis.sanbi.org).

Estuary Protection Levels:

Ecosystem protection level indicates the extent to which ecosystems are protected, based on the proportion of each ecosystem’s biodiversity target that is met in formal protected areas recognised by the NEM:PAA or Marine Living Resources Act (Act No. 18 of 1998). For these calculations, targets for protection were set at 20% of the estuarine habitat area of each ecosystem type. Ecosystem protection level is divided into four categories: well protected, moderately protected, poorly protected and not protected. [4]

Features:

Features refer to the finer, individual environmental elements that comprise a data category, e.g. Hydrology - rivers, streams, wetlands, dams, etc.

Geographical Areas:

A logical spatially demarcated area defined by an EMF as being sensitive, requiring specific management intervention to ensure its future environmental integrity.

Goals:

Goals are present, measurable aims, which need to be implemented in the short-term, in order to achieve the mission of the IMP, as well as the longer-term vision of the FNR.

Indigenous Species:

Means a species (plant or animal) that occurs, or has historically occurred, naturally in a free state in nature within the borders of South Africa, but excludes a species that has been introduced into South Africa as a result of human activity (as per the NEM:BA).

Management:

In relation to a protected area, includes control, protection, conservation, maintenance and rehabilitation of the protected area with due regard to the use and extraction of biological resources, community based practices and benefit sharing activities in the area in a manner consistent with the Biodiversity Act (as per the NEM:PAA).

Management Guidelines:

Management guidelines refer to the specific provisions applied in the management of each individual attribute or activity.

MEC:

Member of the Executive Committee to whom the Premier has assigned responsibility for environmental affairs.

Minister:

Means the Minister of Water and Environmental Affairs.

Municipality:

Means: Overstrand Municipality.

Nature Conservation:

Means the conservation of naturally occurring ecological systems, the sustainable utilisation of indigenous plants and animals therein, and the promotion and maintenance of biological diversity.

Natural Heritage:

As defined in Article 2 of the World Heritage Convention Act, 49 of 1999: "*natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view, geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation, natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty*".

Oligotrophic River:

An oligotrophic river is a river with low primary productivity, the result of low nutrient content. Such rivers have low algal production, and consequently, often have very clear waters, with high drinking-water quality.

Project Steering Committee:

The development of the EMF is overseen by a Project Steering Committee. The committee should be composed of, as a minimum, the initiator, relevant local, provincial and national regulatory authorities, and additional members with an expertise as deemed appropriate by the aforementioned.

Special Management Area:

Means an area declared as such in terms of Section 23 of the NEM:ICMA. Special management areas are, by definition, wholly or partially located in the coastal zone.

A special management area can be declared if environmental, cultural or socio-economic conditions in the area require it to:

- Achieve the objectives of a coastal management programme;
- Facilitate the management of coastal resources by local communities;
- Promote sustainable livelihoods; or
- Conserve, protect or enhance coastal ecosystems and biodiversity.

Sustainable:

Linked with the word "development", sustainable means prudent use, long-term thinking, and stewardship.

Sustainable Development:[5]

The term "sustainable development" can be defined as the process through which current and future generations realise their human potential, whilst maintaining diverse, healthy and productive ecosystems, and minimising harm to other life-forms. Sustainable development is not only about ecology or economics, it includes the social, cultural and governance dimensions as well.

Any future development in the Overstrand must be socially, environmentally and economically sustainable, i.e. meet the "triple bottom line" criteria for development. Sustainable development requires the consideration of all relevant factors including the following:

a. that the disturbance of ecosystems (and loss of biological diversity) is avoided, or where it cannot be altogether avoided, is minimised and remedied;
b. that the disturbance of landscapes and any cultural sites on the FNR is avoided, or where it cannot be altogether avoided, is minimised and remedied;

c. that the development, use and exploitation of renewable resources and the ecosystems of which they are a part, do not exceed the level beyond which their integrity is jeopardised;
d. that a risk-averse and cautious approach is applied (also called the Precautionary Approach) to the general management of the FNR Complex, which takes into account the limits of current knowledge about the consequences of decisions and actions.

Sustainable Development according to the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA):

‘‘means the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations”

PART 1: INTRODUCTION

1.1 BACKGROUND

The Overstrand Municipality, which is located along and inland of the south western coastline of the Overberg District Municipal Area covers a land area of approximately 1 707 km^2 and includes the towns / settlements of Rooi Els, Pringle Bay, Bettys Bay, Kleinmond, Greater Hermanus, Stanford and Greater Gansbaai (**Figure 1**). The Municipal Area has a coastline of approximately 200 km, stretching from Rooi Els in the west to beyond Quoin Point Nature Reserve in the east.[6] The picturesque town of Hermanus is the centre of the jurisdiction area of the Overstrand Municipality, and is the main economic centre for the Municipal Area.

As a result of the rugged, varied topography and underlying geology,[a] the Municipal Area has a varied range of landscapes, distinguished by their landform and micro-climates, which support productive farmland and a diversity of fynbos-dominated natural habitats, rivers and estuaries, and a productive marine environment (fisheries).

Broadly, such landscapes include sandy coastal plains; rugged sandstone-dominated mountain ranges of the Cape Fold Belt; open valleys (in which most of the agricultural crop-farming land is situated); and a diversity of freshwater and coastal habitats (including rivers, streams, estuaries and wetlands, fine-grained sandy beaches, exposed rocky headlands and wave-cut rocky platforms).

Outstanding features of the coast include Cape Hangklip at Rooiels; the mountainous Kogelberg Biosphere Reserve, which is recognised as the heart of the Cape Floristic Kingdom[b]; the Betty's Bay African Penguin Colony at Stony Point; the Fernkloof, Walker Bay, Grootbos and Quoin Point Nature Reserves; the Agulhas Plain; the Betty's Bay Marine Protected Area; and the Walker Bay Marine Protected Area. The coastal areas are contrasted by spectacular, imposing mountain ranges, running nearly parallel to the coastline, and rising very steeply from sea level. At ± 964m Maanskynkop is the highest mountain in the Kleinriviersberg Mountain Range, which surrounds the main centre of Hermanus, and which dominates the entire Walker Bay coastline.

The local urban and rural communities of the Overstrand have historical relationships with these landscapes. They contribute to a feeling of general well-being and create a sense of place for residents and visitors alike. Many of these already imposing landscapes include iconic landmark features in addition to those mentioned above such as Hoy's Koppie in Hermanus; the long white beach called "Die Plaat" in the Walker Bay Nature Reserve, the beautiful Bot and Klein River Estuaries, the "Platbos" indigenous forest; the Hemel en Aarde Valley; and the coastal caves at De Kelders.

The increasing need of land for housing and infrastructure, including potable water, coupled with the high diversity and prevalence of rugged and iconic landscapes, priority habitats, and of land with agricultural potential poses considerable challenges to town planners, farmers, conservation bodies and decision makers (authorities).

The unpredictable effects of climate change, and the potential for dramatic changes to the natural environment in the future, also makes it essential to plan well in advance of these changes taking place. At the same time the cumulative effects of the main issues currently affecting rural and natural environments such as infestations of invasive alien plants, associated increased fire risks in an already fire-prone environment (**Figure 2**), increased agricultural pursuits, and increasing levels of water abstraction must be considered and planned for.

These issues and land-use pressures place the protection of the natural beauty of the Overstrand (arguably the regions greatest asset, which underpins the local economy from a tourism point of view)

[a] The Overstrand Municipal area is underlain by rocks of five main geological formations (stratigraphic units) which are, in chronological order (from oldest to youngest), the Malmesbury, Table Mountain, Bokkeveld and Bredasdorp Groups. The Malmesbury Group rocks are intruded by granites of the Hermanus Pluton.
Reference: Umvoto Africa. (2011). Results of Monitoring Programme April 2011 to September 2011. Volume 1 Gateway Wellfield. Water Source Development and Management Plan for the Greater Hermanus Area, Overstrand Municipality. Draft May 2012.

[b] The smallest of the world's six biomes.

at the centre of policy and actions to ensure sustainable development, food security (agriculture), economic security, sound environmental management and ecosystem custodianship in the Municipal Area.

In recognition of the need to manage the various issues and land-uses at a strategic level, Messrs Urban Dynamics Western Cape (UDWC) appointed Withers Environmental Consultants (WEC) to prepare an Environmental Management Framework (EMF) for the Municipal Area on behalf of the Overstrand Municipality. As such, this EMF was initiated to guide the future planning of the Overstrand region, to strive towards attaining sustainable development.

The EMF should be read together with the Integrated Development Framework (IDF) Towards 2050 document that has been developed by UDWC for the Overstrand Municipal Area and informs, *inter alia*, the policies and associated implementation mechanisms contained therein.

This report provides, *inter alia*, an overview of the current state of the environment within the Municipal Area (including biophysical features, socio-economic characteristics, challenges and opportunities), provides a strategic EMF (including environmental sensitivities, environmental opportunities and constraints, sustainable land-uses, guidelines for natural resources management, and a policy framework), describes the maps / data that will feed into the existing set of Municipal GIS-based spatial land-use decision support tools, and provides guidelines for the continual review and improvement of the EMF. This report is also illustrated with a series of maps that were developed to spatially represent the described biophysical, social and social information.

As such, this EMF provides a basis from which to promote and guide environmentally and socially responsible and sustainable development within the Overstrand Municipal Area towards 2050.

1.3 PURPOSE OF THE EMF

According to the National Department of Environmental Affairs (DEA), the core purpose and functioning of an EMF, is to function as a support mechanism in the Environmental Impact Assessment (EIA) process in the evaluation and review of development applications, and to inform decision making regarding land-use planning applications.[7]

The primary purpose of this EMF is to inform decision-making by officials regarding development and land-use applications in the geographic area to which the EMF applies. This EMF also presents and integrates relevant biophysical and socio-cultural information to identify and inform appropriate future land-use and land-use management.

Due to the limitations of the mapped data (described in Section 6.2 of the EMF), the purpose is not for the EMF to identify “sensitive areas” as described in Activities 13, 16, and 24 of Listing Notice 3 of the 2010 National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) EIA Regulations. Similarly, if an area is not identified as “sensitive” in the EMF, development activities may still require environmental authorisation by the competent authority by undertaking a Basic Assessment or a full Scoping and EIA process, should the 2010 NEMA EIA Regulations be triggered by the proposed development activities.

Ground-truthing of the available biodiversity information contained in the EMF will be required by the applicant (by undertaking specialist studies), during the undertaking of the applicable development application in terms of the NEMA.

As such, the EMF does not replace the use of NEMA for determining whether or not development activities will require a Basic Assessment or a full Scoping and EIA process in terms of the NEMA. Importantly, this EMF does not assign control to or limit existing land-use rights.[8]

This EMF is also required as a response to the set of environmental issues and land-use pressures that characterise the Overstrand Municipal Area. The Overstrand is characterised by its outstanding scenic quality and beauty, its rugged and varied topography, and by its rich biodiversity. Similarly, the positioning of most of the urban areas on the narrow coastal plains between the sandstone-dominated mountain ranges of the Cape Fold Belt and the freshwater and coastal habitats not only makes the area unique, but also makes the region vulnerable to further development. These

characteristics are a catalyst for in-migration, and place the area under development pressure to accommodate new businesses, industries, residential areas and tourist facilities.

The positioning of the urban centres, together with expanding populations, the limited available developable and agricultural land, together with water shortages and the increasing pressures on Municipal services provision makes the a area a complex one, from a management and planning perspective.

Without informed management and development decision-making tools, the Overstrand could very easily lose its appeal and attraction to investors, tourists and new homeowners, leading to disinvestment. Therefore, this EMF strives to integrate land-use and development planning decision making in support of the provisions of NEMA, and relevant local and provincial spatial planning imperatives, without compromising the inherent sensitivity of the environment.

In terms of the above, this EMF aims to give effect to the requirements of the NEMA (refer to **Paragraph 2.1** below) for the Municipal Area, in particular to:

- promote sustainable development;
- secure environmental protection of natural resources; and
- promote co-operative environmental governance between the Overstrand Municipality, agencies such as CapeNature, and the relevant National and Provincial Departments (e.g. the Department of Environmental Affairs [DEA], the Department of Environmental Affairs and Development Planning [DEA&DP], the Department of Water Affairs [DWA], and the National and Provincial Departments of Agriculture).[9]

In order to achieve the above, environmental information needs to be described and mapped. In mapping this information it is necessary to consider the sensitivity of each environmental attribute. Such mapped information can then be used by the authorities to guide decision-making about a development proposal lodged in terms of the 2010 EIA Regulations, or in terms of the relevant planning legislation (such as the Land Use Planning Ordinance, 1985 [Ordinance No. 15 of 1985] [LUPO]). Such mapped information must, however, be ground-truthed.

The EMF and the associated maps / data layers (refer to **Part 6** below) should also be consulted by other authorities, especially those who are involved in decisions regarding the use of land (e.g. Municipal rezoning decisions, issuing of mining permits by Department of Mineral Resources [DMR] etc.).[10]

In summary, this EMF is aimed at providing information that can be used by the authorities to support them in making informed decisions that should take development in the "right direction." As such the purpose is to find the best possible land use that protects the natural and cultural resources (i.e. preventing their loss or degradation), whilst at the same time addressing the pressing social needs, such as housing provision and the alleviation of poverty.

1.3 OBJECTIVES OF THE EMF

The objectives of this EMF strive to:[11,12]

- Promote judicious management of natural resources:
    - (i) to safeguard and improve ecosystem services, by providing clear policies, management guidelines and action plans;
    - (ii) by identifying geographic areas:
        - a) in which development applications (e.g. for housing, infrastructure development, community facilities, land for crop farming and extensive grazing) could be considered;
        - b) in which current activities should be discontinued (e.g. extensive grazing in areas supporting threatened vegetation, or in naturally vegetated corridors that link areas of high biodiversity);

c) in which management interventions should be focussed (e.g. the clearing of invasive alien plants, especially in fire-prone areas, and in key catchment areas – which leads to increased biodiversity and water provision from these areas).

- Support informed and integrated decision-making by development applicants / proponents and authorities at all levels by making significant and detailed information about the natural and cultural environment of the Municipal Area available (to authorities and to developers), before development proposals are generated;
- Contribute to environmentally sustainable development by identifying:
  (i) already existing management challenges to be addressed by anticipating potential impacts, and by providing early warnings in respect of thresholds, limits and cumulative impacts;
  (ii) geographic areas in which development applications (e.g. for housing, infrastructure development, community facilities, land for crop farming and extensive grazing) could be considered;
- Support the undertaking of Environmental Impact Assessments in the area by indicating the scope of potential impacts and information needs that may be necessary for Environmental Impact Assessment;
- "Red Flag" geographical areas within which additional specified activities may need to be identified in terms of the 2010 NEMA EIA Regulations;
- Support the process of delineating geographical areas[c] within which activities listed in terms of the 2010 NEMA EIA Regulations may identified and/or excluded; and
- Present the environmental attributes that inform the EMF in a spatial and electronic format (i.e. maps / data that will feed into the existing set of Municipal GIS-based spatial land-use decision support tools), that enables users to view and interrogate the EMF data at varying scales.

1.4 STRUCTURE OF THE EMF

The EMF is comprised of two components:

- **an EMF Report (this report):** Presents an analysis of the baseline information, identification and mapping of key environmental attributes, and the determination of suitable (allowable/sustainable) land-uses and relevant management guidelines; and
- **supporting maps / data:** Presents the environmental attributes that inform the EMF in a spatial and electronic format and enables users to view and interrogate the EMF data at varying scales.

The structure of this EMF Report is as follows:

Part 1: Introduction

Provides an introduction to the EMF, defines what an EMF is, explains the need for and purpose of the EMF for the Overstrand jurisdiction area, describes the objectives of the EMF, and describes the structure of the EMF.

Part 2: Legal Context of the EMF

Describes the alignment of the EMF with, *inter alia*, the Environmental Management Framework Regulations, 2010, promulgated in terms of the NEMA, as well as the associated Integrated Environmental Management Guideline Series (Guideline 6: Environmental Management Frameworks), issued by the DEA on 10 October 2012.[13]

[c] Fine-scale mapping should be conducted in the identified Environmental Management Focus Areas (refer to **Paragraph 5.4.4** below).

Describes what the content of an EMF must contain in terms of the Regulations, and the alignment of the EMF with the Integrated Development Plan (IDP), Spatial Development Framework (SDF), and Overstrand Towards 2050: Integrated Development Framework (IDF) documents.

Part 3: Approach and Methodology

Describes the approach to, and methodology employed in developing this EMF, and the associated maps / data.

Part 4: Situational Analysis

Provides a summary of the key attributes of the physical and natural environment, and of the socio-economic environment (including the cultural and heritage resources).

Summarises the most pertinent challenges and opportunities facing the physical and natural and socio-economic environments of the Overstrand Municipal Area.

Part 5: Environmental Management Framework

Identifies suitable and unsuitable land-uses, provides environmental management guidelines for the terrestrial, aquatic and marine environments, and provides policies and action plans for judicious natural resource management and spatial planning.

Part 6: Maps / Spatial Data

Introduces the maps / data that will feed into the existing set of Municipal GIS-based spatial land-use decision support tools, and provides an explanation of how the maps / spatial data should be utilised.

Part 7: EMF Implementation and Document Review

Describes how the EMF should be implemented to inform:

(i) decision making by authorities at all levels regarding development and land-use applications in the geographic area to which the EMF applies;

(ii) and assist development applicants / proponents by identifying areas that could be less sensitive to developments, including agricultural development.[d]

It specifies how the EMF should be used and implemented and describes the roles and responsibilities of various key role players in implementing the EMF. It also describes the way forward with respect to the continual review, revision and improvement of the EMF.

[d] Note that if an area is not identified as "sensitive" in this EMF, development activities may still require a Basic Assessment or a full Scoping and EIA process, should the 2010 NEMA EIA Regulations be triggered by the proposed activities

PART 2: LEGAL CONTEXT OF THIS EMF

2.1 Alignment with the Provisions of the NEMA

EMFs are part of the suite of Integrated Environmental Management (IEM) tools that can be used to support informed decisions regarding the management of impacts on the environment that arise out of human activities and developments. In 2010, the Minister of Environmental Affairs passed the Environmental Management Framework Regulations (EMF) Regulations, 2010 in terms of the NEMA.

This EMF was compiled in accordance with the above EMF Regulations, and with the associated EMF Guidelines issued by the National Department of Environmental Affairs (DEA).

The purpose of the EMF Regulations is to provide:

a) *"for the Minister or MEC with concurrence of the Minister to initiate the compilation of information and maps specifying the environmental attributes referred to in section 24(3) of the Act specifying the attributes of the environment in particular geographical areas;*

b) *for such information to inform environmental management; and*

c) *provide for such information and maps to be used as environmental management frameworks in the consideration, as contemplated in section 24(4)(b)(vi) of the Act, of applications for environmental authorisations in or affecting the geographical areas to which those frameworks apply".*

Regulation 4 of the EMF Regulations, 2010 states that an EMF must:

a) "*identify by way of a map or otherwise the geographical area to which it applies;*

b) *specify the attributes of the environment in the area, including the sensitivity, extent, interrelationship and significance of those attributes;*

c) *identify any parts in the area to which those attributes relate;*

d) *state the conservation status of the area and in those parts;*

e) *state the environmental management priorities of the area;*

f) *indicate the kind of developments or land-uses that would have a significant impact on those attributes and those that would not;*

g) *indicate the kind of developments or land-uses that would be undesirable in the area or in specific parts of the area;*

h) *indicate the parts of the area with specific socio-cultural values and the nature of those values;*

i) *identify information gaps;*

j) *indicate a revision schedule for the environmental management framework; and*

k) *include any other matters that may be specified*".

Further guidance on the nature, status, scope and development of an EMF is provided in the EMF Guidelines (Guideline 6, issued by the DEA on 10 October 2012).

Once completed, the Minister or MEC in concurrence with the Minister may adopt the EMF in terms of the NEMA with or without amendments, following which the EMF must be taken into account in the consideration of applications for Environmental Authorisation in or affecting the geographical area to which the EMF applies. The EMF Regulations further require that, *inter alia*, once an EMF has been adopted, it must be implemented and monitored on a regular basis to ensure that it achieves its purpose and goals. The Regulations also make allowance for the revision of the EMF at appropriate intervals, on condition that such revision is subject to a public participation process.

2.2 What is the Relationship between the EMF, IDP, SDF and IDF?

The EMF for the Overstrand Municipality is a key informant of the Overstrand towards 2050 Integrated Development Framework (IDF) that has been developed by UDWC to set the strategic direction for the Overstrand's growth and development for the next 30-40 years. This is to be achieved by amalgamating the current five year planning cycle (as described in the Integrated Development Plan [IDP]) with a long term integrated spatial vision. The IDF will be used as a strategic guide for future sustainable spatial growth and development, specifically in terms of land-use planning, service infrastructure planning, conservation and environmental management for the area.

The IDF provides a platform for strategic integration by building on existing policies as well as by introducing new Municipal policies and action plans. In addition it provides an Integrated Spatial Development Framework (SDF) and an Environmental Management Framework (EMF) that outlines the direction of future spatial development for the Overstrand Region.

The difference between an EMF and a SDF is that an EMF focuses on environmental attributes whereas an SDF reflects proposals or intentions in relation to land-use and development. An EMF serves primarily as an environmental decision-making tool for the Provincial Authority (i.e. the DEA&DP), but can also be used by other decision-makers (e.g. the Municipality) and by the public sector. Furthermore, this EMF document specifically informs and gives effect to the eight strategic directives as described in the IDF, particularly to the realisation of "*An environmentally sustainable and resilient Overstrand*".

The provisions of the Municipal Systems Act, 2000 (Act No. 32 of 2000) requires that the compilers of SDFs (and IDPs) take into account information contained in a relevant EMF. As such, this EMF (in particular the supporting maps / spatial data) will be used to inform the next generation SDFs by means of an environmental "layer" or series of "layers," thereby informing the identification of areas suitable / unsuitable for particular land-uses.

As such, this EMF, read together with the IDF, IDP and SDF documents for the Overstrand Municipal Area of jurisdiction, will be used to provide environmental and planning direction to the environmental authorities, the Municipality, private developers, other infrastructure providers, and to the public sector to achieve long-term sustainable development.

Due to the limitations of the mapped data (described in Section 6.2 of the EMF), the purpose is not for the EMF to identify "sensitive areas" as described in Activities 13, 16, and 24 of Listing Notice 3 of the 2010 NEMA EIA Regulations.

Similarly, if an area is not identified as "sensitive" in the EMF, development activities may still require environmental authorisation by the competent authority by undertaking a Basic Assessment or a full Scoping and EIA process, should the 2010 NEMA EIA Regulations be triggered by the proposed development activities. Ground-truthing of the available biodiversity information contained in the EMF will be required by the applicant (by undertaking specialist studies), during the undertaking of the applicable development application in terms of the NEMA.

Future revisions of the EMF should include finer scaled mapping. Alternatively, finer-scaled mapping should be undertaken in twelve Environmental Management Focus Areas, which have been identified based on environmental sensitivity, and on impending or current development pressure (refer to **Paragraph 5.4.4** below). Fine-scale (at a scale of 1:10 000 or less) mapping of environmental features / attributes is required in these Environmental Management Focus Areas, along with detailed land-use, natural resource management guidelines and heritage resource management guidelines where applicable (i.e. specific EMFs should be developed within such focus areas).

As such, the EMF does not replace the use of NEMA for determining whether or not development activities will require a Basic Assessment or a full Scoping and EIA process in terms of the NEMA (refer to **Paragraph 6.2** below). Importantly, this EMF does not assign control to or limit existing land-use rights.

PART 3: APPROACH AND METHODOLOGY

3.1 Project Approach

This section outlines the general approach to the EMF, defines the concepts that guided the approach, describes the methodology followed in compiling the EMF, and indicates the key deliverables in the process.[14]

The approach to the EMF has been informed by:

- the broad concept of sustainable development that is enshrined in the South African Constitution;
- by the Vision of the South Africa National Framework for Sustainable Development (NFSD) and of the National Strategy for Sustainable Development and Action Plan's (NSSD 1), namely:

  "South Africa aspires to be a sustainable, economically prosperous and self-reliant nation state that safeguards its democracy by meeting the fundamental human needs of its people, by managing its limited ecological resources responsibly for current and future generations, and by advancing efficient and effective integrated planning and governance through national, regional and global collaboration";
- the intention of the EMF is to provide the tools for integrated and informed planning and decision-making that identifies and spatially represents:
  - clear policies, management guidelines and action plans;
  - the key environmental attributes of the Municipal Area;
  - geographic areas in which management intervention/s should be focussed to safeguard and/or improve ecosystem services;
  - geographic areas with associated land-use (e.g. urban and industrial development or agricultural development) guidelines, determined *inter alia* by legislation governing the environmental and socio-economic attributes of the Municipal Area;
- the need for the EMF to provide authorities with appropriate and relevant information about the "*state of environment*" and the desirable planning parameters to inform decisions regarding land-use management; and
- using a GIS platform, in which spatial data (sourced from the South African National Biodiversity Institute, the Department of Water Affairs, the Southern African Agricultural Geo-referenced Information System, and from other sources) is presented in printed and electronic format.

As such, this EMF intends to ensure that development is sustainable by integrating "*environmental factors into planning, implementation and decision-making, so as to ensure that development within the Overstrand region serves present and future generations*".[e]

3.2 Project Methodology

The methodology and content of this EMF has been informed, *inter alia*, by the EMF Guidelines issued by the DEA on 10 October 2012, and by referencing and consulting EMFs compiled for other Municipal areas by other parties. [15]

The Overstrand Towards 2050 IDF project, which this EMF informs, has been divided into the following phases:

[e] NEMA defines **sustainable development** as "*the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations*".

Phase 1: Project Set-Up (February – March 2012)

The Project Set-Up Phase of the Overstrand IDF project involved:

- The establishment of a Project Steering Committee (PSC) made up of Overstrand Municipality officials, Messrs Urban Dynamics Western Cape (UDWC), and Messrs Withers Environmental Consultants (WEC);
- The clarification of the project scope; and
- Initiating the collection of available and up-to-date environmental and planning literature and spatial data pertaining to the Overstrand Region.

Phase 2: Data Collation and Situational Analysis (March – September 2012)

The Data Collation and Situational Analysis Phase, *inter alia*, identified and described the key (baseline) environmental attributes of the Municipal Area, and identified the key/priority issues/concerns, the drivers of environmental change, and their causes, to inform the development of the EMF, IDF and supporting maps / spatial data.

For this EMF, the key environmental and socio-economic attributes described include:

- The Coast, Wetlands, Rivers, Vleis and Lagoons (Estuaries);
- The rugged, varied Topography and underlying Geology;
- Groundwater Resources;
- Indigenous Vegetation Types;
- Agricultural Land;
- Cultural and Heritage Resources; and
- Social and Economic Characteristics

A host of reliable environmental information and spatial data from reputable sources (e.g. from the South African National Biodiversity Institute (SANBI), the Department of Water Affairs, and the Southern African Agricultural Geo-referenced Information System) are available for many of the environmental attributes of the study area. As such, the Situational Analysis was largely based on existing information, which was analysed by the project team in consultation with relevant organisations and government departments.

Various maps that spatially illustrate the baseline information are provided in the EMF. These maps inform, and will feed into the existing set of Municipal GIS-based spatial land-use decision support tools.

A draft situational analysis report was produced by Messrs WEC and presented to Messrs UDWC during August 2012, for inclusion into the IDF document.

Phase 3: Compile Strategic Prioritised Response Documents (IDF, Human Settlement Plan, EMF and SDF with linked GIS database) (October 2012 – September 2013)

The development of the EMF involved the:

- Development of objectives and associated, policies and action plans to achieve the strategic directive as described in the IDF, namely: "*An environmentally sustainable and resilient Overstrand*".

Compilation of a draft report entitled "*An Environmentally Sustainable and Resilient Municipal Area*", which was produced by Messrs WEC and presented to Messrs UDWC on 4 December 2012, for inclusion into the IDF document.

- Analysis of the information and available spatial data obtained during the Situational Analysis Phase (including, but not limited to the latest systematic biodiversity planning information, namely the 2011 National Biodiversity Assessment [NBA]).[16]
- Development of recommended biodiversity-compatible land-use and guidelines for natural resources management, based on applicable policies and guideline documents that should be consulted during decision making.
- Incorporation of the available maps and spatial data into the existing set of Municipal **GIS-based Spatial Decision Support Tools**, which are to be used by the Municipality when interrogating land-use applications, when conducting land-use planning, and when planning management interventions / actions.

Phase 4: Public Consultation and Council Approval Process (October 2013 – 1st Quarter 2014)

- The EMF will be formally reviewed based on comments received during the Public Participation Process (which are attached as **Appendix 1**, together with responses to such comments).
- The revised EMF will thereafter be submitted to the Overstrand Municipal Council for approval, and then to the DEA&DP for review and adoption.
- In terms of the 2010 NEMA EMF Regulations, the Minister (of Water and Environmental Affairs) or MEC (Local Government Environmental Affairs and Development Planning) may adopt the EMF, with amendments if required.
- Notice of the adoption of the EMF by the Minister, as well as the availability of the EMF for public scrutiny (after the adoption thereof) should thereafter be advertised in the Government Gazette.

Phase 5: Implementation Phase (after approval – 2050)

- Once adopted by the Minister, the EMF must be taken into account in the consideration of applications for Environmental Authorisation in or affecting the geographical area to which the EMF applies, i.e. the Overstrand Municipal Area. In addition, the EMF must be implemented and monitored on a regular basis to ensure that it achieves its purpose and goal.
- Once the Overstrand Municipality adopts the EMF as policy, it must be applied.
- The EMF should be revised from time to time in terms of its revision schedule (refer to **Part 7** of this document), and the revision must be subject to public participation.

PART 4: SITUATIONAL ANALYSIS

4.1 THE SOCIO-ECONOMIC ENVIRONMENT

4.1.1 Background

The Overstrand population was estimated at 80 432 or 31.15% of the Overberg District's population of 258 176 in 2011.[17] There are many towns and villages situated in the Municipal Area including Rooi Els, Pringle Bay, Betty's Bay, Kleinmond, Hawston and Fisherhaven, Hermanus, Stanford, Gansbaai, Pearly Beach, De Kelders, Kleinbaai, Baardskeerdersbos and Buffeljagsbaai. Hermanus is the administrative and economic centre of the area.

In the past ten years the average population growth in the area was 3.8% per annum. The Overstrand's recorded population growth rate is the second highest in the Western Cape Province. This can in part be attributed to in-migration, particularly from the Eastern Cape Province. The total number of households increased from 30 796 in the 2008/2009 financial year to 31 357 in 2010/2011. This entails a 1.82% increase in the total number of households over the two year period.[18]

The Municipal Area is largely rural in character, and has high unemployment (± 24%) and illiteracy levels (± 15.5%). [19; 20; 21]

4.1.2 The Local Economy

Municipal economic priorities include basic service provision, human capital development, environmental management, tourism and job creation. The Overstrand is characterised by pockets of extreme poverty, which assume a racialised character. In 2011, 89% of Africans, 78% of Coloureds and just 10% of Whites earned below the then household subsistence level of R1 600 per month.[22]

In the past five years, however, according to the 2012 / 2013 IDP, the Overstrand Municipality's economy has shown positive growth, and can currently be described as healthy. During the period between 1995 and 2004, the Overstrand's local economy grew by 3.2%, roughly at the same rate as that of the Western Cape Province.[23] The Overstrand Local Municipality also contributes more to the Gross Value Added for the Overberg District Municipality than the other local Municipalities within its jurisdiction.

Economic growth in the Overstrand over the past 5 years took place against the backdrop of the global, national and provincial economic downturn, the upswing which occurred after August 2009, and the second downturn which the country is currently experiencing. One of the lingering effects of the economic depression has, however, been a continued decline in consumer spending. Whilst reduced consumer spending on travel and tourism impacted negatively on the tourism sector (which forms an integral part of the local economy), other sectors grew.

The sectors that showed the highest growth percentages in the past 5 years were trade and catering and transport, followed by business services and construction. The sectors with the highest employment figures were trade and catering, community services, agriculture, government and construction, with the highest amount of job losses in the agricultural and manufacturing sectors.

4.1.3 The Contribution of the Rural Environment to the Local Economy

The rural environment contributes significantly to the local economy (4%) through livestock and crop farming (the picturesque open valleys and lower mountain slopes contain most of the cultivated rural land, which includes deciduous fruit, cereal crops and vineyards), fishing and the commercial farming of abalone and crayfish (Kleinmond has an active harbour and many commercial fishermen make their living along the Hangklip coastline whilst abalone farms and fish factories are located at Gansbaai, and at the new harbour in Hermanus), the growing and harvesting of fynbos species for the cut flower industry, and through forestry.[24]

Approximately 15.98% of the land cover of the Overstrand Municipality has been mapped by the SANBI as "intensively farmed" (excluding extensive grazing in natural vegetation), 1.78% as plantations, and 65.65% as "natural habitat" (refer to **Figure 3**).

According to **Figure 4,** 22.3% of the land within the Overstrand Municipality, nearer the coast, consists of areas of moderate agricultural potential for crop planting, with 4.8% being of marginal arable potential. A further 34.8%, situated further inland, is better suited for plantation establishment, or for the extensive grazing of livestock or wildlife.

Tourism resorts, primarily in the economic category for wholesale & retail, catering and accommodation, contributes 15.3% to the Gross Domestic Product (GDPR). Direct contributions to the economy through tourism include whale watching (land and boat), great white shark cage diving, penguins at Bettys Bay, the diversity of landscapes, natural habitats, historical features (e.g. iconic landmark features, the Old Harbour Museum, and to historical seaside cottages), restaurants, wine farms, golf estates, sailing and water sports on the estuaries.

Wholesale & retail, catering and accommodation (in which tourism is primarily nested) contributed approximately 15.3% of the 2008 GDPR[25] (the knock on effect of tourism is much greater than the initial spend by the tourist, but is unfortunately very difficult to measure).[26] In addition, the rural environment is important for biodiversity conservation, recreation, for water catchments and for other ecosystem services (the benefits people obtain from ecosystems). Tourism, specifically eco-tourism, has the potential of becoming one of the major economic activities in the region, with some 60,000 people visiting the area during the holiday season.[27] The newly established Overstrand Destination Marketing Organisation (ODMO) is also helping to enhance the profile of, and market the Overstrand as a world class tourist destination.[28]

4.2 THE PHYSICAL AND NATURAL ENVIRONMENTS

4.2.1 Locality

The Overstrand Municipality, which is located along the south western coastline of the Overberg District Municipal Area covers a land area of approximately 1 710 km^2, and includes the areas of Hangklip/Kleinmond, Greater Hermanus, Stanford and Greater Gansbaai. The Municipal Area has a coastline of approximately 200 km, stretching from Rooi Els in the west to just beyond Quoin Point in the east.[29] The picturesque town of Hermanus is the centre of the jurisdiction area of the Overstrand Municipality, and is the main economic centre for the Municipal Area.

4.2.2 Climatic Characteristics

The Overstrand Municipality has a distinctly Southern Western Cape climate (traditionally described as a Mediterranean climate comprising cold wet winters and hot dry summers with strong south-easterly winds), which is moderated by winds blowing off the Atlantic Ocean's cool Benguela Current. The Municipal Area normally receives about 450 – 830 mm of rain per year (Hermanus normally receives about 518mm of rain per year)[30] which falls year-round, but which peaks during the winter months from May to August (**Figure 5**). South-easterly cloud brings mist precipitation to the eastern and southern mountain slopes at higher altitudes in summer. Frost may occur on 2 or 3 days per year.

The mean average maximum and minimum temperatures for January and July are 25.6 °C and 6.3°C, respectively. The average midday temperatures for Hermanus range from 15.9°C in July to 24.9°C in February.

Figure 5 The average weather in Hermanus[31]

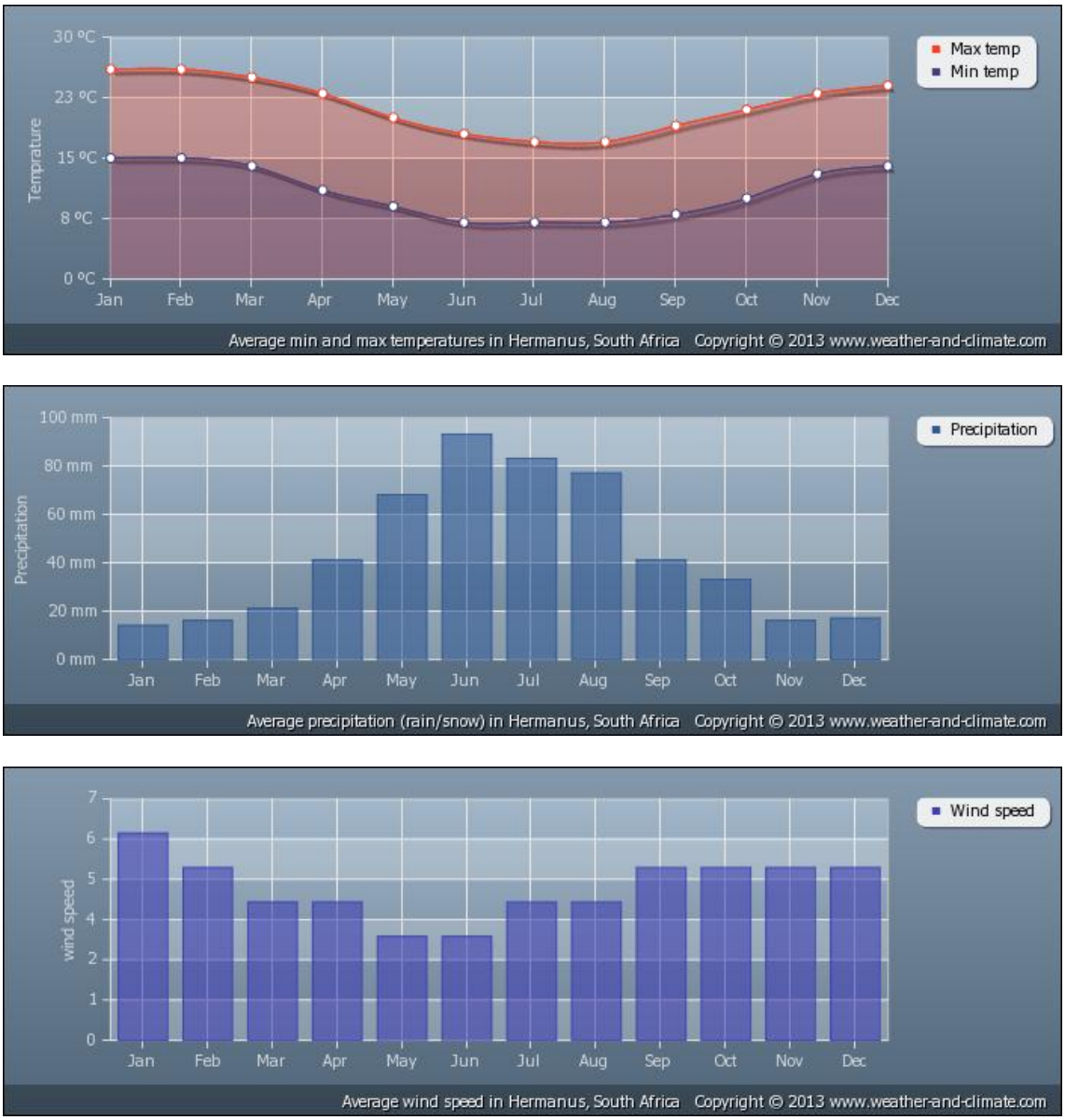

Figure 5: The plots above shows the long term monthy minimum and maximum temperatures, precipitation, and wind speed for Hermanus, South Africa.

4.2.3 Regional Geology

The Overstrand Municipal Area is underlain by rocks of five main geological formations (stratigraphic units) which are, in chronological order (from oldest to youngest), the Malmesbury, Table Mountain, Bokkeveld and Bredasdorp Groups. The Malmesbury Group rocks are intruded by granites of the Hermanus Pluton (refer to **Table 1** below).

The deposits of the Malmesbury Group and the intrusions of the Cape Granite Suite are the oldest formations in the region, >600 million years, and form the basement on which the thick layers of the Palaeozoic Table Mountain Group (TMG) and Bokkeveld Group were deposited. The Malmesbury Group rocks occupy relatively small areas in the Papiesvlei and Ratel River areas and comprise metasediments such as phyllitic shale characterised by clayey soils.

Granite outcrops of the Cape Granite Suite, which form the Hermanus Pluton, can be found north of Stanford at the foot of the Kleinrivierberge, in the Hemel en Aarde Valley north of Hermanus, north of the De Bos Dam and south-east of Pearly Beach.

The TMG dominates the Overstrand Municipal Area as a whole. Two main formations are present, namely the lower Peninsula Formation and upper Nardouw Subgroup. They predominantly comprise resistant quartzitic sandstones separated by the Cederberg Shale Formation. This forms a prominent marker horizon characterised by a smooth green band amongst the otherwise greyish craggy outcrops of quartzitic sandstones. Due to the folded and resistant nature of the fractured quartzites of the Peninsula and Skurweberg Formations, the TMG outcrops form steep, rocky mountains and the west-east trending topographic backbone of the Onrus, Babilonstoring and Kleinriviersberg mountain ranges, a "V" shaped area between Danger Point and Oukraal/Elim, and the catchments of the Haelkraal and Ratel Rivers.

The Bokkeveld Group is composed of less resistant shales and siltstones and subordinate sandstone beds, and forms the base of the Hemel en Aarde Valley, the area between Baardskeerdersbos and Elim, and east of Stanford. It is characterized by clayey soils.

The Bredasdorp Group consists mainly of wind-blown (aeolian) sand, calc-arenite and calcrete deposits and occurs along the coastal plain between the TMG Mountains and the coast. The Bredasdorp Group is most extensive in the Walker Bay area where it reaches thicknesses of over 100 m. The Bredasdorp group deposits infill palaeochannels in the underlying TMG rocks with coarse sediments that give rise to springs, particularly in the Gansbaai area, e.g. De Kelders.

Alluvial (water-transported) deposits comprising sand, gravel and clay occur in mostly narrow belts following the main rivers, particularly the Uilkraal River. A number of regional fault systems cut the Municipal Area with the main trend being ENE-WSW.[32]

Table 1: Stratigraphy of the Hermanus area.

Group	Formation	Lithology	Age
Bredasdorp	Strandveld [Qs]	Unconsolidated white dune sand	Holocene
	- [Qb]	Brackish, calcareous soil	
	Waenhuiskrans [Qw]	Consolidated to unconsolidated dune sand, locally highly calcareous	Late Pleistocene
	Klein Brak [Qk]	Semi-consolidated shelly sand with pebbles, clay and conglomerate	
	- [Qg]	Aeolian sand, sandy soil: Sand and sandy loam of the hillocky veld	Mid to Late Pleistocene
	Wankoe [Tw]	Pale-yellow aeolian calcarenite	Pliocene
~~ Major unconformity ~~~~~~~~~~~~~~			
Supergoup)	False Bay Suite	Dolerite	Cretaceous (136 Ma)
~~ Major hiatus and unconformity ~~~~~~~~~~~~~~			
Bokkeveld	Gamka [Dga]	Dark grey feldspathic sandstone	Early Devonian
	Gydo [Dg]	Black to dark grey shale, mudstone	
Table Mountain	Rietvlei [Dr]	Quartzitic sandstone, siltstone, shale	Silurian
	Skurweberg [Ss]	Coarse quartzitic sandstone	
	Goudini [Sg]	Brown-weathering sandstone, siltstone	
	Cedarberg [O-Sc]	Dark grey, laminated shale, siltstone	
	Pakhuis [Opa]	Massive diamictite, sandstone	~440 Ma
	Peninsula [Ope]	Quartzitic sandstone	Ordovician
~~ Major unconformity ~~~~~~~~~~~~~~			
Cape Granite Suite	Hermanus pluton [N-Chp]	Coarse-grained to porphyritic sheared biotitic granite	540-520 Ma
Malmesbury	Tygerberg [Nt]	Qtz-chl-ser phyllite, greywacke, hornfels	540-750 Ma

4.2.4 Topography and Landscapes

As a result of the rugged, varied topography and underlying geology,[f] the Municipal Area has a varied range of landscapes, distinguished by their landform and micro-climates, which support both productive farmland and a diversity of fynbos-dominated natural habitats, rivers and estuaries, and a productive marine environment (fisheries).

Broadly, such landscapes include sandy coastal plains; sandstone-dominated mountain ranges of the Cape Fold Belt; open valleys (in which most of the agricultural crop-farming land is situated); and a diversity of freshwater and coastal habitats (including rivers, streams, estuaries and wetlands, fine-grained sandy beaches, exposed rocky headlands and wave-cut rocky platforms).

Outstanding features of the coast include Cape Hangklip at Rooiels; the mountainous Kogelberg Biosphere Reserve, which is recognised as the heart of the Cape Floristic Kingdom[g]; the Betty's Bay African Penguin Colony at Stony Point; the Fernkloof, Walker Bay, Grootbos and Quoin Point Nature Reserves; the Agulhas Plain; the Betty's Bay Marine Protected Area; and the Walker Bay Marine Protected Area, comprising a "Whale Sanctuary Area" and an adjacent "Marine Restricted Area" (**Figure 13**). The coastal areas are contrasted by spectacular, imposing mountain ranges, running nearly parallel to the coastline, and rising very steeply from sea level. At ± 964m, Maanskynkop is the highest mountain in the Kleinriviersberg Mountain Range, which surrounds the main centre of Hermanus, and which dominates the entire Walker Bay coastline.

Many of these already imposing landscapes include iconic landmark features in addition to those mentioned above such as Hoy's Koppie in Hermanus; the long white beach called "Die Plaat" in the Walker Bay Nature Reserve, the beautiful Bot and Klein River Estuaries, the "Platbos" indigenous forest; the Hemel en Aarde Valley; and the coastal caves at De Kelders.

The water courses of the Overstrand, in particular, form important altitudinal corridors (linkages for plant and animal dispersal, pollination and movement) between the coast and the mountain ranges. The mountain ranges (including Onrus, Babilonstoring and Kleinriviersberg) in turn link areas of high biological diversity in the Overstrand with naturally vegetated areas in the hinterland, providing unbroken pathways for plant and animal (including insect pollinators) movement.

The local urban and rural communities of the Overstrand have historical relationships with the landscapes surrounding them. The rugged topography, clear mountain streams, wide estuaries and spectacular coastline contribute to a feeling of general well-being and create a sense of place for residents and visitors alike.

4.2.5 Surface Freshwater Resources

The Overstrand Municipality has a large network of important wetlands and river corridors many of which have been identified by the South African National Biodiversity Institute (SANBI) as Freshwater Ecosystem Priority Areas (FEPAs) (**Figure 6**), and/or as Flagship Free-Flowing Rivers[h] (**Figure 7**). The great variability of substrate materials (refer to **Paragraph 4.2.3** above), salinity range and flow regimes create a distinct assemblage of wetland ecosystems from highly acidic "tea-coloured", and oligotrophic rivers (clear, relatively poor in plant nutrients and containing abundant oxygen) to basic limestone pools, and fresh water peat bogs to hyper-saline (salt) pans. Seasonal flooding creates extensive wetlands of significant importance for waterfowl.

Albeit that wetlands are the most threatened of all South Africa's ecosystems,[33] a number of valuable functions are performed by them.

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[f] The Overstrand Municipal area is underlain by rocks of five main geological formations (stratigraphic units) which are, in chronological order (from oldest to youngest), the Malmesbury, Table Mountain, Bokkeveld and Bredasdorp Groups. The Malmesbury Group rocks are intruded by granites of the Hermanus Pluton.
Reference: Umvoto Africa. (2011). Results of Monitoring Programme April 2011 to September 2011. Volume 1 Gateway Wellfield. Water Source Development and Management Plan for the Greater Hermanus Area, Overstrand Municipality. Draft May 2012.

[g] The smallest of the world's six biomes.

[h] A **Flagship Free-Flowing river** is a long stretch of river that has not been dammed, flowing undisturbed from its source to the confluence with another large river or to the sea.

Generally recognised wetland functions relate to:

- water quality (bio-filtration, sediment trapping, protecting shorelines and controlling erosion, aquifer recharge);
- water quantity (reducing peak floods and storing flood waters, supporting stream base flow during the dry season, groundwater discharge/recharge), and
- wildlife habitat (amphibians, birds, fish and mammals for all or portions of their life cycles)(river systems and palustrine (marshy) wetlands have been identified as critically important sites for rare rails and other water birds in Southern Africa[i]).

River corridors in the Overstrand Municipal Area (**Figure 8**) perform a number of similar ecological functions such as modulating streamflow, storing water, removing harmful materials from water (e.g. bulrushes, palmiet, and arum lilies absorbing elevated nutrient levels), and providing habitat and movement/dispersal avenues for aquatic and terrestrial plants and animals. These corridors also have vegetation and soil characteristics distinctly different from surrounding uplands and support higher levels of species diversity, species densities, and rates of biological productivity than most other terrestrial habitats[34]. Indigenous Fish Sanctuaries[j], Freshwater Ecosystem Priority Areas (FEPAs), Fish Support Areas[k], Fish Upstream Management Areas[l] and key Wetland Ecosystems[m] have, *inter alia*, been identified by the SANBI's National Freshwater Ecosystem Priority Area (NFEPA) Programme[35] (**Figure 6**).

Tributaries in South Africa, and in the Overstrand, are generally in better condition and less threatened than main rivers. Healthy tributaries play critical roles in keeping hard working main rivers functioning in terms of supporting water quality & quantity.

Estuaries in the Municipal Area, however, vary significantly in terms of their condition, substrate, salinity, and in terms of the habitats that they provide, ranging from small estuarine river mouths to temporarily open/closed systems, and estuarine lake systems.

While estuaries are generally known to be productive systems, the Overstrand estuaries are primarily fed by oligotrophic rivers, and are thus not particularly productive. The Bot/Kleinmond and Klein River estuaries are exceptions, on account of their size and the long residence time of the water that flows into them. These systems support relatively high densities of fish such as Southern Mullet (Harder) *Liza richardsonii*, and provide important nursery areas for many species including White Steenbras *Lithognathus lithognathus*. They also support most of the waterbird fauna of the Municipal Area, including migratory waders, rails and flamingos. According to Turpie J.K. *et. al.* (2009), the Bot/Kleinmond system qualifies for Ramsar Convention[n] status as a wetland of international importance, especially as waterfowl habitat. [36] The Klein River Estuary has been rated as the 5th most important temperate estuary along the South African Coastline in terms of conservation importance, with the Bot/Kleinmond Estuary in 8th place.[37]

The Klein River Estuary (popularly known as Hermanus Lagoon or Kleinriviersvlei), is situated between the towns of Hermanus and Stanford, and is negatively impacted by flow reduction (abstraction / impoundment for irrigation and alien infestation in the catchment and riparian areas),

[i] BirdLife South Africa has identified three **Important Bird Areas** in the Overstrand Municipal area, namely: "SA107: Eastern False Bay Mountains"; "SA 118: Botrivier Vlei & Kleinmond Estuary"; and "SA 114: Overstrand". Refer to **Figure 13**.

[j] **Fish sanctuaries** are sub-quaternary catchments that are essential for protecting threatened and near-threatened freshwater fish populations that are indigenous to South Africa. They were used by NFEPA as species biodiversity surrogates to supplement the representation of river ecosystem types. A goal of NFEPA is to keep further freshwater species from becoming threatened and to prevent those fish species that are already threatened from becoming extinct.

[k] **Fish migration corridors** provide links between certain habitats (usually between mainstream and tributary habitat) necessary for the migration of threatened migratory fish species. Fish migration corridors are shown as **Fish Support Areas** on the FEPA maps.

[l] **Fish upstream management areas**: These are sub-quaternary catchments in which human activities need to be managed to prevent degradation of downstream fish sanctuaries, fish rehabilitation and translocation areas, and fish migration corridors.

[m] **The biodiversity target for freshwater ecosystems in South Africa is 20%**, which means that we should keep at least 20% of each wetland ecosystem type in a natural or near-natural condition. This serves to conserve many common species and communities, and the habitats in which they evolve.

[n] The Convention on Wetlands of International Importance, called the **Ramsar Convention**, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

increased nutrient loading (waste water treatment works, septic tanks and agricultural return flow and effluent), sedimentation and illegal gill-netting of fish.[38] Such negative impacts have impacted upon the Klein River Esuary's "Health Condition" or "Present Ecological State.

The Klein River Estuary has been rated "C" in terms of its current "Ecological State", and "B in terms of the recommended minimum Ecological "State", or future "Health Condition", since it is considered especially worthy of rehabilitation and a priority for conservation (rated as the fifth most important estuary in the country in terms of botanical, fish and bird data).

The Bot-Kleinmond Estuary System, which is located between the towns of Hawston and Kleinmond has been significantly impacted upon by flow reduction due to water abstraction for agricultural and domestic use, by alien plant infestation in the catchment and riparian areas. Alien plants have also artificially stabilised coastal dunes in the area, which in turn has impacted the height of the sand berms separating the estuary from the sea. An illegal gill-net fishery threatens the estuary's value as a nursery area for marine fish, while some nutrient enrichment and pollution of the system is likely, due to urban and agricultural runoff.[39] The Bot-Kleinmond Estuary System has been rated "C" in terms of its current "Ecological State", and "B in terms of the recommended minimum Ecological "State", or future "Health Condition", since it is considered especially worthy of rehabilitation and a priority for conservation (rated as the eighth most important estuary in the country in terms of botanical, fish and bird data).[o]

The Bot and Kleinmond estuaries are linked when the water level is at least 1.7 m above Mean Sea Level (MSL) via a shallow channel at "Rooisands". Water then flows from the Bot through the Rooisands channel and adjacent Lamloch Swamps into the Kleinmond estuary, and out to sea if the mouth is open. The total amount of water required to breach the Bot Estuary is strongly dependant on the amount lost to the Kleinmond estuary.

The Uilkraals Estuary covers an area of 105 ha and is ranked as the 34th most important estuary in the country in terms of conservation value. The extensive salt marsh area, with its genetically distinctive species and high macrophyte[p] diversity, makes the Uilkraals Estuary unique along the southern Cape coast. It has also been identified as an Important Bird Area. However current factors such as, water abstraction and storage, and pollution, have impacted on the Uilkraals to such a degree that it's estuary been rated "D" in terms of its current "Ecological State", and "B/C" in terms of the recommended minimum Ecological "State", or future "Health Condition".

The National Estuary Biodiversity Plan[40] (developed, as a component of the 2011 NBA), *inter alia*, aims to identify those estuaries that require full or partial protection (i.e. in terms of the NEM:PAA and/ or Marine Living Resources Act, 1998 [Act No. 18 of 1998]). One of the key messages of NBA 2011 is that "*to adequately protect an estuary, it needs to be in a formal protected area with effective no-take zonation, and its freshwater requirements must be guaranteed*". None of the Overstrand estuaries currently have any form of formal protection, although some have nature reserves on adjacent land.

Of almost 300 estuaries countrywide, 56 were listed in the National Estuary Biodiversity Plan as requiring full protection, including the Palmiet Estuary. An additional 61 estuaries were proposed for partial protection, including the Bot-Kleinmond, Klein and Uilkraals estuaries. The National Estuary Biodiversity Plan also recommended that 50% of the estuary margin be left undeveloped for the Palmiet, Bot-Kleinmond and Klein River estuaries, increasing to 75% for the Uilkraals estuary.[41] The C.A.P.E Regional Estuarine Management Programme listed the health of the Onrus Estuary as being

[o] The "Health Condition", or "Present Ecological State" of an estuary, is based on the extent to which an estuary differs from its natural or 'reference' condition, ranging from natural (A) to critically modified (F). For the Overstrand estuaries, the Klein, Bot/Kleinmond and Palmiet were rated C, the Uilkraals D, and the Onrus E.
Reference: Van Niekerk, L. and Turpie, J.K. (eds) (2012). South African National Biodiversity Assessment 2011: Technical Report. Volume 3: Estuary Component. CSIR Report Number CSIR/NRE/ECOS/ER/2011/0045/B. Council for Scientific and Industrial Research, Stellenbosch.

[p] A **macrophyte** is an emergent, submergent or floating type of an aquatic plant, large enough to be visible to the naked eye.
Reference: Biology Online (2013). Macrophyte. Available from http://www.biology-online.org/dictionary/Macrophyte. (Accessed 12 April 2013).

poor, and that rehabilitation of the estuary is required, both in terms of water quality and quantity. The recommended minimum future health condition of the Onrus Estuary is "D" (functional)[42].

In spite of the large network of freshwater resources (and notwithstanding the fact that the winters are cool and wet), the burgeoning population of the Overstrand Municipal Area is beset by shortages of potable water, particularly in the summer months. The De Bos Dam serves as the main potable water supply to the Overstrand (± 2.8 million m³/year), which is supplemented by groundwater from the Gateway Well-Field (± 1.5 million m³/year)[43]. Groundwater is also used for the supply of water to Gansbaai and Stanford. Additional groundwater sources could be further investigated for future use within the greater Hermanus area, including but not necessarily limited to the potential to exploit the Camphill and Volmoed wellfields in the Hemel and Aarde Valley. The monitoring of sustainable yields from the spring or "eye" at Stanford and from the "caves" in Gansbaai should be undertaken.

As such judicious management of all water courses, and in particular high water yield areas[q] (**Figure 7**) NFEPA rivers and their associated sub-quaternary catchment areas (**Figure 6**), and of the De Bos Dam (refer to **Paragraph 4.2.6** below) is of cardinal importance. Such measures include farming and forestry in terms of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA), judicious development planning, the protection of water courses from pollution, and the removal of alien plant species (Refer to **Paragraph 4.3.4** below).

According to the 2011 NBA, High Water Yield Areas are sub-quaternary catchments where mean annual runoff is at least three times more than the average for the related primary catchment. Mean annual runoff is the amount of water on the surface of the land that can be utilised in a year, which is calculated as an average (or mean) over several years. High water yield areas generally occur in mountain catchment areas, and are the "water factories" of the catchment, generating a large proportion of the water for human and ecological use. Maintaining these areas in a healthy state plays a vital role in water security, supporting growth and development needs that are often far away.

High water yield areas make up just 3.9% of the country, and are shown in **Figure 7** for the Overstrand. Currently only 18% of high water yield areas are formally protected country-wide, and only 11.51% of the high water yield areas in the Overstrand[r] are formally protected within the Municipal area (making up 14.08% of the total Municipal area).

Planning for environmentally and socially responsible development in a coastal area such as the Overstrand is especially challenging, in lieu of the fact that coastal and inshore ecosystems are more threatened than offshore ecosystems. According to the 2011 NBA, 17% of South Africa's coast has some form of development within 100m of the shoreline, and nearly a quarter of South Africa's population lives within 30km of the coast. This is especially true in the Overstrand, where all the major urban centres are situated at the coast. As such, development planning should take due cognisance of, *inter alia*, the provisions of the Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (NEM:ICMA), and of the Draft National Estuarine Management Protocol of 4 May 2012,[44] especially regarding coastal and estuarine set-back lines and coastal protection zones (Refer to **Figure 9**, and to **Paragraph 4.3.4** below).

4.2.6 Groundwater

The Table Mountain Group Quartzitic Sandstones support an important aquifer[s] system in the whole of the Overstrand Municipal jurisdiction area.

The Peninsula Formation quartzite in the Hermanus area supports an aquifer, which has been exploited by the so-called Gateway Well-Field for the provision of groundwater to augment potable water supplies to Hermanus.

[q] According to the 2011 NBA, **less than a fifth of high water yield areas in South Africa currently have any form of formal protection**. High water yield areas are of extreme strategic importance for water security. As such, options for extending and strengthening their protection should be prioritised.

[r] High water yield areas cover 23923.77ha or 14.08% of the total land surface of the Overstrand Municipal Area.

[s] An **aquifer** is an underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, or silt) from which groundwater can be extracted.

According to Messrs Umvotu Africa, the Peninsula Formation quartzite unit is hydraulically separated into various fault-bounded compartments, named 'Structural Sub-Areas', across which it is interpreted that there is no hydraulic connection (i.e. no groundwater flow) due to the sealing nature of the annealed fault core.

In some of these compartments the Peninsula Formation quartzite is overlain by Cedarberg Formation shale and the Goudini Formation fine sandstones/siltstones, which act as confining units. In other words, water cannot enter into or escape from the quartzite through the overlying layers, which is the case in Sub-Area 1, in which the Gateway Well-field is located.

In other compartments these overlying units are not present, and the Peninsula Formation is broadly unconfined, for example in Sub-Area 3 (rainwater can infiltrate the Peninsula Formation quartzite unit in this area).

The Gateway Well-field targets the Peninsula Formation within Sub-Area 1. At the well-field, and on the coastal platform, the Peninsula Formation is confined at depth beneath the Cedarberg Formation shales and the Goudini Formation. The recharge zone (source of water) for Sub-Area 1 is where the Peninsula Formation outcrops in the western Kleinrivier Mountain range (Fernkloof Mountains).

Numerical groundwater modelling, and structural geology modelling undertaken by Messrs Umvotu Africa support the conceptual model that recharge (a hydrologic process whereby surface water moves to groundwater) is channelled from Fernkloof by the Hermanus fault to the Gateway Well-field. At the intersection of the Fernkloof and Hermanus Faults, the Peninsula Formation in Sub-Area 1 is in contact with the Peninsula Formation in Sub-area 3. Because the Hermanus Fault is later in origin than the Fernkloof Fault, water is able to cross from the Peninsula Formation at Sub-area 1 to Sub-area 3 at the intersection of the Fernkloof and Hermanus Faults. Water therefore moves along the Hermanus Fault towards the well-field, rather than the Fernkloof Fault acting as a barrier.

The Skurweberg Formation quartzite which overlays the confining beds of the Cedarberg Formation shale and Goudini Formation is also an effective aquifer but is not targeted by the Gateway Well-field (the deeper Peninsula Formation aquifer yields better quality water than shallower layers and the yield is inferred to be more sustainable). In the Hermanus coastal platform the Skurweberg Formation is unconfined, and a monitoring hole (GWE08b) targets this unit to monitor for potential links from pumping in the deep confined Peninsula Formation to the upper Skurweberg Formation aquifer across the Hermanus fault.

In the coastal platform the Skurweberg Formation (south of Hermanus Fault) and Goudini Formation (north of Hermanus Fault) are overlain by the Bredasdorp Group, which forms the shallow alluvium or primary aquifer. Many private well-points penetrate the alluvium for garden watering, and five monitoring points penetrate the alluvium (WP1 to WP4, GWE08a) to monitor a potential link from pumping in the deep confined Peninsula Formation to the upper alluvium aquifer.

Whilst the Gateway Well-Field supplements the water supply to Hermanus by ± 1.5 million m³/year,[45] and groundwater from the Bredasdorp Group is used for the supply of water to Gansbaai and Stanford, additional groundwater water sources should be further investigated. Such additional sources include but are not necessarily limited to the potential to exploit the Camphill and Volmoed wellfields in the Hemel and Aarde Valley, monitoring of sustainable yield from the spring or "eye" at Stanford (refer to **Paragraph 4.2.5** below), and of the caves in Gansbaai.

4.2.7 Indigenous Vegetation Types of the Overstrand Municipal Area

Fynbos, which is largely confined to nutrient-poor soils, is the dominant vegetation group in the Overstrand Municipal Area, accounting for ± 99.7% of the natural vegetation (**Figure 10**).

According to the SANBI's Overberg Transformation Map (**Figure 3**), ± 111 500ha (65.65%) of the Overstrand Municipality is classified as "natural habitat", whilst the remainder comprises degraded areas (3.44%); high density alien plant infested areas (6.93%); plantations (1.78%); intensively farmed areas (15.98% - excluding extensive grazing in natural vegetation); dams (0.14%); roads (3.60%); and urban areas (2.47%).

Remarkable plant diversity characterises natural habitats of the Overstrand Municipal Area. The Overstrand Municipality jurisdiction area contains eighteen vegetation types, six of which are classified as **critically endangered** in Government Gazette No. 1002, promulgated in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) of 9 December 2011(refer to **Table 2** below, and to **Figure 11**).

Table 2: Indigenous Vegetation Types of the Overstrand Municipal Area.

Vegetation Type and Map Symbol	Chief Classification Criterion	Remaining Natural Area of Ecosystem	% Formally Conserved	National Conservation Target[46]	Extent in Overstrand
Elgin Shale Fynbos FFh 6	A1 Remaining natural habitat ≤ than National Biodiversity Target	24%	6% of original area	30% (More than remaining natural area. As such, all remaining patches must be protected).	± 13.6ha (0.01% of Municipality)
Elim Ferricrete Fynbos FFf 1	A1 Remaining natural habitat ≤ than National Biodiversity Target	29%	5% of original area	30% (More than remaining natural area. As such, all remaining patches must be protected).	± 4247.3ha (2.49% of Municipality)
Kogelberg Sandstone Fynbos FFs 11	D1 ≥ 80 threatened Red Data List plant species	88%	58% of original area	30%	± 25952.9ha (15.2% of Municipality)
Overberg Sandstone Fynbos FFs 12	D1 ≥ 80 threatened Red Data List plant species	86%	6% of original area	30%	± 44714.1ha (26.19% of Municipality)
Ruens Silcrete Renosterveld FRc 2	A1 Remaining natural habitat ≤ than National Biodiversity Target	14%	<1% of original area	27% (More than remaining natural area. As such, all remaining patches must be protected).	41.5ha (0.02% of Municipality)
Western Ruens Shale Renosterveld FRs 11	A1 Remaining natural habitat ≤ than National Biodiversity Target	13%	0% of original area	27% (More than remaining natural area. As such, all remaining patches must be protected).	± 29.8ha (0.02% of Municipality)
The six **critically endangered** vegetation types in the Overstrand Municipality cover 74999.2ha (43.9% of the Municipal Jurisdiction area).					

Three vegetation types have been classified as **endangered**, namely:

Vegetation Type and Map Symbol	Chief Classification Criterion	Remaining Natural Area of Ecosystem	% Formally Conserved	National Conservation Target	Extent in Overstrand
Agulhas Sand Fynbos FFd 7	A1 Remaining natural habitats ≤ (biodiversity target + 15%)	35%	7% of original area	32%	± 812.5ha (0.48% of Municipality)
Hangklip Sand Fynbos FFd 6	A1 Remaining natural habitats ≤ (biodiversity target + 15%)	45%	20% of original area	30%	± 2403.8ha (1.41% of Municipality)
Western Cape Milkwood Forest FOz VI3	C Ecosystem extent ≤ 3 000ha, and Imminent Threat.	2000ha	2% of remaining area	All remaining Milkwood Forests must be protected.	± 725.1ha (0.42% of Municipality)
The two **endangered** vegetation types in the Overstrand Municipality cover 3941.5ha (2.3% of the Municipal Jurisdiction area).					

Two vegetation types have been classified as **vulnerable**, namely:

Vegetation Type and Map Symbol	Chief Classification Criterion	Remaining Natural Area of Ecosystem	% Formally Conserved	National Conservation Target	Extent in Overstrand
Agulhas Limestone Fynbos FFl 1	D1 ≥ 40 threatened Red Data List plant species	64%	8% of original area	32%	10994.4ha (6.44% of Municipality)
Cape Winelands Shale Fynbos FFh 5	A1 Remaining natural habitat ≤ 60% of original area of ecosystem	54%	25% of original area is formally protected in Nature Reserves. An additional 25% is protected in Mountain Catchment Areas.	30%	141.8ha (0.08% of Municipality)
The two **vulnerable** vegetation types in the Overstrand Municipality cover 11136.2ha (6.5% of the Municipal Jurisdiction area).					

Special habitats nested within the eighteen different vegetation types in the Overstrand Municipal Area, identified by the SANBI Putting Biodiversity Plans to Work Programme (PBPTW), include wetlands, vleis and estuaries (particularly the Klein and Botriver estuaries), as well as silcrete patches and indigenous forest patches.

A few scattered outcrops of silcrete and ferricrete identified by the PBPTW Programme are present within the Overstrand Municipal Area. Silcretes are harder than most shales, and form prominent outcrops in the landscape (up to 5 hectares in extent, but often smaller than 2 hectares). Such outcrops are stony, rendering them difficult or impossible to plough. These areas are thus often important refuges for the indigenous vegetation. Renosterveld plant communities on silcrete patches are distinct from the Renosterveld on the surrounding shales, and support a significant number of habitat endemic plant species. Ferricrete (ironstone, koffieklip) patches often occur as hardpans just under the soil surface, and their impervious nature means that they result in the presence of perched water tables, and seasonally wet plant community types.

Indigenous forests within the Municipal Area include patches of southern afrotemperate forest occurring chiefly along riparian (riverside) areas, as well as patches of Western Cape Milkwood Forest (e.g. at Franskraal).[47] Interestingly, Platbos Indigenous Forest, located on the slopes of the Baviaanspoort Hills near Gansbaai, occurs in deep sandy alkaline soil on north-facing, gently undulating terrain. No river course feeds the forest, and the relatively low rainfall of the region (600 to 800 mm per annum) is generally not considered sufficient to support a forest.[48]

Whilst planning for environmentally and socially responsible development in the Overstrand must take cognisance of the conservation status (i.e. “critically endangered”, “endangered”, “vulnerable” and “least threatened”), of the different vegetation types that together make up 65.65% of the land surface area, emphasis should be placed on the **classification criterion** for the vegetation in **Table 2.** For example, a vegetation type such as Kogelberg Sandstone Fynbos, which has been classified as critically endangered according to Criterion D1 on account of many threatened plant species occurring therein is statutorily well conserved (58% of the original extent thereof is protected), and not severely compromised in terms of its remaining extent (88% remains). As such, this vegetation type should be able to absorb some development / transformation, pending the results of on-site botanical assessments. Conversely, a vegetation type such as Elgin Shale Fynbos, which has been classified as critically endangered according to Criterion A1, chiefly on account of the fact that very little of this vegetation type remains (24% of the original extent thereof), with only 6% of the original extent thereof statutorily protected, should not be subjected to any development pressure.

In terms of planning for judicious development, more emphasis should be placed on the Critical Biodiversity Areas (CBA) Map (**Figure 12**) of the Overstrand Municipality, refer to **Paragraph 5.4.2.4** below.

The CBA map[49] aims to guide sustainable development by providing a synthesis of biodiversity information to decision makers. It serves as the common reference for all multi-sectoral planning procedures, advising which areas can be lost to development, and which areas of critical biodiversity value and their support zones should be protected against any impacts.

The CBA map indicates areas of land as well as aquatic features which must be safeguarded in their natural state if biodiversity is to persist and ecosystems are to continue functioning. Land in this category is referred to as a Critical Biodiversity Area. CBAs incorporate:

(i) areas that need to be safeguarded in order to meet national biodiversity thresholds
(ii) areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or
(iii) important locations for biodiversity features or rare species.

Ecological Support Areas (ESAs) are supporting zones required to prevent the degradation of Critical Biodiversity Areas and Protected Areas. An ESA may be an ecological process area that connects and therefore sustains Critical Biodiversity Areas or a terrestrial feature, e.g. the riparian habitat surrounding and supporting aquatic Critical Biodiversity Areas.

Those areas of natural vegetation identified on the map as "*Other Natural Areas*" are sufficiently extensive at this stage that they may withstand some loss through conversion of their natural state, and undergo development. It is important to note that in the future, such areas will be increasingly converted or impacted, and it is possible that they will eventually be reclassified as Critical Biodiversity Areas. Therefore, in all decision making, the precautionary principle needs to be applied.

The CBA map identifies areas that have been irreversibly transformed through development (e.g. urban development, plantation, agriculture). These areas are referred to as No Natural Areas Remaining. They no longer contribute to the biodiversity of the area. However, there are areas of land (partially or wholly transformed or degraded land) that have been classified as ESAs or even CBAs. Although these areas are heavily degraded or transformed, they still play an important role in supporting ecological processes.

Note: The land-use guidelines for each category on the CBA map may be found in **Paragraph 5.4.2** below.

4.2.8 Protected Areas and Conservation Stewardship Agreements

Some, but not all of the above dryland and wetland vegetation types, and special habitats are protected in the 23 land-based formal protected areas (Nature Reserves) (refer to **Figure 13**). The Municipal Area also includes the Bettys Bay Marine Protected Area, the Walker Bay Marine Protected Area, and the Kogelberg Biosphere Reserve (which is one of South Africa's six existing Biosphere Reserves). The Kogelberg is regarded as the heart of the Cape Floral Kingdom as it provides habitat for approximately 1 880 plant species, of which an estimated 77 species are endemic to the area, and numerous animals including leopards, baboons, antelope, many birds, freshwater fish, reptiles, amphibians, crustaceans and a huge diversity of insects and arachnids occur there. The Kogelberg Nature Reserve forms the largest part of the core area of the biosphere reserve. Private and Municipal nature reserves, the Harold Porter Botanical Garden, the Palmiet River estuary, sections of the coast and the marine area comprise the buffer zone. Plantations, farms, local towns and industrial developments make up the transition zones.[50]

South Africa's formal protected area network, however, falls far short of sustaining biodiversity and ecological processes. This is also the case in the Overstrand Municipal Area. In this context, the goal of the National Protected Area Expansion Strategy (NPAES) is to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to climate change. The NPAES sets targets for protected area expansion, provides maps of the most important areas for protected area expansion (**Figure 13**), and makes recommendations on mechanisms for protected area expansion.

The NPAES is based on the concept of protected area targets, which indicate how much of each ecosystem (vegetation type) should be included in protected areas, and help to focus protected area expansion on the least protected ecosystems. Where possible, the NPAES uses ecosystem-specific biodiversity thresholds[t] as a basis for setting protected area targets, so that the protected area targets have an underlying science-based ecological logic. The move away from looking simply at the number of hectares included in the protected area network, towards considering how those hectares are distributed across different ecosystems, is a key feature of the NPAES (i.e. promoting connectivity between protected areas).

Having set protected area targets, the NPAES determines which geographic focus areas are the highest priorities for protected area expansion to meet those targets. Focus areas are large, intact and un-fragmented areas of natural vegetation, which are suitable for the creation or expansion of large protected areas.

[t] **Biodiversity targets**, also known as **biodiversity thresholds**, are explicit quantitative targets that tell us how much of an ecosystem (or other biodiversity feature) needs to be conserved in order to meet our biodiversity goals of representation and persistence. Biodiversity targets are expressed as, for example, numbers of hectares of an ecosystem.

Refer to **Figure 13,** which depicts the National Protected Area Expansion Strategy Focus areas[u] within the Overstrand Municipality. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine-scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities.

Threatened ecosystems (e.g. critically endangered and endangered vegetation types listed above) are, however, often highly fragmented and thus not suitable for the creation or expansion of large formal protected areas (refer to **Figure 11**, which depicts the remaining extents of critically endangered and endangered vegetation types within the Overstrand Municipality).

As such, effective conservation of fragments of remaining natural habitat (especially in threatened ecosystems) outside formal nature reserves is dependent on collaboration and stewardship agreements with private landowners, many of whom are farmers[v]. The Stewardship Programme, which formalises the establishment of Conservancies, is co-ordinated in the Western Cape through CapeNature. The Stewardship Programme assists National and Provincial Government in fulfilling its mandate to conserve biodiversity outside of state-owned protected areas, and helps work towards the strategic objective of the Cape Action for People and the Environment partnership (C.A.P.E) that all priority biodiversity areas should be secured, have formal status and be managed effectively[w,51] (Refer to **Figure 13**, which also depicts Conservation Stewardship Sites within the Overstrand Municipal Area).

[u] The **Protected Area Expansion Focus Areas** were identified through a systematic biodiversity planning process undertaken as part of the development of the NPAES 2008. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES, and were designed with strong emphasis on climate change resilience and requirements for freshwater ecosystems.

[v] A successful initiative, taken by the private sector, in partnership with the Botanical Society of South Africa, the World Wildlife Fund of South Africa (WWF-SA), which promotes conservation of natural vegetation and sustainable, environmentally friendly farming practices, is the **Biodiversity and Wine Initiative (BWI)**, which was started in 2004. Working with industry structures and producers, the BWI has worked to set aside land for conservation and to promote biodiversity-friendly farming practices. In 2004, one of the first interventions of BWI was to facilitate the incorporation of Biodiversity Guidelines in the official accreditation procedures for Integrated Production of Wine (IPW) certification.

[w] Since acquiring land to expand protected areas is usually too expensive, **stewardship** provides a cost-effective alternative, by getting landowners (including includes private farms, communal lands and land owned by national/provincial government departments, Municipalities, parastatals like Eskom and Spoornet and private companies) to commit to conserving and managing the biodiversity on their own land.

Table 3: Ecosystem Services.

Ecosystem Services Clustered by Major Categories[52]			
Supporting Services (services necessary for the production of other ecosystem services)	**Provisioning Services** (products obtained from ecosystems)	**Regulating Services** (benefits obtained from regulation of ecosystem processes)	**Cultural Services** (nonmaterial benefits obtained from ecosystems)
Soil formation	Food	Climate regulation	Spiritual and religious
Nutrient cycling	Fresh water	Disease regulation	Recreation and tourism
Primary production	Fuelwood	Water regulation	Aesthetic
Pollination	Fiber	Water purification	Inspirational
Habitat maintenance	Biochemicals	Landscape stabilisation against erosion	Educational
Seed dispersal	Genetic resources	Binding of toxic compounds	Sense of place
		Air purification	Cultural heritage
		Pest and pathogen control	
		Carbon sequestration	

4.2.9 Important Ecological and Evolutionary Process Areas

The maintenance of ecological and evolutionary processes is critical both to conserving the exceptional level of species diversity found in this area and to maintaining ecosystem services such as reliable water yield, water quality, flood regulation, and coastal buffering and protection.

The Municipal area contains representative examples of a wide range of lowland fynbos communities that have been extensively transformed by agriculture or alien plant invasions elsewhere in the globally unique Cape Floristic Region. Conservation of these remnant patches is thus of great importance. The Municipal area also supports a wide variety of birds and other animals that are directly related to the wide diversity of habitats in the Municipal area. It also contains a number of important catchment areas, river systems, estuaries and special habitats such as wetlands and vleis, and forest patches.

Ten important Ecological and Evolutionary Process Areas were identified during the development of the 2006 Overstrand Municipal SDF, as shown in **Figures 14 and 15**.

These Process Areas support connections between areas containing Critically Endangered or Endangered vegetation, by linking areas of natural vegetation, wetlands and watercourses (streams and rivers). They also support connections between the mountains, lowlands and the coast, and along mountain ranges and the coast. The Process Areas support not only current ecological processes, but also make provision for evolutionary processes to continue. It is anticipated that adequate spatial provision for such processes could help local biodiversity adapt to the advent of future climate change.

The sound planning and management of these Process Areas would enable ecological and evolutionary processes and ecosystem services to persist. Of the utmost importance is to avoid injudicious fragmentation of natural habitat, to maintain links or corridors of natural habitat, to manage

freshwater and associated wetland systems soundly, and to replicate the key management "drivers" that determine the species composition and structure (e.g. fire in fynbos).

The Process Areas are broadly defined only. That is, there may be some spatial flexibility within these areas in terms of safeguarding processes (e.g. providing an upland-lowland corridor or coast-inland corridor), or there may be no flexibility (e.g. corridors between spatially fixed, threatened remnants).

The Process Areas cross Municipal Spatial Planning Categories (SPCs), and may accommodate a range of different established land uses. For this reason, they are not defined in terms of an SPC, but rather as an overlay to the SPCs.

The Process Areas, as described in **Table 4** below, were derived during 2006 through a synthesis of available existing information and through workshops, meetings and discussions with key role-players (principally staff of the Conservation Unit of the Botanical Society of South Africa and CapeNature).

Table 4: Important Ecological and Evolutionary Process Areas.

Process Area 1: Riviersonderend Mountains - Hottentots Holland Mountains (outside the jurisdiction area of the Overstrand Municipality).
Process Area 2: Kogelberg - Hottentots Holland Mountains
The Kogelberg Biosphere Reserve is of exceptional conservation significance. It may be regarded as the 'floristic heart' of the Cape Floristic Region as it appears to have the highest plant species richness and endemism. An exceptional diversity of natural environments characterises the area, including marine and coastal environments, rare blackwater lakes, marshes, estuaries, rivers, and mountains bordering on a narrow coastal plain. • This ecological corridor is identified in the PSDF, as it provides for long term evolution and migration across the landscape. It is also identified as an important upland-lowland gradient in the Cape Lowlands Renosterveld Plan. • It incorporates priority clusters identified in the Cape Lowlands Renosterveld Project (2003) where they occur on ecological gradients and have relatively high connectivity (fragments of Critically Endangered Renosterveld within 500m of one another), allowing interaction. • The mountains function as an important catchment area, performing a valuable ecosystem service. • The area provides tracts of natural habitat linking Protected Areas, namely: the Hottentots-Holland Nature Reserve; the Theewaterskloof Nature Reserve; the Groenlandberg Nature Reserve; the Kogelberg Nature Reserve, and the Hottentots-Holland Mountain Catchment Area.
Process Area 3: Bot River Estuary - Riviersonderend Mountains
This ecological corridor links the Bot River estuary on the coast to the Riviersonderend Mountains inland. It is identified in both the PSDF and the Cape Lowlands Renosterveld Project (2003) as an important coast to interior corridor for ecological and evolutionary processes that would support the migration and exchange of inland and coastal biota. The area accommodates a number of upland-lowland gradients identified in the Cape Lowlands Renosterveld Project (2003) that are important for ecological and evolutionary processes. It also accommodates soil gradients. The area incorporates Cape Lowlands Renosterveld Project (2003) priority clusters where they coincide with ecological gradients and have relatively high connectivity, allowing interaction. It accommodates a number of tracts of Endangered vegetation types as identified in the National Spatial Biodiversity Assessment (2004). It accommodates a number of river corridors that provide important linkages between ecosystems, and provides links to the Klein Swartberg Mountain. The area links tracts of intact vegetation preserved in Protected Areas, namely: the Theewaterskloof Nature Reserve; Groenlandberg Nature Reserve; Caledon Nature Reserve; Houwhoek Nature Reserve; Mt Hebron and Bot River Nature Reserves; Kogelberg Nature Reserve; Villiersdorp Nature Reserve; Riviersonderend Mountain Catchment Area.

Process Area 4: Coastal Corridor

The coastal corridor broadly accommodates the coastal zone and dynamic or mobile ecosystems found in that zone. It is important for animal and plant dispersal, providing linkages along climate gradients.

- The coastal corridor is identified in both the PSDF and the Cape Lowlands Renosterveld Project (2003) as being important for enabling the persistence of ecological and evolutionary processes.
- It links a number of protected areas, namely: Kogelberg Nature Reserve; Bot River Nature Reserve; Walker Bay Nature Reserve; Uilkraalsmond Nature Reserve; Pearly Beach and Groot Hagelkraal Nature Reserves; Quoin Point Nature Reserve; De Mond Nature Reserve; and De Hoop Nature Reserve. De Mond is an internationally recognized Ramsar site for its wetlands.
- It incorporates the shifting sand dunes along the coast (west of Cape Agulhas, at Quoin Point, and between Struisbaai and De Hoop).
- The area includes high endemism limestone habitats which are important from an evolutionary process perspective. It incorporates a number of estuaries and floodplains associated with the many rivers that empty into the sea along this coast (including the Palmiet, Bot, Klein, Uilkraals, Nuwejaars, Kars, Heuningnes, Sout and Breede), as well as numerous coastal wetlands.
- It provides a corridor for movement of threatened animal populations between coastal protected areas (eg for endemic and threatened mammals such as the bontebok and Cape mountain zebra between De Hoop and De Mond).

Process Area 5: Bredasdorp Mountains - Stanford/Gansbaai

This mountainous area forms an east-west corridor; tracts of natural habitat between the coast and the mountains provide a 'crest to coast' link.

- The lowlands - to - mountain area is identified in the Cape Lowlands Renosterveld Project (2003) as being an important coast to interior gradient for enabling the persistence of ecological and evolutionary processes.
- The area incorporates priority clusters identified in the Cape Lowlands Renosterveld Project (2003) where they occur on ecological gradients and have relatively high connectivity (fragments of Critically Endangered Renosterveld within 500m of one another), allowing interaction.
- It accommodates a number of tracts of Endangered vegetation types as identified in the National Spatial Biodiversity Assessment (2004).
- It incorporates a number of forest patches that are recognized as 'special habitat'.
- It accommodates a number of river corridors that provide important linkages between ecosystems.
- The area accommodates a number of upland-lowland gradients identified in the Cape Lowlands Renosterveld Project (2003), that are important for ecological and evolutionary processes. It also accommodates soil gradients.
- The area provides tracts of natural habitat linking Protected Areas, namely: the Babilonstoring Nature Reserve, the Maanskynkop Nature Reserve; the Fernkloof Nature Reserve, Walker Bay and Salmonsdam Nature Reserves.

Process Area 6.- Agulhas- Bredasdorp Mountains
(outside the jurisdiction area of the Overstrand Municipality)

Process Area 7: De Hoop - Riviersonderend Mountains
(outside the jurisdiction area of the Overstrand Municipality)

Process Area 8: Breede River Estuary – Langeberg Mountains (outside the jurisdiction area of the Overstrand Municipality)
Process Area 9: Langeberg Mountains (outside the jurisdiction area of the Overstrand Municipality)
Process Area 10: Agulhas Plain
The Agulhas Plain is recognized as being the last relatively intact complex of highly diverse vegetation, wetlands and coastal ecosystems in the Cape Lowlands. Because of its complexity, there are numerous ecological processes active in this area; within and between the freshwater (including vlei and wetland) systems, the coastal corridor, the inland Kleinriviersberg Mountains and areas to the west and east of the Agulhas Plain. • The PSDF identifies a coastal - inland - coastal corridor as being important for ecological and evolutionary processes. This corridor spans the Agulhas Plain from the vicinity of Pearly Beach inland to the Kleinriviersberg Mountains and back to the coast near the mouth of the Heuningnes River. • The Agulhas Plain - mountain area is identified in the Cape Lowlands Renosterveld Project (2003) as being an important coast to interior gradient for enabling the persistence of ecological and evolutionary processes. • It accommodates a number of special habitats such as drainage systems and wetlands that provide important linkages between ecosystems (including Soetendalsvlei, the Ratel River and Nuwejaars River wetland systems), as well as important ecological features such as Geelkop and Heuningrug. • The area incorporates small remnants of Critically Endangered ecosystems, and relatively larger areas of Endangered ecosystems identified in the National Spatial Biodiversity Assessment (2004).

4.2.10 Heritage Resources

According to the Overstrand Heritage Survey Draft Report (2009),[53] the Municipal Area differs substantially from other regions in the Western Cape, both in terms of the overall nature of its landscape features, and in terms of the historical settlements that have evolved in response to this physical context and the range of social and economic forces that have occurred over time.

The Overstrand is characterised by a varied range of landscapes, distinguished by their landform and micro-climates, which support both productive farmland and a diversity of fynbos-dominated natural habitats, rivers and estuaries, and a productive marine environment (fisheries). Broadly, such landscapes include sandy coastal plains; sandstone-dominated mountain ranges of the Cape Fold Belt; open valleys (in which most of the agricultural crop-farming land is situated); and a diversity of freshwater and coastal habitats (including rivers, streams, estuaries and wetlands, fine-grained sandy beaches, exposed rocky headlands and wave-cut rocky platforms). Environmental and heritage resources are inextricably interlinked.

The Municipal Area as a whole is considered to have high heritage significance in terms of its scenic, botanical, cultural/historical, social and archaeological value. The landscape, and the heritage areas and sites embedded within it, thus have the ability to demonstrate a range of heritage resources, which differ widely from the nature and mix of other heritage resources outside the Overstrand.

The Overstrand Heritage Survey Draft Report (2009),[54] includes, *inter alia*, an assessment of landscape significance in an area by area analysis (including heritage management recommendations and "heritage overlay layers") and a cadastral-level heritage resource inventory entitled the "*The Overstrand Heritage Survey Access Database*".

The cadastral-level heritage resource inventory should, according to the Heritage Survey, be incorporated into the Municipal GIS system, to assist in land-use planning and decision-making. In

addition, the 2013 PSDF Heritage and Scenic Resources Assessment should be used to guide land-use planning.[55]

4.3 CHALLENGES FACING THE PHYSICAL AND NATURAL AND SOCIO-ECONOMIC ENVIRONMENTS

4.3.1 Introduction

The natural beauty of the Overstrand Municipal Area and its abundant environmental wealth are the regions greatest assets. From being arguably the best land based whale watching destination in the world to the establishment of South Africa's first biosphere reserve (which is recognised as the heart of the Cape Floristic Kingdom),[x] the Overstrand Municipality aims to bring about growth and development to the benefit of all its people in their various communities, whilst maintaining the essential balance with the natural environment.[56]

The various intrinsic aspects of the natural and rural environments, as well as the threats that these landscapes and ecosystems face, must be considered in future spatial planning and management if the Overstrand Municipality is to realise the abovementioned aim of growth and development to the benefit of its entire population.

4.3.2 Challenges Facing the Local Economy

There are two dominant aspects of the Overstrand local economy that need to be addressed as priorities.

Firstly, the highly racialised and geographically concentrated poverty of the area presents a major challenge. The semi-skilled and un-skilled work force of Overstrand has in the past been negatively impacted by factors such as the decline in the fishing sector and the seasonality of the tourism and agricultural sectors. In addition to the above, significant in-migration of poor and un-skilled people is associated with rising rates of poverty and inequality. Other than the formal safety net of grants, the poor depend on informal work (e.g. construction or seasonal agricultural work) or on the third economy of illegal livelihoods (e.g. abalone poaching, and poaching of estuarine fish using gill-nets).

Secondly, it is widely recognised that the physical beauty of the natural environment is the region's single largest asset. As such, the Overstrand's economy and its ecology are inseparable. If the natural environment is not effectively managed, the declining natural resource base will limit future economic growth.

4.3.3 Challenges Facing Heritage Resources

According to the Overstrand Heritage Survey Draft Report (2009),[57] the Overstrand is characterised by 3 generic landscape types – the coastal terrace, the foothills and the mountains.

The coastal terrace, with its high scenic and amenity value, is the zone in which historically most development has taken place, and where the most pressure still exists for expanding urban areas.

The foothills, which occur on the weathered granites and shales, and which have the most agriculturally productive soils, have historically been used almost exclusively for farming. These scenic rural areas however also attract low-density residential "lifestyle" development applications.

The mountains consist for the most part of extensive areas of wilderness. The sandstone cliffs, stony scree slopes and nutrient-poor soils support a variety of predominantly fynbos vegetation types. The mountainous areas (above the 140m contour and/or steeper than 1:4 slope, refer to **Figures 9 and 17**) are for the most part unsuitable for development, since they contain important habitats for fauna and flora, comprise water catchment areas, and are prone to frequent veld fires (**Figure 2**).

[x] The smallest of the world's six biomes.

Unfortunately, according to the Heritage Survey, the number (and quality) of buildings, places and landscapes of historical, social, architectural and aesthetic interest in the Overstand are being diminished. Rapid urbanisation, the need to address past inequalities, new technologies and shifting attitudes to development control, all contribute to this decline.

As such, whilst change and development are unavoidable and necessary, management of change is essential if the legacy of heritage evident in the Overstrand is to be retained for present and future generations.

4.3.4 Challenges Facing the Physical and Natural Environment

The various intrinsic aspects of the physical, natural and rural environments, as well as the threats that these landscapes and ecosystems face, must be considered in future spatial planning and management if the Overstrand Municipality is to realise its aim to bring about sustainable growth and development to the benefit of all its people in their various communities.[58]

Climate changes will affect rainfall patterns, river run-off, estuarine functioning, sea surface temperature, mean sea level and fish stocks, as well as the frequency of storm events. In the Overstrand Municipal Area, the most pertinent issues are likely to be:[59]

- Water scarcity;
- Sea level rise (± 30cm over the next 50 years, with associated impacts along the coast); and
- An increase in extreme weather and storms (resulting in more flooding and stormwater management problems).

The unpredictable effects of climate change, and the potential for dramatic changes to the natural environment in the future, makes it essential to plan well in advance of these changes taking place.

In the Overstrand Municipal Area, the most pertinent issues affecting the rural and natural environments, which may be further exacerbated by the predicted effects of climate change, are currently:

- Human population growth and in-migration, which translates into a need to supply increasing quantities of energy in the form of fuel and electricity, increased natural resource consumption and increased pollution in the form of greenhouse gas emissions, effluent discharge and solid waste.
- Limited available land to accommodate the growing population of the Municipal Area (in terms of, *inter alia,* housing, infrastructure development, community facilities, land for crop farming and extensive grazing) whilst trying to maintain the essential balance with the natural environment.
- A significant and rapid increase in the urban footprint of Overstrand's towns, as result of the continued outward spread of informal settlements on the urban peripheries.
- Low density and informal urban sprawl contributes to Municipal operational inefficiencies, which puts pressure on economic resources.
- Long travelling distances created as result of low density and informal urban sprawl results in increases in private motorised transport, traffic congestion, increases in CO_2 emissions, and increases in infrastructure development and maintenance costs.
- The adult portion of the population is growing in size, which brings about a corresponding growth in the demand for material goods. It is also at the stage of formal employment that dependence on transport increases. [60]
- Infestations of invasive alien plants (which dramatically decrease the quantities water from mountain catchment areas, suppress and overgrow indigenous vegetation, negatively affect the scenic quality of the natural environment, and increase the frequency and intensity of wildfires) (**Figure 2**).

- Increasing impacts on natural vegetation (alien vegetation invasion, increased agricultural pursuits, reduced rainfall and making suitable land available for housing and infrastructure). The lack of extensive corridors linking the coastal plains with the mountains will have serious impacts on natural ecosystems and biodiversity in the future.[y]
- Decreasing quality and quantity of freshwater inflows into reservoirs for potable water for towns, and recharging of aquifer systems, may compromise adequate water supplies to the burgeoning towns within the Overstrand region.
- Reduced quality and quantity of freshwater inflows (as a result of factors such as soil erosion from croplands, returning water flows from irrigated croplands; excessive water extraction by private landowners, pollution [e.g. from fertiliser run-off from agricultural areas, and sewage pollution from septic tanks and soak-aways], and alien plant invasion of catchment areas[z]) have a major impact on estuarine ecosystems, affecting their mouth state, duration of closures, water quality and productivity.[aa] Other challenges facing the Overstrand's estuaries include water pollution; illegal dumping of solid general waste; fishing with illegal gear (e.g. poaching with gill-nets); vandalism; boat and off-road vehicle use in contravention of by-laws and regulations; the absence of established and agreed limits for fresh water abstraction, illegal estuary mouth breaching (which is impacts on the nursery function and health of the estuary); sedimentation and inadequate law enforcement.
- Marine Protected Areas (MPAs) are poorly protected, and there is poor awareness of the role of MPAs in biodiversity conservation, fisheries management, climate change adaptation and delivery of ecosystem services.
- A high proportion of important marine and coastal habitat types are threatened, marine resources are overexploited and several marine and coastal species are threatened. Overfishing and poaching is a great threat to marine biodiversity, resource sustainability and the livelihoods of legitimate fishers.

The above potential impacts need to be taken into account in planning the future of the Overstrand region to ensure its sustainability and long-term future.

4.3.5 Limited Available Land to Accommodate the Growing Population within the Municipal Area

Apart from the institutional difficulties with regard to subsidised housing delivery in the Overstrand (as identified in the 2012 / 2013 IDP), the growing demand for housing continues to exceed supply. Population projections estimate that an additional 11 000 households will need to be provided for by 2031. Much of this demand consists of families living in informal structures (in informal settlements and in backyards). Furthermore, there are many families in the Overstrand with a household income that exceeds the upper limit for subsidised housing, however not meeting the minimum to access mortgage finance. Other than subsidy housing, an additional challenge is to provide for appropriate housing types for young families (25 - 36 years of age) and for the affluent 55 – 69 year age bracket.

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[y] The single biggest cause of loss of biodiversity in South Africa, and in most of the world, is loss or degradation of natural habitat and ecosystems. **Reference:** Driver, A., Maze, K., Lombard, A.T., Nel, J., Rouget, M., Turpie, J.K., Cowling, R.M., Desmet, P., Goodman, P., Harris, J., Jonas, Z., Reyers, B., Sink, K. & Strauss, T. (2004). South African National Spatial Biodiversity Assessment 2004: Summary Report. South African National Biodiversity Institute. Pretoria. Available from http://www.bcb.uwc.ac.za/pssa/articles/features/no57.htm. (Accessed 18 February 2013).

[z] In the past decade it has become clear that mean annual runoff (MAR) into the Klein River Estuary has been reduced by an estimated 25% through abstraction, water impoundment and alien infestation in the catchment area. Dampening of flood peaks and reduced base flows are insufficient to scour the estuary and prevent marine sediments from blocking the mouth, resulting in more frequent and sustained periods of mouth closure of temporarily closed estuaries. The mean annual runoff (MAR) into the Bot Estuary is recorded as 89 million m^3, but this has been reduced to 72 million m^3 through water abstraction and alien infestation in the catchment area. **Reference:** Matthews, S. (2013). Overstrand Estuaries. Available from http://www.overstrandestuaries.co.za. (Accessed 27 March 2013).

[aa] The Bot/Kleinmond and Klein River systems currently have to be breached artificially to maintain their functionality. Breaching unfortunately does not mirror natural processes, since the estuaries are no longer properly scoured by floods. The result is that such estuaries gradually change over time into freshwater lakes, with far-reaching ecological and socio-economic implications (e.g. huge reductions in the populations of wading migratory birds, algal blooms, reductions in saltmarsh vegetation, expansion of reedbeds [resulting in shallower systems], changes in the relative abundance of various fish species, and reduced recreational attraction). **Reference:** .Turpie, J.K., Clark, B.M., Hutchings, K., Orr, K.K., De Wet,J. (2009). Ecology, Value and Management of the Kogelberg Coast. Prepared for: WWF CAPE Marine Programme. Anchor Environmental. Zoology Department, University of Cape Town PO Box 34035, Rhodes Gift.

The racialised character of the disparity in income and assets of the population contributes to low-density affluent neighbourhoods, and densely populated informal settlements where the poorest people often reside furthest from opportunity areas (e.g. places of employment) and social services, without viable public transport systems.

One of the key challenges to the development of and maintenance of sustainable human settlements is the limited availability of well-located suitable land, if a site and service delivery model is followed. Housing provision should also be aligned with all the necessary supporting services e.g. social and economic facilities, police, health services, bulk engineering services, and should be positioned relatively close to employment opportunities, to Municipal buildings, and to grocery stores. Alignment with all the necessary services results in unavoidable high initial financial costs.

In addition, the development of housing, infrastructure, community facilities, land for crop farming and extensive grazing needs to be planned within budgetary confines whilst considering the constraints imposed by the physical and natural environment, and potential impacts on heritage resources.

The current focus of the Municipal subsidised housing strategy is to develop high density areas, especially on suitable infill sites as opposed to greenfield development. Since the 2012 / 2013 IDP and the current SDF have identified areas suitable for housing, and associated housing strategies, for Pringle Bay and Rooi Els; Betty's Bay; Kleinmond; Hawston and Fisherhaven; Hermanus West; Hermanus Central; Stanford; Greater Gansbaai and Pearly Beach, the identified land parcels will soon be developed to capacity, and further township expansion will become necessary.

PART 5: STRATEGIC ENVIRONMENTAL MANAGEMENT FRAMEWORK

5.1 EXPLANATION

Spatial planning which incorporates environmental attributes and physical constraints, judicious rural land-use management, and the safeguarding of biodiversity features that provide key ecosystem services[bb] are central to ensuring an environmentally sustainable and resilient Overstrand Municipal Area.

A key component of environmental sustainability is that of **environmental resilience**. The term environmental resilience refers to the ability of ecosystems to recover from the impacts of natural hazards in the short to medium term (e.g. the recovery of fynbos habitats after fire, or after the removal of stands of woody invasive alien vegetation), and to adapt to future impacts, such as climate change in the long term.

According to the latest systematic biodiversity planning information (**Figure 16**), namely the 2011 National Biodiversity Assessment (NBA),[61] some features in the landscape are more likely to support resilience of biodiversity to climate change than others. Such features include riparian corridors and buffers; coastal corridors; areas with temperature, rainfall and altitudinal gradients; areas of high diversity;[cc] areas of high plant endemism; refuge sites including south facing slopes and gorges; and large un-fragmented areas of natural vegetation.

The NBA also states that some of the areas important for climate change resilience may also provide more specific, immediate benefits that assist directly with human adaptation to the impacts of climate change, known as ecosystem-based adaptation. For example, buffers of natural vegetation along river corridors and around wetlands mitigate floods, reduce erosion and improve water quality. Intact coastal ecosystems such as dunes, kelp beds and saltwater marshes help to protect human settlements and infrastructure against sea storms. Ecosystem- based adaptation has the potential to be both more effective and less costly than engineered solutions. Fortuitously, because a relatively large proportion of the Overstrand's land cover (65.65%) still exists in a natural or near-natural state, it is still possible to conserve and/or judiciously manage the required areas for climate change resilience to the benefit of present and future generations. This can be achieved by implementing land-use planning that has been informed by the recommendations of an EMF; by ground-truthing the available biodiversity information (e.g. when undertaking Environmental Impact Assessments for proposed developments e.g. afforestation, agricultural or residential developments); through protected area expansion; by working with agricultural and industry sectors to minimise their spatial footprint and to manage their direct impacts on the environment (e.g. by controlling winery and industrial effluent quality).

Environmental resilience is also enhanced by means of increasing biodiversity over time through judicious management of farming practices within rangelands and planted crop fields (e.g. through pollution prevention, alien plant clearing and soil erosion control in priority catchment areas); through integrated water resource management;[62] through the protection and management of species-rich indigenous vegetation communities (e.g. by linking critically endangered vegetation remnants by

[bb] **Ecosystem services** (the benefits people obtain from ecosystems) include **supporting services** (services necessary for the production of other ecosystem services such as soil formation, nutrient cycling, primary production, pollination, habitat maintenance and seed dispersal), **provisioning services** (products obtained from ecosystems such as fuel wood, food, fresh water, fibre, biochemical and genetic resources), **regulating services** (benefits obtained from regulation of ecosystem processes such as climate regulation, disease regulation, water regulation, water purification, landscape stabilisation against erosion, binding of toxic compounds, air purification, pest and pathogen control and carbon sequestration), and **cultural services** (nonmaterial benefits obtained from ecosystems such as spiritual and religious benefits, recreation and tourism opportunities, aesthetic benefits, inspirational benefits, opportunities for environmental educational, the sense of place of natural environments, and cultural heritage).

[cc] According to the NBA, **species are the building blocks of ecosystems**, playing a fundamental role in maintaining well-functioning ecosystems and thus in supporting the provision of ecosystem services. As such, the effective conservation of the exceptionally high species diversity of the Overstrand Municipal Area is one of the key determinants of environmental resilience.

means of formally and informally protected natural corridors, and by implementing rehabilitation / natural resource management / poverty relief programmes).

Another way of increasing biodiversity and in so-doing enhancing environmental resilience, is through the establishment and maintenance of public open spaces, large rural and small urban nature reserves (e.g. through the National Protected Area Expansion Strategy [NPAES]) (**Figure 13**). Importantly, such protected areas also provide opportunities for people of all ages and socio-economic backgrounds to experience the natural environment, and to increase their awareness and appreciation of biodiversity, the importance of conservation and of the ecosystem services that protected areas provide.

Institutional resilience (e.g. at Municipal and Provincial levels) is also necessary to safeguard, and indeed improve the quality of the rural and natural environments for the benefit of present and future generations. By resilience it is meant that institutions (such as the Overstrand Municipality) need to have not only the capacity but also robust mechanisms (such as a succinct but comprehensive and user-friendly IDF that has been informed by a dynamic EMF) to plan for sustainable development and to manage the rural and natural environments pro-actively in order to avoid crisis situations (e.g. flooding of poorly planned / located urban settlements or of croplands within the 1:100 flood-line of a water course).

In terms of institutional resilience (people-capacity), the Overstrand Municipality's administrative component is aligned with the five National Key Performance Areas (namely Municipal Transformation, Institutional Development and Good Governance; Basic Service Delivery and Public Participation; Financial Viability and Financial Management; Local Economic Development; and Infrastructure for Service Delivery). The Environmental Management Section (Department) falls under the Infrastructure and Planning Directorate, and is responsible for Sustainable Environmental Management in the Overstrand Municipal Area.

To safeguard the resilience of ecosystems, it is important to work within the limits of acceptable environmental change. For example, there are limits to the rate at which land can be used to produce food, wood, or other renewable resources. Likewise, in terms of non-productive (regulating) ecosystem services such as water purification, flood attenuation, and carbon sequestration, there are limits to the levels of disturbance that natural areas can absorb before their ability to sustain themselves and provide these services (the resilience of an ecosystem) is compromised.[dd]

Clearly defined urban boundaries, that avoid loss of or fragmentation of prime agricultural land and species-rich natural areas can protect and maintain biodiversity, and the natural resources that are required to provide the necessary ecosystem services for present and future generations. Detailed internal urban designs also contribute to environmental resilience by controlling the location of development to avoid natural hazards (e.g. floods) and to avoid potential future hazards posed by climate change (e.g. sea level rise, and storm surge damage in coastal areas).

New neighbourhoods and buildings can also contribute to environmental sustainability through the use of low-impact design features (i.e. by using green building technology). According to the Green Building Council of South Africa,[ee] "*A green building is a building which is energy efficient, resource efficient and environmentally responsible - it incorporates design, construction and operational practices that significantly reduce or eliminate the negative impact of development on the environment and its occupants*".

[dd] **Reference:** Dunedin City Council. (2011). Dunedin Towards 2050. A Spatial Plan for Dunedin. Draft for Consultation. 50 The Octagon, Dunedin, New Zealand.

[ee] **Reference:** Green Building Council SA. (2012). The Green Building Council of South Africa. Available from http://www.gbcsa.org.za/home.php. (Accessed 26 November 2012).

For example, new neighbourhoods and individual buildings should be designed to:

- minimise wastewater and stormwater contributions;
- improve energy-efficiency through passive solar design (by making maximum use of sunlight to reduce the need for artificial lighting);
- provide on-site water (e.g. rainwater harvesting);
- treat grey water and sewage on-site (e.g. through grey water recycling systems and closed-system biolytic package sewage treatment plants respectively); and
- use recycled and/or eco-friendly building materials (re-use reduces the environmental impacts of development through reduced construction waste, and reduces the loss of embodied energy).

Although challenging to implement in practice, older buildings should also be retro-fitted to reduce their demand for water and energy (e.g. through Eskom's National Efficient Lighting Programme).[63] The Municipality should strongly consider forging a partnership in this respect with a global partner, such as the Clinton Climate Initiative (CCI) Energy Efficiency Building Retrofit Programme (EEBRP).[64]

Whilst considering the environmental attributes and features of the natural and rural environments, new neighbourhoods / developments should be located to optimise connectivity and accessibility (especially in terms of reducing travelling distances for commuters, which will result in reduced vehicular-caused atmospheric pollution). For more information refer to **Part 3.5**: **An Accessible and Connected Municipal Area** of the IDF, and to the Human Settlement Plan attached to the IDF. In addition, the planning and establishment of effective public transport systems, pedestrian and bicycling routes,[65] and even vehicle exclusion / taxation zones in congested urban centres (such as Hermanus) should further help reduce atmospheric pollution. For example, the city of Parma in northern Italy is known as a "zero emission city", where the use of pedal and electric bicycles is as much part of the forward planning as it is part of the culture of the city.[66, 67] Such incentives should be considered in the long-term forward planning of transport routes within the Overstrand Municipal Area, especially within congested urban central business districts.

The environmental performance and efficiency of the Municipality's reticulated water and waste infrastructure and waste management systems are also important contributors to the long-term environmental sustainability of the Overstrand Municipal Area. Waste in the Overstrand Municipality is currently managed according to an Integrated Waste Management Plan (IWMP), which takes into account the Municipality's legal obligations regarding waste avoidance, recovery, disposal and general management.[68] This IWMP highlights that, "*Where very few Municipalities are currently practising material recovery, Overstrand Municipality is regarded as being on the forefront of waste recovery in South Africa by means of source separation and separate collection and continues to improve and expand on the current situation*". The good work currently being conducted in terms of waste management in the Overstrand Municipal Area, has a direct bearing on environmental sustainability.

The IWMP also concludes that whereas the Municipality's current waste management is mainly focussed on collection and disposal, that the move should be towards a sustainable waste management system, whereby the focus will shift to the avoidance and reduction of waste rather than to the disposal thereof.

Whilst private and institutional users (e.g. factories and water treatment works respectively) are obliged to manage the impacts of wastewater discharges to the environment through appropriate treatment and monitoring in terms of the provisions of the National Water Act, 1998 (Act No. 36 of 1998) (NWA), this is not always enforced. As such, institutional roles within the relevant Department/s of the Overstrand Municipality should be aligned to achieve the aims of Integrated Water Resource Management,[69] which in the context of the Municipal Area, seeks to achieve equitable access to, and sustainable use of, water resources by all stakeholders at catchment and regional levels, while maintaining the characteristics and integrity of water resources.

In terms of the above, it is also important not only to implement the existing Municipal Master Plan for stormwater infrastructure, but also to educate the public (including residential property owners, and the commercial, agricultural and industrial sectors) about stormwater runoff and management in order to prevent pollution or sewage ingress into stormwater systems, and conversely, to prevent stormwater ingress into the sewage reticulation system.

The Municipality's on-going commitment to the efficient use, upgrading and maintenance of the existing potable water and sanitation services reticulation networks reduces network leakage and pollution, whilst boosting water saving, and in so-doing contributes to environmental resilience. It is clear that using existing infrastructure efficiently is as important as the creation of new infrastructure.

The Overstrand Municipal Water Services Development Plan states that, "*in terms of adapting for climate change, water systems will need to be more robust and new / alternative sources of supply may need to be found. Increased skills will be required from water managers and long-term water projections will be required*." As such, the Overstrand Municipality is currently incorporating the predicted impacts of climate change in the area in their long-term forward planning for water services development and maintenance. This bodes well for the protection of water resources, and accordingly for environmental sustainability and resilience in the Overstrand Municipal Area, in spite of challenges posed by, *inter alia*, the ever increasing population, current water scarcity, and predicted future climate change.

5.2 WHERE WE WANT TO BE BY 2050

By 2050, the Overstrand will be a Municipal Area where the concepts of environmental sustainability and resilience are understood by its citizens, and are as much integral to their daily lives, as they are to spatial (development) planning, to land-use management, and to infrastructure development and planning, specifically in terms of the following:

- Spatial planning of urban development and agricultural activities provides for sufficient areas of natural habitat to deliver the necessary ecosystem services to ensure an environmentally sustainable and resilient Municipal Area.[ff]

- High and moderate quality agricultural areas have been retained, are un-fragmented, and are managed productively and in an environmentally sustainable manner.

- The areas under formal protection / conservation have expanded in terms of the NPAES, are largely free of invasive alien plant and animal species, and are managed by competent staff in terms of terms of the provisions of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA), and in terms of Environmental Management Plans compiled in terms of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEM:PAA).

- Areas of natural habitat that fall outside of formally protected areas are judiciously managed in terms of the provisions of the NEM:BA (e.g. in terms of stewardship programmes and conservancies).

- Mountain catchment areas and estuaries are managed in terms of the NEM:BA, and in terms of Catchment and Estuary Management Programmes, respectively.

- Areas of natural habitat are linked via a network of "green corridors", comprising naturally vegetated land that is co-managed by CapeNature through their Conservation Stewardship Programme. Such green corridors comprise rivers and their tributaries, ridgelines and mountainous areas. Green corridors provide habitats and movement routes for indigenous

[ff] "**Sustainable development**" is generally defined as "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs". Within this context sustainable development relates to balancing three interlinked factors, namely human well-being, economic efficiency and environmental integrity.

plant and animal life, and as such increase the resilience and productivity of formally and informally protected areas.

- Planning for the establishment of new agricultural fields and rangelands is conducted in terms of Bioregional Planning Principles.[gg] Extensive livestock grazing is not undertaken within CBAs.

- Planning for the development of industries, commercial centres, community facilities and new neighbourhoods is conducted in terms of Bioregional Planning Principles.

- Planning for the development of industries and new neighbourhoods avoids surrounding areas of high agricultural, heritage and ecological importance, optimises the use of existing infrastructure (roads, sewage, potable water and electricity distribution systems), and optimises transport distances to places of business and to commercial centres.

- The intrinsic character of the mountainous and coastal environments of the Overstrand Municipal Area is preserved. New development along the coast considers the predicted effects of climate change (e.g. is behind pre-determined ecological set-back lines).

- Rural and urban development, and agricultural areas avoid areas of potential environmental hazards (e.g. coastal and low-lying areas most at risk from sea level rise, and areas that are subject to flooding), and existing developments are managed to reduce these risks.

- All of the most important and distinctive heritage artefacts and buildings have been conserved and maintained, as have the sense of place of urban and rural settlements, agricultural and natural landscapes.

- The detailed designs and internal layouts of new developments and agricultural areas maximise opportunities to enhance biodiversity, whilst agricultural areas maximise local food production.

- All new developments are designed and constructed using low-impact designs and locally sourced materials wherever possible. Such buildings are warm in winter and cool in summer, are energy efficient, and minimise water consumption and waste production. A large proportion of existing buildings will have been retro-fitted to the same standard.

- New roads and infrastructure development are planned in order to meet the needs of the target communities, whilst complying with the relevant heritage and environmental authority guidelines and/or legislation.

- Sustainable and effective public transport systems, walking and bicycling routes are established, which in addition to optimising the connectivity of the Overstrand Municipal Area, help to reduce atmospheric pollution.

- The Municipal infrastructure (particularly the sewage and potable water reticulation systems) is utilised to an appropriate capacity, meets the needs of all the target communities, and is maintained to a standard that minimises negative environmental impacts, such as wastage and pollution.

- New treatment works and reticulation networks are well designed where treated effluent is recycled for human consumption and agricultural production. Such treatment works must be managed to improve the quality of effluent for re-use and minimisation of pollution.

[gg] **Bioregional planning** refers to the matching of human settlement and land use pattern with the parameters of ecological systems, and the planning design and development of the human made environment within these parameters in a manner that ensures environmental sustainability. **Reference:** Overberg District Municipality. (2004). Overberg Spatial Development Framework. Executive Summary. Dennis Moss Partnership Inc. Stellenbosch, South Africa. Available from http://www.savebantamsklip.org/docs/OVERBERG%20SDF%20EXECUTIVE%20SUMMARY.pdf. (Accessed 27 November 2012).

- The water treatment works must be designed to improve drinking water quality, while the water reticulation system must be designed to reduce leakages and negative environmental impacts, to minimise potable water use, and to provide adequate levels of service to all areas and communities.

- Solid waste is efficiently managed in terms of waste avoidance, waste reduction, waste recycling and sustainable waste disposal.

In terms of the above, the Overstrand will continue to be South Africa's leading Municipality in terms of best practice for conservation planning and sustainable environmental management.[hh]

As the leading Municipality in terms of best practice for conservation planning and sustainable environmental management, the Overstrand Municipality will continue to implement efficient waste management, energy efficiency and conservation, water and air quality management, landscaping, tree planting and beautification projects. All of the aforementioned actions are underpinned by strong leadership, robust institutional arrangements and implementation mechanisms, and transparent, inclusive public participation processes.

In achieving the above, the Overstrand will have realised the vision for the current Municipal SDF, which is as follows:

"Overstrand Municipality is striving to be the most desirable destination to visit, stay and do business".

In achieving the above, the Overstrand will also have realised the vision and mission statements of the current IDP, which is are follows:

- Vision: *"To be a centre of excellence for the community".*

- Mission: *"Creation of sustainable communities by delivering optimal services to support economic, social and environmental goals in a politically stable environment".*

The Overstrand Municipal Area will also have effectively contributed to achieving the Vision of the South Africa National Framework for Sustainable Development (NFSD) and of the National Strategy for Sustainable Development and Action Plan's (NSSD 1), namely:

"South Africa aspires to be a sustainable, economically prosperous and self-reliant nation state that safeguards its democracy by meeting the fundamental human needs of its people, by managing its limited ecological resources responsibly for current and future generations, and by advancing efficient and effective integrated planning and governance through national, regional and global collaboration".

5.3 WHAT WE WILL DO – POLICY FRAMEWORK

5.3.1 Introduction

In order to determine robust broad EMF strategies, policies and action plans, the relevant existing national, provincial and local policies for the environment must be considered. As such, the Overstrand Municipality should take cognisance of and implement the various policies, action plans and objectives outlined in the following 5 parts of this chapter below, to promote and guide environmentally and socially responsible development within the Municipal Area, and to ensure judicious management of the natural resources that underpin ecosystem services vital to the health and well-being of present and future generations.

[hh] The Overstrand Municipality was announced as the **national winner** in the local municipality category of the "**2010/11 Greenest Municipality Competition**" by the Deputy Minister of Water and Environmental Affairs, Ms Rejoice Mabudafhasi, at an awards ceremony held in Kempton Park on Tuesday, 20 November 2012. The Overstrand Municipality also won the inaugural competition in 2011. The monetary value of this award is R3.5 million. This prize money, which can be accessed only with an approved business plan, must be used to address issues of greening and also advance the objectives of Expanded Publics Work Program (EPWP) projects, which emphasise creation of temporary jobs and promoting skills development.

In addition, the socio-economic context of the Overstrand also needs to be considered, in terms of the need to grow the economy to provide jobs (industries should in particular be related to agriculture and aquaculture, beneficiation, retail, services, the green economy and tourism. The Overstrand area is not desirable to hosting huge factories). Infrastructure development, the provision of subsidised housing at appropriate locations, and the provision of effective Municipal services, is also required to combat poverty, and to propel job creation.

5.3.2 Align with Presidency

Specific policies and action plans to alleviate / address potential and existing key environmental challenges in the Overstrand (refer to **Paragraph 5.3.6** below) should be developed and implemented in alignment with the Outcomes and Outputs issued by the Presidency's Department of Performance Monitoring and Evaluation in 2010,[70] particularly with:

Outcome 10: Environmental Assets and Natural Resources that are Well Protected and Continually Enhanced.

Outcome 10 incorporates the following outputs, namely:

- **Output 1:** Enhanced quality and quantity of water resources
- **Output 2:** Reduced greenhouse gas emissions, climate change impacts and improved air/atmospheric quality
- **Output 3:** Sustainable environmental management
- **Output 4:** Protected biodiversity

In 2013, the Presidency published the National Development Plan: Vision for 2030 (NDP).[71] The NDP must be applied by the Overstrand Municipality wherever practically possible, through judicious land-use and natural resource management, in order to achieve the overarching vision of the NDP, which is to eliminate poverty and to reduce inequality by 2030.

5.3.3 Apply National Policy[72]

In 2008, Cabinet approved the South Africa National Framework for Sustainable Development (NFSD)[73]. The National Strategy for Sustainable Development and Action Plan, also referred to as NSSD 1 (2011 to 2014), followed the NFSD, and was approved by Cabinet on 23 November 2011. The NSSD 1 will be implemented during the period 2011 to 2014, and will be followed by the NSSD 2 (2015 to 2020) and subsequent NSSD publications.

Among other things, the NFSD and the NSSD1 spell out South Africa's vision for a sustainable society:

"*South Africa aspires to be a sustainable, economically prosperous and self-reliant nation state that safeguards its democracy by meeting the fundamental human needs of its people, by managing its limited ecological resources responsibly for current and future generations, and by advancing efficient and effective integrated planning and governance through national, regional and global collaboration.*"

This vision is underpinned by a number of principles:

5.3.3.1 Fundamental principles

The fundamental principles relate to the following fundamental human rights that are guaranteed in the Constitution of the Republic of South Africa, namely:

- Human dignity and social equity.
- Justice and fairness.
- Democratic governance.
- A healthy and safe environment.

5.3.3.2 Substantive principles

The substantive principles are based on the following sustainable development principles that are already enshrined in South African law and that underscore a systems approach[ii] to achieving sustainable development:

- Natural resources must be used sustainably.
- Socio-economic systems are embedded in and are dependent on ecosystems.
- Basic human needs must be met to ensure that the resources that are necessary for long-term survival are not destroyed for short-term gain.

5.3.3.3 Process principles

The process principles apply to the implementation of the NFSD and the NSSD 1, and include the following:

- Integration and innovation.
- Consultation and participation.
- Implementation in a phased manner.

In the NSSD 1, five strategic priorities and an associated Action Plan for each priority have been developed within the context of sustainable development. Key interventions, targets and indicators for each strategic priority are outlined in each Action Plan, while 20 headline indicators have been identified to monitor progress towards the implementation of NSSD 1.

Cognisance is taken in the NSSD1 of emerging global issues and challenges, such as the financial crisis, global climate change and transitioning to a green economy. The strategic priorities of the NFSD have accordingly been reformulated (**Table 5**) to form the NSSD1 strategic priorities as follows:

Table 5: NSSD1 and NFSD Strategic Priorities.

NFSD strategic priorities	Reformulated NSSD 1 strategic priorities
Priority 1: Enhancing systems for integrated planning and implementation	**Priority 1:** Enhancing (governance) systems for integrated planning and implementation
Priority 2: Sustaining our ecosystems and using natural resources efficiently	**Priority 2:** Sustaining our ecosystems and using natural resources efficiently
Priority 3: Economic development through investing in sustainable infrastructure	**Priority 3:**Towards a green economy
Priority 4: Creating sustainable human settlements	**Priority 4:** Building sustainable communities
Priority 5: Responding appropriately to emerging human development, economic and environmental challenges (including climate change, rising oil prices, globalisation and trade)	**Priority 5:** Responding effectively to climate change

The development and implementation of area-specific policies and action plans (in addition to implementation of the 113 interventions listed in the NSSD1) are required in order to achieve the goals listed under the NSSD1 Action Plans, especially in terms of Priorities 2 and 5, and in so-doing,

[ii] According to the NFSD, a **systems approach to sustainability** is one where the economic system, the socio-political system and the ecosystem are embedded within each other, and then integrated through the governance system that holds all the other systems together in a legitimate regulatory framework. Sustainability implies the continuous and mutually compatible integration of these systems over time. Sustainable development means making sure that these systems remain mutually compatible as the key development challenges are met through specific actions and interventions to eradicate poverty and severe inequalities.

to achieve the desired state of sustainable development in the Overstrand Municipal Area (refer to **Paragraph 5.3.6** below).

5.3.4 Apply Provincial Policy[74]

Policies and action plans relating to "*An Environmentally Sustainable and Resilient Overstrand Municipal Area*" should also be guided by Provincial Policy, specifically by the Western Cape Provincial Spatial Development Framework (PSDF), and by the associated Draft Rural Land-use Planning & Management Guidelines (2009) document.

Development is only acceptable and in the public interest if it is ecologically justifiable, socially equitable and economically viable, i.e. environmentally sustainable. This means that the development needs of present generations should be met without the ability of future generations to meet their own needs being compromised.

Sustainable development encompasses the integration of social, economic and ecological factors into planning, decision-making and implementation so as to ensure that development serves present and future generations. It is of crucial importance for the long-term survival of Humankind that all development complies with this principle.

The three pillars of sustainability, also referred to as the "*triple bottom line*", are:

- Ecological integrity (health of the Planet);
- Social equity (situation of the People); and
- Economic efficiency (attainment of Prosperity).

It is important to note that economic and human capital cannot draw more from society and from the ecology than what the ecology and society can yield sustainably in the long term.

However, according to the NSSD 1, because of certain complex development considerations – including the disturbing widening of the gap between the rich and the poor populations in South Africa – a simple "triple bottom line" approach to sustainable development is insufficient. This realisation has led to a broader definition of sustainable development, which, in accordance with the systems approach to sustainability, accepts that socio-political, economic and ecosystem factors are embedded within each other and are integrated through the governance system that holds all the other systems together in a legitimate regulatory framework.

The PSDF will actioned by implementing the applicable policies (refer to **Paragraph 5.3.6** below) related to:

- The protection of heritage resources

  "*Objective 5: Conserve and strengthen the sense of place of important natural, cultural and productive landscapes, artefacts and buildings*";

- Biodiversity management, the protection of agricultural resources and the management and protection of coastal and river bank areas

  "*Objective 8: Protect biodiversity and agricultural resources*"; and

- The consumptive use of natural resources

  "*Objective 9: Minimise the consumption of scarce environmental resources, particularly water, fuel, building materials, mineral resources, electricity and land – in the latter case especially pristine and other rural land, which is the Province's 'goldmine-above-the-ground*'".

5.3.5 Apply Municipal Strategies, Policies and Plans

The six key strategies that should underpin all spatially related decision making in the Overstrand Municipality's Management Area, as included in the current Overstrand SDF, are given in **Table 6** below. Strategies 5 and 6 in particular are central to the Municipal SDF goals and objectives specific to this EMF (refer to **Paragraph 5.3.6** below).

According to the 2013 State of Environment Outlook Report for the Western Cape Province, to ensure that development remains environmentally sustainable, environmental deterioration must be decoupled from economic activity and population growth. An increase in population numbers, or an increase in economic output, tends to result in an increase in environmental impacts. However, if ways can be found to reduce per capita consumption, to reduce natural resource use intensity, and to improve land-use planning and natural resource management, then the overall effects of the burgeoning population on the environment could be reduced, and potentially reversed.

Opportunities for decoupling include new technologies (e.g. renewable energy), new methods (e.g. micro-generation of electricity), new consumption patterns (e.g. a shift to public and non-motorised transport) and less residual pollution (e.g. improved solid waste and sewage management). However, economic development does not equate to social welfare unless it is underpinned by environmental sustainability. [75]

Table 6: Six key strategies that should underpin all spatially related decision making.

	Spatial Development Strategy	Implementation
1	Managing Population Growth and In-migration	Adopt a selective "supply driven" approach by only providing for housing growth and related community facilities in the urban areas where the highest potential for sustained economic growth exists.
2	Housing Strategy	Eliminate the current subsidised housing backlog through the implementation of a coordinated housing supply plan. Ensure that the overall provision of land for housing makes provision for a balanced mix and range of housing types for all income groups.
3	Bulk Service Infrastructure Provision	Compile a co-ordinated bulk infrastructure supply provision policy which prioritises the implementation of bulk infrastructure based on the Municipality spatial development concept – Growth Management Framework.
4	Initiate – Place specific key economic development projects / drivers	Stimulate economic growth and development linked to the comparative locational advantage. Municipality should identify and actively facilitate key catalyst projects in conjunction with strategic partnerships with business / investors.
5	Priority areas for biodiversity conservation	All public owned land that is of high conservation importance is to be included in a formal Municipal reserve network. The mechanism being to establish contract nature reserves (possibly negotiated in conjunction with CapeNature's Conservation Stewardship Programme), thus providing legally binding guidelines for land-use. The objective of this strategy is to ensure that a broader formal conservation strategy is implemented for all public owned land within the Overstrand Municipal Area.

	Spatial Development Strategy	Implementation
5	Priority areas for biodiversity conservation (continued)	One option is for private land owners to be encouraged to join CapeNature's Conservation Stewardship Programme, in order to help achieve the goal of an expanded Protected Area Network.
6	Rural development strategy	Demarcate Rural Development Areas (RDAs) to ensure that non-agricultural development outside urban areas is managed and promoted in a sustainable manner. The use of RDAs is particularly important within the context of the Overstrand Municipal Area, where appropriate rural development is critical to the local and sub-regional economy. A number of rural development areas have been identified for further investigation in the Overstrand.

In order to strategically address the challenges facing the Overstrand Municipal Area from an environmental management and land-use decision-making point of view, the following SDF goals and objectives should inform the objectives and policy framework of this EMF (refer to **Paragraph 5.3.6 below**):

Table 7: SDF Goals and Objectives.

	Goals	Objectives
1	To implement an effective management system for the protection of biological diversity and ecosystems through the co-operation of all concerned.	Irreplaceable, threatened, highly dynamic and sensitive elements of the environment shall be protected. Adequate and effective measures shall be implemented to ensure co-ordination of environmental responsibilities by key role players and monitoring of usage in sensitive areas.
2	To protect and conserve the heritage resources of the area:	To promote the conservation and inclusion of important heritage resources into a sub-regional tourism strategy. To improve and develop tourism related facilities
3	To provide an environmentally and economically sustainable bulk service infrastructure (and road transport network).	To ascertain the overall carrying capacity of existing bulk services related to existing and future growth, and where appropriate, determine flood lines. To identify critical problem areas relating to bulk water supply, groundwater abstraction and quality. To improve and maintain the standard of bulk services with particular reference to bulk water supply, sewerage and solid waste and sewage management. To create an efficient, well defined hierarchy of roads.

	Goals	Objectives
4	To promote the conservation of the natural resources in the Overstrand Municipal Area.	To protect, conserve, and restore where appropriate, all areas deemed to be conservation worthy. To ensure that the impact of existing and proposed development is adequately evaluated from an holistic environmental perspective, taking current and future generations into account. To promote the sound management of natural areas to ensure their sustainability; Rehabilitate and/or restore degraded and disturbed environments where necessary to meet conservation or environmental management objectives. To limit and control development and activities within environmentally sensitive and / or conservation worthy areas so as to ensure their sustainability taking into account effects on biodiversity. To promote efficient use of water and energy resources. To implement water conservation and demand management objectives within Municipal areas in order to promote savings and decrease the demand for costly bulk water supply systems.
5	To ensure that ongoing development pressure and its spatial implications are managed in a sustainable manner that protects the unique character of the existing cultural landscape and the place-specific character and form of the existing settlement pattern.”	To promote a spatial development pattern that contains urban sprawl / urban development and promotes compact well-defined settlements. To retain and strengthen the unique identity of the Municipal areas and its districts. To determine clear limits to urban development and define the urban edge / limits of existing settlements. To conserve and improve the visual quality of the landscape and the scenic route experience of the primary movement corridors. To improve the aesthetic quality of the built environment.

5.3.6 Objectives, Policy Framework and Implementation

Judicious management and spatial planning in the Overstrand can be realised through the budgeting and implementation of specific management programmes and strategies / actions (i.e. as specific Environmental Management Framework (EMF)[jj] projects that are included in the following Municipal IDP planning cycle).

Table 8: Objectives, Policies, Implementation Mechanisms and Actions.

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 1: Develop and implement policies in terms of the South Africa National Framework for Sustainable Development (NFSD) and the National Strategy for Sustainable Development and Action Plan's (NSSD 1) vision for a sustainable society.[kk]	a) Implement a systems approach to sustainable development.[ll] b) Incorporate the applicable NSSD1 Action Plans into the EMF in order to achieve a sustainable and resilient Overstrand Municipal Area. c) Implement the associated NSSD1 Action Plan that has been developed for each strategic priority, as described in the EMF for the Overstand Municipality.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources

[jj] Note that a more detailed description of the rural and natural environments of the Overstrand Municipal area, the challenges faced, and the implications thereof for management and spatial planning are contained in the EMF for the area.

[kk] The applicable NSSD 1 strategic priorities and objectives are:

2. *"**Sustaining our ecosystems and using natural resources efficiently**.*

Objective: Value, protect and continually enhance environmental assets and natural resources

3. ***Towards a green economy***

Objective: A just transition towards a resource-efficient, low-carbon and pro-employment growth path

4. ***Building sustainable communities***

Objective: Create community awareness and participation, and work together to protect the environment through changing attitudes and behaviour in consuming resources sustainably and responsibly.

Objective: Develop and support quality housing programmes, including building community self-sufficient farming strategies, indigenous knowledge, the sustainable production of herbs and traditional medicines, and businesses to secure societal equity and cohesion.

5. ***Responding Effectively to Climate Change**"*

Objective: A fair contribution to the global effort to achieve the stabilisation of greenhouse gas concentrations in the atmosphere at a level that prevents dangerous anthropogenic interference with the climate system.

Objective: Effectively adapt to and manage unavoidable and potential damaging climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity.

Objective: Develop various adaptation strategies with climate sensitive sectors.

Objective: Assist various key sectors to develop and implement climate change adaptation plans.

Objective: Strengthen key sectors such as water, agriculture, health etc. to be more resilient and also have the ability to adapt to climate variability and change.

Reference: Department: Environmental Affairs and Tourism. (2011). National Strategy for Sustainable Development and Action Plan (NSSD 1) 2011–2014. Available from http://www.environment.gov.za/sites/default/files/docs/sustainabledevelopment_actionplan_strategy.pdf. (Accessed 26 November 2012).

[ll] According to the NFSD, a **systems approach to sustainability** is where the economic system, the socio-political system and the ecosystem are embedded within each other, and then integrated through the governance system that holds all the other systems together in a legitimate regulatory framework. Sustainability implies the continuous and mutually compatible integration of these systems over time. Sustainable development means making sure that these systems remain mutually compatible as the key development challenges are met through specific actions and interventions to eradicate poverty and severe inequalities.

Reference: Department: Environmental Affairs and Tourism. (2008). A National Framework for Sustainable Development in South Africa. Available from http://www.environment.gov.za/?q=content/documents/strategic_docs/national_framework_sustainable_development. (Accessed 26 November 2012).

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 2: Implement the policies and actions described in the National Development Plan: Vision for 2030 (NDP), especially in terms of: a) spatial planning transformation (reversing spatial effects of apartheid); b) enhancing the resilience of people, the economy and the environment to climate change; c) a transition to a low-carbon economy; d) publishing a regularly reviewed "state of the environment" report to inform policy and actions; e) respond quickly to protect the environment and mitigate the effects of climate change; and f) reduce greenhouse gas emissions and improve energy efficiency.	a) Implement the policies and actions as described in the NDP, in spatial planning, in land-use management, and in infrastructure development planning. b) The EMF should be formally reviewed and updated in alignment with the review cycle of the Municipal IDP and/or SDF documents (i.e. every 5 years) in order to describe the current "state of the environment". Such reviews will, *inter alia*, result in adaptive management in response to the effects of climate change, and will inform policies and actions.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Bylaws
OBJ 3: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with the Outcomes and Outputs issued by the Presidency's Department of Performance Monitoring and Evaluation in 2010, particularly with Outcome No. 10: *"Environmental Assets and Natural Resources that are Well Protected and Continually Enhanced"*. The Presidency Output which informs the policy framework for this section is: *"Output 1: Enhanced quality and quantity of water resources"*	a) Incorporate the actions as described in the Overstrand Water Services Development Plan into the EMF in order to create the necessary water services infrastructure to enable economic growth, which is an important precondition for sustainable development. b) Implement the actions described in the Overstrand Water Services Development Plan leading to improved services delivery, to improved water resource quality and quantity, and to improved community health. c) Catchment Management Plans, coastal and estuarine set-back lines, the coastal protection zone, and the strategies for Integrated Water Resource[mm] Management, as defined by the DWA[76] and by the 2011 Western Cape Integrated Water Resources Management Action Plan,[77] should be incorporated and implemented in spatial planning, in land-use management, and in infrastructure development planning.	Legislation, Policies and Guidelines Water and waste services projects Environmental Management Framework Financial Incentives Funding Sources Bylaws

[mm] **Integrated Water Resource Management** (IWRM) is a process which promotes the coordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. IWRM seeks integration under two basic categories, namely the natural system which is critically important with regards to resource availability and quality, and the human system, which determines the resource use, the production of waste and the pollution of the resource, as well as setting priorities for development. Integration has to occur both within and between these categories.

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 4: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with the Outcomes and Outputs issued by the Presidency's Department of Performance Monitoring and Evaluation in 2010, particularly with Outcome No. 10: *"Environmental Assets and Natural Resources that are Well Protected and Continually Enhanced"*. The Presidency Output which informs the policy framework for this section is: *"Output 2: Reduced greenhouse gas emissions, climate change impacts and improved air/atmospheric quality"*	a) The October 2011 National Climate Change Response White Paper[nn] should be considered, incorporated and implemented in spatial planning, in land-use management, and in infrastructure development planning. b) The policies contained within the 2007 National Framework for Air Quality Management in the Republic of South Africa should be considered, incorporated and implemented in spatial planning, in land-use management, and in infrastructure development planning. In particular, each Municipality preparing an Integrated Development Plan (IDP) should include an Air Quality Management Plan. c) In partnership with the Overberg District Municipality, implement the Overberg Distrct Municipality's Integrated Transport Plan, and, in particular, an Integrated Public Transport Network, as proposed by the Overberg District Municipality's Mobility Strategy (2010).[78] [79]	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws Partnership with the Overberg District Municipality

[nn] In terms of the October 2011 National Climate Change Response White Paper, South Africa will ensure that national, provincial and municipal coastal management plans incorporate relevant climate information and geographic information systems and adopt a risk-based approach to planning that anticipates the consequences of the continued migration of communities into high risk coastal areas. **Reference:** The Government of the Republic of South Africa. (2011). National Climate Change Response White Paper. Available from http://www.rava.qsens.net/themes/theme_emissions/111012nccr-whitepaper.pdf (Accessed 26 November 2012).

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 5: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with the Outcomes and Outputs issued by the Presidency's Department of Performance Monitoring and Evaluation in 2010, particularly with Outcome No. 10: *"Environmental Assets and Natural Resources that are Well Protected and Continually Enhanced"*. The four Presidency Outputs, which together underpin Outcome No. 10, inform the policy framework for this section, and are: *"Output 3: Sustainable environmental management"* *"Output 4: Protected biodiversity"*	a) Incorporate the Action Plans as described in the Overstrand Integrated Waste Management Plan into the EMF in order to ensure that Waste Management in the Overstrand Municipal Area complies with South African and International environmental standards so that it is beneficial to industrial and agricultural growth and the public's right to a clean and healthy environment. b) Implement the recommendations and actions as described in the Overstrand Integrated Waste Management Plan in terms of waste avoidance, waste reduction, waste collection and transport, waste disposal and general waste management. c) Implement the Bioregional Planning Model of the Overstrand Municipal Wide Spatial Development Framework by actioning the policies and strategies within the described Spatial Planning Categories in a manner that protects biodiversity and ensures environmental sustainability. d) The latest systematic biodiversity plans (e.g. the 2011 National Biodiversity Assessment) must be considered, incorporated and implemented in spatial planning, in land-use management, and in infrastructure development planning.	Legislation, Policies and Guidelines Water and waste services projects Environmental Management Framework Financial Incentives Funding Sources Bylaws

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 6: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to biodiversity management is: "*Objective 8: Protect biodiversity and agricultural resources*".	a) Biodiversity planning and management outside of protected areas should be in accordance with the National Environmental Management: Biodiversity Act No. 10 of 2004, and should draw from the National Biodiversity Framework (NBF) of 3 August 2009. The NBF identifies 33 priority actions for the period 2008 to 2013, organised according to the five strategic objectives of the National Biodiversity Strategy and Action Plan. The NBF will necessarily be revised after 2013. b) Priority areas for biodiversity conservation must be informed by the most recent systematic biodiversity planning outputs (e.g. the 2011 National Biodiversity Assessment produced by the SANBI, which includes ecosystem threat status and ecosystem protection level. The NBA 2011 also deals with species of special concern and invasive alien species, presents new work on geographic areas that contribute to climate change resilience, and provides a summary of spatial biodiversity priority areas that have been identified through systematic biodiversity plans at national, provincial and local scales). c) Municipal land containing areas of high conservation importance (e.g. Critical Biodiversity Areas that are included within the mapped areas of the National Protected Area Expansion Strategy) should be incorporated into a formal Municipal reserve network. Alternatively, such areas should be incorporated into CapeNature's Conservation Stewardship Programme, and should be jointly managed by CapeNature. d) All Marine Protected Areas (MPAs) must be managed according to the NEM:ICMA, and a new Kogelberg MPA should be established in terms of the 2010 Kogelberg Coast Integrated Management Plan. e) MPAs should be extended where possible, and "no-take zones" comprising at least 20% of the total Overstrand coastline should be identified.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 6 continued: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to biodiversity management is: "*Objective 8: Protect biodiversity and agricultural resources*".	f) Environmental Management Plans should be developed and implemented to effectively manage and promote Municipal Nature Reserves and Municipal Open Spaces. The Establishment and management of protected areas and Special Management Areas must be in accordance with the NEM:PAA, and in terms of the NEM:BA where applicable. g) Private and Municipal land containing areas of high conservation importance should be the focus of local economic development projects with biodiversity benefits (such as clearing of invasive aliens through Working for Water, clearing of solid waste from rivers through the Extended Public Works Programme[oo] [EPWP], or other forms of rehabilitation e.g. through the Working for Wetlands, LandCare and CoastCare programmes). h) Private landowners who have land in important biodiversity corridors, or that contain areas of high conservation value, should be encouraged to manage their land in terms of Voluntary Agreements with CapeNature (Conservation Stewardship Programme), or alternatively, with the Overstrand Municipality. i) An Environmental Management Framework (EMF) must be developed (and be reviewed) in terms of the National Environmental Management Act No. 107 of 1998 EMF Regulations, in order to manage and monitor conservation threats, and matters of environmental concern, in the Municipal Area. j) Biodiversity management and permissible activities per Municipal Spatial Planning Category should be governed by the Policies as contained in the Municipal SDF, and by the policies contained in the corresponding PSDF Spatial Planning Category.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

[oo] The **EPWP** is one of government's short-to-medium term programmes aimed at alleviating and reducing unemployment. This aim can only be achieved through the provision of work opportunities coupled with training. Opportunities for implementing the EPWP have been identified in the infrastructure, environmental, social and economic sector. In the environmental sector the emphasis is on creating additional work opportunities through the introduction of labour-intensive projects.

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 7: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to the protection of agricultural resources is: "*Objective 8: Protect biodiversity and agricultural resources*".	a) All naturally vegetated land not suitable for Intensive Agriculture outside urban edges and not classified in the in the Municipal Core 1 or Core 2 Spatial Planning Categories, should be classified as Buffer Areas. b) The Municipality should consider bioregional spatial planning for all land-use applications on land zoned as Agriculture and applications in terms of the Land-use Planning Ordinance 15 of 1985, the Subdivision of Agricultural Land Act 70 of 1970, the Conservation of Agricultural Resources Act 43 of 1983 or any other application as determined by the relevant Department of Agriculture. c) Land-use management and permissible activities on agricultural land should be governed by the Policies as contained in the Municipal SDF per Municipal Spatial Planning Category, by the Conservation of Agricultural Resources Act No. 43 of 1983, by the National Water Act No. 38 of 1998, by the draft Sustainable Utilisation of Agricultural Resources Bill, and by the policies contained in the corresponding PSDF Spatial Planning Category.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 7 continued: Overarching Objective: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to the protection of agricultural resources is: "*Objective 8: Protect biodiversity and agricultural resources*".	d) Land-use management, managing rural land-use change, and permissible activities on agricultural land should be guided by the Draft PSDF Rural Land-use Planning & Management Guidelines. Detailed management guidelines are presented for the full spectrum of rural land-uses. In general, the following should be enforced: • No buildings or structures should be allowed on ridgelines; • Avoid transforming land steeper than 1:4; • Avoid buildings or structures on elevated exposed slopes; • No development should take place over minerals, faults & unstable soils; • Conserve high potential and unique agricultural land; • No development should take place on good agricultural soils or on embedded moderate soils; • Avoid fragmenting homogeneous farming areas; • No development should take place within 100 year floodplains and/or within established setback lines (also called "process lines") and/or within the estuarine functional zone (usually defined by the 5m contour); • No development should take place within wetlands or riverine corridors (identified in systematic biodiversity plans [e.g. the NFEPA]). In addition, development in rural areas should consider the detailed guidelines presented for each Critical Biodiversity Areas Mapping Category in the Draft 2009 PSDF Rural Land-use Planning & Management Guidelines.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 7 continued: Overarching Objective: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to the protection of agricultural resources is: "*Objective 8: Protect biodiversity and agricultural resources*".	e) Subdivision and development of agricultural land should be governed by the Policies as contained in the Municipal SDF per Municipal Spatial Planning Category, the Land-use Planning Ordinance 15 of 1985, the Subdivision of Agricultural Land Act 70 of 1970, by the NEMA, and by the policies contained in the corresponding PSDF Spatial Planning Category. f) Land suitable for intensive agriculture should be protected against conversion to other uses and in particular against pressure from urban development by the delineation of strict urban edges. This protection should be further enhanced by the valuation of such land according to commercial agricultural rates of return rather than speculative values based on the possibility of partial or full urban rights.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 8: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to management of heritage resources is: *"Objective 5: Conserve and strengthen the sense of place of important natural, cultural and productive landscapes, artefacts and buildings".*	a) Wherever possible, heritage considerations should be incorporated into land-use planning, should be considered in land-use management and in development applications, without environmental and social goals being compromised. b) All future buildings, roads and infrastructure should be planned, sited and designed according to relevant heritage and environmental authority guidelines and/or legislation prior to evaluation by the Municipality c) Pipelines, transmission lines and telecommunications masts should be aligned along existing and proposed transport corridors rather than along point to point cross-country routes. d) Wind farms should be located where they will cause least visual impact taking into consideration the viability of the project. e) Development in rural and urban areas should consider the generic heritage and development guidelines that included in the 2009 Overstrand Heritage Survey and the policies contained in the 2013 PSDF Heritage and Scenic Resources Assessment. f) The inventory of Heritage Resources as included in the 2009 Overstrand Heritage Survey and in the 2013 PSDF Heritage and Scenic Resources Assessment should be used to inform development planning in the Municipal Area.	Legislation, Policies and Guidelines - **REG** Environmental Management Framework - **EMF** Financial Incentives - **FUND** Funding Sources – **FS** Bylaws

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 9: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to the consumptive use of natural resources is: *"Objective 9: Minimise the consumption of scarce environmental resources, particularly water, fuel, building materials, mineral resources, electricity and land – in the latter case especially pristine and other rural land, which is the Province's 'goldmine-above-the-ground'".*	a) All land in the Municipality should be defined by the Broad Spatial Planning Categories[pp] as described in the Municipal SDF in order to ensure that non-agricultural development outside urban areas is managed and promoted in a sustainable manner, and in order to manage land-use change in the five main physiographic components of the landscape, i.e. the coastal zone, the coastal plain, the mountains and valleys, and the inland plains. The Municipality should revise such Spatial Planning Categories with each revision of the SDP. b) Municipal Spatial Planning Categories should be informed by the most recent systematic biodiversity planning outputs (e.g. the 2011 National Biodiversity Assessment produced by the SANBI). Whenever development applications are received, the available GIS-based bioregional planning information must be ground-truthed by the applicant of any development application. c) Sustainable resource use per Spatial Planning Category should be governed by the Policies as contained in the PSDF, by the Land-use Policies and Guidelines as contained in the Municipal SDF, and by the Water Services Development Plan. d) Wherever financially feasible, no new buildings, developments or neighbourhoods should be approved by the Municipality that do not incorporate "green building technology". Developments should incorporate water saving technologies and electricity saving measures. In addition, specific environmentally friendly building regulations should be developed and implemented in environmentally sensitive areas (e.g. in Betty's Bay).	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

[pp] **Note:** These categories may not take away existing property rights. They should instead provide the basis for new rights.

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 9 continued: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to the consumptive use of natural resources is: *"Objective 9: Minimise the consumption of scarce environmental resources, particularly water, fuel, building materials, mineral resources, electricity and land – in the latter case especially pristine and other rural land, which is the Province's 'goldmine-above-the-ground'".*	e) Where possible, older buildings should be retro-fitted, to reduce their demand for water and energy (e.g. through Eskom's National Efficient Lighting Programme and by including solar hot water geysers, thermal insulation in roofs, rainwater collection tanks, duel-flush toilets, tap aerators etc.). f) New developments and neighbourhoods should be located with due consideration for minimising transport distances to commercial centres and to places of work. g) The Municipality should, in terms of the Draft Transport Policy,[qq] develop and implement efficient public transport routes and systems, in order to reduce fuel consumption, congestion in urban centres, and atmospheric pollution. h) The Municipality should support and promote "green" transport options, such as bicycle and pedestrian routes, and should develop electricity-based transport systems as a long-term project.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

[qq] **Reference:** Liezl Bezuidenhout. Overstrand Environmental Management Section. pers. comm. 23 April 2013.

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 10: Implement policies and action plans that have been developed in terms of the Overstrand Municipal Wide Spatial Development Framework (SDF) Goals and Objectives relating to the protection of biological diversity and ecosystems and that ensures environmental resilience and sustainability. The applicable Municipal SDF Goals are: *"Goal: To implement an effective management system for the protection of biological diversity and ecosystems through the co-operation of all concerned.* *Goal: To protect and conserve the heritage resources of the area:* *Goal: To provide an environmentally and economically sustainable bulk service infrastructure (and road transport network).* *Goal: To promote the conservation of the natural resources in the Overstrand Municipal Area.* *Goal: To ensure that ongoing development pressure and its spatial implications are managed in a sustainable manner that protects the unique character of the existing cultural landscape and the place-specific character and form of the existing settlement pattern."*	a) It is recommended that the descriptions of Municipal Spatial Planning Categories be informed by the categories contained in the most recent PSDF. b) Apply the SDF policies and strategies formulated for each Spatial Planning Category (Core Conservation; Buffer; Agriculture; Core Urban; Important Ecological Process Areas; and Agricultural Settlements) in terms of the Bioregional Planning Model for decision making purposes relating to land-use applications, for spatial planning, and for land-use management. Incorporate applicable policies and strategies into the EMF for the Overstrand. c) For the purposes of any development within any untransformed areas, or areas containing natural vegetation, the applicant is required to provide adequate proof to the satisfaction of the Municipality and/or responsible government department/s (i.e. Department of Agriculture, CapeNature, DEA&DP) that the vegetation in the area is not regarded as Critically Endangered, Endangered, important for key ecological .processes, special habitat, or of ecological significance. d) The Municipality should, where necessary, convene a technical advisory group to advise on development applications (including intensive agriculture applications) in sensitive environments (i.e. regarding changes in land-use). Such a technical advisory group could, *inter alia*, consist of representatives from CapeNature (Land-use Advisory Unit representative and the regional ecologist), the Department of Agriculture (Western Cape), Overstrand Municipality (Biodiversity Manager and representative from the town planning department), and local environmental groups.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 10 continued: Implement policies and action plans that have been developed in terms of the Overstrand Municipal Wide Spatial Development Framework (SDF) Goals and Objectives relating to the protection of biological diversity and ecosystems and that ensures environmental resilience and sustainability. The applicable Municipal SDF Goals are: *"Goal: To implement an effective management system for the protection of biological diversity and ecosystems through the co-operation of all concerned.* *Goal: To protect and conserve the heritage resources of the area:* *Goal: To provide an environmentally and economically sustainable bulk service infrastructure (and road transport network).* *Goal: To promote the conservation of the natural resources in the Overstrand Municipal Area.* *Goal: To ensure that ongoing development pressure and its spatial implications are managed in a sustainable manner that protects the unique character of the existing cultural landscape and the place-specific character and form of the existing settlement pattern."*	e) The EMS should monitor compliance with the policies and strategies of the SDF and of the EMF on a regular basis, to ensure sound implementation. f) Incorporate and apply the Land-use Policies and Guidelines as contained in the Municipal SDF for decision making purposes relating to land-use applications, for spatial planning, and for land-use management. Incorporate applicable policies and strategies into the EMF for the Overstrand. The Land-use Policies and Guidelines should also inform the zoning scheme for the Overstrand Municipal Area. g) Incorporate and apply the Spatial Development Strategy, as described in the Municipal SDF, to provide the overall spatial structure and broad principles that will be used to guide growth, development and land-use management in the Overstrand Municipal Area. h) Incorporate and apply the local level planning proposals and strategies, as described in the Municipal SDF, in order to identify Local Strategic Spatial Interventions critical to achieving environmental resilience and sustainability.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 11: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to the management and protection of coastal and river bank areas is: "*Objective 8: Protect biodiversity and agricultural resources*".	a) The Integrated Coastal Management Act No. 24 of 2008 should form the basis for managing coastal developments. b) The principles and objectives of the Sea Shore Act No. 21 of 1935 (which is built on the fundamental Roman Dutch Law premise that the sea and sea-shore owned by the State for the use and benefit of the public); the Marine Living Resources Act No. 18 of 1998; and the National Environmental Management Act No. 107 of 1998; must be considered when developing and implementing coastal management and land-use planning policies / strategies in the Overstrand. c) The objectives and policies (strategies and actions) contained within the 2000 White Paper for Sustainable Coastal Development in South Africa, the 2004 Coastal Zone Policy for the Western Cape, and the 2011 NBA Technical Report: Marine and Coastal Component should be considered, incorporated and implemented with regard to protection of our national heritage, coastal planning and development, pollution control and waste management, natural resource management, governance and capacity building in coastal areas. d) A Coastal Management Programme for the Overstrand should be developed and implemented. The Kogelberg Coast Integrated Management Plan could be used as a template to develop such a plan for the entire coastal zone of the Overstrand Municipality. e) For proposed new developments or urban areas that fall outside existing urban areas, erosion set-back-lines, ecological set-back lines and building set-back lines from coastal areas, including estrauries and water courses should be established by coastal ecologists / hydrologists, botanists and town planners.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 11 continued: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to the management and protection of coastal and river bank areas is: "*Objective 8: Protect biodiversity and agricultural resources*".	f) Land-use management and permissible activities in coastal areas should be informed by the Policies as contained in the PSDF, in particular the following: • Coastal and river bank development should be set back behind floodlines (1:50 year floodline: property boundaries; 1:100 years floodline: building platform) and storm surge lines (coastal set-back line). • Coastal buffer zones (i.e. coastal set-back line and coastal protection zone determined in terms of the NEM:ICMA), and ecological set-back lines from rivers and estuaries should be demarcated to enable potentially affected residents to prepare, and to prevent new developments from being unsafely located. • Whilst mariculture and aquaculture projects should be encouraged, they should be carefully located with regard to environmental and visual impact criteria. • Ribbon development along the coast and riverbanks should be discouraged wherever possible. • Residential development should be limited to within the urban edges of existing coastal and river bank towns. • Coastal resort / tourism development outside the urban edge should be restricted to less sensitive sites along the coast and along/near to rivers and wetlands (sensitive habitats include, but are not limited to: frontal dune systems; estuaries; mud flats; and wetlands). • Nodal frontage should be limited to a maximum of 25% of the property boundary abutting the coast or river / estuary banks. • Coastal and river bank resort development should not limit public access to beaches and river banks.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 11 continued: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to the management and protection of coastal and river bank areas is: "*Objective 8: Protect biodiversity and agricultural resources*".	• Resorts on coastal and river cliffs should be set back far enough from the cliff edge that they are not visible from coastal and river paths and beaches below. The DEA&DP Guideline for the Management of Development on Mountains, Hills and Ridges of the Western Cape[80] should be referred (by applicants and authorities) to when considering / reviewing developments proposed in a mountain, hill or ridge environment. g) For policy implementation, it is essential to have dedicated allocations to specific coastal management activities and projects in the budgets of local authorities h) Estuaries should be managed through the development, implementation and scheduled revision of Estuary Management Plans. i) River Corridors include the main stems of all rivers and their tributaries which, according to the PSDF, should be protected by a minimum 32 metre (in terms of the NEMA 2010 EIA Regulations) riparian boundary buffer from development and ploughing.[rr] In some critical instances it may be necessary for the relevant department (e.g. Department of Agriculture) to remove existing rights and development to restore the functioning of rivers and ecological corridors (for example, if ploughing permits lapse they might not be renewed).	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

[rr] Closer developments could be approved in exceptional circumstances, following approval of an EIA by the relevant authorities.

Objectives	Policies	Implementation Mechanisms and Actions
OBJ 11 continued: Develop and implement policies and action plans to alleviate / address potential and existing environmental challenges in the Overstrand in alignment with Objectives 5, 8 and 9 of the Provincial Spatial Development Framework (PSDF) in in a manner that protects biodiversity and ensures environmental resilience and sustainability. The applicable PSDF objective related to the management and protection of coastal and river bank areas is: "*Objective 8: Protect biodiversity and agricultural resources*".	j) River set-back lines and Ecological Corridors should be determined / ground-truthed before applications for urban or rural development (including agriculture) are lodged with the relevant authorities. The Municipality should check that this has been done when development applications are under review. k) According to the C.A.P.E Regional Estuarine Management Programme, it is recommended that 50% of the estuary margin should be left undeveloped for the Palmiet, Bot-Kleinmond and Klein River estuaries, increasing to 75% in the case of the Uilkraals estuary.[81] l) Catchment Management Plans should be produced by the DWA, in collaboration with District and Local Municipalities, and should be implemented by Catchment Management Agencies with Municipal support for priority river systems, as identified and mapped by the SANBI's National Freshwater Ecosystem Priority Area (NFEPA) programme.	Legislation, Policies and Guidelines Environmental Management Framework Financial Incentives Funding Sources Bylaws

5.4 WHAT WE WILL DO – IMPLEMENT SYSTEMATIC BIODIVERSITY PLANNING AND THE LATEST BIODIVERSITY PLANNING INFORMATION IN LAND-USE DECISION-MAKING AND MANAGEMENT

5.4.1 Introduction

Systematic biodiversity planning[ss] forms the basis for achieving conservation goals in South Africa, and in the Overstrand. Systematic biodiversity planning provides, *inter alia*, the basis for biodiversity sector plans,[tt] assists with the identification of threatened ecosystems, and identifies geographic priority areas for conservation / protection.

There are two main strategies for ensuring that the geographic priority areas identified in systematic biodiversity plans remain in a well-managed natural state:

- **Strategy 1:** Consolidation and expansion of the protected area network.
- **Strategy 2:** Integrated management aimed at conservation of CBAs outside the protected area network.

The protected area network, for various historical reasons, is biased towards certain ecosystems (such as mountain fynbos ecosystems) and does a poor job of protecting other ecosystems (such as fynbos lowlands, freshwater ecosystems, estuaries, and offshore marine ecosystems). This makes the second strategy important for ecosystems that are poorly protected by the protected area network. These ecosystems often occur in production landscapes (e.g. in agricultural areas), or in areas under imminent development pressure, with limited options for formal protection through the protected area network.

The latest systematic biodiversity planning information obtained from, *inter alia*, the SANBI's 2011 NBA (**Figure 16**), the Department of Water Affairs, the Southern African Agricultural Geo-referenced Information System, and from other sources has been used to inform the biodiversity planning that underpins the content of this EMF.

[ss] There are several possible approaches to biodiversity planning. The approach used most often in South Africa, is referred to as **systematic biodiversity planning**. Systematic biodiversity planning is based on three key principles:

- The need to conserve a representative sample of biodiversity pattern, such as species and habitats (the principle of representation);
- The need to conserve the ecological and evolutionary processes that allow biodiversity to persist over time (the principle of persistence);
- The need to set quantitative biodiversity-based targets that tell us how much of each biodiversity feature should be conserved in order to maintain functioning landscapes and seascapes. These targets should ideally be based on best available science, rather than on arbitrarily defined thresholds (such as 10% of all features).

Reference: Driver, A., Maze, K., Lombard, A.T., Nel, J., Rouget, M., Turpie, J.K., Cowling, R.M., Desmet, P., Goodman, P., Harris, J., Jonas, Z., Reyers, B., Sink, K. & Strauss, T. (2004). South African National Spatial Biodiversity Assessment 2004: Summary Report. South African National Biodiversity Institute. Pretoria. Available from http://www.bcb.uwc.ac.za/pssa/articles/features/no57.htm. (Accessed 18 February 2013).

[tt] **Biodiversity Sector Plan:** A map of Critical Biodiversity Areas and Ecological Support Areas accompanied by contextual information, land- and resource-use guidelines and supporting GIS data. The map must be produced using the principles and methods of systematic biodiversity planning. A biodiversity sector plan represents the biodiversity sector's input into planning and decision-making in a range of other sectors. It may be formally published in the Government Gazette as a bioregional plan in terms of the Biodiversity Act, but need not necessarily be. **Reference:** Driver A., Sink, K.J., Nel, J.N., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. & Maze, K. (2012). National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria.

5.4.2 Suitable Land-Uses and Activities

5.4.2.1 Threatened Terrestrial and Freshwater Ecosystems of the Overstrand Municipal Area

Since an EMF is an environmental planning tool that specifies areas where certain land-uses are most compatible or incompatible with environmental opportunities and constraints in the landscape, listed ecosystems[uu] must be incorporated, with restrictions on any loss of natural habitat in critically endangered or endangered ecosystems.

The starting point is for the Overstrand Municipality to be aware of listed ecosystems that fall within their jurisdiction. To this end, the SANBI and the DEA have produced a Threatened Ecosystems Map for the Overstrand (**Figure 11**), which depicts the remaining extents of threatened ecosystems within the jurisdiction area of the Overstrand Municipality.

The SANBI's PBPTW Programme for the Overstrand Municipality, and the 2011 NBA make some of the following **general recommendations** pertaining to land-use decision-making where the natural terrestrial and freshwater environments may be impacted upon: [82]

1. **In all rural areas:**

- Spatial planning should consider the existing urban edge and the natural beauty of the mountainous environment, *inter alia*, in terms of an altitudinal restriction contour line to development (including establishment of new agricultural fields). A height of 140m above mean sea level is proposed (**Figure 9**).
- Spatial planning must consider the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA) in terms avoiding development on soils of high and/or moderate agricultural potential (**Figure 4**), and avoiding development (including establishment of new agricultural fields) on steep slopes (> 1:4 gradients) (**Figures 9 and 17**).

2. **In all natural habitats:**

- Wherever possible, avoid dividing a continuous area of natural habitat into smaller fragments;
- Notify CapeNature's Land-Use Advisory Unit (021 866 8000 or landuse@capenature.co.za) when applications for non-conservation land-use are submitted for authorisation or approval;
- Decisions that may cause negative impacts on pristine and threatened (critically endangered, endangered or vulnerable) ecosystems should be informed by specialist biodiversity assessments.
- Spatial planning must consider all the implications of the 2010 NEMA EIA Regulations regarding development applications.
- Spatial planning should consider the National Protected Area Expansion Strategy (NPAES). The NPAES sets targets for protected area expansion, provides maps of the most important geographic areas for protected area expansion (NPAES Focus Areas as depicted in **Figure 13**)), and makes recommendations on mechanisms for protected area expansion.

[uu] **Threatened Ecosystems:** those vegetation types listed as Critically Endangered, Endangered and Vulnerable in terms of their conservation status in Government Gazette No. 1002, which was promulgated in terms of the NEM:BA on 9 December 2011.

3. **In special habitats:** [vv]

In Silcrete Patches and Indigenous Forests (not mapped at this scale, as the patches are too small):

- Avoid further loss or degradation, and conserve the rare and endangered species that occur on these outcrops.
- Recommend erosion control measures and suggest a 50 m buffer or the fencing off these areas if there is potential for trampling by stock or other similar disturbance.
- Where loss of natural habitat is inevitable, rare or endangered plant species should be transplanted to a suitable site (search and rescue). The Overstrand Municipality, together with the DEA&DP and CapeNature should identify appropriate biodiversity offsets.
- Notify CapeNature's Land-use Advisory Unit (021 866 8000 or landuse@capenature.co.za) when applications for non-conservation land-use on silcrete outcrops or in indigenous forests are submitted for authorisation or approval. Decisions should be based on a specialist assessment that has been reviewed by CapeNature. Where loss of natural habitat is inevitable, rare or endangered plant species should be transplanted to a suitable site. The DEA&DP should identify appropriate development offsets together with CapeNature.
- Avoid further loss of dune thicket and milkwood thicket. Indigenous forests are protected by the National Forests Act, 1998 (Act No 84 of 1998).

4. In critically endangered ecosystems:

- Prevent further loss of or degradation of natural habitat (**Figure 11**).
- Appropriate land-uses include activities that do not result in further loss of habitat or disturbance to ecosystem functioning in these systems.
- Appropriate land-uses may include, for example, passive recreation and tourism (hiking trails, bird watching), research and environmental education.
- Remaining healthy examples or portions of critically endangered or endangered ecosystems are always priorities for protected area expansion, even if they do not fall within a mapped focus area for protected areas expansion.

5. In endangered ecosystems:

- Avoid further loss of or degradation of natural habitat (**Figure 11**).
- Appropriate land-uses are the same as for critically endangered ecosystems.
- The Overstrand Municipality, together with the DEA&DP and CapeNature should identify appropriate biodiversity offsets to ensure that the endangered ecosystem doesn't become critically endangered. Offsets could be implemented through conservation stewardship agreements with CapeNature, or alternatively, a similar agreement be negotiated with the Overstrand Municipality.

6. In vulnerable ecosystems:

- Some further loss of habitat may be acceptable. Consult with CapeNature before authorising further transformation of such a habitat. Unchecked habitat loss can move a vulnerable ecosystem into the endangered category.

[vv] **Reference:** SANBI. (2013). PBPTW: Overstrand Municipality Special Habitats. Available from http://bgis.sanbi.org/PBPTW/Overstrand/specialHabitats.asp. (Accessed 12 April 2013).

7. In least threatened ecosystems (other natural habitats):

- Adopt a precautionary approach to environmental impacts in these ecosystems;
- Least threatened ecosystems (**Figure 11**) provide important ecosystem services, and keep ecological processes intact on a regional scale. Wherever possible, avoid fragmentation of habitats and encroachment into areas important for ecological processes.
- Least threatened ecosystems may include areas that are currently under pressure of uncontrolled development, such as coastal habitats, or that have been identified as locally important, such as limestone habitats or silcrete patches (not mapped at this scale).
- Note that least threatened status does not automatically equate to low biodiversity value, it rather implies that sufficient natural habitat still exists to meet the biodiversity target for the ecosystem concerned. Least threatened areas may support red data book species or contribute significantly to the regional landscape. Large, pristine tracts should, in particular, be protected from fragmentation and degradation.

The presence of Threatened Ecosystems has certain **Environmental Authorisation implications**, in terms of NEMA and the 2010 EIA Regulations:

The 2010 EIA Regulations include three lists of activities that require Environmental Authorisation, namely:

- Listing Notice 1: activities that require a Basic Assessment (R544 of 2010);
- Listing Notice 2: activities that require Scoping and Environmental Impact Reporting (EIR) (R545 of 2010); and
- Listing Notice 3: activities that require a Basic Assessment in specific identified geographical areas only (R546 of 2010).

Activity 12 of Listing Notice 3 relates to the clearance of 300m^2 of more of natural vegetation, which will trigger a Basic Assessment within any critically endangered or endangered ecosystem listed in terms of Section 52 of the NEM:BA. This means any development that involves loss of natural habitat in a listed critically endangered or endangered ecosystem is likely to require at least a Basic Assessment in terms of the 2010 EIA Regulations.

It is important to note that while the original extent of each listed ecosystem has been mapped, Activity 12 of the Listing Notice 3 is triggered only in remaining natural habitat within each ecosystem and not in portions of the ecosystem where natural habitat has already been irreversibly lost. As such, it is important to ground-truth the presence of indigenous vegetation of the ecosystem in question. Spatial data on the location of ecosystems and on land cover is always subject to errors of scale, and land cover data is never 100% up to date.

5.4.2.2 The Coast

The protection of the aesthetic, tourism and cultural value of the coast requires that the planning and management of land use in the coastal zone takes these values into consideration.[83] Land-use planning must also consider the predicted effects of climate change in terms of, disaster risk reduction strategies and programmes,[ww] and in terms of safeguarding and promoting ecosystem resilience.

Especially in terms of the effects of predicted climate change, coastal areas (and areas adjacent to rivers and water courses) are particularly vulnerable. As such, future spatial planning and land-use in coastal areas should take cognisance of / incorporate the following:

1. The Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (NEM:ICMA), which provides *inter alia* for various levels of protection for both aquatic and terrestrial habitats in the **coastal zone**,[xx] namely:

- A **coastal protection zone** (the coastal protection zone forms the landward boundary of the coastal zone) has been proposed for the Overstrand Municipality by Messrs SSI Environmental (now Royal HaskoningDHV) in terms of the NEM:ICMA. The position of this line is shown in **Figure 9**.

    - The NEM:ICMA currently requires that no organ of state may allow land that is part of the coastal protection zone to be used for anything that may have an adverse effect on the coastal environment without first considering an EIA / Basic Assessment report compiled in terms of the 2010 NEMA EIA Regulations.

  The coastal protection zone is established to manage, regulate and restrict the use of land that is adjacent to coastal public property (the coastal zone), or that plays a significant role in the coastal ecosystem. More specifically, the coastal protection zone aims to:

    - Protect the ecological integrity, natural character and the economic, social and aesthetic value of the coastal public property;
    - avoid increasing the effect or severity of natural hazards in the coastal zone;
    - protect people, property and economic activities from risks arising from dynamic coastal processes, including the risk of sea-level rise;
    - maintain the natural functioning of the littoral active zone;
    - maintain the productive capacity of the coastal zone by protecting the ecological integrity of the coastal environment; and
    - make land near the seashore available to organs of state and other persons for
        - performing rescue operations; or
        - temporarily depositing objects or materials washed up by the sea or tidal water. [84]

- The NEM:ICMA also provides for the establishment of a **coastal setback line**, which is designed to protect the coastal protection zone. A coastal set-back line (also called a "process line") has been proposed for the Overstrand Municipality by Messrs SSI Environmental, and is shown in **Figure 9**.

    - Any future development proposal seawards of the coastal set-back line is automatically subject to prior authorisation by the provincial MEC of the Department of Environmental Affairs and Development Planning (DEA&DP) in terms of the National Environmental

[ww] In terms of incorporating climate change in **their risk management strategies**, the Overstrand Municipality is involved in initiatives such as the "*Making cities resilient*" campaign initiated by the United Nations International Strategy for Disaster Reduction, and participated in the building of the world wide "*Local Government Alliance for Disaster Risk Reduction*". **Reference:** Overstrand Municipality. (2012). Integrated Development Plan 2012 – 2017. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 17 August 2012).

[xx] **Coastal Zone** means: The area comprising coastal public properly, the coastal protection zone, coastal access land and coastal protected areas, the seashore, coastal waters and the exclusive economic zone and includes any aspect of the environment on, in, under and above such area.

Management Act, 1998 (Act No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations of 18 June 2010.

- In the case of estuaries, any development proposal within the above set-back line (or a within a set-back line specifically determined for that estuary) would have to be compatible with the vision and objectives defined within the applicable specific estuary management plan, compiled under the auspices of the Cape Action Plan for the Environment (C.A.P.E.): Estuaries Management Programme.[yy]

- Coastal set-back lines, as detailed in the NEM:ICMA, are prescribed boundaries that indicate the limit of development along ecologically sensitive or vulnerable areas, or along an area that poses a hazard or risk to humans. As such, the coastal set-back line may be situated wholly or partially outside the coastal zone.

- The coastal set-back line should / is intended to prohibit or restrict the construction, extension or repair of structures that are either wholly or partly seaward of the line. The intention of the coastal set-back line is to protect the coastal protection zone, and to protect or preserve coastal public property; coastal private property; public safety; and the aesthetics of the coastal zone. [85]

2. The coastal planning scheme, as proposed in Kogelberg Coast Integrated Management Plan[86] (compiled in terms of the NEM:ICMA), should be used as a guideline in the development of a coastal planning / zoning scheme or zoning scheme overlay for the rest of the Overstrand Municipal area.

5.4.2.3 Wetlands, Rivers, Vleis, Estuaries, Lagoons

The SANBI's PBPTW Programme and/or the 2011 NBA for the Overstrand Municipality and/or the C.A.P.E Regional Estuarine Management Programme make the following **recommendations** pertaining to land-use decision-making in or near to "wetlands": [87]

- No development in wetland ecosystems (a specialist ecologist, and the DWA or CapeNature are to determine the agreed upon boundary of the ecosystem). Note that whilst the boundaries of the Estuarine Functional Zones for the estuaries in the Overstrand have been determined by the NBA, these should still be ground-truthed (**Figure 8** refers). The estuarine functional zone for South Africa's estuaries is defined by the 5 m topographical contour (i.e. 5 m above mean sea level). In some cases however, the estuarine functional zone goes beyond the 5m contour (refer to **Paragraph 5.4.2.4 below**).[88]
- Provide for a minimum 32 meter (in terms of the NEMA 2010 EIA Regulations) ecological buffer[zz] adjacent to all wetlands (decisions regarding optimal buffer width should include rating the aquatic ecosystem in terms of its condition and its role in the broader ecological and human landscape, plus an assessment of the impacts to the ecosystem of the existing and proposed adjacent land-use.).
- High Water Yield Areas, (**Figure 7**) River FEPAs and their associated sub-quarternary catchments (**Figure 6**) should be maintained in natural or near-natural condition. Wetland FEPAs that are currently in natural or near-natural condition should remain so; those that are not should be rehabilitated to the best attainable ecological condition. This means that land-uses that reduce stream flow (for example, plantation forestry) should be minimised in these

[yy] Individual management plans for the larger estuaries of the Overstrand Municipality have been compiled under the auspices of the Cape Action Plan for the Environment (C.A.P.E.) Estuaries Management Programme in accordance with the NEM:ICMA, and with the NWA.

[zz] **Ecological buffers** of natural vegetation along river corridors and around wetlands provide important connectivity in the landscape, allowing ecosystems and species to respond to climate change. In addition, such ecological buffers mitigate floods, reduce erosion and improve water quality

areas, as well as any activity that would affect water quality (for example, timber mills, mining, over-grazing, heavy industry).

- Buffers of healthy natural vegetation should always be maintained around river and wetland FEPAs[aaa]. The recommended buffer width around river (and wetland) FEPAs is 100m (**Figure 6**).
- Options for extending and strengthening the protection of high water yield areas should be explored, for example declaring them as Protected Environments in terms of the Protected Areas Act (No. 57 of 2003), to ensure that they are managed effectively with appropriate restrictions on land-use. In many cases, only part of the sub-quaternary catchment concerned would require formal protection.
- No cultivation may take place within the 1-in-10 year "flood area" of any water course in terms of the CARA (see GN No. R.1048, 25 May 1984).
- 50% of the estuary margin should be left undeveloped for the Palmiet, Bot-Kleinmond and Klein River estuaries, increasing to 75% in the case of the Uilkraals estuary.[89]
- A Surface Water Management Plan should inform decisions regarding activities outside of aquatic ecosystems that directly impact their functioning.
- Notify CapeNature's Land-use Advisory Unit (021 866 8000 or landuse@capenature.co.za) when applications for non-conservation land-use that affect wetlands, are submitted for authorisation or approval. Decisions should be based on a specialist assessment that has been reviewed by CapeNature. Where loss of natural habitat is inevitable, rare or endangered plant species should be transplanted to a suitable site. The DEA&DP should identify appropriate development offsets together with CapeNature.
- Flagship Free-Flowing Rivers (**Figure 7**) should receive top priority for retaining their free-flowing character. This means that dams or other restrictions to water flow such as weirs should not be constructed on or within flagship free-flowing rivers. Flagship Free-Flowing Rivers should be considered priorities for protected area expansion. These rivers may lend themselves to a biodiversity stewardship approach in collaboration with CapeNature. Alternatively, similar agreements could be negotiated with the Overstrand Municipality where Flagship Free-Flowing Rivers bisect privately owned properties.

Judicious management of surface and ground water resources can be realised through the budgeting and implementation of specific catchment management strategies (i.e. as specific EMF projects that are included in the following Municipal IDP planning cycle). Such catchment management plans should incorporate *inter alia*: social, institutional, biophysical management, legislative/policy, and economic components, and should also include an estuarine reserve determination, and a water allocation plan.

5.4.2.4 Critical Biodiversity Areas of the Overstrand Municipal Area

The primary purpose the CBA map (**Figure 12**) is to guide decision-making about where best to locate development, by providing a synthesis of biodiversity information (including wetlands, threatened ecosystems, special and/or restricted habitats, known localities of threatened plant species, and key habitats for mammals, birds, fish, reptiles, amphibians and certain invertebrates) to decision makers.

The CBA map indicates areas of land as well as aquatic features which must be safeguarded in their natural state if biodiversity is to persist and ecosystems are to continue functioning. Land in this category is referred to as a Critical Biodiversity Area.

[aaa] For more information on river and wetland FEPAs, as well as other categories shown on FEPA maps, see the Implementation Manual for Freshwater Ecosystem Priority Areas. **Reference:** Driver, A., Nel, J.L., Snaddon, K., Murray, K., Roux, D.J., Hill, L., Swartz, E.R., Manuel, J. & Funke, N. (2011). Implementation Manual for Freshwater Ecosystem Priority Areas. WRC Report No. 1801/1/11, Water Research Commission, Pretoria.

CBAs incorporate:

- areas that need to be safeguarded in order to meet national biodiversity thresholds;
- areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or
- important locations for biodiversity features or rare species.

Ecological Support Areas (ESAs) are supporting zones required to prevent the degradation of CBAs and Protected Areas. An ESA may be an ecological process area that connects and therefore sustains Critical Biodiversity Areas or a terrestrial feature, e.g. the riparian habitat surrounding and supporting aquatic Critical Biodiversity Areas.

"Other Natural Areas" are areas of natural vegetation that were not identified as CBA or ESAs by Holness and Bradshaw (2010).[90] Although these areas are not required to meet biodiversity targets at present, they should still be subject to appropriate rural development controls and authorisations (e.g. there may be other reasons such as urban edge delineation or other environmental impacts) and where possible development should be located in already transformed or disturbed areas rather than in natural areas. It is possible that high value biodiversity features such as previously unidentified threatened species or small wetlands could be present in these areas. As such, the use of the precautionary principle and site visits by a specialist are always advisable to advise decision-making. Further, as a certain amount of loss of CBAs or ESAs is inevitable, in the future some of the "Other Natural Areas" may be required to meet biodiversity targets, and hence excessive loss of natural habitat should be avoided wherever possible.

The CBA map also identifies areas that have been irreversibly transformed through development (e.g. urban development, plantation, agriculture). These areas are referred to as "No Natural Areas Remaining". They no longer contribute to the biodiversity of the area. However, there are areas of land (partially or wholly transformed or degraded land) that have been classified as ESAs or even CBAs. Although these areas are heavily degraded or transformed, they still play an important role in supporting ecological processes. This is particularly the case with riparian areas, some key catchment areas and key pieces of corridors (especially the coastal corridor). No further intensification of land-use activities should be permitted and they should be prioritised for rehabilitation, where possible.

In terms of land-use decision-making, the presence of alien vegetation in some cases resulted in such areas not being identified as CBAs or as ESAs by Holness and Bradshaw (2010). An indication of the relative density of alien vegetation, as determined by the DWA in 2000, is illustrated in **Figure 18**. The 2011 NBA has also produced a map indicating alien density **Figure 19**). It is however well-known that threatened indigenous plant species can survive under high densities of alien plant cover, and that fynbos soil-stored seed banks are long-lived. As such, fynbos vegetation can in many cases be successfully restored following removal of alien plant infestations.

In terms of the above, in alien infested areas that would originally have contained threatened indigenous vegetation, land-use decision-making must be informed by specialist botanical assessments.

The identified Critical Biodiversity Areas (and Ecological Support Areas) have been determined by the SANBI in order to meet the targets for conserving the underlying biodiversity features in as small an area as possible, and in areas with least conflict with other land-uses. The CBAs and Ecological Support areas were also identified in order to help facilitate the functioning of ecological processes (both currently and in the face of climate change) which are required to ensure that the biodiversity features persist in the long term. Such ecological processes include aspects such as fire ecology, upland / lowland and coastal biodiversity corridors (connectivity between habitats), active dune fields, and hydrological processes (such as wetland vegetation that modulates stream flow, improves water

quality by absorbing excess nutrients and harmful materials, and that provides habitat for aquatic and terrestrial animals).

The CBA map that was produced by Holness and Bradshaw (2010) is intended to act as the biodiversity sector's input into the spatial plans and assessments compiled for the Overstrand Municipality (e.g. SDF, IDP, IDF, EMF, EIAs, etc.). Note further that the CBA map (**Figure 12**) is aligned with national standards for bioregional plans, and that revised CBA networks must replace the current network when available

The presence of Critical Biodiversity Areas, as identified in systematic biodiversity plans adopted by the competent authority (Minister or MEC), or in bioregional plans, may have certain **Environmental Authorisation implications**, in terms of NEMA and the 2010 EIA Regulations:

Activities 12 and 13 of Listing Notice 3 relate to the clearance of natural vegetation, which will trigger a Basic Assessment within any Critical Biodiversity Area and/or Ecological Support Area identified in bioregional plans. Activities 5, 16, 18 and 24 relate to the construction and/or expansion activities within Critical Biodiversity Areas.

Even though the DEA and/or the DEA&DP have not yet formally approved any bioregional plans to date, Critical Biodiversity Areas incorporate critically endangered and endangered ecosystems listed in terms of Section 52 of the NEMBA. Development that involves loss of more than 300m^2 of natural habitat in a listed critically endangered or endangered ecosystem requires at least a Basic Assessment process to be undertaken.

This means any development in Critical Biodiversity Areas (and in Ecological Support Areas, if the development footprint is larger than 1ha) is likely to require at least a Basic Assessment in terms of the 2010 EIA Regulations.

In addition to the above, the following implications for land-use decision-making have been identified, based on the CBA mapping exercise undertaken by Holness and Bradshaw (2010).

5.4.2.5 Desired Management Objective per Municipal Spatial Planning Category

The Desired Management Objective refers to the ecological state that a parcel of land (terrestrial or aquatic habitat) should be maintained in (refer to **Table 9** below). It guides the identification of appropriate land-uses or activities and management guidelines. Land-use activities that should not be supported within each Spatial Planning Category (SPC) are described in **Table 11** below.

Table 9: Desired Management Objective per mapped Municipal Spatial Planning Category.

SPATIAL PLANNING INFORMANT	**MAPPED CATEGORIES / SECTORS**							
MUNICIPAL SPATIAL PLANNING CATEGORY	Core1		Core 2	Buffer	Intensive Agriculture	Agricultural Settlements	Urban Development	Important Ecological and Evolutionary Process Areas (overlay)
PSDF SPATIAL PLANNING CATEGORY	Core 1		Core 2	Buffer 1 and Buffer 2	Intensive Agriculture	N/A	Urban Development	N/A
CBA / ESA MAP CATEGORY[91]	Protected Areas	Critical Biodiversity Areas	Ecological Support Areas	Other Natural Areas	No Natural Areas Remaining			N/A
DESIRED MANAGEMENT OBJECTIVE PER MAPPED MUNICIPAL SPC AND CBA MAPPED CATEGORY								
MAIN MANAGEMENT OBJECTIVES PER MUNICIPAL SPC	Conserve and maintain natural areas. Rehabilitate degraded land.		Maintain key ecological processes.	Sustainably manage natural resources.	Maintain agricultural production. Sustainably manage natural resources.	Create and maintain sustainable agricultural settlements.	Create and maintain sustainable urban areas.	Maintain ecological processes.
MANAGEMENT OBJECTIVE PER CBA MAPPED CATEGORY	Maintain natural land. Rehabilitate degraded to natural or near natural and manage for no further degradation.		Maintain ecological processes.	Sustainable management within general rural land-use principles.				
MAIN LAND-USES PER MUNICPAL SPC	Conservation		Conservation, extensive grazing and agri-tourism / resort development.	Extensive grazing and agri-tourism / resort development.	Intensive agriculture and extensive grazing.	Small-scale agriculture, grazing, and low-density agricultural settlements.	Urban.	Variety of land-uses compatible with key ecological processes.

5.4.2.6 Description of Municipal Spatial Planning Categories

The existing natural features and landscapes contained within each Municipal SPC are described **Table 10** below. Land-use activities that should be avoided within each SPC are described in **Table 11** below.

Table 10: Description of existing natural features and landscapes contained within each Municipal SPC.

SPATIAL PLANNING INFORMANT	**MAPPED CATEGORIES / SECTORS**							
MUNICIPAL SPATIAL PLANNING CATEGORY (SPC)	Core1		Core 2	Buffer	Intensive Agriculture	Agricultural Settlements	Urban Development	Important Ecological and Evolutionary Process Areas (Overlay)
CORRESPONDING CBA / ESA MAP CATEGORY	Protected Areas	Critical Biodiversity Areas	Ecological Support Areas	Other Natural Areas	No Natural Areas Remaining			N/A
EXISTING ATTRIBUTES / FEATURES OF EACH SPC	Formally Protected Areas in private or public ownership. Mountain Catchment Areas. World Heritage Sites.	Terrestrial and/or aquatic Critical Biodiversity Areas. Critically Endangered Vegetation types.	Terrestrial and/or aquatic Ecological Support Areas. Endangered vegetation types. Estuaries, river and stream corridors. Ecological corridors across the landscape (connecting natural areas of importance). Mountain catchment areas (not falling under Core 1 SPC). Biosphere Reserve buffer areas.	Rural, modified landscapes containing areas of natural or near-natural vegetation close or adjacent to Critical Biodiversity Areas or Ecological Support Areas in Core 1 or Core 2 SPCs. Biosphere Reserve buffer areas. Rivers and water-courses within this SPC. Natural or near-natural areas of vegetation within this SPC having a Vulnerable or Least Threatened ecosystem status.	Rural agricultural landscapes, largely transformed areas. This SPC may contain remnants of natural or near-natural vegetation (some of which may be classified as Critically Endangered or Endangered vegetation types). Rivers and water-courses within this SPC.	Modified rural landscapes which contain small, low-density, nodal agricultural settlements or “agri-villages”. Intensive small-scale agriculture dominates the land use. These areas are transitional between urban and partly transformed natural landscapes. This SPC may contain remnants of natural or near-natural vegetation (some of which may be classified as Critically Endangered or Endangered vegetation types). Rivers and water-courses within this SPC.	Urban Areas, main towns. This SPC may contain remnants of natural or near-natural vegetation (some of which may be classified as Critically Endangered or Endangered vegetation types). Rivers and water-courses within this SPC.	Process Areas 1 – 10, as described in **Paragraph 4.2.9** of this EMF, and in the existing Municipal SDF.

5.4.2.7 Recommendations for Land-uses that should not be supported per Municipal Spatial Planning Category

Biodiversity-incompatible land-uses per Municipal SPC have been informed by the desired management objectives (described in **Table 9** above), and by the likely impacts of land and resource use activities on biodiversity.

Table 11: Land-uses that should not be supported per Municipal SPC and CBA/ESA map category.

SPATIAL PLANNING INFORMANT	**MAPPED CATEGORIES / SECTORS**							
MUNICIPAL SPATIAL PLANNING CATEGORY (SPC)	Core 1		Core 2	Buffer	Intensive Agriculture	Agricultural Settlements	Urban Development	Important Ecological and Evolutionary Process Areas / Corridors (Overlay)
CORRESPONDING CBA / ESA MAP CATEGORY	Protected Areas	Critical Biodiversity Areas	Ecological Support Areas	Other Natural Areas	No Natural Areas Remaining			N/A
LAND-USES THAT SHOULD NOT BE SUPPORTED	Transformation or loss of any natural or near natural habitats. The transformation of land of any size to allow for resorts, residential, retail, commercial, industrial or institutional use, including social facilities (except if included in an EMP approved in terms of the NEM:PAA for a protected area and/or subject to the necessary approvals in terms of the NEMA and other relevant legislation).Industry, including small and large-scale agricultural industries and alternative energy projects. Bulk infrastructure and services (except if included in an EMP approved in terms of the NEM:PAA for a protected area). Establishment of new or expansion of existing agricultural fields, forestry plantations, orchards and vineyards, and other forms of intensive agriculture (e.g. stock feedlots, cereal crops and vegetable farming). Game farming, extensive grazing or production of livestock (e.g. piggeries, feedlots, poultry etc.). Subdivision of land to allow for intensive agriculture, for extensive livestock grazing purposes, or to establish smallholdings or agricultural settlements. Harvesting of natural resources (even if sustainable). Reservoirs and dams, telecommunication masts, sewage treatment works, cemeteries. Mining and mineral extraction.		Transformation or loss of > 1ha of any natural or near natural habitats, or of any natural or near natural habitats comprising Critically Endangered or Endangered vegetation types and/or within identified ecological corridors (e.g. NFEPAs, identified Important Ecological and Evolutionary Process Areas and Environmental Management Focus Areas). The transformation of land of any size to allow for residential, retail, commercial, industrial or institutional use, including bulk engineering services and social facilities (except if the necessary approvals in terms of the NEMA and other relevant legislation have been obtained). Large-scale commercial facilities and industrial facilities, including agricultural industries and alternative energy projects. Reservoir and dams, sewage treatment works, cemeteries. Establishment of new or expansion of existing agricultural fields, forestry plantations, orchards and vineyards, and other forms of intensive agriculture (e.g. stock feedlots, cereal crops and vegetable farming).	Transformation or loss of > 1 ha of any natural or near natural habitats, or of > 300m^2 of natural or near natural habitats comprising Critically Endangered or Endangered vegetation types and/or within identified ecological corridors (e.g. NFEPAs, identified Important Ecological and Evolutionary Process Areas and Environmental Management Focus Areas) without obtaining specialist input from the respective disciplines (e.g. botanist, freshwater ecologist). The transformation of land bigger than 1000 m^2 in size, to residential, retail, commercial, industrial or institutional use, including bulk engineering services and social facilities (except if the necessary approvals in terms of the NEMA and other relevant legislation have been obtained). Establishment of new or expansion of existing agricultural fields, forestry plantations, orchards and vineyards, and other forms of intensive agriculture (e.g. stock feedlots, cereal crops, vegetables), except if specialist input (e.g. botanist or freshwater ecologist) has been obtained to the satisfaction of the Municipal EMS. Subdivision of land to allow for intensive agriculture.	Land-uses involving the transformation or loss of > 5 ha of any natural or near natural habitats in rural areas, or of > 300m^2 of natural or near natural habitats comprising Critically Endangered or Endangered vegetation types and/or within identified ecological corridors (e.g. NFEPAs, identified Important Ecological and Evolutionary Process Areas and Environmental Management Focus Areas) without specialist input from the respective disciplines (e.g. botanist, freshwater ecologist). Land-uses in rural areas that compromise food security (i.e. that result in reduced agricultural crop or livestock production). Subdivision of agricultural land without approval from the DAFF, and from the Provincial Department of Agriculture. Development of buildings or infrastructure > 50m^2 within 100 year floodplains and/or within 100m of FEPAs (within 32m of all other wetlands) and/or within established setback lines and/or within the estuarine functional zone (usually defined by the 5m contour). Buildings or structures that do not comply with the 2002 DEA&DP Guideline document for development on Mountains, Hills and Ridgelines. Transformation of land on slopes steeper than 1:4. Development on high potential agricultural soils, or on embedded moderate soils in rural areas. No cultivation within the 1-in-10 year "flood area" of any water course. Buildings, developments or neighbourhoods that do not incorporate “green building technology”, including the use of recycled and / or building materials obtained from sustainable sources (applicable to all SPCs).		Any land-uses (e.g. intensive agriculture, afforestation, mining, urban development, industrial development) which would reduce the integrity of remaining natural areas and/or disrupt connections between remaining natural areas, wetlands and drainage lines, and between the mountains, the lowlands and the coast should not be supported.

SPATIAL PLANNING INFORMANT	**MAPPED CATEGORIES / SECTORS**							
MUNICIPAL SPATIAL PLANNING CATEGORY (SPC)	Core 1		Core 2	Buffer	Intensive Agriculture	Agricultural Settlements	Urban Development	Important Ecological and Evolutionary Process Areas / Corridors (Overlay)
CORRESPONDING CBA / ESA MAP CATEGORY	Protected Areas	Critical Biodiversity Areas	Ecological Support Areas	Other Natural Areas	No Natural Areas Remaining			N/A
LAND-USES AND ACTIVITIES THAT SHOULD NOT BE SUPPORTED (Continued)	Development of buildings or infrastructure, including linear development, > 10m^2 within 100 year floodplains and/or within 100m of all wetlands and/or within established coastal and estuarine setback lines and/or within the estuarine functional zone (usually defined by the 5m contour). Buildings or structures that do not comply with the 2002 DEA&DP Guideline document for development on Mountains, Hills and Ridgelines. Transformation of land on slopes steeper than 1:4.		Subdivision of land to allow for intensive agriculture, for extensive livestock grazing purposes, to establish smallholdings or agricultural settlements. Heavy industries, mining and mineral extraction. Development of buildings or infrastructure > 50m^2 within 100 year floodplains and/or within 100m of all wetlands and/or within established coastal and estuarine setback lines and/or within the estuarine functional zone (usually defined by the 5m contour). Buildings or structures that do not comply with the 2002 DEA&DP Guideline document for development on Mountains, Hills and Ridgelines. Transformation of land on slopes steeper than 1:4.	Heavy industries, mining and mineral extraction. Development of buildings or infrastructure > 50m^2 within 100 year floodplains and/or within 100m of FEPAs (within 32m of all other wetlands) and/or within established coastal and estuarine setback lines and/or within the estuarine functional zone (usually defined by the 5m contour). Buildings or structures that do not comply with the 2002 DEA&DP Guideline document for development on Mountains, Hills and Ridgelines. Transformation of land on slopes steeper than 1:4.				
POLICIES PER SPC	As contained in Municipal SDF		As contained in Municipal SDF	As contained in Municipal SDF	As contained in Municipal SDF	As contained in Municipal SDF	As contained in Municipal SDF	As contained in Municipal SDF
STRATEGIES PER SPC	Municipal SDF SPC strategies 2.1 – 2.10		Municipal SDF SPC strategies 3.1 – 3.20	Municipal SDF SPC strategies 4.1 – 4.19	Municipal SDF SPC strategies 5.1 – 5.21	Municipal SDF SPC strategies 6.1 – 6.9	Municipal SDF SPC strategies 7.1 – 7.8	Municipal SDF SPC strategy No. 8.1

Note 1: The purpose of the above set land-uses that should not be supported per Municipal SPC, is to encourage development which avoids or has minimal biodiversity impacts, especially in CBAs and ESAs. In general, land-uses that result in irreversible loss of natural habitat (such as cultivation, afforestation, urban development and mining) have the highest impact on biodiversity. Land-uses that allow for natural habitat to remain intact (such as appropriately managed grazing by either livestock or game or sustainable harvesting of natural resources from the environment), have the lowest impacts on biodiversity.

Note 2: Refer to the Provincial Rural Land-use Planning and Management Guidelines[92] for guidance in identifying appropriate land-use activities in "Other Natural Areas" and in areas where no natural vegetation remains. Always aim for sustainable development when considering land and water-use applications in natural areas.

Note 3: All SPCs may contain remnants of natural vegetation, some of which may be classified as Critically Endangered or Endangered vegetation types. Transformation or loss of natural or near natural habitats containing such vegetation types should be avoided in all SPCs.

Note 4: For the purposes of any development within any untransformed areas, or areas containing natural vegetation, the applicant is required to provide adequate proof to the satisfaction of the Municipality and/or responsible government department/s (i.e. Department of Agriculture, CapeNature, DEA&DP) that the vegetation in the area is not regarded as Critically Endangered, Endangered, important for key ecological .processes, special habitat, or of ecological significance i.e. obtain specialist input from the respective disciplines (e.g. botanist, freshwater ecologist). If development or land-use change is unavoidable, at least a Basic Assessment process in terms of the NEMA EIA Regulations, 2010, may be required to legally allow for development resulting in the loss of natural or near natural habitats in such vegetation types.

Note 5: For unavoidable development in all SPCs (except in Core 1), the 2006 DEA&DP draft Guideline on Biodiversity Offsets can be considered to counter the loss or transformation of natural or near-natural vegetation due to development. Such biodiversity offsets could be on other properties, on be in terms of financial contributions to biodiversity management in other areas. Alternatively, the compulsory commissioning and implementation of an environmental management system / EMP could represent an appropriate biodiversity offset for the development of on-farm settlements and for the subdivision of agricultural land, provided that the Municipal SPC allows for such development or subdivision.

Note 6: The Municipal SPCs must not be confused with "Management Use Zones", as determined in EMPs compiled for Protected Areas (e.g. for nature reserves, estuaries and in the coastal zone). The "Management Use Zones" describe, at a much finer scale, the allowable land-uses and activities in clearly defined areas.

5.4.2.8 Agri-Environmental Resource Management.

Agriculture is a significant economic player, land-user and contributor to rural development and employment in the Overstrand. It is also a key platform for land reform.

Owing to the diversity of vegetation types, and to historical patterns of land-use and settlement, an estimated 42% of the landscape outside protected areas must be specifically managed if biodiversity targets in the Cape Floristic Region are to be met. In addition, sustainable agricultural production is dependent on the wise use of water as a strategic resource.

Sustainable utilisation[bbb] and management of agri-environmental systems is therefore crucial to the establishment of a "'biodiversity economy" that supports biodiversity conservation while realising the productive and developmental value of farmland. This is in-line with Components 1 and 5 of the C.A.P.E[93] programme.

In addition, the provisions of the Draft Sustainable Utilisation and Protection of Agricultural Resources Bill, 2003, provide, *inter alia*, for the establishment of LandCare Committees; the Control of Spreading Weeds and Invader Plants; the Utilisation of Agricultural Land; the Subdivision of Agricultural Land; and for the enforcement of the provisions contained therein.

LandCare area-wide planning, as conducted by the Western Cape Department Agriculture, is an established guide and tested instrument for agri-environmental planning, and for sustainable agricultural development respectively. [ccc] LandCare is a community-based programme supported by both the public and private sector through a series of partnerships. It is a process focussed towards the conservation of the natural resources (soil, water and vegetation) through sustainable utilization and the creation of a conservation ethic through education and awareness. In addition it seeks to address rural poverty by means of sustainable job creation. Search for the term "LandCare" on the www.agis.agric.za website for a set of explanatory documents pertaining to the LandCare South Africa Project.

LandCare area-wide planning, which is guided by systematic biodiversity planning, provides a platform for achieving the objectives of sustainable agricultural development based on informed streamlined decision-making. In such instances, regulatory authorities would have a shared, spatially explicit inventory of agri-environmental informants against which to assess the merits of applications requiring environmental and agricultural authorisations.[ddd]

5.4.3 General Guidelines for Natural Resources Management

Apart from the appropriate spatial planning, the implementation of sustainable land-use activities (**Paragraph 5.4.2**), and the availability of policy guidelines (**Paragraph 5.3.6**), the implementation of the following management guidelines for the natural resources of the Overstrand Municipality, along with the relevant heritage, agricultural and environmental policy guidelines and/or legislation should serve to safeguard and increase its biodiversity. In so-doing the environmental sustainability of the Overstrand region will be ensured to the benefit of its people.

[bbb] **Sustainable utilisation:** means the utilisation of natural agricultural resources for the production of food and other produce to enhance food security in an environmentally sound way, without compromising the ability of future generations to meet their own needs. **Reference:** Department: Agriculture, Forestry and Fisheries. (2003). Draft Sustainable Utilisation and Protection of Agricultural Resources Bill, 2003. Available from: http://www.nda.agric.za/docs/Legislation/sustainable.htm. (Accessed 26 March 2013).

[ccc] **The Provincial LandCare Programme Manager:** Mr Francis Steyn: Postal address: Private Bag X1, ELSENBURG, 7606. E-mail: FrancisS@Elsenburg.com. Tel: 021 808 5090. Fax: 021 808 5092.

[ddd] Note that LandCare area-wide planning cannot and should not replace project-specific EIA applications where the provisions of the NEMA are triggered.

5.4.3.1 Natural Habitats and Threatened Ecosystems of the Overstrand Municipal Jurisdiction Area

Pro-active guidelines for natural resources management for naturally vegetated areas (in particular threatened ecosystems), includes the following recommendations, some of which are adapted from the SANBI's PBPTW Programme for the Overstrand Municipality: [eee]

- Protected area management plans should pay particular attention to the need for careful management of threatened ecosystems within protected areas.
- A Biodiversity Management Plan should be developed and published by the Minister for listed ecosystems (**Figure 11**). The Minister must identify an implementing agent (e.g. the Overstrand Municipality) for the management plan, and must assess its successful implementation every five years. A Biodiversity Management Plan could also be developed for a portion of a listed ecosystem or for a group of listed ecosystems. Once the draft Norms and Standards for such Threatened Ecosystem Biodiversity Management Plans have been gazetted, the Minister (or MEC) can enter into a Biodiversity Management Agreement with the implementing agent. In the context of the Overstrand Municipal Area, it is suggested that such Biodiversity Management Plans be drafted first for Critically Endangered Ecosystems that have been classified as such in terms of their remaining extent (i.e. A1 classified Critically Endangered Ecosystems), and thereafter for other threatened vegetation types.
- Promote connectivity (corridors) of natural habitats within threatened ecosystems such as Renosterveld, and between threatened ecosystems, for example between Renosterveld and fynbos.
- Ensure that ecological processes such as periodic fires or pollination are maintained (consult with CapeNature).
- Biodiversity stewardship programmes should prioritise listed ecosystems for contract protected areas in terms of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEM:PAA) or for other biodiversity stewardship agreements with CapeNature (e.g. in the form of Conservancies).
- CapeNature's Biodiversity Stewardship Programme should prioritise listed ecosystems on private land for inclusion into contract protected areas, or in terms of other biodiversity stewardship agreements.
- Private landowners (many of whom are farmers) should prioritise threatened ecosystems when they set aside land for conservation.
- All farmers should implement biodiversity-friendly farming practices on their farms such as using biological pest control, maintaining strips of indigenous vegetation between fields, and reducing the use of fertilisers and pesticides near indigenous vegetation or wetlands.
- Wine farms should become members of the Biodiversity and Wine initiative, should set aside land on their farms for conservation (especially threatened ecosystems), and should implement biodiversity friendly farming practices.
- The Overstrand Municipality should continue to implement its Integrated Invasive Alien Clearing Plan, to prevent biodiversity loss and minimise fire frequency and intensity (**Figure 2**). Priority areas for alien plant clearing programmes should include:
    - Protected areas (research has shown that protected areas can often be the source of alien plant invasions into neighbouring properties, and clearing will result in an increase in the biodiversity value and tourism potential of protected areas) (**Figure 13**).
    - High Water Yield mountain catchment areas (**Figure 7**) important for potable water supply (e.g. for the De Bos Dam, which is one of the main potable water sources for Hermanus), and thereafter in sub-quarternary catchments identified in terms of the NFEPA (**Figure 6**).

[eee] **Threatened Ecosystems:** those vegetation types listed as Critically Endangered, Endangered and Vulnerable in terms of their conservation status in Government Gazette No. 1002, which was promulgated in terms of the NEM:BA on 9 December 2011.

- Areas along the urban edge, in order to reduce the intensity of wild fires.
- Areas crucial for maintaining connectivity between formally and informally protected areas (i.e. in NPAES focus areas).
- CBAs, particularly in critically endangered vegetation types, and in special terrestrial and aquatic habitats (such as silcrete patches and wetlands) (**Figure 12**).
- ESAs, focussing on threatened vegetation types.

In terms of the above, in alien infested areas that would originally have contained threatened indigenous vegetation, land-use decision-making must be informed by specialist botanical assessments.

Rehabilitation / natural resource management / poverty relief programmes such as the Working for Water, Working for Wetlands, Working on Fire, Working for the Coast, LandCare, CoastCare (all Extended Public Works Programme [EPWP] projects) should also focus on the above-mentioned priority areas.

A few general principles for effective alien plant clearing should also apply, namely:

- Always clear downstream, since the seeds of many invasive alien plant species are dispersed by water;
- Focus on lightly infested areas before clearing heavily infested stands;
- Conduct follow up clearing operations within one year of clearing (many alien plant species set seed within a year after germination); and
- River banks, steep slopes and other areas susceptible to soil erosion should, following initial clearing, be stabilised by the packing of logs perpendicular to the slope and/or through the planting of sowing of suitable indigenous plant species.

The aim of the Overstrand Municipality's Integrated Invasive Alien Clearing Plan is to prevent biodiversity loss and minimise fire frequency and intensity in the Overstrand area.[94] As such, this plan should include the above recommendations, also considering that, in their natural states, mountain fynbos areas are more susceptible to fire than lowland fynbos vegetation types, Renosterveld and forest habitats in that order. Fire intensity and frequency is, however, much increased by dense stands of alien vegetation, which are by and large concentrated in lowland areas, often along transport routes, and close to the urban interface.

5.4.3.2 The Coast, Inshore Waters, Wetlands, Rivers, Vleis, Estuaries, Lagoons

1. **Pro-active guidelines for natural resources management for coastal and freshwater environments**, includes recommendations from the SANBI's PBPTW Programme for the Overstrand Municipality, such as:

- Section 48 of the NEM:ICMA (2008) obligates Municipalities to prepare and adopt Coastal Management Programmes for the coastal zone, or specific parts of the coastal zone in areas under their jurisdiction, within four years of the act coming into effect. As such a Kogelberg Coast Integrated Management Plan[95] was commissioned and completed in 2010 to, *inter alia*, guide the development of a Municipal Coastal Management Programme for the Overstrand Local Municipality and to clarify the roles and functions of the national, provincial and Municipal authorities in the coastal zone of the Kogelberg region.
- A Kogelberg Coast Integrated Management Plan should be implemented and adapted through a process of continuous research, monitoring and review.
- The Kogelberg Coast Integrated Management Plan could be used as a template to develop such a plan for the entire coastal zone of the Overstrand Municipality. This is important, since the competent authority must ensure that the terms and conditions of any Environmental Authorisation are consistent with the objectives of any coastal management programme in the area.
- Specific Catchment Management Strategies, and Estuary Management Plans should be developed for all NFEPAs and Estuaries in the Overstrand respectively (**Figure 6**).[96]

- Avoid extreme increases and decreases of water quantities in wetlands. Increased stormwater volumes from paved areas can cause erosion or unnatural changes in water levels. This can destroy the habitat of specially adapted wetland vegetation species, as well as species such as wading birds, frogs or dragonflies.
- Protect habitat around wetlands. Many wildlife species depend on water as well as habitat on land for different parts of their life cycles (adequate buffer zones must therefore be maintained).
- Avoid activities that impact on the surface and sub-surface flow of water between rivers and floodplains. The movement of water between these ecosystems is an important ecological process.
- High Water Yield Areas, (**Figure 7**) River FEPAs and their associated sub-quarternary catchments (**Figure 6**) should be maintained in natural or near-natural condition.
- Wetland FEPAs that are currently in natural or near-natural condition should remain so; those that are not should be rehabilitated to the best attainable ecological condition. This means that wetlands in high water yield areas should be maintained in good ecological condition, as they regulate stream flow and prevent erosion.
- High water yield areas should inform the identification of priority sub-quaternary catchments for the control of invasive alien plants. Clearing of invasive alien plants in these areas would deliver large water yield benefits relative to clearing in other parts of the catchment.
- Flagship Free-Flowing Rivers (**Figure 7**) should receive top priority for retaining their free-flowing character. This means that flagship free-flowing rivers should be maintained in a natural or near-natural ecological condition.
- The NWA must be complied with at all times.
    - The provisions of the NWA have implications specifically regarding the use of water resources, and development (housing and agriculture) adjacent to water courses (which includes estuaries, rivers, streams, wetlands and man-made in-stream dams). In particular, a Water Use Licence Application may be required by the DWA for any development located within 500m of a water course.
    - The NWA also regulates the release of pollutants into water courses, and water extractions from rivers and aquifers.

- Polluted run-off into wetlands must be avoided as per the NWA. Wetlands are sensitive to water quality degradation, including that caused by fertiliser run-off from lawns and agricultural areas or heavy metal pollution run-off from roads and from treated effluent from waste water treatment works.

The SANBI's PBPTW Programme for the Overstrand Municipality makes the following additional recommendations / statements pertaining to natural resource management in or near to "river corridors":[97] [fff]

- No infilling, excavation, drainage, hardened surfaces (including buildings and asphalt) or intensive agriculture within a river, or within at least 32 meters (in terms of the NEMA 2010 EIA Regulations) of the delineated riparian boundary.
- Delineation of the riparian boundary should be undertaken by a specialist ecologist according to the DWA's "*practical field procedure for identification and delineation of wetlands and riparian areas*".
- Appropriate land-uses are activities that do not result in further loss of habitat or disturbance to ecosystem functioning in these systems.

[fff] The SANBI notes that, when interpreting any of their maps, to ensure maximum accuracy, the **data must be checked against actual conditions on the ground** when undertaking planning or decision-making and that decisions that may cause negative impacts on rivers should be informed by specialist biodiversity assessments.

- Appropriate land-uses allow the basic structure and ecological functioning of river ecosystems to be sustained and protected from degradation.
- Appropriate land-uses do not increase the potential for flooding and damage to property.
- All development of, in or within 500m of water courses requires an authorisation from DWA per Sections 21 and 22 of the NWA (refer to **Figure 8**).
- The CARA further restricts activities within rivers.
- Where possible, riparian areas should be rehabilitated, for example through the Working for Wetlands[98] Programme, with the emphasis on re-connecting habitat, re-establishing basic flows and prioritising the clearing of invasive plants to help restore the natural functioning of these systems.
- A Surface Water Management Plan should inform decisions regarding activities outside of aquatic ecosystems that directly impact their functioning.

Note: Any infrastructure including buildings and hardened surfaces such as roads and parking lots built within a river floodplain dramatically increases the likelihood of flooding and damage to property.

2. Estuary Management

The NEM:ICMA, stipulates, in Section 33, that estuaries within the Republic must be managed in a co-ordinated and efficient manner, and in accordance with a national estuarine management protocol.

The Minister published the Draft National Estuarine Management Protocol on 4 May 2012. Promulgation / finalisation of the protocol does not imply that any aspects of the Estuary Management Plans already developed would become legally binding. Proposals for zoning each estuary and its shore, must still be subject to a public consultative process, and the most appropriate legislative vehicle, such as incorporation into the Municipal SDF (and EMF), must be decided upon.[99]

Draft Estuary Management Plans[100] have been compiled for the Bot (December 2009), Uilkraals[101] (December 2010) and Klein river (March 2011) estuaries in terms of the NEM:ICMA, and specifically in terms of the Cape Estuaries Programme, but have not yet been formally adopted. Estuary Management Plans should also be developed and implemented for the Buffels, Onrus, Palmiet and Rooiels Estuaries.

The estuary-specific management plans cover so-called Estuary Management Areas, which are designed to provide additional protection for coastal estuarine ecosystems and biodiversity, and for control over exploitation of living and non-living natural resources.

The Bot, Klein and Uilkraals River Estuaries are currently managed by stakeholder groups (known as Estuary Forums), since the Draft Estuary Management Plans[102] compiled in terms of the NEM:ICMA, and specifically in terms of the Cape Estuaries Programme, have not yet been formally adopted.

The mouths of the Bot, Klein and Uilkraals River Estuaries are allowed to breach naturally, unless otherwise decided by the Estuary Forums. “Mouth Management Plans” have been compiled in terms of the Estuary Management Plans for the Klein and Bot River Estuaries, and provide guidelines regarding the specific conditions under which the estuaries may be artificially breached (the “Mouth Management Plan” for the Uilkraals River Estuary is still in a draft format). The elected Estuary Forums comprise representatives of:

- All the government agencies that have the necessary jurisdiction to take actions that are necessary (such as CapeNature, and the applicable Municipality).
- All civil society organisations with a direct interest in the proper management of the estuarine ecosystems.

The formal adoption of the above Estuary Management Plans by the Municipal Council, and thereafter by the DEA&DP, should, *inter alia*, enable formalisation of the Mouth Management Plans.

Table 12 below indicates the main provisions as contained within the “Mouth Management Plans” that have been developed for the Klein and Bot Estuaries.

Table 12: The main provisions as contained within the Mouth Management Plans that have been developed for the Klein and Bot Estuaries.

Estuary → **Mouth Management ↓**	**Klein**	**Bot**
Natural Breaching	Preferred at + 2.9m – 3.1m above Mean Sea Level (MSL), with no or minimal interference. Artificial breaching will not be considered to: • Prevent water inundation of low-lying private or public properties, or • Flush polluted water out of the estuary (which will pollute the seashore).	The Kleinmond mouth should not be breached artificially, as this reduces the likelihood of the Bot water level reaching the required height for breaching. Neither estuary should be artificially breached for the sole purpose of preventing floodwater damage to surrounding properties, while natural breachings should be allowed to take place without interference.
Minimum water level for artificial breaching	2.6m above MSL	**1st & 2nd year after previous breach:** • Water level > 2,5m above MSL and salinity =< 10 parts per thousand (ppt) OR • Water level < 2,5m above MSL, but breaching feasible and salinity =< 6 ppt **3rd year after previous breach:** • Water level = 2.5m above MSL • Salinity not considered OR • Consensus decision by breaching sub-committee and specialists should salinities <6 ppt and catastrophe is imminent (e.g. mass mortality of fish) even though level has not reached 2.5m above MSL. **4th year after previous breach:** • If no breach has occurred for 4 years and breaching is feasible, then breaching should take place.
Artificial breaching data requirements to be considered	Water level, berm height, salinity, and water quality parameters where feasible.	Water level, berm height, salinity, and water quality parameters where feasible. Note that mass fish mortalities have been recorded when the estuary's salinity fell below 6 ppt.

Estuary ⟶ Mouth Management ↓	Klein River Estuary	Bot River Estuary
Artificial breaching decision	The decision to artificially breach will be made by a sub-committee comprising: • the Klein River Estuary Forum Chairperson; • the Overstrand Estuary Management Coordinator; • the Overstrand Municipality's Environmental Manager; and • a representative from CapeNature. The decision to breach will be taken following consultation with at least two members of a team of specialists, as described in the Mouth Management Plan.	The decision to artificially breach will be made by a sub-committee comprising: • the Bot River Estuary Forum Chairperson; • the Overstrand Estuary Management Coordinator; • the Overstrand Municipality's Environmental Manager; and • a representative from CapeNature.
Timing, position, and method of artificial breaching	• Annually if natural breaching is considered to be unlikely. • Only between 1 August to end October. • Preferably 3 – 4 days before spring tide, just after a high tide that occurs during daylight hours. • At the lowest position of the berm, opposite the channel, somewhere near the middle of the mouth. • A deep, relatively wide trench is to be dug by mechanised excavator.	• Breaching only to take place between 01 May – 31 September • Only during daylight hours. • Preferably just after spring high tide, but this shall not be considered a deciding factor. • At the mouth of the Bot between Meerensee Resort and Rooisand Nature Reserve, within 300 m of the 2008 breach position, and well away from dunes to prevent unnecessary sand entrainment. • A deep, relatively wide trench is to be dug by mechanised excavator.
Implementation of artificial breaching	CapeNature will be responsible for overseeing breaching activities.	CapeNature will be responsible for overseeing breaching activities. The Overstrand Municipality will make an excavator and operator available.
Review Estuary Management Plan	Every 5 years (the current Estuary Management Plan is valid until June 2013. Such a review should, where possible, be co-ordinated with the Overstrand Municipality's SDF review cycle.	Every 5 years (the current Estuary Management Plan is valid until December 2014. Such a review should, where possible, be co-ordinated with the Overstrand Municipality's SDF review cycle.
Review Mouth Management Plan	Due.	Before December 2014.

In addition to the implementation of estuary management plans (and associated mouth management plans), the enforcement of building set-back lines from estuaries (currently the Estuarine Functional Zone, as determined by the 5m contour and/or by the landward limit of estuarine / riparian vegetation), the judicious management of land-use practices (e.g. farming and forestry in terms of the NWA and the CARA), the protection of water courses from pollution (i.e. replacement of all septic tanks and soak-aways within 500m of a water course with Municipal sewage infrastructure), and the removal of alien plant species in the catchment areas are of cardinal importance for the continued ecological functionality and productivity of the Overstrand's estuaries.

In addition to enforcing a building set-back line from estuaries (and limiting the extent of development along estuary margins), the NWA has implications on development adjacent to water courses (which includes estuaries, rivers, streams, wetlands and man-made in stream dams. This Act requires that authorisation (a Water Use Licence) be obtained for any alterations to the bed, banks, course or characteristics of a water course (which includes changes in land-use, vegetation cover, topography, soil, etc.) or within the riparian habitat from the Department of Water Affairs (DWA) (**Figure 8**). The NWA regulates water extractions from rivers and aquifers, and in so-doing aims to maintain an adequate supply of fresh water to estuaries.

The riparian habitat, according to the NWA "*includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas*" or the 1:100 year flood line, whichever is the greater distance.

Recently, the Western Cape DWA has started enforcing Schedule 6 (b) of the General Authorisations for water use as contained in Government Notice No. R 1199, promulgated in terms of the NWA on 26 March 2004. As such, the DWA has been requesting Water Use Licence Applications to be submitted for any development within a **500m radius** from the boundary of any wetland, as determined by terrestrial limit of the associated riparian habitat (refer to **Figure 8**).

5.4.2.2 Marine Ecosystems off the Coast of the Overstrand Municipality

1. Marine Protected Areas

Marine Protected Areas have been implemented worldwide as a management strategy to address the many threats to marine and coastal ecosystems, but also to meet a wide range of human needs, including education, fisheries management, recreation, income generation and research. Marine Protected Areas in South Africa are often zoned to include two levels of protection, namely:

- "no-take areas" or "sanctuary zones", where no fishing is permitted; and
- "controlled use areas" where certain extractive activities (e.g. line fishing, crayfish harvesting) are permitted through exemptions issued by the Minister.

Only shore angling is allowed in Harderbaai, to the north of a line between the beacons at Van der Riet Hoek (OR1) and Marine Drive Point (OR2). This area is known as the Onrus River Closed Area.

Only shore angling and the catching of rock lobster is allowed between the western limit of the Hawston harbour and the eastern limit of the Frans Senekal Reserve, extending 100 m seawards from the high-water mark. This area is known as the Mudge Point Closed Area. [103]

The Betty's Bay Marine Protected Area, declared in 1981 (which lies offshore of the village of Betty's Bay, just east of Cape Hangklip)[104] and the Walker Bay Whale Sanctuary, declared in 2001, are illustrated in **Figure 13**. Whilst the Betty's Bay MPA constitutes a "no-take zone" in terms of exploitation of marine living resources, the Walker Bay Marine Protected Area comprises two zones, namely a "Whale Sanctuary Area", and a "Marine Restricted Area" (open to boat-based whale watching and to line fishermen). Only shore angling (and no other type of fishing) is allowed between the beacons at Kraal Rock (HR1), Walker Bay, and Rietfontein (HR2), Hermanus, extending 500 m

seawards from the high-water mark.[105] Note that the provisions and stipulations contained within Government Notice No. 473 of 29 May 2001 (Walker Bay Marine Protected Area) are only in effect from the period 1 July to 30 November in any year (both dates included).

The 2010 Kogelberg Coast Integrated Management Plan proposed that a new MPA be established on the Kogelberg coast. The proposed new MPA incorporates the entire marine region of the Kogelberg Biosphere Reserve (all of the coastline from the north bank of the Steenbras River estuary to the east bank of the Bot River estuary to a distance of between 2 and 3 nautical miles from the shore). The proposed new MPA should be zoned into no-take and controlled use areas.

It is proposed that no-take zones will comprise approximately 20% of the area of the new Kogelberg MPA, while the controlled use areas will comprise 80% of the coast. Whilst the extent of the no-take and (controlled use areas) have provisionally been identified, the zones listed below will need to be finalised in consultation with various stakeholder groups. The following no-take zones are proposed in the 2010 Kogelberg Coast Integrated Management Plan:

- The existing Betty's Bay MPA (**Figure 13**)
- Four areas in the Bot/Kleinmond estuary.[106]

The remainder of the proposed new MPA should comprise controlled use areas, the boundaries of which will also need to be determined in consultation with stakeholder groups by means of a public participation process.

2. Marine Resource Management Recommendations

General resource management recommendations for the Marine Environment of South Africa, which should equally be applied off the Overstrand Coast are contained in the 2011 NBA, and include:

- Strengthen legislation and enforcement to prevent the release of ballast water in all South African ports and control the cleaning of ship hulls in harbours, to prevent the introduction of new invasive alien species in the marine environment.
- Support good environmental practice and effective regulation of the emerging aquaculture and mariculture sector, which otherwise has the potential for serious negative impacts on the health of ecosystems. For example, aquaculture and mariculture should be avoided in biodiversity priority areas including Marine Protected Areas, Critical Biodiversity Areas, Freshwater Ecosystem Priority Areas, priority estuaries, critically endangered and endangered ecosystems.
- Increase the delivery of the existing marine protected area network by implementing more no-take zones, and increase benefits through diversified non-consumptive tourism activities.
- Support the recovery of overexploited marine (e.g. abalone) and estuarine resources and threatened fish species through implementing resource recovery plans for over-exploited species and implementing the ecosystem approach to fisheries management (as opposed to a single-species approach), thereby supporting long-term food and job security.

In addition, the 2011 NBA Technical Report: Marine and Coastal Component[107] identifies "Priority Actions" for effective marine and coastal management. A number of these actions (the most salient actions are listed below) should be actively implemented and/or supported by the Overstrand Municipality, in order to ensure the sustainability of marine resources and of the associated ecosystem services:

Priority Action: Minimise impacts on priority ecosystems.

- Prevent further degradation of critically endangered and endangered marine and coastal habitat types.
- Support the use of coastal and marine ecosystem priority areas (**Figure 16**) in integrated planning, management and decision making across all sectors that impact on marine and coastal ecosystems and their relevant government departments. These include fisheries and

mariculture, mining and alternative energy, coastal development, and water resource management.

Priority Action: Expand and strengthen the Marine Protected Area (MPA) Network.

- Expand South Africa's MPA network to include currently unprotected habitat types.
- Increase the delivery of the existing MPA network by:
    - Implementing more no-take zones to contribute to the sustainability of fisheries;
    - Increasing benefits through diversified non-consumptive tourism activities; and
    - Improving monitoring and management effectiveness.
- Build public awareness of the role of MPAs in marine biodiversity conservation and fisheries management through targeted awareness initiatives, collaborative research and co-management.

Priority Action: Support the recovery of overexploited resources and threatened species.

- Secure critical habitats through the implementation of spatial management measures including Fishery Management Areas and MPAs.
- Fortify compliance efforts and reduce poaching especially for rock lobster, abalone and linefish.

Priority Action: Prevent further introduction and spread of invasive species.

- Build scientific and management capacity to support the identification of potential marine invasive species, assess risks and develop and implement appropriate management actions.
- Publish and publicise existing lists of known marine invasive species found in the South African marine environments which are a serious threat to fisheries and to indigenous shellfish (e.g. European Shore Crab and Black Sea Urchin).
- Secure resources and develop capacity to enable rapid management action to prevent potential invasive species from becoming established when detected through monitoring programmes.

Priority Action: Support good environmental practice and effective regulation of the emerging mariculture sector.

- Locate mariculture on land, or in ocean areas that have sufficient depth and flushing rates to minimise habitat impacts. Mariculture should be avoided in biodiversity priority areas including Critical Biodiversity Areas, Marine Protected Areas, Estuaries, Fresh Water Ecosystem Priority Areas (including estuaries), critically endangered and endangered ecosystems and other sensitive biodiversity areas.
- Select species for mariculture with full consideration of potential impacts on indigenous species, ecosystems and fisheries. A comprehensive risk assessment and contingency plan should be conducted for all mariculture operations proposing to farm alien or translocated species.
- In order to prevent the introduction of microbes, parasites and pathogens to wild populations, effluent from land-based farms should be filtered and sterilised and sea-farmed stock should be certified disease free prior to stocking.
- To avoid potentially damaging genetic impacts, ensure that the genetic variability of broodstock resembles the genetic profile of the surrounding wild populations.

Priority Action: Strengthen climate change resilience

- Conserve, manage and where appropriate rehabilitate natural ecosystems that play a critical role in climate change adaptation. For example, beaches, dunes, estuaries, and kelp forests should be maintained in an ecologically healthy and functioning state as they play a critical role in helping humans cope with the impacts of climate change.

- Implement integrated ecosystem-based management including Integrated Coastal Management and the Ecosystem Approach to Fisheries management.

- Ensure MPAs support resilience to climate change through adequate representivity and connectivity by expanding and consolidating the MPA network.

Priority Action: Ensure sufficient freshwater flow to the coastal and marine environment.

- The needs of coastal and marine ecosystems (water quantity, water quality & sediment) should be taken into account in determining and implementing ecological water requirements for estuaries (also known as the "ecological reserve".

Priority Action: Strengthen institutional arrangements to facilitate integrated ecosystem-based management

- Develop effective institutional arrangements to underpin co-operative governance to support ecosystem based management (including the Ecosystem Approach to Fisheries management) and integrated strategic planning and management (including Integrated Coastal Management).

5.4.4 Specific Municipal Plans to Help Ensure Environmental Sustainability and Resilience

5.4.4.1 Action Plan for Heritage

The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) (Sections 5 and 6 in particular), sets the parameters for heritage management in the Overstrand Municipal Area.

The requirement for judicious heritage resource management should be integrated into the Municipality's overall vision statement, and into the policy and planning frameworks (e.g. IDF, EMF, SDF and IDP), into the zoning scheme, and into Municipal by-laws.

The zoning scheme for the Overstrand is in a continual process of being amended to ensure continuity and consistency across the Municipal Area. It is recommended that the special heritage areas (particularly adjacent to coastal areas and wetland systems in Rooi Els, Betty's Bay, Kleinmond, Hawston, Onrust, Gansbaai and Baardskeerdersbos and in Hermanus [e.g. Hoy's Koppie]) identified in the Overstrand Heritage Survey Draft Report (2009),[108] be adopted in the zoning scheme.

Guidelines for the control and appropriate management of development applications within these areas have been formulated in the Heritage Survey to provide a framework for decision-making.

It is recommended that the Overstrand Heritage Survey Draft Report (2009) should be entirely re-written in a much shortened, strategic format with clearer management guidelines for each identified heritage area.

The identified "special heritage areas" (cadastral-level heritage resources identified in the Overstrand Heritage Survey Draft Report [2009]), and the relevant scenic and heritage resources identified in the 2013 PSDF Heritage and Scenic Resources Assessment could be added to the list of "Environmental Management Focus Areas" (i.e. defined areas in which fine-scale [1:10 000 or less] mapping of

environmental and/or heritage features / attributes is required, along with detailed land-use, natural resource and/or heritage management guidelines) (refer to **Paragraph 5.4.4.4** - Environmental Management Section (EMS) Projects).

5.4.4.2 Integrated Waste Management Plan

According to the 2012 Integrated Waste Management Plan (IWMP) [109] for the Overstrand Municipality, achieving sustainable integrated waste management requires that the Municipality must establish and maintain sufficient waste management facilities, such as disposal sites, transfer stations, material recovery facilities, collection infrastructure, buy-back centres, composting facilities, public drop-offs, etc.

It also requires that the Municipality be pro-active with regards to public awareness and public education because waste minimisation needs to be practiced by the waste generator. The Municipality has also embarked on reducing the volume of waste that requires disposal through various source separation initiatives. The measured volumes however show that participation rates are currently low.

Source separation is currently also only practised in higher income areas. Although the general perception is that the waste stream from lower income areas contains significantly less recoverable materials, it has been proven not to be so. It is only the waste stream from areas serviced by communal skips that has low recoverable volumes. It appears that the residents of lower income areas recognise their recoverable waste as a potential income and therefore prefer not to give it to the Municipality for free, but sell it (e.g. to scrap metal dealerships and materials recovery facilities).

In these areas buy-back centres should be established, since purchasing recoverable waste materials from the residents should prove to be less expensive than collecting them. A great example is the Swop-shop in Gansbaai (White Shark Projects), which allows children to collect and trade recyclables in for points, and then “buy” certain items like stationary, toiletries or even clothes with the points they accumulate. This encourages and educates the public to recycle, and to minimise waste from a young age.

The Overstrand Municipality is committed to a system of waste management that will see the least possible amount of waste going to modern engineered landfills. This commitment is illustrated by the Waste Management Strategic Objectives and Action Plans for the Municipality, which can be summarised as follows:

1. **General**

   Strategic Objective:

   “*To ensure that Waste Management in the Overstrand Municipal Area complies with South African and International environmental standards so that it is beneficial to industrial and agricultural growth and the public’s right to a clean and healthy environment*”.

2. **Waste Avoidance**

   Strategic Objective:

   “*To promote the minimisation of the generation of waste*”.

   Waste Avoidance is defined as the action that avoids the entry of material into the waste stream that is when the generator of the potentially waste material exercises the decision to do something else with that material rather than to put it out for waste collection. The following are typical examples of waste avoidance:

- Composting of the organic/green waste at home,
- Self-delivery of glass/cardboard/newspaper/transparent plastic bottles to recycling bins or school recycling projects
- Re-use of empty jars as storage containers at home,
- Reclamation of drum containers
- Recovery of fruit and food solid waste component as animal feed,
- Recovery of chemicals from industries
- Recovery of electronic equipment
- Changing raw materials of industrial processes to produce recoverable industrial waste

Action Plans:

- The Overstrand Municipality will develop a public awareness and education campaign, putting special emphasis on waste avoidance through separation at source.
- The Council will endeavour to quantify waste avoidance through the use of performance indicators and by other means.

3. Waste Reduction

Strategic Objective:

"*To promote the reduction of all waste so that nothing of value, nor anything that can decompose, gets disposed*".

Typical examples of waste reduction are as follows:

- Separate collection of source separated materials
- Separate collection of spent oils, solvents, print cartridges, x-ray and photographic developers by recovery contractors,
- Kerbside collection of recyclable material by informal salvagers
- Composting of green wastes at composting facility
- Recovery of recyclable material at a Material Recovery Facility
- Recovery of recyclable material at waste disposal site

Action Plans:

- The Overstrand Municipality will ensure the continuing operation of the Material Recovery Facility (MRF) at Hermanus Transfer Station and Gansbaai Landfill where source separated recyclable materials are sorted and recovered from the collected wastes so that only material of no value is forwarded for landfilling.

- The Overstrand Municipality will continue to chip its garden waste and to support the central composting facility at Karwyderskraal Landfill. The feasibility of establishing and operating a small composting plant at Gansbaai will be investigated.

4. Waste Disposal

Strategic Objective:

"*To store, dispose or treat all waste that cannot be avoided nor reduced at licensed facilities with regular operational and environmental monitoring and in accordance with regulatory requirements*".

The disposal of waste by landfill is considered to be the least desirable option in the Waste Management Hierarchy. The volume of waste to be disposed is a measurement of the success achieved with waste avoidance and waste reduction.

Municipal waste disposal takes place at the Municipality's licensed and engineered landfill near Gansbaai, at the District's licensed and engineered landfill at Karwyderskraal.

- The disposal of non-recoverable waste will only be allowed at properly engineered waste disposal sites that are licensed by the relevant statutory authority and that are operated and audited in terms of the relevant permit conditions.

- All waste destined for disposal and disposal facilities shall continue to be monitored for compliance with permit conditions, volumes received, and for environmental impact.

5. General Waste Management

Strategic Objective:

"*To ensure that through waste collection and cleansing, every resident of and every visitor to Overstrand Municipality enjoys an environment that is not detrimental to his/her well-being. Also to ensure that all waste is measured, whether it is avoided, minimised, re-used, reduced, treated or disposed*".

Although the National Waste Management Strategy focuses mainly on waste avoidance, reduction and disposal, certain other waste management activities need also to be addressed in order to achieve suitable levels of waste avoidance, reduction and disposal.

Action Plans:

- The Overstrand Municipality will continuously review its waste collection operations, in order to make them as efficient as possible, with due regard to value for money in the area of Municipal waste collection. The Municipality will examine the quality of their service, resource management and general working arrangements.

- The Overstrand Municipality will continue to gather accurate data regarding domestic, commercial and industrial waste generation and collection. The Municipality will endeavour to aggregate the data collected from each town for analysis.

- The Overstrand Municipality will ensure the general cleansing of the Municipal area.

The implementation of the above actions towards Integrated Waste Management must be scheduled in such a way that it is realistic, achievable, financially feasible and publically acceptable.

6. Recommendations

(i) General

It is recommended that Municipality's by-laws are updated according to the new content of the Waste Act.

(ii) Public Awareness

The first step in educating the public about waste is to make them aware of any new waste management procedures, by-laws and facilities available to them, by for example regularly updating the Municipality's website.

The main benefit of educating the public about waste will be an increased awareness of waste minimisation. This will reduce waste generation rates which will in turn reduce transport volumes and costs.

The Overstrand Municipality should continue and expand its current successful waste minimisation advertising campaign.

(iii) Waste Collection and Transport

The waste collection schedule for Overstrand should be continually optimised to achieve a uniform collection level of service to all areas.

(iv) Waste Disposal

It must be ensured that all waste management facilities are regularly audited as stipulated in each Waste Licence. Regular audits will ensure that these facilities are operated correctly and efficiently.[110]

5.4.4.3 Water Services Development Plan (Potable Water and Waste Water Treatment Works)

1. Introduction

According to the 2012/2013 Water Services Development Plan (WSDP)[111] for the Overstrand Municipality, investing in infrastructure creates an enabling environment for economic growth and is an important precondition for sustainable growth. The Overstrand Municipality therefore needs to continue with the rehabilitation and maintenance of their existing infrastructure in order to ensure the medium to long term sustainability of the existing infrastructure.

Rooi Els, Pringle Bay, Betty's Bay, Fisherhaven, De Kelders, Kleinbaai, Franskraal and Pearly Beach are not currently serviced by a sewer reticulation system, and make use of septic tanks and soak-aways. The towns of Kleinmond, Hawston, Hermanus, Stanford and Gansbaai are partially serviced by a sewer system. Septic Tanks contribute to the pollution of groundwater in these areas. As such, the replacement thereof with water-bore sanitation systems is the preferred option in terms of improving the quality and thus environmental sustainability of groundwater resources.

About 80.2% of the water supply network (Bulk and Reticulation Water Pipelines) is in a poor and very poor condition. The bulk of the backlog is made up of bulk water pipeline and water reticulation pipeline assets.

About 3.4% of the sewage network is in a poor and very poor condition. The bulk of the backlog is made up of sewer pump stations and sewage treatment works assets.

Various bulk infrastructure capital projects are currently being implemented in order to ensure that the bulk water infrastructure can meet the future demands for the various towns within the Municipal Area. Adequate funds also need to be allocated to essential rehabilitation and maintenance of the existing infrastructure in addition to the need to extend services to poor communities as both are priorities which need to be addressed.

The Gateway, Camphill and Volmoed Well fields are being developed by the Overstrand Municipality as additional groundwater resources for the greater Hermanus Area. A detailed feasibility study was also recently completed for the re-use of treated effluent from the Hermanus WWTW (as such this water should be used for potable and irrigation water purposes in the future). Both the Preekstoel Water Treatment Works (WTW) and the Hermanus Waste Water Treatment Works (WWTW) are currently being upgraded.

Groundwater for Stanford from the Kouevlakte area will be supplied via two newly drilled boreholes. The Municipality is currently busy with the construction of the new bulk supply pipelines in order to connect the two newly drilled boreholes to the existing water reticulation network.

A new Nano Filtration WTW was constructed in Gansbaai in order to fully utilise the Klipgat and Grotte water resources, and to improve the quality of the water. A new Pearly Beach WTW was also constructed. A new borehole will be commissioned in the near future for the augmentation of the Baardskeerdersbos existing surface water source.

The Municipality also actively implements their Water Demand Management (WDM) Strategy and various WDM activities in order to reduce their current percentage of non-revenue water, and to help reduce the future water demand.

In terms of adapting for climate change, water systems will need to be more robust and new / alternative sources of supply may need to be found (e.g. the re-use of sewage).
It is proposed that the following approach be adopted to mitigate and adapt to the predicted impacts of climate change:

- All resources, especially surface water resources, need to be re-evaluated, especially where demand is close to the safe one in twenty year yields. It is important to establish assurance of supply levels of all water sources;
- increase assurance of supply of the water resources by ensuring that there is at least 10% additional capacity when considering the maximum 24 hour demand during the peak months of the year;
- do not undertake new developments unless a proper investigation of the implication on water sources and sustainability in the long term has been undertaken; and
- vigorously implement WDM measures, especially in terms of the following:

    - increased water use efficiency;
    - frequent monitoring of the water supply system, from the sources to the consumers; and
    - by conducting regular and adequate system maintenance and repairs.

It is the responsibility of the Overstrand Municipality to ensure the progressive realisation of the right of all people in its area of jurisdiction to receive at least a basic level of water and sanitation services. Whilst the provision of basic water services is the most important and immediate priority, Water Service Authorities (WSAs) (in this case the Overstrand Municipality), are expected to provide intermediate and higher levels of services (for example, water on-site) wherever it is practical and provided it is financially viable and sustainable to do so. As such, the Overstrand Municipality works towards providing all households in the towns with a water connection inside the house and connecting all households to a waterborne sanitation system.

One of the highest priority projects, as identified in the WSDP for 2012/2013, includes the provision of required basic water and sanitation services in the rural areas to households currently below Reconstruction and Development Programme (RDP) standards. The following policies have been developed to address the challenges faced regarding water services provision, namely:

- Free basic water policy:

    - The provision of the infrastructure (facilities) necessary to provide access to water to all households in a sustainable and economically viable manner.
    - The development of subsidy mechanisms which benefit those who most need it.

- Free basic sanitation policy:

    - Provision of the correct sanitation facility to the poor household.
    - Health and hygiene promotion must be provided in a co-ordinated manner and must be properly managed and adequately funded if free basic sanitation is to become a reality. This requires close collaboration between the Environmental Health Practitioners of the Overberg District Municipality and the Overstrand Municipality.
    - Subsidising the operating and maintenance costs of sanitation services to the poor.

The most vulnerable groups within the Overstrand Municipal Area are persons living in informal areas with shared services. It is therefore of outmost importance to properly maintain communal standpipes, and to promote health and hygiene awareness amongst standpipe users.

Similarly, the supply of basic sanitation services on farms needs to be linked to the provision of health and hygiene education by community health workers employed on sanitation projects.

2. Action Plan for Bulk Water Infrastructure

In terms of the above, and to supply future water demands, it will be necessary to upgrade the bulk water supply systems for:

- Buffels River
    - Upgrading of the 300mm diameter bulk pipeline from Buffels River WTW to Betty's Bay Voorberg reservoir (3 335m x 315mm diameter parallel reinforcement of main pipe). The upgrading of this pipeline can be postponed if a booster pump station is constructed on the pipeline before the draw-off point to the Pringle Bay reservoir.
- Greater Hermanus
    - Replace the existing 300mm diameter bulk pipeline with a 500mm diameter pipeline when the existing 300 and 400mm diameter bulk pipes reaches capacity.
    - New 200mm diameter parallel reinforcement of the existing 160mm diameter bulk supply pipeline to the Onrus reservoir in order to augment supply to the reservoir.
    - Replace the existing 300mm diameter bulk pipeline with a 500mm diameter pipeline when the existing 300 and 350mm diameter bulk pipes reaches capacity.
    - New 550mm diameter parallel reinforcement of the existing 250mm diameter pipeline when the existing 250mm diameter bulk pipe reaches capacity.
    - New 500mm diameter parallel reinforcement of the existing 150mm diameter bulk supply pipeline to the Hawston LL reservoir in order to augment supply to the reservoir.
    - New 200mm diameter parallel reinforcement of the existing 250mm diameter bulk supply pipeline to the Fisherhaven LL reservoir in order to augment supply to the reservoir.
    - New 250mm diameter parallel reinforcement of the existing 200mm diameter bulk supply pipeline to the Fisherhaven LL reservoir in order to augment supply to the reservoir.
    - Replace the existing 225mm diameter bulk pipeline with a 400mm diameter pipeline when the existing 225 and 300mm diameter bulk pipes reaches capacity.
    - New 315mm diameter parallel reinforcement of the existing 400mm diameter bulk supply pipeline when the 400mm diameter pipeline reaches capacity.
    - New 335mm diameter bulk supply pipeline from the Hawston LL reservoir to the proposed Hawston HL reservoir when it is constructed.
    - New 250mm diameter parallel reinforcement of the existing 150mm diameter bulk supply pipeline to the Sandbaai reservoir in order to augment supply to the reservoir.
    - Replace the existing 225mm diameter bulk pipeline (from the Preekstoel WTW to the Coastal and Hermanus bulk pipelines) with a 500mm diameter pipeline when the existing 225, 400 and 600mm diameter bulk pipes from the Preekstoel WTW reaches capacity.
- Greater Gansbaai
    - Replace the existing 200mm diameter bulk pipeline with a 315mm diameter pipeline when the existing 200mm and
    - 355mm diameter bulk pipes reaches capacity.
    - New 200mm diameter parallel reinforcement of the existing 150mm diameter bulk supply pipeline to the Kleinbaai
    - reservoir in order to augment supply to the reservoir.
    - New 315mm diameter parallel reinforcement of the existing 250mm diameter bulk supply pipeline in order to augment
    - supply to the Gansbaai and De Kelders reservoirs.

- New 400mm diameter bulk supply pipeline to the Gansbaai reservoir. This item is required in order to utilize the existing bulk pipelines between Gansbaai and De Kelders so that bulk water supply to the De Kelders reservoirs can be augmented from Gansbaai.
- Dedicate the existing 250mm diameter pipeline between the Greater Gansbaai bulk system and the De Kelders reservoirs as a bulk supply pipeline to the De Kelders reservoirs. This item is required to isolate the bulk and distribution systems from each other when the new supply pipeline from the reservoirs to the De Kelders network is implemented.
- New 450mm diameter bulk supply pipeline from the Franskraal WTW to the Franskraal reservoirs.

3. Action Plan for Water Treatment Works Infrastructure

- The Overstrand Municipality will annually revise the capacity and efficiency of their water and sewage reticulation systems, and of their WWTWs to meet the requirements of DWA (as stipulated in their Blue Drop Criteria).[ggg]

- Buffels River WTW:

  - The plant is operated below its design capacity, and is only in operation for 8 hours per day. There is therefore considerable spare capacity available, and no capacity increase will be required for the foreseeable future.
  - General housekeeping and safety conditions should be improved.

- Klein River WTW:

  - Provide hoppers at the bottom of the settling tanks to improve sludge disposal.[hhh]
  - Improve the installation and arrangement of chemical dosing facilities (to provide facilities similar to that at Preekstoel WTW).
  - Provide better clarity boxes for the rapid sand filters to replace the redundant existing filter boxes.
  - Provide a storage building for treatment chemicals to allow safe storage of these chemicals.
  - Improve the condition of the access road to the plant.
  - Improve the operational monitoring programme by applying more frequent on-plant sampling and measurements, and by communicating the monitoring results to the Municipal Engineering Department.

- Preekstoel WTW:

  - It is recommended that a comprehensive plant audit be carried out when construction work (a new 10 Mℓ/day biological WTW for iron and manganese removal will be constructed, in order to treat the newly developed groundwater sources and to increase the overall treatment capacity for the Greater Hermanus to 38 Mℓ/day) has been completed and the new filters commissioned.
  - Implement the overall conclusions / recommendations as contained in the 2011 Process Audit Report for the Preekstoel Water Treatment Plant.

- Baardskeerdersbos WTW:

  - Improve reliability of automated operation (backwashing).
  - Security fencing and a lockable gate should be provided around the treatment system.

[ggg] According to the WSDP, **blue drop status** is awarded by the DWA to those towns that comply with 95% of the drinking water criteria. Green drop status is awarded to those Water Supply Authorities (e.g. the Overstrand Municipality) that comply with 90% of the criteria for key selected indictors of waste water quality management.

[hhh] Incidents of sewage pollution have in the past occurred into the Klein River and Klienriviersvlei (Aubrey Withers, pers. comm. 2013).

- Due to the elevated colour and iron concentrations, an investigation should be done to consider options for upgrading the treatment system to include processes for colour and iron removal (e.g. ultrafiltration).
- Contract a local resident on a part time basis to inspect the treatment plant on a daily basis, and to measure free chlorine residual levels.
- Depending on the quality of the raw water, the chlorine dosage rate should be checked and adjusted if necessary to give the desired free chlorine residual at the final water sampling point.
- The contracted local resident can also asses the condition of the treatment equipment on a regular basis, thereby improving maintenance efficiency.

4. Action Plan for Water Pump Stations

Based on the most likely land-use development scenario, it will be necessary for new and /or ugraded water pump stations at Buffels River, Kleinmond, Greater Hermanus, Stanford, Greater Gansbaai and Peary Beach.

5. Action Plan for Reservoir Infrastructure

According to the WSDP, even though the towns within the Overstrand Municipality's overall storage capacity might be adequate, there might be some distribution zones within the town's network with inadequate storage capacity.

As such, the following new reservoirs are recommended in the Water Master Plan of January 2011:

- 3 new reservoirs for Buffels River;
- 9 new reservoirs for Greater Hermanus (and upgrading of the storage capacity of the Kidbrook Place development's reservoir);
- 1 new reservoir for Stanford; and
- 4 new reservoirs for greater Gansbaai.

The total additional storage capacity will amount to ±47.7 Mℓ.

6. Action Plan for Water and Sewer Reticulation Infrastructure and Sewer Pump Stations

The Water and Sewer Master Plans (both dated January 2011) have indicated that based on the most likely land-use development scenario, that in order to increase capacity, a range of new water and sewer reticulation infrastructure components and pump stations will be necessary, and that improvements will be required to existing infrastructure.

In particular, a new sewer reticulation system is proposed for the towns of Rooi Els, Pringle Bay and Betty's Bay, De Kelders and Franskraal, which are currently serviced by septic tanks.

7. Action Plan for Waste Water Treatment Infrastructure

The Overstrand Municipality is currently busy with the upgrading of the Hermanus WWTW from a capacity of 7.3 Mℓ/day to 12 Mℓ/day. The upgrading includes a new inlet works, refurbishment of the existing aeration and settling tanks, new anaerobic and anoxic basins and settling tank, mechanical sludge dewatering and a new chlorination system.

- The Overstrand Municipality will annually revise the capacity and efficiency of their water and sewage reticulation systems, and of their WWTWs to meet the requirements of DWA (as stipulated in their Green Drop Criteria).

- In cases of non-compliance with the requirements of the DWA, or when the inflow to a specific WWTW has increased to such an extent that the capacity of the plant needs to be increased, options must be explored for upgrading and/or for extending the treatment capacity of the works.

- The Overstrand Municipality will place a high priority on water demand management, in order to postpone additional capital investment for as long as possible without compromising the quality of the treated effluent released into the environment.

- The Overstrand Municipality will consider the availability of water and the capacity of existing WTWs and WWTWs (or that will be constructed in the near future) when undertaking Municipal land-use and development planning, and when reviewing development applications.

- In order to prevent condition backlogs, the Municipality must ensure that assets are rehabilitated and / or replaced before the end of their economic life, and that the necessary capital funds are allocated for this purpose.

- Potential renewal projects for water and sanitation infrastructure will be identified from the Municipal Asset Register. All assets with a condition grading of “poor” and “very poor” will be prioritised for refurbishment and/or upgrading and/or expansion.

- the Overstrand Municipality is committed to work with the DWA and the other role-players in order to continually improve on their Green Drop Scores for the various sewage distribution systems and WWTWs.

- The Municipal Health Services of the Overstrand Municipality will report monthly to the Overberg District Municipality’s “Municipal Health Services” Department regarding the quality of drinking water, and of treated water released from WWTWs. The Municipal Health Services Department in turn report to the Western Cape Provincial Department of Health.

8. Action Plan for Water Demand Management

Metering of all water demand is one of the most significant steps in order to properly plan and manage water sources. As such, the Overstrand Municipality will continue with monthly reading of all the existing bulk water meters.

The Municipality’s Water Conservation and WDM Strategy and Action Plan includes, *inter alia*, the following key activities:

- Continue to investigate options for the use of final treated effluent for irrigation purposes and/or for other purposes (e.g. industrial use).
- Continue with the upgrading of the telemetric (automatic data transfer) system, to act as an early warning system for e.g. pipe failures and reservoir overflows.
- Continue to review and improve the efficiency of remote (telemetric) monitoring of minimum night flows in all areas. Focused leak detection and repair programs will be performed in areas with highest minimum night flows.
- Continue with the metering of all the inflow received at their WWTWs, monitoring of the quantity of treated effluent, and of the quantity of treated effluent returned to the environment.
- Continue to replace pipelines in priority areas (those areas with old reticulation networks and frequent pipe failures / leakages), and with the repairing of leaks in the water reticulation network at all indigent households.
- Continuing with the monitoring, upgrading and repairing of water meters where required.
- Municipal building inspectors will continue include the inspection of the water meter installations during the foundation inspections at construction / building sites.
- Continue to identify users on the financial data base with regular abnormally high or abnormally low water use and phone the owners of the properties, or physically inspect the causes.
- The Municipality’s current tariff structure (volumetric sewage tariffs and dual-level water restriction tariffs) discourages excessive use of water. The tariff structure will be reviewed as part of the Municipality’s Master Planning.

- Continuing with a phased approach for the investigation / implementation of potable water pressure management initiatives. The Municipality is currently installing two pressure reducing valves in Kleinmond, and one in Stanford.
- Continuing with a phased approach for the establishing of water management zones for the various potable water distribution systems. Water management zones will help to improve the Municipality's management of non-revenue potable water provision.
- The Municipality Environmental Management Services Department will continue to support the DWA's Working for Water Programme in terms of removing alien vegetation in river catchment areas.
- Continue updating the water balance models in the water information database, in order to determine locations of wastage, and to enable the active implementation of the WDM Strategy to reduce losses.
- The Overstrand Municipality needs to ensure that adequate funding is allocated under their Capital and Operational budgets towards Water Conservation / WDM initiatives
- The Municipality will also source all potential external sources of funding to assist with the implementation of the Water Conservation / WDM measures, for example for leak repairs on properties in indigent areas.

9. Action Plan for the Management of Water Resources

- **Water Quality**

    - The Municipality makes use of a specialist subcontracting firm to conduct potable water compliance sampling and analysis. Samples are taken at various locations in each water reticulation system and are analysed at an accredited laboratory. The water quality results are the uploaded loaded onto DWA's Blue Drop System website, and compared to SANS241 (National Drinking Water Standards). This monitoring and data compliance monitoring system allows for immediate intervention to rectify any problems.

- **Effluent Quality**

    - The Environmental Management Section of the Overstrand Municipality monitors the "recreational waters" to determine the severity of faecal pollution in the Klein River Estuary by means of:
        - Green Drop Monitoring at the WWTW; and
        - Sewage and environmental monitoring at Blue Flag Beaches.

    - The Breede Overberg Catchment Management Agency (Estuaries Coordinator) conducts water quality sampling at set monitoring points.

    - Data collected and assimilated from the monthly samples undertaken by the Environmental Management Section, supplemented by data obtained from the Breede Overberg Catchment Management Agency, forms the basis of a monthly Water Quality Report, which is used to recommend actions to address health hazards in the estuarine and marine recreational environment.

    - The long term goal is to extend the monitoring programme to embrace estuarine and marine environments throughout the Municipal region.

- **Industrial Consumers**

The volumes and nutrient loads of effluent discharged by industries in the Overstrand Municipality's Management Area into the Municipality's sewer system are not yet monitored. The Municipality's tariff structure for the discharge of effluent by industrial consumers does not currently make provision for nutrient loads and volumes.

Whilst there is no limit on the permitted volume of effluent that can be discharged into the sewer system, concentration limits for various parameters are included in the Municipality's Water Services by-laws (Acceptance of industrial effluent for discharge into the sewage disposal system).

10. Action Plan for the Augmentation of Water Supply to the Overstrand

The Overstrand Municipality completed a detailed investigation during 2010/2011 of the water resources for the area from Rooi Els to Kleinmond. The recommendations from the report were as follows:

- **Buffels River and Kleinmond Areas:**

    - Further studies and investigations be undertaken to reduce the non-revenue water percentages to 20%.
    - Demand management should include the pressure management of the Kleinmond reticulation system and further studies are required to evaluate the feasibility of pressure management of the Betty's Bay reticulation network.
    - Telemetry should be provided for all reservoirs, WTW's flow meters, strategic pressure meters and the pressure reducing valve installations to increase efficiency in managing the system and reducing the time of identifying, locating and repairing leaks. Additional meters should be installed to correlate the sales data and identify areas with higher non-revenue water (losses) percentages.
    - Environmental studies should be commissioned to further inform the decision on which resources should be further developed and should include the following for the Buffels River supply area: The raising of the Buffels River dam; developing of boreholes; and investigate the Disa Kloof- and Rooi Els Rivers. Desalination and reclamation of WWTW effluent could be considered should the aforementioned options prove to be unsuccessful.
    - Environmental studies should also be commissioned for the Palmiet River to determine the maximum abstraction rate during the low flow periods and also to drill and equip additional boreholes.

- **Greater Hermanus Area:**

    - The Gateway, Camphill and Volmoed Well fields are being developed by the Overstrand Municipality as additional groundwater resources for the greater Hermanus Area. The Gateway boreholes are in production and the Municipality keeps on implementing their Groundwater Monitoring Programme for all the well fields.
    - The Municipality is also planning for the construction of a new pipeline from the Camphill and Volmoed boreholes to the Preekstoel WTWs (seven boreholes will be put into operation).
    - A detailed feasibility study was also completed during the 2010/2011 financial year for the re-use of treated effluent from the Hermanus WWTWs.
    - The Municipality will also start investigating various desalination options in the nearby future. The desalination option was however found to be currently the most expensive scheme to operate, with a Unit Cost approximately 50% more expensive that the re-use schemes considered. It was therefore proposed that a re-use scheme be implemented to address the immediate demand for water.

- **Stanford:**

Groundwater for Stanford from the Kouevlakte area will be supplied via two newly drilled boreholes. The Municipality is currently busy with the construction of the new bulk supply pipelines in order to connect the two newly drilled boreholes to the existing water reticulation network.

- **Greater Gansbaai:**
    - A new Nano Filtration Plant was constructed during the 2010/2011 financial year in order to fully utilise the Klipgat and Grotte resources, and to improve the quality of the water.
- **Pearly Beach:**
    - The Overstrand Municipality is committed to manage the dam efficiently. Other resource options include the extension of the existing groundwater supply system and the Kraaibosch scheme.
- **Baardskeerdersbos:**
    - A new borehole will be commissioned in the near future and the supply from the stream and the new borehole will be adequate to meet the medium- and long-term future water requirements.
- **Buffeljags Bay:**
    - The current source is adequate to supply the medium- and long-term future water requirements. No further exploration work will be undertaken, as there is now a sufficient source of water to meet the future demand.
- **Industrial Consumers:**
    - A "*Form of Application for Permission to Discharge Industrial Effluent into the Municipality's sewer*" is included in the Overstrand Municipality's water services by-laws and all industries now need to formally apply for the discharge of industrial effluent into the sewer system.
    - The following gaps with regard to industrial consumers and their discharge of effluent into the Overstrand Municipality's sewer system were identified:
        - Industrial effluent discharge into the sewer system needs to be quantified.
        - All industries need to formally apply for the discharge of industrial effluent into the sewer system.
        - Regular sampling of the quality of industrial effluent discharged into the sewer system is necessary.
        - Any returns from the industries directly to the Water Resource System needs to be metered.
    - The Overstrand Municipality is committed to ensure that all industries apply for the discharge of industrial effluent into the sewer system, to monitor the quality and volume of industrial effluent discharged and to implement the set of by-laws with regard to the discharge of industrial effluent into the Overstrand Municipality's sewer system in order to determine whether the quality complies with the standards and criteria
    - The industrial consumers in the Overstrand Municipality's Management Area are not yet monitored, with regard to the quality and volume of effluent discharged by them. The Overstrand Municipality needs to adopt an approach whereby the various parameters at all the industrial consumers are monitored, including volumetric monitoring at the larger users. Adaptation of procedures must be undertaken in accordance with any changes to the wastewater discharge criteria set by DWA. It will also be necessary to consider limits above which volumetric monitoring will be necessary at new industries and existing smaller industries, where expansion is likely to take place.
    - All current industrial consumers need to apply for discharge permits and they must supply and maintain a flow meter measuring the volume of water that is discharged into the Overstrand Municipality's sewerage system.

- It is also recommended that the accounts generated by the Municipality for each cycle include a summary of the Chemical Oxygen Demand (COD), and flow results in order to enable industries to keep their own records try to improve the quality and reduce the quantity of effluent discharge where possible.

5.4.4.4 Projects of the Environmental Management Section (EMS) of the Municipality

The Overstrand Municipality's Environmental Management Section (Department) (EMS) falls under the Municipal Infrastructure and Planning Directorate.

1. The Vision of the EMS is the following

"*The Environmental Management Section strives towards sustainable environmental management by means of environmental best practice. Accordingly, the section strives to coordinate, plan and manage all human activities in a defined environmental system to accommodate the broadest possible range of sustainable short and long term environmental, social and economic development objectives*".

2. The Mission of the EMS is

"*The mission of the section is to promote the use of sound environmental management principles to ensure a healthy environment within the Overstrand Municipality*".

The function of the EMS of the Overstrand Municipality is to promote a sustainable balance between environmental, social and economic development in accordance with Parts B of Schedule 4 and 5 of the Constitution of South Africa. The EMS also strives to achieve the above in terms of the relevant sections of the 2012/2013 IDP.

3. The five focus areas of the 2012/2013 IDP are

- Basic Service Delivery
- Social upliftment and Economic development
- Optimization of financial resources
- Good Governance
- Safe and Healthy Environment

4. These focus areas were linked to the following Key Performance Areas (KPAs)

- KPA OS 5
  Safe and Healthy Environment
- KPA OS 5(a)
  Effective public safety and disaster management
- KPA OS 5(b)
  Effective Environmental Management

5. KPA OS 5(b) Effective Environmental Management is explained briefly below

In essence, this function (Effective Environmental Management) of the EMS can be divided into three main tasks as follows:

- Effective management of Municipal Nature Reserves and Municipal Open Spaces.
- Progressive development and implementation of a corporate Environmental Management System to reduce the environmental footprint of the Municipality.
- Evaluate all prospective developments (development proposals, town planning applications, building plans and infrastructure projects) in terms of environmental sustainability.

6. In addition, the EMS is currently, amongst others, involved with the following projects

- Working for Water.
- Working for the Coast.
- Estuary Management
- The development of facilities in the form of a Coffee shop, Eco-centre, ablutions, upgraded parking areas and access to the penguin colony and coastal trails at Stony Point.
- Invasive Alien Clearing Strategy (in parallel with the Working for water Project) on Municipal Reserves and Public Open Spaces.
- Terrestrial and Marine Protected Area Management, including extensions of protected areas.
- Other Special Projects / Partnerships.
- Stony Point Development.
- Coastal Management Programme.
- Dune Management Plan.
- Alien Plant Clearing Plan.

7. Amongst others, the EMS also performs the following functions

- Advises the Municipal Council and Municipal officials on Environmental matters.
- Facilitates public participation in environmental programmes.
- Facilitates & co-ordinates environmental education programmes in collaboration with Environmental Education NGO's.
- Liaises and engages with stakeholders concerning environmental matters.
- Continually adapts the Baboon Protocol for the Overstrand area, in collaboration with other conservation authorities in order to improve the understanding and management of the of the human - baboon conflict in the area.
- Develops and aids in the management of natural resource-based tourism attractions in the Overstrand. Some of the current destination places are of high conservation, cultural and heritage value e.g. Fernkloof Nature Reserve; Stony Point; Milkwood Forests and the Klein and Botriver Estuaries.
- Monitors and supports conservation efforts regarding estuaries by means of active involvement in the establishment of Estuary Management Plans and through providing administrative support to the relevant Estuary management entity, and to key stakeholders.

8. Environmental Management Focus Areas

"Environmental Management Focus Areas" are areas defined in this EMF in which fine-scale (1:10 000 or larger) mapping of environmental features / attributes is required, along with detailed land-use, conservation and natural resource management guidelines (e.g. requiring detailed EMFs or EMPs of their own).

Such "Environmental Management Focus Areas" are nested within the three distinct Bioregions of the Overstrand Municipal Area, namely the Kogelberg, Overberg and Agulhas Bioregions.[112]

The EMS, together with the Town Planning Department of the Municipal Infrastructure and Planning Directorate have identified the following so-called "Environmental Management Focus Areas" (**Figure 20**), based on environmental sensitivity, and on impending or current development pressure:

These Environmental Management Focus Areas provide a mechanism through which policy pertaining to environmental sustainability can be implemented and regulated at the local level, in the key areas identified below.

8.1 Cape Hangklip Ecological Corridor

This Environmental Management Focus Area is a catchment (mountains) to coast corridor which contains Engangered and Critically Endangered vegetation types as well as seepage and riparian wetland systems. Most of the corridor forms the buffer zone between the core and transitional zones of the Kogelberg Biosphere Reserve. This visually sensitive corridor is also an important tourist route between the Cape Town Metropole and the Whale Coast Route destinations such as Hermanus. Detailed planning and development solutions are required to assist landowners to exercise their primary development rights, whilst conserving this sensitive environment.

8.2 Coastal Dune Systems (Pringle Bay, Betty's Bay and Pearly Beach)

This Environmental Management Focus Area comprises formerly mobile dune systems that have been progressively stabilised with alien invasive vegetation. Various settlements have been established within these dune systems, disrupting seepage patterns within the dune slack wetland systems, and altering sediment pathways. These coastal dune systems are being destabilised by dynamic coastal processes, and by the impacts of increased urbanisation of the coastal environment. Interventions are required to prevent the further degradation of coastal ecosystems, and to manage the impacts of dynamic coastal processes on existing urban settlements.

8.3 Palmiet Catchment and Coastal Plain

The Palmiet River Catchment and coastal plain is arguably one of the most pristine river and estuarine systems in South Africa. The vegetation types in the catchment, and on the coastal plain, are similar to those occurring in the greater Hangklip region. The inland portion of the catchment is located largely within the Kogelberg Nature Reserve, and to a lesser extent, within the Kleinmond Nature Reserve. The coastal plain is under constant threat from urban and ribbon type development. Detailed development controls are required to maintain the aesthetic quality, and the ecological integrity of this important coastal corridor.

8.4 Botriver Estuary and Coastal Plains (Lamloch, Afdaks/Meerenvlei, Paddavlei)

The Bot River Estuary and Coastal Plain is the watershed between the Kogelberg and Overberg Bioregions. This estuary is important as a nursery area for marine fish species, as well as for the ecological functioning of the Lamloch swamps. The estuary is heavily impacted upon by forestry and agricultural activities in the catchment, which results in sedimentation and decreased flow in the estuary, affecting the management of the estuary mouth. Urban development pressure and alien invasive vegetation is encroaching on the wetland feeder systems, which further endangers the natural functioning of this system. An estuary management plan is in place, but catchment and development management plans are desperately needed to protect this estuarine system.

8.5 Onrus/Vermont Wetland and Greenbelt System

The Onrus/ Vermont Wetland and Greenbelt System is located within and at the foot of the Onrust Mountain Range near Hermanus. At the centre of this system is the Vermont Salt pan which accommodates a fairly large population of flamingos and other migratory and resident water fowl. The flood attenuation potential of the salt pan as well as the biodiversity value of the corridor should not be underestimated. The Vermont Conservation Trust has commissioned the services of a consultant to develop a management plan for this sensitive system.

8.6 Klein River Ecological Corridor

The Klein River (Stanford) Ecological Corridor ensures connectivity between several statutory nature reserves in the region and the Klein River Estuary which mouths into the sea adjacent to the town of Hermanus. The Klein River Estuary is regarded as the fifth most important estuary in South Africa, and is located adjacent to the Walker Bay Whale Sanctuary. Catchment

management plans are required to ensure that water flows into the estuary are sustained and improved.

8.7 Danger Point Ecological Corridor

The Danger Point ecological corridor is a botanically diverse region, spanning four ecosystems and interspersed with small coastal wetland systems. The area forms the largest intact system of Overberg Dune Strandveld in the Overstrand region. This visually significant promontory is prone to subdivision of agricultural land, which also threatens the aesthetic quality of the landscape. Development controls are required to ensure that coastal development in this region is in harmony with the landscape.

8.8 Franskraal Ecological Corridor

The Franskraal Ecological Corridor is an important coastal plain system which links a large inland Milkwood forest and seepage system with the coast. The corridor is important in terms of the aesthetic appeal of the landscape, and because of the ecosystem services delivered by the wetland ecosystem. This area is being considered for the establishment of a local nature reserve, which will benefit the region, and particularly the residents of Franskraal.

8.9 Hagelkraal Ecological Corridor

The Hagelkraal Ecological Corridor is a catchment system which serves as the main water supply to the town of Pearly Beach. The Groot Hagelkraal and Klein Hagelkraal rivers converge below the R43 Road to form the Pearly Beach Marsh within the corridor. This corridor is especially important in terms of its aesthetic value, and since it delivers a number of valuable ecosystem services, including flood attenuation.

8.10 Urban Wetland and Riparian Systems

The coastal plain contains many ecologically important areas, including coastal seepage wetlands and riparian areas. Such areas are however subject to ever increasing development pressure. Wetland and riparian systems define micro-climatic zones within the coastal plain, and perform the important ecosystem service of flood mitigation. Specific micro-habitats, nested within micro-climatic zones, form important habitats for wetland fauna, including threatened amphibian species. The EMS will develop specific building controls for properties in urban wetland systems, in order to mitigate the effects of natural disasters, and to maintain the ecological integrity of these highly threatened ecosystems.

8.11 Urban Conservation Networks

Urban conservation networks comprise open spaces located within the urban fabric of coastal towns or slightly beyond the urban edge in the rural landscape, which display significant biodiversity value. These properties / areas should be judiciously managed, as they form integral parts of the Overstrand Municipality's ecological capital, in terms of their aesthetic value and delivery of ecosystem services. Judicious management of these urban conservation areas is also required in order to reduce risks to the surrounding area (e.g. through the clearing of dense stands of alien vegetation, which pose significant fire risks). The EMS aims to develop specific EMPs for these urban / peripheral properties.

8.12 Urban Coastal Corridors

Urban coastal corridors typically contain coastal thicket, seashore vegetation or strandveld ecosystems. These coastal public property corridors are subjected to a variety of impacts resulting from tourism, uncontrolled access to the seashore, and vagrancy. Ecological management of these properties is often difficult to achieve due to the close proximity to dwellings. The EMS aims to develop specific management interventions to counteract these challenges.

Contractual agreements could be signed between private landowners and Capenature (in terms of their Conservation Stewardship Programme) and/or between private landowners and the Municipality in the above areas, in order to enhance or protect the aesthetic quality of the area, to ensure appropriate use of productive agricultural land, and to conserve biodiversity on privately owned land.[iii] Financial incentives could be provided whereby no taxes would be levied by the Municipality on land rezoned for conservation purposes.

Such contractual agreements would commit private landowners to adopt and implement an environmental management system that conforms to ISO 14001 standards[jjj] (such an environmental management system could be in the form of a DEA&DP and Municipality-approved EMP). The effective implementation of such en environmental management system would help ensure that the land and resources in the subject area are managed in a manner which promotes environmental and economic sustainability.

Such agreements could, *inter alia*, require the landowner/s to establish a trust fund, which would ensure that the necessary financial resources are available for effective long-term management of the subject area. In addition, the agreements could specify the landowner's obligations in respect of the following:

a) Environmental policy.
b) Planning and design.
c) Implementation and operation.
d) Monitoring and corrective action.
e) Environmental auditing.

The signing of such contractual agreements could also be included, for example, as a Municipal condition of approval for the development of an on-farm settlement or agricultural industry / or agricultural commercial venture, or for the subdivision of agricultural land. As such, contractual agreements to manage private land in terms of an approved environmental management system / EMP could serve as a viable mechanism for ensuring environmental sustainability on the relevant farm.

In terms of the above, the compulsory commissioning and implementation of an environmental management system / EMP could represent an appropriate biodiversity offset for development on farms and/or for the subdivision of agricultural land within the identified Environmental Management Focus Areas (**Figure 20**), provided that the Municipal SPC allows for such development or subdivision.

9. Special Management Areas

In some cases, application/s should be made to the Minister to declare the listed "Environmental Management Focus Areas" that are located partially or wholly in the coastal zone,[kkk] as "special management areas" in terms of section 23 of the NEM:ICMA. Such declared areas must then be managed in terms of the provisions of the NEM:ICMA and other relevant legislation.

A "Special Management Area" can be declared (by the Minister) if environmental, cultural or socio-economic conditions in the area require it to:

- Achieve the objectives of a coastal management programme;

[iii] **Reference:** Provincial Administration of the Western Cape.1999. Bioregional Planning Framework for the Western Province. Project J3021. Plan 4: Provincial Bioregional Plan.

[jjj] ISO (the International Organisation for Standardisation) is a worldwide federation of national standards bodies (ISO member bodies).

[kkk] **Coastal Zone:** Means the area comprising coastal public properly (mainly Admiralty Reserve and land below the High-Water Mark), the coastal protection zone (an area along the inland edge of coastal public property), coastal access land (which the public may use to gain access to coastal public property), special management areas, and coastal protected areas, the seashore, coastal waters and the Exclusive Economic Zone and includes any aspect of the environment on, in, under and above such area.

- Facilitate the management of coastal resources by local communities;
- Promote sustainable livelihoods; or
- Conserve, protect or enhance coastal ecosystems and biodiversity.

As such, application to the Minister for the declaration of any areas as “Special Management Areas” should be preceded, by the commissioning of a Coastal Management Programme for the entire coastal zone of the Overstrand Municipality (the Kogelberg Coast Integrated Management Plan[113] could be used as a template to develop such a plan for the entire coastal zone of the Overstrand Municipality).

Similarly, the coastal planning scheme, as proposed in Kogelberg Coast Integrated Management Plan, should be used as a guideline in the development of a coastal planning / zoning scheme or zoning scheme overlay for the rest of the Overstrand Municipal area.

Note that a coastal planning scheme is intended to:

a) reserve defined areas within the coastal zone to be used exclusively or mainly for specified purposes; and
b) prohibit or restrict any use of these areas in conflict with the terms of the Scheme.

It is important to note that a coastal planning scheme may not create or change any rights to use land or coastal waters.

PART 6: GIS-BASED LAND-USE DECISION SUPPORT

6.1 MAPS AND SPATIAL DATA

The data on environmental attributes that informed this EMF needs to be accessible to all users (e.g. to municipal officials, authorities, and to civil society), at varying scales and in an interactive manner, and must be considered when interrogating land-use applications, when conducting land-use planning, and when planning management interventions / actions.

This is to be achieved through the integration of the latest systematic biodiversity planning information data sets from, *inter alia*, the SANBI's 2011 NBA, the Department of Water Affairs, the Southern African Agricultural Geo-referenced Information System, and from other sources into the existing set of Municipal GIS-based Spatial Decision Support Tools, which are intended to assist in appropriate spatial planning, land-use decision-making, and where to focus efforts in terms of the management and conservation of natural resource bases.

The baseline information layers (maps) produced from the latest systematic biodiversity planning information data sets (**Figures 2 – 13**, and **16 – 19**) spatially represent **environmental constraints and opportunities** within the Municipal Area, and should be used to guide various types of land-use. This is achieved by using the baseline environmental information and layers to delineate the boundaries of Municipal SPCs, to inform policy and actions (**Table 8** refers), and to inform allowable land uses per SPC (**Table 11** refers).

The baseline information layers also serve to "red flag"' geographic areas in which development applications could trigger activities listed in terms of the 2010 NEMA EIA Regulations, and/or the provisions of other legislation (e.g. NWA, NEM:ICMA) or of specific local management plans (e.g. estuary or catchment management plans). The identified geographic areas should be used to guide natural resource management decision-making (**Paragraph 5.4.3** above refers), and specific Municipal plans to help ensure environmental sustainability and resilience (**Paragraph 5.4.4** above refers).

The GIS-based Spatial Data / Maps produced for this EMF include, *inter-alia*:

1. An **Environmental Sensitivity Analysis Map**, in the form of the **2011 NBA Composite Map** (**Figure 16**). The most important of the SANBI's baseline layers are automatically incorporated therein, and this map should be used as the primary biodiversity informant to land-use planning and decision-making in the Municipal area.

2. The SANBI's **individual baseline layers / maps** that make up the 2011 NBA Composite Map, and baseline spatial information from the Department of Water Affairs, the Southern African Agricultural Geo-referenced Information System, and from other sources (**Figures 2 – 13**, and **17 – 19**).

3. Maps indicating important ecological and evolutionary process areas. The sound planning and management of these Process Areas is critical both to conserving the exceptional level of species diversity found in this area, and to maintaining ecosystem services such as reliable water yield, water quality, flood regulation, and coastal buffering and protection (**Figures 14 and 15**).

4. A map indicating **Environmental Management Focus Areas** within the Overstrand Municipal area, which indicate defined areas in which fine-scale (1:10 000 or less) mapping of environmental features / attributes is required, along with detailed land-use, natural resource management guidelines and heritage resource management guidelines where applicable (e.g. requiring detailed EMFs or EMPs of their own) (**Figure 20**).

In terms of the above, the user should, by zooming in to cadastral-level, be able to assess the spatial information described in this EMF with regard to:

- Land-uses and activities that may or may not have a significant impact on the environment;
- The likelihood that Environmental Authorisation will be required for activities listed in terms of the 2010 NEMA EIA Regulations, and the likelihood that development approvals will be required in terms of the provisions of other legislation (e.g. NWA, NEM:ICMA), or in terms of specific local management plans (e.g. estuary or catchment management plans); and
- The kinds of developments and land-uses that are undesirable in the Municipal Area, or in a specific part of the Municipal Area (SPC) (refer to **Table 11** above).

Note that the user should also consult the relevant key legislation and source documents, for more detail if required. Note further that ground-truthing of the mapped biodiversity information contained in the EMF will be required by the applicant (by undertaking specialist studies), during the undertaking of the applicable development application in terms of the NEMA.

6.2 LIMITATIONS OF THE MAPPED DATA IN THIS REPORT,

It is important to note that the spatial accuracy of the information presented is inherently limited by the accuracy of the biodiversity databases used to develop the various maps. Mapping accuracy varies from approximately 1:5 000 through to about 1:20 000 scales. More importantly, the information content of the CBA map (**Figure 12**), which informs the 2011 NBA Composite Map (**Figure 16**) is limited by the depth of knowledge on the distribution of biodiversity in the planning domain.

Much of the information used to define CBA's is based on broad scale surrogates for biodiversity pattern and process, especially for site level assessments. As such, there is a need to supplement (in particular) the CBA map, and the NBA Composite Map with site visits and specialist inputs (i.e. ground-truthing and mapping at a 1: 10 000 scale or larger).[115]

Due to the limitations of the mapped data, the EMF does not replace the use of NEMA for determining whether or not development activities will require a Basic Assessment or a full Scoping and EIA process in terms of the NEMA.

PART 7: EMF IMPLEMENTATION AND DOCUMENT REVIEW

7.1 ROLES AND RESPONSIBILITIES

This EMF will be implemented by the Overstrand Local Municipality, with the support of the Overberg District Municipality, the DEA&DP and the DEA, in line with the IDP, SDF, and the Overstrand Towards 2050 IDF documents. The individual roles of these authorities are discussed below. More detail on the individual tasks and responsibilities of the Local and District Municipalities, Provincial and National Departments and Agencies, and of the public is provided in **Paragraphs 7.1.1 to 7.1.4** below.[116]

7.1.1 The Overstrand Municipality

As the initiator of the EMF and as the authority with responsibility for the Municipal Area to which the EMF is applicable, the Overstrand Municipality will be responsible for coordinating and managing the EMF, which involves:

- Creating awareness among all relevant authorities, key stakeholders, and the general public regarding the availability, purpose and use of the EMF.
- Providing a liaison officer to attend to any queries that stakeholders may raise regarding the EMF. This function could be located in the EMS and/or Municipal Planning Department, to ensure that there is synergy between the IDP, SDF and EMF processes.
- Consulting the EMF before commenting on or authorising land-use applications (whether they are received from private individuals or from other authorities), or the next generation SDFs and/or IDPs and/or other strategic planning documents.
- Providing access to the GIS-based spatial information on request, and keeping a database of stakeholders who have received such information / data.
- Actively improving and updating the EMF and the GIS-based maps / spatial data by following the recommendations contained in Paragraph 7.2 below.
- Disseminating information about the updated EMF for public comment.

Since this EMF is intended to guide the location of new development, strategic land-use planning, natural resource management and conservation, and decision making, the success thereof depends on its efficient implementation.

To ensure efficient implementation, the Overstrand Municipality needs to provide appropriate EMF training to the relevant EMS and planning officials who are involved in administering the EMF, commenting on proposed developments in the Municipal Area and making decisions on land-use applications. Whilst training should focus on the use of the EMF as a decision support tool, the EMF should also be used as a mechanism to build the capacity of officials responsible for natural resource management and land-use decision making.

New staff should be trained in the use of the EMF as part of their induction, and it is recommended that all staff making use of the EMF receive a “refresher” training session annually. This should also assist in identifying any shortcomings of, or difficulties experienced in implementing the EMF, which will serve to inform future updates thereof.

7.1.2 Provincial Departments and Agencies

Provincial Government Departments (such as DEA&DP, Western Cape Department of Agriculture, and Heritage Western Cape) and agencies (such as CapeNature and SANBI) should support and cooperate with the Overstrand Municipality in the implementation of the EMF by:

- Consulting the EMF when reviewing Environmental Impact Assessments or before commenting on or authorising land-use applications (whether they are received from private individuals or other authorities) or SDFs and/or IDPs and/or other strategic planning documents.
- Assisting the Overstrand Municipality in improving the database of the EMF by collecting and / or passing on information such as new systematic biodiversity planning information.
- Providing technical support (e.g. GIS support) to the Overstrand Municipality if required.
- Encourage the Overstrand Municipality to use the EMF, e.g. by ensuring that reference is made to the EMF in comments provided on land-use applications.
- Providing input into and reviewing updated versions of the EMF.

7.1.3 National Departments

Relevant National Departments (such as DEA, DWA, Department of Agriculture, Forestry and Fisheries and the South African Heritage Resources Agency) also need to provide support to the Overstrand Municipality in the implementation of the EMF by:

- Consulting the EMF when commenting on or authorising policies or applications at a national, provincial or local level.
- Assisting the Overstrand Municipality in improving the database of the EMF by collecting and / or passing on information such as new systematic biodiversity planning information.
- Encourage the Overstrand Municipality to use the EMF, e.g. by ensuring that reference is made to the EMF in comments provided on land-use applications before the national authority.
- Providing input into and reviewing updated versions of the EMF.

7.1.4 Public

The public, which includes individual stakeholders (such as landowners), their representative bodies (such as Farmers' Associations or Irrigation Boards, Home Owners Associations, Rate-Payers Associations), developers and their planning and environmental consultants, NGOs and other organisations, have an important on-going role to play in the EMF process, with roles and responsibilities including:

- Actively using the EMF to determine whether proposed land-uses may or may not be suitable for the specific geographic area.
- Querying the EMF and in particular its management guidelines with respect to activities currently taking place, to ensure that environmental management is improved and the impact on the environment from existing activities is minimised.
- Assisting the Overstrand Municipality in improving the database of the EMF by collecting and / or passing on information such as new systematic biodiversity planning information.
- Engaging with the Overstrand Municipality EMS or Planning departments regarding queries and comments on the EMF, or to obtain copies of the EMF once available.
- Commenting on future versions of the EMF as they become available.

The Overstrand Municipality should assist the public, stakeholders, developers, NGOs and other organisations in the use of the EMF, and in particular the GIS-based maps / spatial data.

7.2 EMF UPDATING

This EMF is to remain a live document that will need to be updated on a regular basis to ensure that it remains relevant given the changing environmental and socio-economic conditions and availability of new information in the Municipal Area. Changes to the EMF must be subject to a public participation process as determined by the EMF Regulations of 2010.

7.2.1 Review Cycle

The EMF must be a dynamic document and should therefore be reviewed periodically, at which stage:

- The respective data layers making up the Municipal GIS database must be replaced with the new or improved data on environmental attributes contained in the EMF.
- Management guidelines should be updated to incorporate any new relevant guidelines and eliminate any guidelines that have become redundant.
- The desirability of land-uses in areas characterised by the individual environmental attributes should be reviewed in line with possible policy changes or as a result of difficulties encountered in the application of the EMF.
- Land-use definitions and associated activities listed in the EIA Regulations should be reviewed, to reflect any changes to the EIA Regulations.
- Detailed mapping (at a scale of 1:10 000 or larger – i.e. to an individual property scale) and recommendations for land-use and conservation within the identified Environmental Management Focus Areas should be included.

This update process should be guided by the Overstrand Municipality's EMS, Planning and GIS departments.

It is recommended that the EMF be formally reviewed and updated in alignment with the review cycle of the Municipal IDF and/or SDF documents (i.e. every 5 years). Additional reviews should be undertaken during scheduled reviewing of the IDF document, which this EMF informs and is appended to.

If the spatial extent of any of the environmental attributes contained in the EMF changes significantly prior to that of the above review cycles (e.g. significant extension or reduction of cultivated areas, updates to CBA areas, significant loss of natural vegetation or change in status of FEPAs), the respective EMF layer(s) should be updated earlier.

This EMF, once adopted, must be taken into account in all future reviews of the SDF, IDP and other planning documents. Specifically, any changes in land-use proposed in the SDF, e.g. location of new developments or protected / open space areas, must be checked for compatibility with the EMF to avoid placing proposed developments in areas identified as unsuitable in the EMF. This should increase the efficiency with which the Overstrand Municipality will be able to execute their spatial planning, as projects are less likely to be held up by lengthy approval processes or to require costly engineering solutions, should the planning of such development have taken the recommendations of the EMF into account.

7.3 CONCLUSION

This report provides, *inter alia*, an overview of the current state of the environment within the Overstrand Municipal Area (including biophysical features, socio-economic characteristics, challenges and opportunities), provides a strategic EMF (including environmental sensitivities, environmental opportunities and constraints, sustainable land-uses and activities, guidelines for natural resources management and conservation, and a policy framework), describes the maps and spatial data that should be fed into the existing Municipal GIS-based spatial land-use decision support tool-set, and provides guidelines for the continual review and improvement of the EMF.

It is recommended that, in the short term, 1:10 000 scale (or finer-scaled) mapping of environmental features / attributes should be undertaken within the identified Environmental Management Focus Areas, along with detailed land-use, conservation and natural resource management guidelines (i.e. detailed EMFs or EMPs should be compiled for each of these Focus Areas).

Whilst, this EMF provides a basis from which to promote and guide environmentally and socially responsible development within the Overstrand Municipal Area towards 2050, more detailed planning and finer-scaled mapping in key areas should be included each time that the that EMF is formally reviewed and updated. The end goal should be the production of a cadastral (property) scale EMF, covering the entire Overstrand region.

PART 8: REFERENCE LIST

[1] **Reference:** CapeNature. 2012. What is Biodiversity? Available from http://www.CapeNature.co.za. (Accessed 15 June 2012).
[2] **Reference:** Adapted from: Glavovic, B. 2000. Our Coast, Our Future. A New Approach to Coastal Management in South Africa. Common Ground Consulting. For the Department of Environmental Affairs and Tourism, Pretoria. 134 p.
[3] **Reference:** Van Niekerk, L. and Turpie, J.K. (eds) (2012). South African National Biodiversity Assessment 2011: Technical Report. Volume 3: Estuary Component. CSIR Report Number CSIR/NRE/ECOS/ER/2011/0045/B. Council for Scientific and Industrial Research, Stellenbosch
[4] **Reference:** Van Niekerk, L. and Turpie, J.K. (eds) (2012). South African National Biodiversity Assessment 2011: Technical Report. Volume 3: Estuary Component. CSIR Report Number CSIR/NRE/ECOS/ER/2011/0045/B. Council for Scientific and Industrial Research, Stellenbosch
[5] **Reference:** Adapted from: Glavovic, B. (2000). Our Coast, Our Future. A New Approach to Coastal Management in South Africa. Common Ground Consulting. For the Department of Environmental Affairs and Tourism, Pretoria. 134 p.
[6] **Reference:** Overstrand Municipality. (2012). Integrated Development Plan 2012 – 2017. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 17 August 2012).
[7] **Reference:** DEA (2010), Environmental Management Frameworks in terms of the EMF Regulations of 2010, Integrated Environmental Management Guideline Series 6, Department of Environmental Affairs (DEA), Pretoria, South Africa
[8] **Reference:** SRK Consulting. (2011). Environmental Management Framework: Cape Winelands District Municipality Environmental Management Framework Report: 2012 to 2017. Draft. Report No. 410438/4. Available from http://www.srk.co.za/en/page/za-cape-winelands-district-municipality-emf. (Accessed 4 February 2013).
[9] **Reference:** DEA (2010). National Environmental Management Act, 1998 (Act No. 107 of 1998). Environmental Management Framework Regulations. Government Notice No. R 547. Government Gazette No. 33306 of 18 June 2010.
[10] **Reference:** Drakenstein Municipality (2010). Environmental Management Framework for the Drakenstein Municipality. Working Draft – Version 3.
[11] **Reference:** DEA (2010). Environmental Management Frameworks in terms of the EMF Regulations of 2010. Integrated Environmental Management Guideline Series 6. Department of Environmental Affairs (DEA), Pretoria, South Africa.
[12] **Reference:** Drakenstein Municipality (2010). Environmental Management Framework for the Drakenstein Municipality. Working Draft – Version 3.
[13] **Reference:** DEA (2010), Environmental Management Frameworks in terms of the EMF Regulations of 2010, Integrated Environmental Management Guideline Series 6, Department of Environmental Affairs (DEA), Pretoria, South Africa
[14] **Reference:** SRK Consulting. (2011). Environmental Management Framework: Cape Winelands District Municipality Environmental Management Framework Report: 2012 to 2017. Draft. Report No. 410438/4. Available from http://www.srk.co.za/en/page/za-cape-winelands-district-municipality-emf. (Accessed 4 February 2013).
[15] **Reference:** SRK Consulting. (2011). Environmental Management Framework: Cape Winelands District Municipality Environmental Management Framework Report: 2012 to 2017. Draft. Report No. 410438/4. Available from http://www.srk.co.za/en/page/za-cape-winelands-district-municipality-emf. (Accessed 4 February 2013).
[16] **Reference:** Driver A., Sink, K.J., Nel, J.N., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. & Maze, K. (2012). National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria.
[17] **Reference:** Statistics South Africa. (2012). Census 2011 Municipal Fact Sheet. Report no.: 03-01-58. Pretoria.
[18] **Reference:** Overstrand Municipality. (2012). Integrated Development Plan 2012 – 2017. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 17 August 2012).
[19] **Reference:** Overstrand (2007). Overstrand Local Economic Development Strategy. Available from http://www.overstrand.gov.za/media/Overstrand_LED.pdf. (Accessed 14 February 2013).
[20] **Reference:** Overstrand Municipality. (2012). Integrated Development Plan 2012 – 2017. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 17 August 2012).

[21] **Reference:** Overstrand Municipality (2013). 2011/2012 Annual Report. "Centre of Excellence". Final: 25 March 2013. Available from http://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CDgQFjAA&url=http%3A%2F%2Fwww.overstrand.gov.za%2Findex.php%3Foption%3Dcom_docman%26task%3Ddoc_download%26gid%3D1838%26Itemid%3D159&ei=UDp6UaSADIS1hAeek4H4DA&usg=AFQjCNH5CS23-uInNBiDjTKzk2-UMEMfIg&bvm=bv.45645796,d.ZG4. (Accessed 26 April 2013).
[22] **Reference:** Overstrand (2007). Overstrand Local Economic Development Strategy. Available from http://www.overstrand.gov.za/media/Overstrand_LED.pdf. (Accessed 14 February 2013).
[23] **Reference:** Overstrand Municipality. (2012). Integrated Development Plan 2012 – 2017. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 17 August 2012).
[24] **Reference:** Overstrand Municipality. (2012). Integrated Development Plan 2012 – 2017. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 17 August 2012).
[25] **Reference:** Overstrand Municipality. (2012). Integrated Development Plan 2012 – 2017. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 17 August 2012).
[26] **Reference:** Overstrand Municipality. (2010). The Impact of Tourism on the Overstrand Economy. Baseline Impact Assessment. Available from http://www.overstrand.gov.za/media/Impact_of_Tourism_2010.pdf. (Accessed 12 April 2013).
[27] **Reference:** Unesco. (2013). The MAB Programme. MAB Biosphere Reserves Directory. Biosphere Reserves Information. South Africa, Kogelberg. Available from http://www.unesco.org/mabdb/br/brdir/directory/biores.asp?mode=all&code=SAF+01. (Accessed 12 April 2013).
[28] **Reference:** Overstrand Municipality. (2012). Region. Available from http://www.overstrand.gov.za/index.php?option=com_content&task=blogcategory&id=14&Itemid=43. (Accessed 21 August 2012).
[29] **Reference:** Overstrand Municipality. (2012). Integrated Development Plan 2012 – 2017. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 17 August 2012).
[30] **Reference:** SAExplorer. (2012). Hermanus Climate. Available from http://www.saexplorer.co.za/south-africa/climate/hermanus_climate.asp. (Accessed 3 August 2012).
[31] **Reference:** World Weather and Climate Information. (2014). Available from http://www.weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine,hermanus,South-Africa . (Accessed 24 February 2014).
[32] **Reference:** Overstrand Municipality. (2012). Integrated Waste Management Plan. Third Edition. Jan Palm Consulting Engineers. PO Box 931 Brackenfell 7561.
Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 16 November 2012).
[33] **Reference:** SANBI. (2012). National Biodiversity Assessment 2011: Top Twelve Highlights. International Day for Biodiversity 22 May 2012. http://bgis.sanbi.org/nba/NBA2011_%20Top12Highlights_%20InternationalDayBiodiversity.pdf. (Accessed 12 April 2013).
[34] **Reference:** SANBI. (2013). PBPTW: Overstrand Municipality River Corridors. Available from http://bgis.sanbi.org/PBPTW/Overstrand/riverCorridors.asp. (Accessed 12 April 2013).
[35] **Reference:** SANBI. (2013). National Freshwater Ecosystem Priority Areas Map. Available from http://bgis.sanbi.org/nfepa/NFEPAmap.asp . (Accessed 12 April 2013).
[36] **Reference:** Turpie, J.K., Clark, B.M., Hutchings, K., Orr, K.K. & De Wet, J. (2009). Ecology, Value and Management of the Kogelberg Coast. WWF CAPE Marine Programme. Zoology Department, University of Cape Town, Anchor Environmental Consultants CC. Rhodes Gift, South Africa. Available from http://www.anchorenvironmental.co.za/Documents/Pdfs/Kogelberg%20CIMP/Ecology,%20Value%20and%20Managment%20of%20the%20%20Kogelberg%20Coast%20-Final.pdf. (Accessed 16 August 2012).
[37] **Reference:** Turpie J, Clarke B. 2007. C.A.P.E. Regional Estuarine Management Programme. Development of a Conservation Plan for Temperate South African Estuaries on the Basis of Biodiversity Importance, Ecosystem Health and Economic Costs and Benefits. Final Report. Anchor Environmental Consultants CC. Available from http://www.anchorenvironmental.co.za/Documents/Pdfs/Cape%20Estuaries%20Cons%20Plan%20Final%20Report.pdf. (Accessed 12 April 2013.
[38] **Reference:** Klein River Estuary Forum. (2010). Mouth Management Plan for the Klein River Estuary. Available from http://www.overstrandestuaries.co.za/index.php/klein-4/management-plan. (Accessed 12 April 2013).

[39] **Reference:** Bot River Estuary Forum. (2010). Mouth Management Plan for the Bot-Kleinmond Estuary System. Available from http://www.overstrandestuaries.co.za/images/stories/Bot-Mouth_Management_Plan.pdf. (Accessed 12 April 2013).
[40] **Reference:** Van Niekerk, L. and Turpie, J.K. (eds) (2012). South African National Biodiversity Assessment 2011: Technical Report. Volume 3: Estuary Component. CSIR Report Number CSIR/NRE/ECOS/ER/2011/0045/B. Council for Scientific and Industrial Research, Stellenbosch.
[41] **Reference:** Matthews, S. (2013). Overstrand Estuaries. News. Available from http://www.overstrandestuaries.co.za/index.php/news. (Accessed 27 March 2013).
[42] **Reference:** Turpie J, Clarke B. 2007. C.A.P.E. Regional Estuarine Management Programme. Development of a Conservation Plan for Temperate South African Estuaries on the Basis of Biodiversity Importance, Ecosystem Health and Economic Costs and Benefits. Final Report. Anchor Environmental Consultants CC. Available from http://www.anchorenvironmental.co.za/Documents/Pdfs/Cape%20Estuaries%20Cons%20Plan%20Final%20Report.pdf. (Accessed 12 April 2013.
[43] **Reference:** Bryant, J. (2008). Hermanus harnesses water supply from record yield borehole. Science in Africa - Africa's First On-Line Science Magazine. Available from http://www.scienceinafrica.co.za/2008/august/borehole.htm. (Accessed 22 August 2012).
[44] **Reference:** Department of Environmental Affairs. (2012). National Environmentak Management Integrated Coastal Management Act, 2008 (Act No. 24 of 2008). Invitation to Comment on the Draft National Estaurine Management Protocol. Government Gazette No. 336. 4 May 2012.
[45] **Reference:** Bryant, J. (2008). Hermanus harnesses water supply from record yield borehole. Science in Africa. Africa's First On-Line Science Magazine. August 2008. Available from http://www.scienceinafrica.co.za/2008/august/borehole.htm. (Accessed 22 August 2012).
[46] **Reference:** Mucina, L., Rutherford, M.C. (eds.) (2006). The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19, South African National Biodiversity Institute, Pretoria, 2006. 807pp.
[47] **Reference:** SANBI. (2013). PBPTW: Overstrand Municipality Special Habitats. Available from http://bgis.sanbi.org/PBPTW/Overstrand/specialHabitats.asp. (Accessed 12 April 2013).
[48] **Reference:** Platbos (2012). Platbos Forest Africa's Southernmost Forest. Available from http://www.platbos.co.za/platbos_forest.html. (Accessed 15 April 2013).
[49] **Reference:** Holness S, Bradshaw P (2009). Overberg Critical Biodiversity Areas and Ecological Support Areas. Available from http://bgis.sanbi.org/overberg/CBAs.asp. (Accessed 8 February 2013).
[50] **Reference:** Cape. (2011). Cape Action for People and the Environment. What is Cape? Available from http://www.capeaction.org.za/index.php?C=land&P=4. (Accessed 15 April 2013).
[51] **Reference:** Cape. (2011). Cape Action for People and the Environment. Home. Available from http://www.capeaction.org.za/index.php?C=enable. (Accessed 15 April 2013).
[52] **Reference:** Wall, D., Rabbinge, R., Gallopin, G., Khoday, K., Lewis, N., Lubchenco, J., Melillo, J., Schmidt-Traub, G., Sombilla, M., Cimarrusti, L., La Vina, T., Munasinghe, M., Rusong,. (2006). Millennium Ecosystem Assessment. Chapter 19. Implications for Achieving the Millennium Development Goals. Available from http://www.maweb.org/documents/document.324.aspx.pdf. (Accessed 26 October 2012).
[53] **Reference:** Baumann, N. (2009). Overstrand Heritage Survey: Draft report. The Overstrand Heritage Landscape Group. Available from http://www.overstrand.gov.za. (Accessed 12 February 2013).
[54] **Reference:** Baumann, N. (2009). Overstrand Heritage Survey: Draft report. The Overstrand Heritage Landscape Group. Available from http://www.overstrand.gov.za. (Accessed 12 February 2013).
[55] **Reference:** Oberholzer, B. and Winter, S. (2013). Western Cape PSDF: Heritage and Scenic Resources: Inventory and Policy Framework.. Available from http://eadp-westerncape.kznsshf.gov.za/sites/default/files/news/files/2013-10-15/heritage-and-scenic-resources-study-presentation.pdf. (Accessed 10 January 2014).
[56] **Reference:** Overstrand Municipality. (2012). Region. Available from http://www.overstrand.gov.za/index.php?option=com_content&task=blogcategory&id=14&Itemid=43. (Accessed 21 August 2012).
[57] **Reference:** Baumann, N. (2009). Overstrand Heritage Survey: Draft report. The Overstrand Heritage Landscape Group. Available from http://www.overstrand.gov.za. (Accessed 12 February 2013).
[58] **Reference:** Overstrand Municipality. (2012). Region. Available from http://www.overstrand.gov.za/index.php?option=com_content&task=blogcategory&id=14&Itemid=43. (Accessed 21 August 2012).
[59] **Reference:** Turpie, J.K., Clark, B.M., Hutchings, K., Orr, K.K. & De Wet, J. (2009). Ecology, Value and Management of the Kogelberg Coast. WWF CAPE Marine Programme. Zoology Department, University of Cape Town, Anchor Environmental Consultants CC. Rhodes Gift, South Africa. Available from http://www.anchorenvironmental.co.za/Documents/Pdfs/Kogelberg%20CIMP/Ecology,%20Value%20and%20Managment%20of%20the%20%20Kogelberg%20Coast%20-Final.pdf. (Accessed 16 August 2012).
[60] **Reference:** Van Weele, G. & Maree, G. (2013). State of Environment Outlook Report for the Western Cape Province. Introductory Matter – For public comment.

Available from http://eadp.westerncape.gov.za/sites/default/files/news/files/2013-06-04/state-of-environment-outlook-report-introductory-matter.pdf. (Accessed 15 January 2013).

[61] **Reference:** Driver A., Sink, K.J., Nel, J.N., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. & Maze, K. (2012). National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria.

[62] **Reference:** Department of Water Affairs. (2012). Integrated Water Resource Management. Available from http://www.dwaf.gov.za/iwrm/contents/about/what_is_iwrm.asp. (Accessed 26 November 2011).

[63] **Reference:** Eskom CFL CDM Project. (2011). COP17 fact sheet. Available from http://www.eskom.co.za/content/The%20Eskom%20National%20Efficient%20Lighting%20Programme%20Compact%20Fluorescent%20Lamps%20Clean%20Development%20Mechanism%20Project.pdf. (Accessed 26 November 2012).

[64] **Reference:** Clinton Foundation (2010). Clinton Climate Initiative Energy Efficiency Building Retrofit Program (EEBRP). Available from http://www.cityenergy.org.za/files/resources/networkmtngs/seed_cesu_2010/Clinton%20Climate%20Initiative%20-%20Building%20Efficiency%20Retrofit%20Programme%20in%20CoJ.pdf. (Accessed 26 November 2012).

[65] **Reference:** Energie-Cités, (2008). Development of Bicycle Mobility: Bike Office - Parma, Italy. Available from http://www.energy-cities.eu/db/parma_575_en.pdf. (Accessed 26 November 2012).

[66] **Reference:** City of Parma, Italy (2012). Personal Observations. September 2012.

[67] **Reference:** Wikipedia. (2012). Electric Vehicle Network. Available from http://en.wikipedia.org/wiki/Electric_vehicle_network. Accessed 26 November 2012.

[68] **Reference:** Overstrand Municipality. (2012). Integrated Waste Management Plan. Third Edition. Jan Palm Consulting Engineers. PO Box 931 Brackenfell 7561. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 16 November 2012).

[69] **Reference:** Department of Water Affairs. (2012). Integrated Water Resource Management. Available from http://www.dwaf.gov.za/iwrm/contents/about/what_is_iwrm.asp. (Accessed 26 November 2011).

[70] **Reference:** The Presidency. Republic of South Africa. Department of Performance Monitoring and Evaluation. (2012). Available from http://www.thepresidency.gov.za/pebble.asp?relid=1906. (Accessed 8 October 2012).

[71] **Reference:** The Presidency. Republic of South Africa. National Planning Comission (2011). Western Cape Provincial Spatial Development Framework. Available from http://www.npconline.co.za/medialib/downloads/home/NPC%20National%20Development%20Plan%20Vision%202030%20-lo-res.pdf. (Accessed 14 January 2014).

[72] **Reference:** National Department of Environmental Affairs (2011). National Strategy for Sustainable Development and Action Plan (NSSD 1) 2011–2014. Available from: http://www.environment.gov.za/?q=content/documents/strategic_documents. (Accessed 10 October 2012).

[73] **Reference:** National Department of Environmental Affairs (2008). People - Planet - Prosperity: A National Framework for Sustainable Development in South Africa. Available from http://www.environment.gov.za/?q=content/documents/strategic_docs/national_framework_sustainable_development. (Accessed 11 October 2012.

[74] **Reference:** Western Cape Government (2008). Western Cape Provincial Spatial Development Framework. Available from http://www.westerncape.gov.za/eng/pubs/public_information/W/186589. (Accessed 11 October 2012).

[75] **Reference:** Van Weele, G. & Maree, G. (2013). State of Environment Outlook Report for the Western Cape Province. Introductory Matter – For public comment. Available from http://eadp.westerncape.gov.za/sites/default/files/news/files/2013-06-04/state-of-environment-outlook-report-introductory-matter.pdf. (Accessed 15 January 2013).

[76] **Reference:** Department of Water Affairs. (2012). Integrated Water Resource Management. Available from http://www.dwaf.gov.za/iwrm/contents/about/what_is_iwrm.asp. (Accessed 26 November 2011).

[77] **Reference:** Provincial Government of the Western Cape. (2011). Western Cape Integrated Water Resources Management Action Plan 2011. Executive Summary: Status Quo Report. Available from http://www.westerncape.gov.za/other/2011/8/final_draft_exec_summary_report_2011.pdf. (Accessed 26 November 2012).

[78] **Reference:** Mkuna, Y., Mitchell, K., Stander, H. (2013). Update of the Transport Register, Transport Needs Assessment, Transport Improvement Proposals and Implementation Budget & Programme for the Overberg District Municipality's Integrated Transport Plan. March 2013. Final Draft. Available from http://www.odm.org.za/wp-content/uploads/2013/08/Overberg%20District%20Municipality%27s%20Intergrated%20Transport%20Plan.pdf. (Accessed 15 January 2013).

[79] **Reference:** Overberg District Municipality. (2006). Overberg District Municipality Integrated Transport Plan. April 2006. Draft Report.
Available from
http://www.westerncape.gov.za/text/2006/6/overberg_intergrated_transport_plan__draft_2006.pdf (Accessed 15 January 2013).
[80] **Reference:** Department of Environmental Affairs and Development Planning. (2002). Guideline for the Management of Development on Mountains, Hills and Ridges of the Western Cape. Available from http://www.westerncape.gov.za/text/2003/mountain_hills_and_ridges_guideline.pdf (Accessed 29 April 2013).
[81] **Reference:** Turpie J, Clarke B. 2007. C.A.P.E. Regional Estuarine Management Programme. Development of a Conservation Plan for Temperate South African Estuaries on the Basis of Biodiversity Importance, Ecosystem Health and Economic Costs and Benefits. Final Report. Anchor Environmental Consultants CC. Available from
http://www.anchorenvironmental.co.za/Documents/Pdfs/Cape%20Estuaries%20Cons%20Plan%20Final%20Report.pdf. (Accessed 12 April 2013.
[82] **Reference:** SANBI. (2013). PBPTW: Overstrand Municipality Ecosystem Status. Available from http://bgis.sanbi.org/PBPTW/Overstrand/ecosystemStatus.asp. (Accessed 12 April 2013).
[83] **Reference:** CAPE – WWF Marine Programme. (2010). Kogelberg Coast Integrated Management Plan. Zoology Department, University of Cape Town, Anchor Environmental Consultants CC. Rhodes Gift, South Africa. Available from
http://www.anchorenvironmental.co.za/index.php?option=com_content&view=article&id=27&Itemid=29. (Accessed 15 April 2013).
[84] **Reference:** CAPE – WWF Marine Programme. (2010). Kogelberg Coast Integrated Management Plan. Zoology Department, University of Cape Town, Anchor Environmental Consultants CC. Rhodes Gift, South Africa. Available from
http://www.anchorenvironmental.co.za/index.php?option=com_content&view=article&id=27&Itemid=29. (Accessed 15 April 2013).
[85] **Reference:** Breetzke, T., Van Weele G., Mather, A., Moore, L. (2012). The Establishment of Coastal Set-back Lines for the Overberg District. Report no. E02.CPT.000209. SSI, P.O. Box 867, Gallo Manor 2052, Gauteng, South Africa.
[86] **Reference:** CAPE – WWF Marine Programme. (2010). Kogelberg Coast Integrated Management Plan. Zoology Department, University of Cape Town, Anchor Environmental Consultants CC. Rhodes Gift, South Africa. Available from
http://www.anchorenvironmental.co.za/index.php?option=com_content&view=article&id=27&Itemid=29. (Accessed 15 April 2013).
[87] **Reference:** SANBI. (2013). PBPTW: Overstrand Municipality Special Habitats. Available from http://bgis.sanbi.org/PBPTW/Overstrand/specialHabitats.asp. (Accessed 12 April 2013).
[88] **Reference:** Matthews, S. (2013). Overstrand Estuaries. Setback Line For Estuaries. Available from http://www.overstrandestuaries.co.za/images/stories/Setback_line_for_estuaries.pdf. (Accessed 27 March 2013).
[89] **Reference:** Turpie J, Clarke B. 2007. C.A.P.E. Regional Estuarine Management Programme. Development of a Conservation Plan for Temperate South African Estuaries on the Basis of Biodiversity Importance, Ecosystem Health and Economic Costs and Benefits. Final Report. Anchor Environmental Consultants CC. Available from
http://www.anchorenvironmental.co.za/Documents/Pdfs/Cape%20Estuaries%20Cons%20Plan%20Final%20Report.pdf. (Accessed 12 April 2013.
[90] **Reference:** Holness, S., Bradshaw, P. (2010). Critical Biodiversity Areas of the Overberg District Municipality. Park Planning and Development Unit, SANParks. Available from
http://bgis.sanbi.org/Overberg/Overberg_DM_Conservation_Planning_Report.pdf. (Accessed 15 April 2013).
[91] **Reference:** Holness S, Bradshaw P (2009). Overberg Critical Biodiversity Areas and Ecological Support Areas. Available from http://bgis.sanbi.org/overberg/CBAs.asp. (Accessed 8 February 2013).
[92] **Reference:** Western Cape Government. (2009). Western Cape Provincial Spatial Development Framework. Rural Land Use Planning & Management Guidelines. Available from
http://www.westerncape.gov.za/eng/pubs/public_info/W/186589. (Accessed 15 April 2013).
[93] **Reference:** C.A.P.E: Cape Action for People and the Environment. Available from
http://www.capeaction.org.za/. (Accessed 26 March 2013). Component 1 of the C.A.P.E programme focusses on institutional strengthening, whilst Component 5 is about establishing the foundations of the biodiversity
[94] **Reference:** Overstrand Municipality. (2012). Integrated Development Plan 2012 – 2017. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 17 August 2012).
[95] **Reference:** CAPE – WWF Marine Programme. (2010). Kogelberg Coast Integrated Management Plan. Zoology Department, University of Cape Town, Anchor Environmental Consultants CC. Rhodes Gift, South Africa. Available from

http://www.anchorenvironmental.co.za/index.php?option=com_content&view=article&id=27&Itemid=29. (Accessed 15 April 2013).
[96] **Reference:** Overstrand Municipality. (2012). Integrated Development Plan 2012 – 2017. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 17 August 2012).
[97] **Reference:** SANBI. (2013). PBPTW: Overstrand Municipality River Corridors. Available from http://bgis.sanbi.org/PBPTW/Overstrand/riverCorridors.asp. (Accessed 12 April 2013).
[98] **Reference:** CapeNature. (2012). Working for Wetlands. Available from http://www.capenature.co.za/projects.htm?sm%5Bp1%5D%5Bcategory%5D=683&sm%5Bp1%5D%5Bpersistent%5D=1. (Accessed 15 April 2013).
[99] **Reference:** Matthews, S. (2013). Overstrand Estuaries. News. Available from http://www.overstrandestuaries.co.za/index.php/news. (Accessed 27 March 2013).
[100] **Reference:** Matthews, S. (2013). Overstrand Estuaries. Available from http://www.overstrandestuaries.co.za. (Accessed 27 March 2013).
[101] **Reference:** CAPE Estuaries Management Programme. Uilkraals Estuary Draft Management Plan. Available from http://www.anchorenvironmental.co.za/index.php?option=com_content&view=article&id=27&Itemid=29. (Accessed 27 March 2013). Anchor Environmental Consultants CC. Suite 8, Steenberg House, Steenberg Office Park, Steenberg Rd, Tokai 7945, South Africa
[102] **Reference:** Matthews, S. (2013). Overstrand Estuaries. Available from http://www.overstrandestuaries.co.za. (Accessed 27 March 2013).
[103] **Reference:** The South African Sustainable Seafood Initiative (2013). Marine Protected Areas and Closed Areas: Western Cape. Available from http://wwfsassi.mobi/RecMPA_WC.aspx. (Accessed 6 May 2013).
[104] **Reference:** WWF South Africa. 2009. Bettys Bay MPA. Available from http://www.wwf.org.za/what_we_do/marine/mpas/our_mpa_s/?1281/Bettys-Bay-MPA. (Accessed 15 April 2013).
[105] **Reference:** The South African Sustainable Seafood Initiative (2013). Marine Protected Areas and Closed Areas: Western Cape. Available from http://wwfsassi.mobi/RecMPA_WC.aspx. (Accessed 6 May 2013).
[106] **Reference:** CAPE – WWF Marine Programme. (2010). Kogelberg Coast Integrated Management Plan. Zoology Department, University of Cape Town, Anchor Environmental Consultants CC. Rhodes Gift, South Africa. Available from http://www.anchorenvironmental.co.za/index.php?option=com_content&view=article&id=27&Itemid=29. (Accessed 15 April 2013).
[107] **Reference:** Sink K, Holness S, Harris L, Majiedt P, Atkinson L, Robinson T, Kirkman S, Hutchings L, Leslie R, Lamberth S, Kerwath S, von der Heyden S, Lombard A, Attwood C, Branch G, Fairweather T, Taljaard S, Weerts S, Cowley P, Awad A, Halpern B, Grantham H, Wolf T. (2012). National Biodiversity Assessment 2011: Technical Report. Volume 4: Marine and Coastal Component. Available from http://bgis.sanbi.org/nba/NBA2011_TechnicalReport_Vol4Marine.pdf. (Accessed 14 January 2014).
[108] **Reference:** Baumann, N. (2009). Overstrand Heritage Survey: Draft report. The Overstrand Heritage Landscape Group. Available from http://www.overstrand.gov.za. (Accessed 12 February 2013).
[109] **Reference:** Overstrand Municipality. (2012). Integrated Waste Management Plan. Third Edition. Jan Palm Consulting Engineers. PO Box 931 Brackenfell 7561. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 16 November 2012).
[110] **Reference:** Overstrand Municipality. (2012). Integrated Waste Management Plan. Third Edition. Jan Palm Consulting Engineers. PO Box 931 Brackenfell 7561. Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 16 November 2012).WMP
[111] **Reference:** Overstrand Municipality. (2012). Executive Summary. Water Services Development Plan 2012 / 2013. Available from Available from http://new.overstrand.gov.za/index.php?option=com_docman&task=cat_view&gid=98&Itemid=159. (Accessed 19 November 2012).
[112] **Reference:** Provincial Administration of the Western Cape.1999. Bioregional Planning Framework for the Western Province. Project J3021. Plan 4: Provincial Bioregional Plan.
[113] **Reference:** CAPE – WWF Marine Programme. (2010). Kogelberg Coast Integrated Management Plan. Zoology Department, University of Cape Town, Anchor Environmental Consultants CC. Rhodes Gift, South Africa. Available from http://www.anchorenvironmental.co.za/index.php?option=com_content&view=article&id=27&Itemid=29. (Accessed 15 April 2013).
[115] **Reference:** Holness, S., Bradshaw, P. (2010). Critical Biodiversity Areas of the Overberg District Municipality. Park Planning and Development Unit, SANParks. Available from http://bgis.sanbi.org/Overberg/Overberg_DM_Conservation_Planning_Report.pdf. (Accessed 15 April 2013).

[116] **Reference:** SRK Consulting. (2011). Environmental Management Framework: Cape Winelands District Municipality Environmental Management Framework Report: 2012 to 2017. Draft. Report No. 410438/4. Available from http://www.srk.co.za/en/page/za-cape-winelands-district-municipality-emf. (Accessed 4 February 2013).