

# DEVELOP THE VULINDLELA STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) FOR THE MSUNDUZI MUNICIPALITY

**Final SEA Report** 

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# Glossary

SEA	Strategic Environmental Assessment
EIA	Environmental Impact Assessment
LAP	Local Area Plan
PSC	Project Steering Committee
РТМ	Project Team Meeting
EMF	Environmental Management Framework
SDF	Spatial Development Framework
EDTEA	KZN Department of Economic Development, Tourism and Environmental Affairs
DWS	Department of Water and Sanitation
DAFF	Department of Agriculture, Forestry and Fisheries
DOT	Department of Transport
EKZN	Ezemvelo KZN Wildlife
AMB	Area Based Manager

# 1 INTRODUCTION

# 1.1 Background and Objectives

The Msunduzi Local Municipality has commissioned SMEC to undertake a Strategic Environmental Assessment (SEA) for Vulindlela, a management area which falls under the municipality's jurisdiction **(Map 1)**. The SEA process started in October 2018 and it will be 13 months in duration.

The scope of works explains that the SEA must:

- Inform the Msunduzi Municipality about the balance between developmental, socio-economic and biophysical implications of the broad development options of the study area; and
- Identify and assess the main alternative scenarios for land use with specific reference to the Vulindlela Local Area Plan (LAP) that was developed for this area.

The SEA is therefore expected to help decision-makers understand the opportunities and risks of the strategic options for development with specific reference to the Vulindlela LAP. This must be done by collecting and translating the best available spatial information into possible futures, assessing strategic options and developing guidelines to assist strategic implementation.

The key output that the client expects from the SEA is a spatial product to support future decision-making. The scope of works explains that this product must translate the *'final most desirable land use scenario for Vulindlela'* into spatial zones with guidelines to facilitate the attainment of a *'Desired State of the Environment'* which must also include permissible limits of change for the study area. Stakeholders must be consulted with respect to the limits of change.



Map 1: Location of study area

The underlying need for the SEA is primarily driven by the following factors:

- Concern about an unprecedented growth in development pressures, encroachment onto open space, degradation
  of scarce resources, uncontrolled development and deficient data and information to make informed land use
  management decisions (particularly in Ward 39);
- The policy imperative to promote environmentally sustainable human settlement growth;
- The need for environmental strategies that are based on a comprehensive inventory of important natural resources, sensitive and valued areas that play a role in critical ecosystems, and green infrastructure that can connect people with places; and
- The need for a spatial environmental vision that could be implemented in a coordinated, consistent manner complimentary to the development vision for the area.

## 1.2 Approach and Methodology

In order to address the scope of works and the underlying needs for the SEA a conceptual framework was developed to serve as a road map for the SEA process (Figure 1). This framework underpins the methodologies and tools to be selected during the process. More detail about the strategic concepts and the spatial methodologies are contained in the Project Inception Report (2018).

## 1.3 Progress to date and purpose of this report

The project started with a public participation process to afford local stakeholders an opportunity to be informed about and to contribute to the SEA process (see next section). This was followed by an extensive literature, policy and spatial data review to obtain an understanding of the context within which the SEA is being undertaken. The review results were documented in Status Quo Report (April 2019) which also serves as the basis for further strategic and spatial analysis.

This 1<sup>st</sup> Draft SEA Report marks the beginning of the strategic assessment process and it focuses primarily on the spatial assessment of key environmental and sustainability issues in the study area.

#### Figure 1 - Conceptual Framework for the Vulindlela SEA



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# 2 STAKEHOLDER ENGAGEMENT

Input from the public and stakeholders was considered during the completion of this report. Two public meetings were held early in December 2018 to afford the public and local stakeholders an opportunity to be informed about and to contribute to the SEA process. The contributions from the public and local stakeholders, as captured during these meetings, are shown in **Map 2** below, while more detail about the public participation process are contained in the *Public Participation and Stakeholder Engagement Report* which is attached as Annexure B to this SEA Report.

The following opportunities are available for stakeholders to further engage with the SEA process:

- Through direct communication with the project team; and/or
- Through the Project Steering Committee under the management of the Msunduzi Municipality.



Map 2: Spatial community issues captured from public community meetings (2018)

The spatial community issues are summarised in **Table 1** and it translates local participant knowledge on sense of place and/or issues of value or concern in terms of economic, environmental, political and social aspects.

MAP FEATURE	DESCRIPTION (Sense of place/community significance)	WARD
Economic /planning aspects	Siyanda Temple; Shembe Site, Nazareth Baptist Church	Ward 2
	Mpumuza Clinic	Ward 2

Table 1: Sense of place and issues raised by local community members

	Simphiwe Hall, Nqabeni by P411, Mpande Community Hall	Ward 3
	Taylors Police Station	Ward 4
	Taylor Clinic	Ward 4
	Filling Station	Ward 4
	Sport Field	Ward 4
	Bottle Store	Ward 5
	Supermarket	Ward 5
	Tuck Shop	Ward 5
	Drop-in Centre	Ward 5
	Mashaka Hall	Ward 5
	Mpushini Hall	Ward 2
	Cemetery	Ward 2
	Zayaka Hall	Ward 2
	Filling Station	Ward 8
	Supermarket	Ward 7
Environmental	Grazing	Ward 1, 2, 4, 8 and 39
aspects	Quarry	Ward 4, 8 and 39
	Forest	Ward 4 and Ward 5
	Hendly Dam	Ward 4
	Agricultural Land	Ward 4, 5 and 8
$\langle \rangle$	Floods	Ward 8
	Soil Erosion	Ward 8 and 39
	Game Reserve/ Nature Reserve	Ward 39
	Mondi Forest	Ward 8
Political aspects	Hendly Forest Disputes	Ward 4
	Traditional Authority	Ward, 4, 5, 8, 39 and 7
Social aspects	Gezubuso Hall (Ihnolo) Lomphakathi	unknown

Depo Bus	Ward 4
Sportfield	Ward 4, 8 and 39
Church	Ward 5 and 8
Shembe Site	Ward 5
Supermarket	Ward 2
Community Hall	Ward 8 and 39
Drop-in Centre	Ward 8
Vulingqondo Hall	unknown
Standpipe (water supply)	Ward 39

Following the completions of the two public meetings, participants were afforded further timeframes to add comments to the process, and they were requested to further circulate the information shared in the meetings with those that may be interested but did not attend the meetings. No further comments received after this exercise.

In addition, following this participation process, main stakeholders, namely the Department of Water and Sanitation (DWS), Ezemvelo KZN Wildlife (EKZN), Department of Agriculture, Forestry and Fisheries (DAFF), Department of Transport (DoT), Amafa Heritage Agency and the Department of Economic Development and Tourism and Environmental Affairs (EDTEA), were further engaged directly with, in order to obtain input to the SEA process.Feedback was obtained from the following Departments:

- EKZN- Suggested that the uMgungundlovu District Biodiversity Sector Plan document and the associated CBA map spatial information, as well as the Protected Area spatial coverage and the Systematic Conservation Assessment for the uMgungundlovu District must be considered. These documents and spatial data were considered.
- AMAFA Heritage- Do not have any heritage for the area in geospatial format. This has been noted in the report. No other input was provided.
- DAFF- Indicated that the National Forests Act of 1998 (as amended) must be adhered and that forests must not be destroyed unless through exeptional circumstances. Furthermore, any distrurbances to trees must be undertaken via a permit. The Department further reiterated that the SEA must undertake a greening plan in the areas and also delineate/rezone forest areas for conservation purposes.
- EDTEA- indicated the following:
  - Guard against duplication of processes (the SEA is not extending the Environmental Management Framework (EMF) for the Msunduzi Municipality); Use informants (including the updated Msunduzi EMF) to consider alternative land use options and the identification of environmental risks and opportunities (particularly in Ward 39); Ensure alignment with the updated Msunduzi EMF and the District EMF (which excludes Ward 39), including the sustainability framework and guidelines; also to ensure that the new information collected for Ward 39 is aligned with this framework and guidelines; and take the Smithfield Dam on the boundary of Ward 39 (and predominantly in Impendle) into consideration. Part of this development is likely to require biodiversity offsets and a significant portion of this proposed offset area has been identified in Ward 39. This information was obtained and reviewed.

- The Department further reviewed the Draft SEA and were noted: Outcome 4 to address water production/availability and water quality, in order to address the broader benefit and parameters of water resources; appropriate wording such as resilence and ecological infrastructure must be used; the Msunduzi Municipal Sustainability Framework (within the Msunduzi SEA) and the Msunduzi Environmental must be clearly refered to; and agricultural resources must be addressed as a regional influencer. Furthermore, the Department has acknowledged that significant work has been undertaken to identify ecological importance of wetlands and rivers which will assist the municipality considerably in terms of planning.

# 3 THE VULINDLELA LOCAL AREA PLAN

The Vulindlela LAP was developed to address a complex set of human development challenges. The area has a weak economic base, insufficient infrastructure and service levels, and a growing population that is highly dependent on natural resources for their livelihoods. Uncontrolled settlement expansion has become a threat to the future sustainability of the region and human vulnerability is a key issue of sustainability concern. The LAP therefore introduced a new strategic direction to achieve the transformation and development of Vulindlela and created a new vision for the future, supported by strategic objectives, a spatial land use framework that shows the desired future land uses, and guidelines to steer development towards a more sustainable future.

While environmental management has received a high level of attention in the LAP it acknowledges the need for a refined inventory to inform the 'open space system' that was developed for the area, the protection of important ecological areas of priority through zonation in the land use scheme, and measures to control the impact of activities on sensitive attributes. This need is at the forefront of this SEA and it will refine the spatial environmental vision for Vulindlela.

The spatial frameworks of the two LAPs that were developed separately for Wards 1-9 and Wards 39 were consolidated to produce an all-inclusive spatial framework for Vulindlela. The combined land use features in **Map 3** below broadly represent the spatial vision for the area and the desired future land uses. In order to avoid unnecessary duplication, readers are encouraged to consult the respective LAP documents for a detailed explanation of these features and how they relate to the vision for the area.



Map 3: Consolidated land use features derived from the two spatial frameworks for Vulindlela

The sections that follow will demonstrate how these features were used to assess opportunities and risks, and to explore scenarios. The approach adopted in the assessment was to use the LAP features map as an input layer to reflect the reasonable foreseeable future pressures should the LAP be implemented as planned, and to assess the potential impacts of the LAP on the surrounding environment by intersecting this pressure layer with environmental sensitivity data layers.

DRAFT 01 REPORT Data SEA Report Prepared for Msunduzi Municipality

# 4 VULINDLELA IN CONTEXT

## 4.1 Strategic framework for environmental sustainability

The environmental sustainability policy context within which socio-economic growth in the Vulindlela Settlement Area must take place can be summarised into a basic Strategic Reference Framework (SRF) as shown in **Figure 2** below. This framework incorporates the key policy imperatives that apply to the project, and it takes cognisance of the *National Environmental Management Act*, 1998 (NEMA), the *National Strategy for Sustainable Development* (NSSD, 2011), and the numerous 'environmental' acts that deal with specific mediums of the environment.

Figure 2: Strategic Reference Framework showing the environmental sustainability outcomes to pursue in Vulindlela

STRATEGIC GOAL: ENVIRONMENTAL SUSTAINABILITY		
ENVIRONMENTAL OUTCOMES		
The character and quality of the <b>natural landscape</b> is managed. Land degradation and erosion is prevented, degraded land is reclaimed and the productivity of the land improves.		
Scarce non-renewable <b>agricultural resources</b> are managed and conserved and the use of such resources is sustainable.		
The <b>biological diversity</b> of the area is managed and conserved and the use of such resources is sustainable.		lge.
Water resources are sustainable in terms of biodiversity and their use as a source of water for human needs.		ate char
The management and conservation of <b>heritage resources</b> defines cultural identity, affirms diverse cultures and helps shape the national character.		es to <b>clim</b>
Waste is managed to protect the health of people and the environment.		shons
The quality of the <b>air</b> is not harmful to the health of people and the environment.		ffective re
Environmentally <b>sustainable human settlements</b> where people and nature have the capacity to adapt to change from external forces.		ш
An inclusive and <b>areener economv</b> that also benefits communities.		
A restructured <b>governance system</b> that continuously builds environmental management capacity and facilitates responsible land administration and natural resource management.	© Th	orn-Ex

The SRF represents an 'ideal future' for the Vulindlela Settlement Area and enables planning with a focus on outcomes. As such it is used in the strategic assessment to:

**DRAFT 01 REPORT** Data SEA Report Prepared for Msunduzi Municipality

- Test the contributions that the area are making to the desired policy outcomes;
- Identify the issues that matter most for making a change; and
- Facilitate strategic decisions towards more sustainable futures.

## 4.2 Local policy frameworks

The SEA must also take cognisance of the broader socio-economic and environmental needs of society as reflected in local policies, plans, programmes or strategic initiatives. The following policy instruments were further explored during the status quo investigations as they have specific relevance to the SEA:

- 1. The Msunduzi Spatial Development Framework (SDF);
- 2. The Msunduzi Integrated Development Plan (IDP);
- 3. The Msunduzi Municipality Vulindlela Local Area Plan;
- 4. The Msunduzi Municipality Environmental Management Framework (EMF);
- 5. The Msunduzi Integrated Environmental Management Policy (IEMP);
- 6. The Draft Msunduzi Ecosystem Services Plan;
- 7. The Draft Msunduzi Conservation Plan;
- 8. The Msunduzi Municipality Strategic Environmental Assessment (SEA) and Strategic Environmental Management Plan (SEMP);
- 9. The Msunduzi Municipality Climate Change Policy;
- 10. The uMgungundlovu District Biodiversity Sector Plan (2014); and
- 11. The uMgungundlovu District Environmental Management Framework (2014)

### 4.3 Regional influences

#### 4.3.1 Continuous decline in biodiversity and ecosystem resilience

The Msunduzi Municipality is located within the Maputaland-Albany-Pondoland Hotspot, a globally recognised biogeographic region of significance, which contains unusually high numbers of endemic species, as well as globally unique ecosystem diversity in terrestrial, freshwater and marine systems. At least 70% of the original habitat, which occurred in this hotspot, has already been lost. And, there is global agreement of the urgency to arrest ongoing global declines in biodiversity and to enhance the resilience of ecosystems. Given this context, Vulindlela is an important role-player in global efforts to influence the world's extinction crisis and to ensure the continued functioning of ecological and evolutionary processes that allow biodiversity to persist over time at a global scale.

The strategic significance of the regions' biodiversity is further addressed in the *uMgungundlovu District-level Biodiversity Sector Plan* (EKZNW, 2011) and the *uMgungundlovu District Environmental Management Framework* (2014) which identifies the biodiversity network that is required for the province to ensure the persistence and maintenance of habitats, ecosystems and their associated species. This network consists of protected areas and areas that are critical for biodiversity management and they have implications for spatial planning and land use management.

#### 4.3.2 Water security

Vulindlela is located in the *Southern Drakensberg Strategic Water Resource Area* (**Map 4**), a nationally recognised region of strategic importance for water security. Strategic Water Source Areas (SWRA) are those areas that supply a disproportionate amount of mean annual runoff (MAR) to a geographical region of interest, and they are important because they have the potential to contribute significantly to overall water quality and supply, supporting growth and development needs that are often a far distance away. The significance of the *Southern Drakensberg SWRA* is that it generates the greatest volume of MAR in the country (**Figure 3**, Water Research Commission, 2018) and supplies 98% of the water for Pietermaritzburg and eThekwini.



Map 4: Vulindlela is spatially linked to the Southern Drakensberg Strategic Water Resource Area



Figure 3: Strategic Water Resource Areas for surface water and groundwater (SWSAs) in South Africa, Lesotho and Swaziland (Water research Commission, 2018)

Given this context, Vulindlela is an important role-player in national efforts to influence regional water security and to ensure that the societal and economic benefits of these water resources are sustained.

The strategic significance of the regions' water resources and the implications for Vulindlela is further addressed in the *uMgungundlovu District Environmental Management Framework* (2014) which, amongst others, addresses the social-ecological importance of the district's catchments and the need to protect ecological infrastructure to improve the delivery of water-related ecosystem services, ensure development is appropriately located, and manage waste appropriately.

# 5 ISSUES ARISING FROM THE STATUS QUO ANALYSIS

# 5.1 Summary of key issues

The Strategic Reference Framework which was presented earlier in this report (see **Figure 2** in section 4.1) was used to guide the literature review and data collection process, to assess the status quo of the receiving environment, and to report results against policy themes (refer to Status Quo Report). This outcome-based approach enabled the identification of strategic issues that matter most for making a change towards environmental sustainability in Vulindlela and which therefore demand further assessment. An 'Issues Matrix', which was prepared to guide the team through the policy priorities, are attached as Annexure A to this SEA Report. The significance of strategic issues are broadly indicated in the table below:

Table 2: Strategic significance of environmental policy issues

POLICY THEME	SIGNIFICANCE
1. Natural landscape	High sensitivity
2. Agricultural resources	High sensitivity
3. Biological diversity	Very high sensitivity
4. Water resources	Very high sensitivity
5. Heritage resources	Opportunity
6. Waste	Pressure
7. Air	Not significant
8. Human settlements	Drivers-Pressures
9. Green economy	Opportunity
10. Environmental governance	Driver
11. Climate change	Driver

The sections that follow focuses on the spatial assessment of key environmental and sustainability issues in the study area.

## 5.2 Key drivers of change

The extent to which the landscape has been altered in Vulindlela can be seen in **Map 5** below. It is evident from this land cover information that the most apparent landscape alterations in the landscape have taken place due to:

- Settlements;
- Alien plant stands; and
- Changes in ecosystem conditions (e.g. indicated by the poor condition of grasslands).

Although the alteration of the landscape from natural vegetation (e.g. wilderness) to any other use may yield both positive and negative outcomes, the causes and the effects of the changes need to be better understood to inform future planning. The section that follows provides an overview of the linkages between the key underlying factors that has caused this land cover change. Thereafter the report will briefly look at the pressures associated with these land cover changes, and the relationship between the use of land and environmental quality.



Map 5: Key landscape alterations due to human factors

#### 5.2.1 Population dynamics

The status quo investigations uncovered the significant role that population dynamics play as a direct driver of land cover change. A few of the linkages between the complex population dynamics and land use/land cover change are summarised in

**Table** 3 below to underscore the likelihood that the prevailing trends will sustain the demand for resources and the patterns of resource consumption.

Table 3: Population as a key driver of change

POPULATION AS A KEY DRIVER OF CHANGE										
Factors driving change	Assumptions about the future									
<ul> <li>Population growth is occurring and it is expected to increase significantly over the next 10 years with a likelihood of doubling by 2050 (WARD 1-9);</li> <li>Poor education levels, high unemployment levels, and low household income exist and is expected to prevail into the near future.</li> <li>The number of households is expected to grow significantly in all wards over the next 10 years.</li> </ul>	<ul> <li>Anticipated increase in:</li> <li>The demand for land resources (housing and subsistence farming).</li> <li>The amount of natural resources consumed.</li> <li>The volumes of waste generated.</li> <li>The potential for environmental degradation.</li> </ul>									

### 5.2.2 Settlement arrangement

While the size of the population and factors of human well-being will drive future change in the landscape it is more important to appreciate the manner in which settlements are organised, the extent to which they have transformed and/or altered the landscape, and the patterns of change associated with these settlements. The rapid expansion of human settlements is clearly demonstrated in **Map 6** which shows the original settlement boundary as well as the growth of each settlement over the course of just 3 years. These land use change patterns are likely to continue exerting pressures on the environment over the next 10 years.



Map 6: Settlement expansion over 3 years

### 5.2.3 Institutional factors

The impacts of population growth and settlement expansion are amplified by institutional and political factors which includes the past apartheid history of the area and the post 1994 policies to redress these factors. This was further explored by comparing the concentration and distribution of the population in relation to land ownership to demonstrate that tenure and local governance plays an important role in how communities live and use land resources (**Map 7**).



Map 7: Land ownership as a driver of change

### 5.3 Key environmental pressures

The section that follows takes a brief look at the pressures associated with the external drivers of change and the relationship between the use of land and environmental quality, while more detailed consideration of existing and potential future pressures will be discussed at the thematic level.

## 5.3.1 Use of land resources and patterns of change

The manner in which the settlement pressures are distributed across the landscape (**Map 8**) and the concentration (density) of the population in certain areas will influence the functionality of the ecosystems through different pathways and make a difference to the capacity of the environment to support the population in their way of life.



Map 8: Environmental impacts associated with current settlement expansion

## 5.3.2 Anticipated future patterns of change

Whilst large areas of untransformed land still remain in the study area, these are also subject to ongoing transformation and alterations. The degradation threats associated with the current and anticipated future landscape alterations are illustrated in **Map 9** and include:

- Existing settlements: Ongoing densification and disturbance will result in further loss of biodiversity values. A reduction in fire frequency (linked to community safety) affects grassland condition, leading to encroachment by ruderals and alien invasive species.
- Areas surrounding existing settlements: Activity (linked with human traffic and livestock use) is generally very high around urban settlements. Risks of degradation are therefore high in this zone, depicted by a 150m buffer around existing settlements.
- Alien plant stands: Dense alien plant stands not only replace natural habitat, but without appropriate control, pose a threat to adjacent intact habitat.
- **Degraded habitat**: These areas already show signs of over-use and exploitation, and are likely to deteriorate further in response to growing pressures (particularly linked to grazing) and degradation from a wide range of pressures.



Map 9: Overview of key pressures that reflect current and anticipated future levels of degradation

This map was used to prepare a map indicating the existing levels of degradation and threat of further degradation (**Map 10**). This shows that pressures of ongoing degradation are very high in the study area, with few areas remaining that are outside what has been identified as moderate to high pressure zones. Even areas outside the areas mapped, are often subject to high grazing pressure and medicinal plant collection, which can slowly erode biodiversity values.



Map 10: Indication of threats of ongoing degradation in the study area.

## 5.4 Ecosystem Goods and Services

Natural habits are recognised by most people for their importance in providing habitat for wildlife and by some for their scenic and recreational values. While these are important attributes, natural ecosystems, including rivers and wetlands, generate a wide range of additional goods and services that are often overlooked and undervalued by society. These include global benefits such as carbon sequestration and regional benefits such as water purification and flood mitigation. Internationally, ecosystem goods and services are typically grouped and valued under a few common themes. These include regulating, cultural, provisioning and habitat or supporting services as outlined in **Figure 4**.



Figure 4: Overview of the range of ecosystem goods and services provided by natural systems

It is widely understood that ecosystem services, if valued as equivalent to the services of conventional infrastructure, and systematically planned for as such, can assist society in its everyday functioning, particularly in the face of intersecting climatic, ecological and infrastructural challenges. With a growing understanding of the value of natural capital, scientists have therefore started assigning economic values to natural ecosystems. In a recent global review, the value of global ecosystem services was estimated at \$125 trillion/yr<sup>1</sup> compared with a global gross domestic product of \$72 trillion/yr<sup>2</sup>. Such an assessment was also undertaken in eThekwini Municipality in 2003. The study estimated the value of the city's natural assets as R6.6 billion per annum in today's terms<sup>3</sup>, excluding the value that open space contributes to tourism.

Global estimates of the value of ecosystem services have been developed and refined for different habitats, and those developed by Costanza were used to obtain a course estimate of the values of ecosystem services provided by ecological infrastructure in the study area<sup>4</sup>. Based on these estimates, the value of natural capita is estimated at R3.2 billion per annum in today's terms. The values ascribed to wetlands are more than 6X that of other ecosystems, emphasizing the importance of wetlands as key natural assets in the study area. Thus, despite occupying less than 8% of untransformed land, close to 40% of the natural capital value is ascribed to wetlands (**Figure 5**).



Figure 5: Graph showing the breakdown in goods and services values provided by wetlands, rivers and dams, and terrestrial areas in the Vulindlela study area

<sup>1</sup> Costanza *et. al.* 2014. Changes in the global value of ecosystem services. Global Environmental Change 26 (2014) pp 152–158.

<sup>2</sup> Source: http://www.statista.com/statistics/268750/global-gross-domestic-product-gdp/

on an initial estimate of 3.1billion with an inflation Link: This is based rate of 6% applied.  $http://www.durban.gov.za/City\_Services/development\_planning\_management/environmental\_planning\_climate\_protection/Durban\_Open\_Space$ /Pages/The-value-of-D%E2%80%99MOSS-to-the-City.aspx

<sup>4</sup> This was based on the extent of untransformed landcover estimates informed by 2017 aerial photography and specifically excluded the following classes: Old fields (previously Grassland), Alien plant stands, Maintained areas and Modified land. Classes were then simplified and re-classified to Costanza's broad classes which included Grass/Rangelands; Forest – temperate; Wetlands: Swamps/Floodplains: and

Lakes/Rivers. Values were calculated for each amalgamated landcover class and increased using an inflation rate of 6% to obtain a 2019 estimate.

#### 5.4.1 Biodiversity

The sensitivity of the study area is indicated based on existing biodiversity plans for the study area (**Map 11**). This shows that much of the remaining untransformed areas are of high biodiversity value and need to be managed to ensure that biodiversity objectives are secured and not undermined through inappropriate land use or management. These areas also provide a range of goods and services to society including direct use values such as grazing for livestock and medicinal plants. These areas also serve to help regulate stream flows and storing carbon, which is important for climate regulation. Opportunities also exist to secure important areas as multi-purpose zones which not only safeguard biodiversity for future generations but also provide sustainable grazing for livestock and recreational and tourism opportunities.



Map 11: Biodiversity sensitivity based on existing biodiversity information.

#### 5.4.2 Water resources

Wetlands and rivers provide an interconnected ecological network that are regarded as sensitive to development. This is reflected by local policies and regional and local plans that seek to secure these important areas. A map indicating the sensitivity of wetlands and rivers is illustrated in **Map 12** and need to be integrated into decision making if the ecosystem services provided by these important systems are to be maintained.

Given the importance of ecosystem services provided by wetlands, an assessment was undertaken to better understand the values provided by wetlands in the study area. This assessment focussed on key regulating services including (i) water quality enhancement; (ii) sediment trapping and (iii) flood attenuation. The initial focus was on assessing the present ecological state of wetlands and rivers across the study area, since this provides some indication of the potential of wetlands to supply these services. This was followed by a rapid and largely qualitative evaluation of the demands for these services based on available information and knowledge of the study area. Once estimates of supply and demand had been obtained, these were integrated to obtain an overall indication of the importance of wetlands in providing these key ecosystem services across the study area (**Map 13**). This suggests that wetlands and rivers in the upper

reaches of the uMsunduzi River deliver the most important benefits at this stage. It is however important to recognise that all wetlands in the study area provide ecosystem services, and that this map cannot be used to ascribe benefits to individual wetlands. A brief overview of the assessment and associated outcomes is presented in the text and accompanying maps that follow.



Map 12: Sensitivity of wetlands, rivers and associated buffer zones to development.



Map 13: Ecological importance of wetlands and rivers in providing key ecosystem services in the study area.

### State of wetlands and rivers

Wetlands and rivers in the study area have been classified as either "natural" or degraded" based on whether or not these features intersected with mapped modified landcover types. This information was summarised for defined subcatchments to obtain an indication of the relative % of untransformed habitat remaining. Landcover in each subcatchment was also assessed in terms of risks to wetland condition, and was used to obtain a catchment modification score for wetland hydrology, geomorphology and water quality<sup>5</sup>. These scores were then integrated to obtain an overall indication of the potential risks of landuses in the catchment to undermine wetland condition. An integrated score was then calculated for each catchment by averaging the scores for wetland transformation and catchment risk. The result is illustrated in Map 13Map 14 and shows that wetlands are generally in a largely modified state (D PES Category), with wetlands in more undeveloped catchments classified as being moderately modified (C PES Category).

<sup>&</sup>lt;sup>5</sup> This assessment was informed by landcover intensity weightings developed for the latest Wet-Health, Level 1 assessment which is currently being finalised (Macfarlane *et.al.* in prep).



Map 14: Indicative "average" condition of wetlands in different catchments across the study area.

The potential for wetlands to provide ecosystem services was then rated for each sub-catchment by integrating the score for wetland condition with the relative extent of wetlands across different sub-catchments. This serves to highlight sub-catchments characterised by large wetlands, favouring those where wetlands remain in better ecological condition (**Map 15**).



Map 15: Map indicating the potential for wetlands to deliver ecosystem services based on wetland condition and relative extent of wetlands across sub-catchments.

#### Water quality enhancement

The demand for water quality enhancement benefits was based on the risks to water quality and the perceived demand for water across the study area. This assessment was informed by available water quality data for the study area which was synthesized by Eco-Pulse as part of the recent EMF update. For catchments where this information was lacking, water quality was based on the rating of water quality risks captured in a recent national PES/EIS Assessment<sup>6</sup>. An additional estimate of water quality risks was included based on an assessment of landcover risks to water quality, undertaken as part of the PES assessment. The maximum of these scores was then taken to provide an indication of water quality risks.

<sup>6</sup> Department of Water and Sanitation. 2014. A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Compiled by RQIS-RDM: http://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx: accessed on: 31 March 2014. The demand for this service is also dependant on the importance of downstream water resources for direct abstraction (dams) or linked to direct use for local communities. The only dam in the study area is Hazelmere dam, which is reportedly no longer used for water supply. Catchments draining towards Midmar dam are regarded as particularly important however due to the strategic importance of this dam to supply regional domestic water needs. Whilst little information was available on direct use of water from rivers and streams, available information indicates that much of Vulindlela is supplied by a water supply scheme operated by Umgeni Water. The demand for direct water use was therefore rated as low for much of the study area, but higher for sections of Ward 39 where communities are likely to have a greater reliance on rivers and springs to meet household water requirements. An integrated measure of demand was then calculated by also considering the recommended level of constraints linked to water quality risks in the study area<sup>7</sup>.

An integrated measure of demand for water quality enhancement services was then obtained by averaging the scores for water quality risk and demand and normalising these to illustrate a range of values across the study area (**Map 16**). This shows that demand is moderate in the study area relative to catchments such as the catchment associated with Mpophomeni in the North, where water quality is poor and rivers deliver water directly into Midmar dam.

<sup>7</sup> Eco-Pulse. 2018. Msunduzi Environmental Management Framework, Draft Water Quality Constraint Map. Unpublished specialist report & GIS coverage prepared by Eco-Pulse Environmental Consulting Services for SRK Consulting, February 2018.



Map 16: Perceived demand for water quality enhancement functions.

#### **Sediment retention**

The demand for sediment retention was based on erosion hazard and the risk of sediment generated by catchment landuses. Erosion hazard was informed by a dataset that provides an indication of water erosion potential of South Africa generated from a combination of the effect of cover and crop management factor - C' and physical soil erosion contributing factors of rainfall erosivity, soil erodibility, topography and vegetation cover<sup>8</sup>. An indication of the risk of sediment generated from each catchment was also obtained based on the Wet-Health assessment. These measures were then averaged and normalised to generate a map indicating the demand for sediment retention functions (**Map 17**). This suggest that sediment loss is high across much of the study area, as is evident from the extent of erosion gullies and poor vegetation cover in large parts of the study area. Risks associated with Ward 39 are particularly high as evident by widespread erosion in large parts of this landscape.

<sup>&</sup>lt;sup>8</sup> Msadala, V., Gibson, L., Le Roux, J.J., Rooseboom, A. Basson, G.R., 2010: Sediment Yield Prediction for South Africa: 2010 Edition, WRC report 1765/1/10. Water Research Commission: Pretoria, South Africa.



Map 17: Map indicating the demand for sediment retention linked to erosion risk and landcover.

#### **Flood Attenuation**

The demand for flood attenuation services was informed by an assessment of flood risks in which settlement flooding risk had been assessed. The extent of flood risk areas was calculated in each sub-catchment and a flood risk score was calculated using the relative extent of flood risk areas and level of flooding risk for settlements. The results indicate that flood risks are highest in the mid-reaches of the study area, whilst flooding risk is largely absent from Ward 39 (**Map 18**).



Map 18: Demand for flood attenuation services based on a flood risk analysis.

# 6 OPPORTUNITIES AND RISKS

## 6.1 Landscape character and quality

The distribution of existing settlements in relation to slope sensitivity was assessed to show the extent to which settlements have encroached into areas which are not deemed favourable. The results in **Map 19** below underscores the need for stricter land use control, particularly in areas such as Elandskop, KwaMntogotho, Henley Dam, KwasMncane and Munywini.

The risks associated with the prevailing land use pattern must be interpreted within context of the water resource significance of the region, and the extent to which the settlements on steep slopes may increase sediment losses in the catchment. It is clear from this analysis that there are sufficient opportunities in the landscape to facilitate densification that are more sensitive to slope restrictions.



Map 19: Distribution of settlements in relation to slope.

## 6.2 Scarce agricultural resources

The LAP pressure map was integrated with the map of indicative agricultural potential to define the spatial opportunities available for different types of agriculture (i.e. either for arable crops, livestock and/or plantation). While the distribution of settlements have caused significant transformation and fragmentation of the agricultural landscape, particularly in the north-eastern parts of the area, there are still spatial opportunities available to exploit agricultural as an economic activity (**Map 20**).



Map 20: Areas available for exploiting future agricultural potential

## 6.3 Biodiversity

The LAP pressure map was integrated with the map of biodiversity sensitivities to create a composite map indicating the anticipated conflict between the aspirations articulated in the LAP and biodiversity objectives (**Map 21**). This illustrates that threats are largely associated with gradual expansion of the existing urban edge into adjacent critical biodiversity areas. Whilst the LAP does largely avoid critical biodiversity areas, ongoing encroachment of this nature will gradually undermine biodiversity conservation objectives in the study area.

Whilst not linked directly with the LAP, it is important that the threat of future development is also understood within the broader threats associated with land degradation (**Map 22**). This serves to further illustrate the pressures placed on remaining untransformed habitat that will continue to place pressure on biodiversity in the study area.



Map 21: Review of potential policy conflicts between the LAP and biodiversity objectives





### 6.4 Water resources

Vulindlela is located in the Southern Drakensberg Strategic Water Source Areas (SWSA). SWSAs are areas of land that either: (a) supply a disproportionate (i.e. relatively large) quantity of mean annual surface water runoff in relation to their size and so are considered nationally important; or (b) have high groundwater recharge and where the groundwater forms a nationally important resource; or (c) areas that meet both criteria (a) and (b). They include transboundary Water Source Areas that extend into Lesotho and Swaziland.

Of significance is the fact that the Southern Drakensberg SWSA generates the greatest volume of Mean Annual Rainfall (MAR) which is 9% of national and transboundary MAR). It is therefore imperative that the conservation of water resources in Vulindlela should be a priority.

In many instances, the LAP has not been developed at a scale where development aspirations adequately account for a network of rivers and wetlands. This is illustrated in **Map 23** below, which highlights key intervention and densification areas that coincide with wetlands and riparian areas. It will be important that these areas are integrated into site-level planning to ensure that the critical ecosystem services provided by these areas is not undermined further.



Map 23: Perceived threat to water resources based on the existing LAP

## 6.5 Flood risk

An assessment of the probability for flooding was undertaken to produce a '*refined flood potential zone*' as provided in the Msunduzi EMF. It was based on the modelling of water accumulation of the region and integrating the results with the existing Flood Zone dataset. The results are shown in **Map 24** which also indicates the settlements most at risk.



Map 24: Flood analysis

# 7 SEA CONTROL ZONES AND GUIDELINES

The analysis of data in the preceding sections indicate areas in Vulindlela that are under significant development pressure. Uncontrolled land use management and the resultant encroachment of settlement development onto environmentally sensitive areas is of huge concern as high levels of transformation, fragmentation and degradation of habitat it threaten to adversely impact on environmental goods and services. The remaining untransformed and unprotected areas are exposed to continued pressures that cause a loss of ecosystem condition and resilience. Map 25 provides a visual synopsis of this reality.

The development of guidelines is a key concept and requirement of the SEA with the purpose of informing development planning tools such as the LAP. Being a spatial oriented tool, a spatial layer showing the final most desirable land use scenario for Vulindlela has been developed. This layer denotes three distinct control zones, i.e.

- (1) Areas of conservation where no development is permitted;
- (2) Areas suitable for development; and
- (3) Conservation with development.



Map 25: Encroachment of settlement development on sensitive areas

### 7.1 SEA Control Zones

A spatial layer depicting three distinct control zones has been developed based on the following criteria:

(1) Areas of conservation where no development is permitted: This is primarily open space areas flagged as having "Moderate to High" sensitivity, showing little to no transformation and impacts. All development related to settlement expansion in these areas should be avoided. This zone should for all practical intent and purpose be regarded as a no-go area.

- (2) Areas suitable for development: Areas identified for normal urban development as identified in the LAP, albeit with no or very little policy conflicts with biodiversity (Map 21), water resources (Map 23) and Low flooding probability (Map 24). Areas of high potential agricultural land (Map 20) within this zone should be considered for agricultural purposes only.
- (3) Conservation with development: Areas outside of the above two zones where development can be allowed and where there are conflicts between the LAP and sensitive areas. This zone provides for preserving of open space and the management of development which have low impacts on the objectives of conservation. It should be noted that this zone has a dualistic character, implicating concepts of conservation and development.

The spatial layer, referred to as 'SEA Control Zones', is depicted on Map 26. Underlying the demarcation of these zones is a set of integrated geospatial data that was used in the production of preceding maps in this report. Having captured attributes such as sensitivities, risks and status quo values in a relational database, the criteria as described above could be translated into spatial queries to identify the respective zones. These have further been ground truthed and modified to consolidate land facets within the zones.

The value of an integrated spatial layer and dataset is further demonstrated by the use thereof specifically with regard to Zone 3: Conservation with development, so as to identify pieces of land that might be subject to conservation limits or development potential. This is further highlighted in the matrix of land use guidelines for the SEA control zones as dicussed in Section 7.3.



Map 26: SEA Control Zones

# 7.2 Land Use Index

Working towards the development of SEA guidelines a land use compatibility index has been created. The purpose of the index is to identify alternative land use classes to be considered in the application of guidelines. The index is provided in Table 4.

#### Table 4 : Land use compatibility index (LAP categories)

LAP Land Use Compatibility Index													
	Residential (high density)	Residential (low density)	Commercial	Manufacturing	Subsistence <sup>agriculture</sup>	Intensive <sup>agriculture</sup>	Arabie land	Forestry	Grazing	Open space			
Residential (high density)	У	у	У	n	n	n	n	n	n	n			
Residential (low density)	У	у	р	n	n	n	n	n	n	n			
Commercial	У	р	У	р	n	n	n	n	n	n			
Manufacturing	n	n	р	у	n	n	n	n	n	n			
Subsistence agriculture	n	n	n	n	У	У	У	р	у	р			
Intensive agriculture	n	n	n	n	У	У	У	р	У	n			
Arable land	n	n	n	n	У	У	У	р	У	n			
Forestry	n	n	n	n	р	р	р	У	р	n			
Grazing	n	n	n	n	У	У	У	У	У	У			
Open space	n	n	n	n	р	n	n	n	У	У			



# 7.3 SEA Guidelines

A matrix of land use guidelines for the SEA control zones has been developed to support decision making and further planning with regard to development and control in Vulindlela. The matrix provides a refinement of the LAP land use categories with the aim of providing support and input for the development of a land use scheme. The matrix is aimed at the implementation of the above mentioned compatibility index in terms of the SEA control zones, and is qualified as follows.

Key to Table 5:	
1. Compatible activity	Recommended land use
2. Potential activity	Potential may exist depending on the existing land-use and potential, the current ecological state, and the sustainable nature of the development type in question.
3. Incompatible activity	Not Recommended. Should be avoided

Table 5 : Land use guidelines for SEA control zones

				S	SEA CON		NES
				Zo ne 1	Zor	ne 2	Zone 3
	AND-USE CATEGORIES			Conservation with No Development	Conservation with Development : Conservation Component	Conservation with Development: Development Component	Areas Suitable for Settlement Development
	IRRIGATED CR	OP PROD	UCTION	3	3	1	2
	CROP PF	RODUCTIC	N	3	2	1	2
	AGRI-I	NDUSTRY		3	2	2	1
AGRICOLIURE	ANIMAL I	3	2	2	3		
	FOF	3	2	1	3		
	GR	AZING		2	1	2	2
	CONSERVATIO	1	1	2	2		
ENVIRONMENTAL SERVICES & CONSERVATION	ECOLOGICAL I	1	1	2	2		
	MODIFIED	3	2	2	1		
	LOW IMPACT	1	1	2	1		
TOURISM	MEDIUM IM	2	2	1	1		
	HIGH IMP	3	2	1	2		
	AIF	RSTRIP		3	2	1	1
	ROADS AN	ND RAILW	AYS	2	2	1	1
INFRASTRUCTURE	UTILITIES	AND SERV	ICES	2	2	1	1
	SEWERA	GE WORK	(S	3	2	1	1
	WATER WORKS PROJECTS	ΑΝΟ ΓΑΤΟ	`HMENT TRANSFERS	2	2	1	1
	RURAL/TRADITI	ONAL SET	TLEMENT	3	2	1	1
SETTLEMENT EXPANSION /	RESI	DENTIAL		3	2	1	1
URBAN DEVELOPMENT	MIX	ED USE		3	2	1	1
CIVIC AND SOCIAL						1	1
	INDU	JSTRIAL		3	2	1	1
MINING	MINING AN	ID QUARR	YING	3	3	2	1
		SE	A CONTROL ZONE	S			
		Zone	Zone 2	Zone			
		1		3			

SEA CONTROL ZONES AND GUIDELINE
---------------------------------

LAND-USE C	Conservation with No Development	Conservation with Development : Conservation Component	Conservation with Development: Development Component	Areas Suitable for Settlement Development		
	IRRIGATED CROP PRODUCTION	3	3	1	2	
	CROP PRODUCTION	3	2	1	2	
AGRICULTURE	AGRI-INDUSTRY	3	2	2	1	
	ANIMAL PRODUCTION	3	2	2	3	
	FORESTRY	3	2	2	3	
	GRAZING	2	1	2	2	
	CONSERVATION MANAGEMENT AND STEWARDSHIP ECOLOGICAL	1	1	2	2	
d conservation	INFRASTRUCTURE	1	1	2	2	
	MODIFIED OPEN SPACE	3	2	2	1	
	TOURISM	1	1	2	1	
TOURISM	MEDIUM IMPACT TOURISM	2	2	1	1	
	HIGH IMPACT TOURISM	3	2	1	2	
	AIRSTRIP	3	2	1	1	
	ROADS AND RAILWAYS	2	2	1	1	
INFRASTRUCTURE	UTILITIES AND SERVICES	2	2	1	1	
IN RASTROCTORE	SEWERAGE WORKS	3	2	1	1	
	WATER WORKS PROJECTS AND CATCHMENT TRANSFERS	3	2	1	1	
	RURAL/TRADITIONAL SETTLEMENT	3	2	1	1	
SETTLEMENT / URBAN	RESIDENTIAL	3	2	1	1	
DEVELOPMENT	MIXED USE	3	2	1	1	
	CIVIC AND SOCIAL	3	2	1	1	
	INDUSTRIAL	3	2	1	1	
MINING	MINING AND QUARRYING	3	2	3	1	

Table 5 : Key to land use guidelines for SEA control zones (Table 4)

#### 7.3.1 Constraint Descriptions and Planning Guidelines

Constraint descriptions and planning guidelines are provided for the following environmental features:

• Wetlands:

**Constraint.** The overarching objective from a wetland conservation and maintenance of ecosystem service perspective is to achieve a 'no net loss' of functions and values from a wetland. Development within wetlands and riparian vegetation destroys the habitat and ability of these systems to provide important services like improvement of water quality, particularly hard infrastructure as is required for this land use. Hardened surfaces also increase the rate and intensity of run off. This alters the flow of water through wetlands and establishes a risk of erosion. The disturbance from large number of people and vehicles also affects any species that utilise this habitat.

### Guidelines.

- Preferably no development within wetland footprint and buffers. If an environmental authorisation is
  obtained for development in a wetland, appropriate mitigation measures must ensure no net loss
  principle is adhered to. Environmental authorisation assessments should contain a wetland condition
  assessment, wetland functional assessment, wetland buffer zone assessment, and potentially wetland
  rehabilitation and / or offset assessment.
- A wetland rehabilitation and management plan must be a condition of an authorisation to assist in addressing the water quality issues in the catchment.
- Sustainable urban storm water design (SUDS) principles should be applied to all infrastructures to increase infiltration and reduce the volumes and intensity of water runoff from the development area.
- Road layouts should be designed to go around wetlands and not through them. Where it is unavoidable to cross a wetland, it should be at the narrowest point in the system and the structure must provide for sustained flow of water across the wetland system a specialist wetland consultant should be consulted in the design process.

#### Biodiversity

**Constraint.** Sensitive biodiversity areas include protected areas and critical biodiversity areas. The primary impact is the conversion of large areas of natural vegetation to settlement development and agricultural use. Structures and infrastructure create disturbance and barriers to the movement of wildlife. The higher the conservation value the higher the constraint. The noise and disturbance associated with movement of people and vehicles reduce the suitability of any remaining habitat on, or adjacent to a site. Solid waste also reduces the condition of land and natural resources, particularly in isolated areas where there are no collection facilities. Associated with these disturbances is land degradation and infestation by invasive alien plant species.

#### Guidelines.

- No development should take place within areas of high biodiversity conservation value.
- In areas of lower conservation value, the footprint should be limited as far as possible and design should be sensitive to valuable biodiversity features (habitat, species).
  - Indigenous species should be used in landscaping to retain some level of biodiversity value, and reduce irrigation requirements.
  - Applications should include a solid waste management plan that is focussed on recycling. The practice of 'bury and burn' is not acceptable.
- Develop an open space system linking with the Msunduzi open space system as well as that of other neighboring municipalities.

#### Water Quality

**Constraint.** All residential development involves the production of sewage, hereby adding to the cumulative impact in a catchment where levels exceed standards and are a significant sustainability issue. Poor water quality impacts both human users (recreational and domestic) and aquatic biota. Residential land use also increases the volumes and intensity of runoff which has the potential to erode river banks and instream habitat.

#### Guidelines.

- In areas of important water resources such as quinary and proximal catchment areas, there should not be an increase in loading of pollutants, particularly nutrients, sediments and microbiological contaminants. Water quality must not be compromised in any way and should be improved where possible. Only activities which have a negligible impact on water quality should be permitted in these areas. These are typically activities that:
  - Do not generate large volumes of waste (activities associated with low numbers of people) and no waste should be discharged in critical catchments (Any waste generated in these areas must be treated and discharged outside of quinary areas),
  - Activities that do not carry a significant spill pollution risk (avoid fuel and hazardous substance storage and manufacture) and
  - Activities with limited landscape disturbance (where sediment generation can be meaningfully controlled).
  - Any activity must at least abide by the requirements of any issued water use licence and the Resource Quality Objectives for the catchment.
- For other less sensitive catchment areas, the development application must show that the following Guidelines have been considered in the case of infrastructure for the containment and treatment of sewage:
  - The quality of the effluent released to the surface water systems (rivers) from Waste Water Treatment Works (WWTW) exceeds standards to assist in working towards a state of improved water quality.
  - Contamination of groundwater is avoided. Pit latrines and VIPs are not recommended due to the impact on groundwater – particularly in the case of high density, large scale low cost housing. Alternative technologies should be investigated such as Urine Diversion Dehydration (UDD) toilets as those utilised in eThekwini.
  - Conservancy tanks are used rather than septic tanks are used in the case of isolated dwellings with regular removal and treatment at a WWTW.
  - The location of all sewage containment and treatment facilities is informed by a detailed geohydrological investigation and layout indicating the location of facilities in relation to natural water resources.
  - Protection/maintenance of wetlands and riparian areas to buffer water quality issues (see below).

#### Flood Zones

**Constraint.** Locating infrastructure and residential units in such areas therefore also exposes the infrastructure to risk of damage and loss of lives.

#### Guidelines.

- Development within a flood prone zone should be avoided.
- Where this is unavoidable, the design must be informed by a detailed geotechnical and flood line investigation.

# ANNEXURE A: ISSUES MATRIX

The following summarises issues that were identified during the SEA process. It is kept here for reference and interogation together with the GIS tool containing a an integrated dataset where all attributes of the matrix are linked to spatial facets of the development and conservation geography of Vulindlela.

SRF	Categorisation	PRESSURE ATTRIBUTES	EXISTING PRESSURES / IMPACTS	SENSITIVITY ATTRIBUTES	SENSITIVITY OF STUDY AREA	STRATEGIC PRIORITY	RATIONALE	DATA QUALITY
Landscape	Risk	Encroachment of settlements. Lack of infrastructure causes settlements to spread and encroach into sensitive areas. If infrastructure was available people would not develop on sensitive landscapes. Furthermore the impact of grazing activities has resulted in soil erosion. 8) Degree of Soil Degradation/ Erosion	H	Geotechnical constraints - slope analysis	Н	Н	In less steep areas there is a trend of encroachment of settlements which causes soil degradation	Good

SRF	Categorisation	PRESSURE ATTRIBUTES	EXISTING PRESSURES / IMPACTS	SENSITIVITY ATTRIBUTES	SENSITIVITY OF STUDY AREA	STRATEGIC PRIORITY	RATIONALE	DATA QUALITY
Agricultural land	Risk	Encroachment of settlements onto active agricultural lands Degree of Soil Degradation/ Erosion	H	<ul> <li>It is noted that the general condition of grassland in the area is relatively fair and that there is likely as much good grassland in the east as in the western sections of the study area. There is a high potential of arable land.</li> <li>Agricultural Potential Grazing capacity (Could look at grassland condition &amp; other datasets)</li> </ul>	Η	Н	Potential for commercial farming is relatively low relative to other areas in the country. There is however a high demand for urban subsistence agriculture - there is therefore a good rationale for protecting moderate to good potential agricultural land in the area.	Good
Biodiversity	Risk	<ul> <li>Urban expansion and associated transformation (linked with formal planned and informal development) is regarded as the most important pressure to biodiversity.</li> <li>Pressures of degradation also increase with urban expansion. Key</li> </ul>	νн	Key sensitivities are reflected in the Critical Biodiversity Areas Map for the study area.	VH	νн	Encroachment of settlements & associated pressures Land degradation Need for protection (none)	Good: Based on fine-scale conservation plan for Vulindlela and Provincial data for Ward 39. Should be updated when the plan for the Municipality is updated.

SRF	Categorisation	PRESSURE ATTRIBUTES	EXISTING PRESSURES / IMPACTS	SENSITIVITY ATTRIBUTES	SENSITIVITY OF STUDY AREA	STRATEGIC PRIORITY	RATIONALE	DATA QUALITY
		<ul> <li>pressures that reflect current and anticipated future levels of degradation include:</li> <li>Existing settlements;</li> <li>Areas surrounding existing settlements;</li> <li>Alien plant stands;</li> <li>Degraded habitat.</li> </ul>						

SRF	Categorisation	PRESSURE ATTRIBUTES	EXISTING PRESSURES / IMPACTS	SENSITIVITY ATTRIBUTES	SENSITIVITY OF STUDY AREA	STRATEGIC PRIORITY	RATIONALE	DATA QUALITY
Water Resources	Risk	An estimated 63% of wetlands and riparian areas in the study area are degraded (linked to degraded or transformed landcover types). This is attributed to a range of pressures including: • Erosion; • Cultivation; • Urban Encroachment; and • Water quality impacts. The extent of such pressure is illustrated in a map indicating the Present Ecological State (PES) of wetlands across catchments in the study area. This shows that wetland condition varies from a C (Moderately modified) to a D (Largely modified) state across the study area.	H	Untransformed wetlands within critical biodiversity areas are regarded as most important from a biodiversity conservation perspective. Wetlands also provide a range of important ecosystem services such as water quality enhancement, sediment trapping and flood attenuation that are important for disaster risk management and downstream water uses. The relative importance of wetlands in providing such services has been assessed to inform future planning and strategic interventions. This has highlighted the upper catchments of the Msunduzi River as the most important based on the demand for these services	Η	Н	Wetlands and rivers provide a range of important ecosystem services but have been heavily degraded, which undermines the services they can provide. Pro-active management of impacts (including landuse and water quality risks) and rehabilitation to secure key services is required to ensure that such values are maintained and enhanced.	Good

SRF	Categorisation	PRESSURE ATTRIBUTES	EXISTING PRESSURES / IMPACTS	SENSITIVITY ATTRIBUTES	SENSITIVITY OF STUDY AREA	STRATEGIC PRIORITY	RATIONALE	DATA QUALITY
		<ul> <li>Water quality impacts are another key concern and are expected to increase with increasing urban expansion and densification.</li> <li>Wetland condition (Expert Interpretation) <ul> <li>Qualitative statements for each quinery catchment (linked to pressures)</li> </ul> </li> <li>Degree of Settlement encroachment (Current &amp; future)</li> <li>Rivers Vulnerability (Water quality constraints - existing)</li> </ul>		and the extent of wetlands in these catchments. • Ecosystem supply (Expert Interpretation) – Ecological Importance of wetlands and riparian areas				

SRF	Categorisation	PRESSURE ATTRIBUTES	EXISTING PRESSURES / IMPACTS	SENSITIVITY ATTRIBUTES	SENSITIVITY OF STUDY AREA	STRATEGIC PRIORITY	RATIONALE	DATA QUALITY
Human Settlements	Driver	The pressure on the human aspect is that people will settle where infrastructure provides them with basic needs, and in the lack of infrastructure, they will move to any area that the land can provide them with goods, e.g. arable land, proximity to watercourse, etc. Thus placing pressure on those resources 5) Degree of Settlement encroachment (Current & future)I	H	Degree of flood potential (Flood risk zone in district EMF)	L	L	Historic land policies, unequal land distribution as well as increasing population densities increase the stresses on the land and lead to increased degradation. This will pose a risk of disasters such as floods, landslides and fires Encroachment of settlements & associated pressures Land degradation Need for protection (none)	Poor
Climate change	Driver	All Encompassing	н	Degree of flood potential (Flood risk zone in district EMF)	L	Н	Overall Protection of the Environment	Good
Waste	Pressure	Nature & type of waste (low) Existing waste disposal facilities / services (poor) Illegal dumping	L	N/A	L	L	Need to reduce waste to landfills	Moderate

# ANNEXURE B – IPUBLIC PARTICIPATION SUMMARY

## VULINDLELA STRATEGIC ENVIRONMENTAL ASSESSMENT

This serves as a summary of the Public Participation Process (PPP) followed for the Vulindlela Strategic Environmental Assessment (SEA), Msunduzi Municipality, KwaZulu-Natal.

The PPP commenced following inception. Triplo4 engaged with the Area Managers from the Area Based Management (ABM) department, in order to ascertain suitable venues and dates for the public meetings. Triplo4 undertook to obtain contact details of relevant representatives within each of the respective stakeholder departments. These stakeholders were invited to attend the public meetings.

The Background Information Document (BID) was distributed via email to all relevant stakeholders on 3 November 2018. An advert was published in the Witness and Isolezwe newspapers on 2<sup>nd</sup> of November 2018 followed by a registration period which was open for 30 days for I&APs to register and comments or suggestions regarding the proposed SEA. Two public meetings were held on 4 and 5 December 2018.

### PUBLIC PARTICIPATION AS PART OF THE SEA PROCESS

### • Public Notices/Advertisements

Advertisements were published in the Witness (English) and Isolezwe (isiZulu) newspapers on 2 November 2018. The advertisements invited potential Interested and Affected Parties (I&APs) to register for the SEA process and to provide comments or suggestions related to the SEA.

The content of the advert in a form of notification, as well as the BID, were submitted to the ABM office on the 2<sup>nd</sup> and 7th November 2018. The Area Manager circulated a copy of the BID in isiZulu to relevant internal stakeholders on 20 November 2018, in order to invite Ward Committees and Ward Councillors of all the respective wards.

Refer to Appendix A for proof of publication of the advertisements, as well as submission of the notification to ABM office

### • Background Information Document (BID)

A background information document in English and a public notice (in isiZulu) were distributed to stakeholders on 2 November 2018. An isiZulu version of the BID was distributed to the Area Manager on 5 November 2018 for circulation to the Amakhosi in Vulindlela area.

Refer to Background Information Document, public notice and I&AP Database, attached as Appendix B, for the details regarding stakeholders contacted as per above-mentioned list as well as content of the BID and public notice.

### • I&AP Communication

Stakeholders were engaged with during the registration period in order to obtain confirmation of their attendance at the public meetings. Refer to email communications (Appendix C) for further detail as well as the I&AP database (Appendix B) showing which stakeholders confirmed attendance.

### • Public Meetings

Two public meetings were held with I&APs and stakeholders on 4 and 5 December 2018. The meetings were held as follows:

Meeting 1: for Wards 1 – 7 and 9 took place on the 4 December 2018 at 10am-12pm at the Gezubuso Hall in Gezubuso (29°40'10.51"S; 30°13'27.06"E).

 Meeting 2: for Ward 8 and 39 took place on the 5 December 2018 at 10am-12pm at the Vulinqondo Hall in Kanzakana (29°42'52.55"S; 30° 5'34.48"E).

Triplo4 had liaised with the stakeholders to confirm their attendance. Triplo4 further liaised with the Area Managers, Mr. Caleb Magubane and Mr. Sthembiso Hlongwane to confirm the attendance of the Amakhosi, ward councillors and ward committee members.

It must be noted that only ward councillors and ward committee members attended both meetings. An AMAFA representative also attended Meeting 1, and welcomed the request to provide digital files of the areas of heritage significance.

At both meetings, Triplo4 presented the project to the attendees, and explained to them the reason for the meeting and how each attendee could participate. This was followed by an interactive practical session where representatives from each ward were asked to pinpoint on a map the locations of various environmental, social, economic and political issues/areas from their experiences within their respective areas.

Copies of the presentation were circulated to all attendees on 6 December 2018. Attendees were afforded a further 14 days comment period following the meeting. However no further comments were received.

Refer to Appendix D for a copy of the presentation, the attendance registers, proof of circulating the presentation as well as photographs from the meetings.

#### Outcome of the Public Participation Process

The Public participation process was considered an important aspect for this Vulindlela SEA, which allowed for an open and transparent process for the identified 'affected' population and all relevant stakeholders. The outcome of the process was to understand the overall issues that I&APs were affected by or wish to be considered in the SEA process, and to also allow them to gain greater acceptance of the Vulindlela SEA, once approved and implemented.

This process allowed for the identification of key issues (in terms of environmental, social, economic/ planning and political aspects) to be identified and discussed by the local community. This involvement allowed for a strategic assessment of the above-mentioned issues which has informed the SEA Report. Table 1, provides an overview of the key areas of concern by I&APs, especially the 'affected' community. The table is arranged according to main issues that were identified in specific wards.

Overall the public participation process allowed for the public to engage with the professional which informed the SEA influencing decision-making. The main impeding factors seem to be: political and economic issues which centres on the issue of land ownership and the issues around tenure and local government involvement. The input as captured from the engagement with the public and stakeholders meetings was limited and thus further engagement were made.

Following the completions of the two public meetings, participants were afforded further timeframes to add comments to the process, and they were requested to further circulate the information shared in the meetings with those that may be interested but did not attend the meetings. No further comments were received after this exercise.

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