PROPOSED ESTABLISHMENT OF AN AQUACULTURE DEVELOPMENT ZONE IN AMATIKULU, KWAZULU-NATAL

LOCATED IN THE MANDENI LOCAL MUNICIPALITY

VISUAL IMPACT ASSESSMENT

For Department of Agriculture, Forestry and Fisheries

agriculture, forestry & fisheries
Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

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1 INTRODUCTION

1.1 QUALIFICATION AND EXPERIENCE OF THE PROFESSIONAL TEAM

NuLeaf Planning and Environmental (Pty) Ltd, specialising in Visual Impact Assessment, undertook this visual assessment.

The team undertaking the visual assessment has extensive practical knowledge in spatial analysis, environmental modelling and digital mapping, and applies this knowledge in various scientific fields and disciplines. The expertise of these practitioners is often utilised in Environmental Impact Assessments and Environmental Management Plans.

The visual assessment team is familiar with the "Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes" (Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning) and utilises the principles and recommendations stated therein to undertake visual impact assessments. Although the guidelines have been developed with specific reference to the Western Cape Province of South Africa, the core elements are more widely applicable.

Department of Agriculture, Forestry and Fisheries (DAFF), appointed NuLeaf Planning and Environmental as an independent specialist consultant to undertake the visual impact assessment. Neither the author, nor NuLeaf Planning and Environmental will benefit from the outcome of the project decision-making.

1.2 LEGAL FRAMEWORK

The following legislation and guidelines have been considered in the preparation of this report:

- The Environmental Impact Assessment Amendment Regulations, 2010;
- Guideline on Generic Terms of Reference for EAPs and Project Schedules (DEADP, Provincial Government of the Western Cape, 2011).
- Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (DEADP, Provincial Government of the Western Cape, 2005).

1.3 INFORMATION BASE

This assessment was based on information from the following sources:

- Topographical maps and GIS generated data were sourced from the Surveyor General, Surveys and Mapping in Mowbray, Cape Town;
- Observations made and photographs taken during site visits;
- Conceptual layout plan received from MBB Consulting Engineers (South);
- Professional judgement based on experience gained from similar projects; and
- Literature research on similar projects.

1.4 ASSUMPTIONS AND LIMITATIONS

This assessment was undertaken during the planning stage of the project and is based on information available at that time.

The proposed development entails the establishment of an Aquaculture Development Zone (ADZ) to the north east of the Matigulu estuary in KwaZulu-Natal. The ADZ will entail the establishment of aquaculture facilities that will be used for the farming of a range of species, which could include Dusky Kob, Barramundi, Scallops, Sea Cucumbers, marine and freshwater Ornamental Fish and Ornamental Plants, Tilapia, Catfish and Nile Crocodile. Phase 1 will comprise the refurbishment of earthen ponds and tunnel based tank systems that were historically used for Prawn and Ornamental Fish culture (activities will include the installation of water supply for farming, a facility to grow fingerlings, construction of a feed store, other storage facilities and offices). Phase 2 will entail the extension of the aquaculture facilities and the installation of civil infrastructure that will allow for the establishment of a range of production systems for a range of species. Infrastructure for the ADZ will include administration buildings, storage areas, fish processing and packaging facilities, access roads, electricity and water reticulation, sea water supply and discharge, pump stations, reservoirs and fencing.

This Visual Impact Assessment and all associated mapping for most of the proposed development has been undertaken according to the worst case scenario, which is a typical 2-storey building with roof (measuring approximately 6m). The proposed water tanks have been mapped at a height of 15m.

As the support infrastructure (i.e. roads, parking, bulk services etc) has no vertical dimesion (i.e. it is located at ground level), no viewshed maps have been generated for these. It is assumed that this ground-level infrastructure will not be visible beyond the boundaries of the proposed Amatikulu ADZ site.

1.5 LEVEL OF CONFIDENCE

Level of confidence[1] is determined as a function of:

- The information available, and understanding of the study area by the practitioner:
    - **3**: A high level of information is available of the study area and a thorough knowledge base could be established during site visits, surveys etc. The study area was readily accessible.
    - **2**: A moderate level of information is available of the study area and a moderate knowledge base could be established during site visits, surveys etc. Accessibility to the study area was acceptable for the level of assessment.
    - **1**: Limited information is available of the study area and a poor knowledge base could be established during site visits and/or surveys, or no site visit and/or surveys were carried out.

- The information available, understanding of the project and experience of this type of project by the practitioner:

[1] Adapted from Oberholzer (2005).

- **3**: A high level of information and knowledge is available of the project and the visual impact assessor is well experienced in this type of project and level of assessment.
- **2**: A moderate level of information and knowledge is available of the project and the visual impact assessor is moderately experienced in this type of project and level of assessment.
- **1**: Limited information and knowledge is available of the project and the visual impact assessor has a low experience level in this type of project and level of assessment.

These values are applied as follows:

Table 2: Level of Confidence

	Information on the project & experience of the practitioner			
Information on the study area		**3**	**2**	**1**
	3	9	6	3
	2	6	4	2
	1	3	2	1

*The level of confidence for this assessment is determined to be **9** and indicates that the author's confidence in the accuracy of the findings is high:*

- The information available, and understanding of the study area by the practitioner is rated as **3** and
- The information available, understanding and experience of this type of project by the practitioner is rated as **3**.

2 METHODOLOGY

The study was undertaken using Geographic Information Systems (GIS) software as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed development. A detailed Digital Terrain Model (DTM) for the study area was created from 5m interval contours from the National Geo-spatial Information data supplied by the Department: Rural Development and Land Reform.

The approach utilised to identify potential issues related to the visual impact included the following activities:

- The creation of a detailed digital terrain model (DTM) of the potentially affected environment;
- The sourcing of relevant spatial data to develop an understanding of the existing visual character and quality of the receiving environment. This includes cadastral features, vegetation types, land use activities, topographical features, site placement, etc.;
- The identification of sensitive environments upon which the proposed development could have a potential visual impact;
- The creation of viewshed analyses from the proposed development area in order to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analyses take into account the dimensions of the proposed structures.

This report (visual impact assessment) sets out to identify and quantify the possible visual impacts related to the proposed upgrade and expansion of the

proposed Amatikulu ADZ (including related infrastructure) as well as offer potential mitigation measures, where required.

The following methodology has been followed for the assessment of visual impact[2]:

- **Determine potential visual exposure**

  The visibility or visual exposure of any development is the point of departure for the visual impact assessment. It stands to reason that if the proposed development were not visible, no impact would occur.

  Viewshed analyses of the proposed development components indicate the potential visibility.

- **Determine visual distance and observer proximity to the development**

  In order to refine the visual exposure of the development on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence.

  Proximity radii are created in order to indicate the scale and viewing distance of the development and to determine the prominence thereof in relation to the environment.

  The visual distance theory and the observer's proximity to the development are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly negative visual perception of the proposed development.

- **Determine viewer incidence, perception and sensitivity**

  The number of observers and their perception of a development determine the concept of visual impact. If there are no observers, then there would be no visual impact. If the visual perception of a development is favourable to all observers, then the visual impact would be positive.

  It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed development and its related infrastructure.

  It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer; regularity of sighting, cultural background, state of mind, and purpose of sighting which would create a myriad of options.

- **Determine the visual absorption capacity**

  This is the capacity of the receiving environment to absorb the potential visual impact of the proposed development. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense

[2] This methodology is adapted from that developed by MetroGIS, and detailed in numerous Visual Impact Assessments undertaken by them (2010-2014).

and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC.

The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low.

The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases.

The digital terrain model utilised in the calculation of the visual exposure of the development does not incorporate the potential visual absorption capacity (VAC) of the natural vegetation of the region. It is therefore necessary to determine the VAC by means of the interpretation of the vegetation cover and other landscape characteristics.

- **Determine the visual impact index**

  The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur. These areas are further analysed in terms of the previously mentioned issues (related to the visual impact) and in order to judge the magnitude of each impact.

- **Determine impact significance**

  The potential visual impacts identified and described are quantified in their respective geographical locations in order to determine the significance of the anticipated impact. Significance is determined as a function of extent, duration, magnitude and probability. Appropriate mitigation is recommended where relevant.

3 PROJECT DESCRIPTION

DAFF is proposing an upgrade and expansion of the proposed Amatikulu ADZ. The proposed development site is situated in the Mandeni Local Municipality which falls under the iLembe District Municipality in KwaZulu-Natal province, approximately 120 km north of Durban. The site has an area of approximately 108.37 Ha in size and is situated north east from the Matigulu estuary.

An ADZ is an area that has been earmarked specifically for aquaculture activity. The purpose of an ADZ is to encourage investor and consumer confidence, create incentives for industry development, provide aquaculture services, manage risk associated with aquaculture, as well as to provide skills development and employment for coastal communities. The development of ADZs supports the Aquaculture Policy objective aimed at creating an enabling environment that will promote growth and sustainability of the aquaculture sector in South Africa, as well as to enhance the industry's contribution to economic growth.

The proposed site in Amatikulu is one such site identified by DAFF for the establishment of an aquaculture development zone. The site is approximately 108.37 Ha in size and used to be utilized as an ornamental fish and plant farm, as well as, for the farming of prawns. Refer to **Map 1**. Majority of this infrastructure is now in a state of disrepair, however, the following operations are currently being undertaken on site:

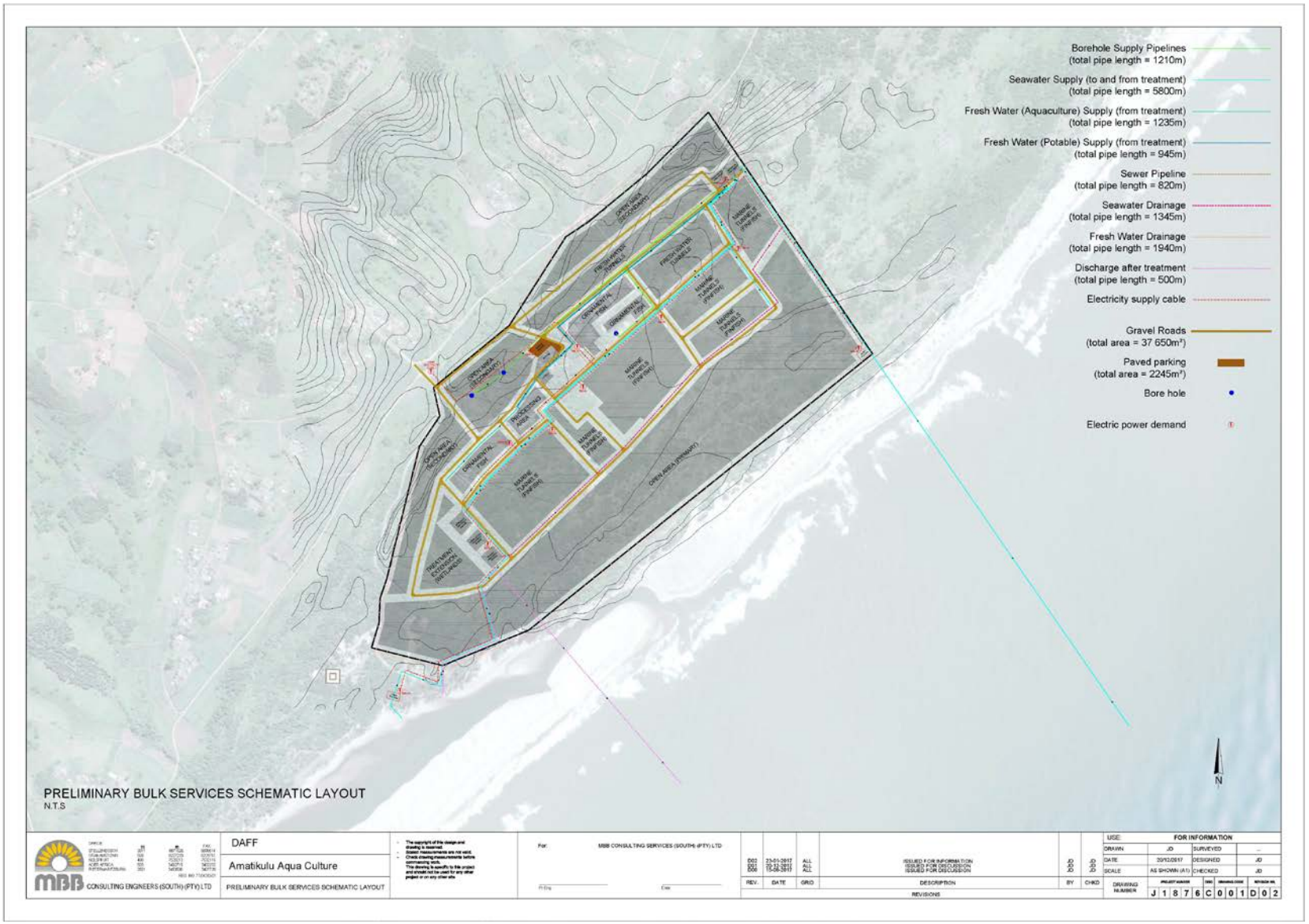
- Amatikulu Pet Products which consists of an administrative building and a factory facility that manufactures pet products, as well as a pack house and storeroom.
- Amatikulu Aquarium Plants, which consists of a hatchery, workshop, and a number of tunnels and water supply infrastructure for ornamental fish and plants.
- A water treatment facility.

The main purpose of the ADZ seeks to address poverty and unemployment in the coastal area of Amatikulu by creating skill-based employment. The infrastructure development on the site will require a labor force which will be sourced from the surrounding local disadvantaged communities. Once the farm has been established, people from the surrounding community will have an opportunity to develop skills in the farming of aquatic organisms.

In short the proposed extension and new facilities will have a considerable social impact on society.

4 SCOPE OF WORK

The broader study area (i.e. the extent of the maps shown in this report) encompasses an area of approximately 32 km², and allows for a minimum radius of 4 km measured from the outer boundary of the proposed development. The scope of work for this assessment includes the determination of the potential visual impacts in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation of the proposed Amatikulu ADZ. Mitigation measures are recommended where appropriate.



Map 1: Proposed layout of the development

5 THE AFFECTED ENVIRONMENT

5.1 GENERAL ENVIRONMENT

The 102 Ha site for the proposed Amatikulu ADZ is located approximately 120km north of Durban in the Kwa-Zulu Natal Province.

Access to the site is gained off the N2 Dokodweni off-ramp [exit 277] to Eshowe/Ging/Ulundi via various district roads.

Figure 1: Access to the site

The topography of the study area is characterised as flat coastal plains where the height above sea level ranges between 0-125 m above sea level.

The study area is located within the *Savanna* biome, with mean annual precipitation ranging from 650mm to 1200mm, generally declining from coastal areas to inland areas. The site does not lie within any threatened ecosystems, however, a small corner of the site in the far north encroaches into the Eshowe Mtunzini Hilly Grasslands which are classified as critically endangered. Three (3) vegetation types are found within the proposed site: Subtropical Alluvial vegetation is found in the centre of the site covering the wetland area, Subtropical Dune Thicket covers the southern boundary of the site, while Maputaland Coastal Belt vegetation covers the northern portion of the site. Subtropical Alluvial vegetation and Maputaland Coastal Belt vegetation have a provincial conservation status of Endangered, while Subtropical Dune Thicket has a conservation status of Least Threatened.

The regional land cover and land uses differs within the areas surrounding the site. Land use is generally consistent with widespread subsistence agriculture. Refer to **Map 2**.

Figure 2: Topography of the site and surrounds

Figure 3: Typical land cover of the area

Conservation activities are present in the area. The only known and most notable Protected Areas in the study area the Umlalazi Nature Reserve, located to the north east of the site and Amatikulu Nature Reserve, located south west of the site. Refer to **Map 1**.

Note: Additional tourism accommodation such as guest houses are sure to exist within the study area, but as the locations of these are not known at this stage, the visual impact on them cannot be determined.

Figure 4: Typical land use of the area

In general the landscape character of the greater study area presents as rural with some agriculture. The site itself is most natural in character, with the proposed Amatikulu ADZ situated mainly in the northern portion of the site.

5.2 VISUAL QUALITY

The visual quality of the region is generally high with large tracts of vegetation and subsistence agriculture characterising most of the visual environment. There is no evidence of widespread erosion or natural degradation, and development, where this occurs, is domestic in scale, with the exception of the existing aquaculture and manufacturing activities already taking place on the site.

The entire area where the Amatikulu ADZ is proposed to take place is considered highly sensitive to visual impacts due to its generally low level of transformation. The key visual experience is linked to the use of the road network and associated views of the surrounding landscape, which is characterised by rolling hills, valley bottom wetlands and sandy dunes with low levels of transformation.

Therefore, the visual quality of the site is high overall, with the exception of the existing infrastructure located on the site.

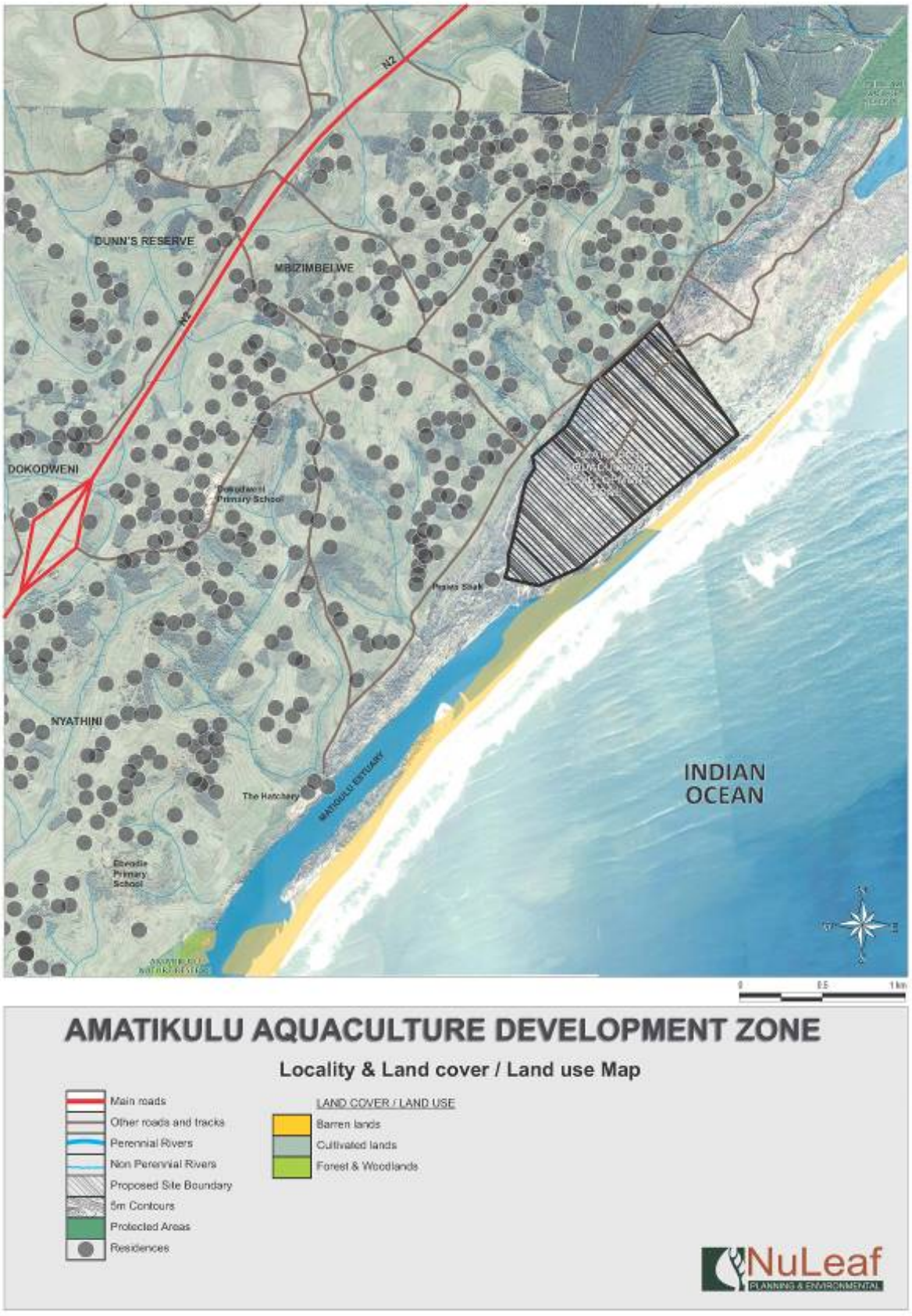
The existing infrastructure at the proposed Amatikulu site consists of several building and tunnels which are in a state of disrepair. The remainder of the site retains more of a natural sense of place, relating strongly to the sandy dune / wetland network upon which the site is located.

Large tracts of intact natural vegetation help the existing structures to blend into the surrounding landscape. Therefore the visual quality of the site is high overall.

Figure 5: Visual quality of the region

Figure 9: Existing Aquaculture structures already on site

Figure 10: Existing pet treats processing plant



Map 2: Locality and land cover/land use map

6 ANTICIPATED ISSUES RELATED TO VISUAL IMPACT

Anticipated issues related to the potential visual impact the proposed Amatikulu ADZ include the following:

- The visibility of the development to, and potential visual impact on sensitive visual receptors (i.e. users of roads and observers residing in homesteads/farmsteads) within the study area.
- The visibility of the proposed development to, and potential visual impact on protected areas (i.e. the Umlalazi Nature Reserve and the Amatikulu Nature Reserve) within the study area.
- The potential visual impact associated with the construction phase of the development on sensitive visual receptors in close proximity.
- The potential visual impact of safety and security lighting of the development at night on sensitive visual receptors in close proximity.
- The potential to mitigate visual impacts and inform the design phase.
- The potential cumulative visual impacts of the development within the study area.

7 RESULTS

7.1 POTENTIAL VISUAL EXPOSURE

The results of the viewshed analysis and potential observer proximity for the proposed Amatikulu ADZ is shown on **Map 3** that follows.

A visibility analysis for the proposed development was generated from several representative points on site at an offset of 6 m above average ground level, which is the height of an average 2 storey building. The proposed water towers visibility analysis was generated at a representative height of 15m. The receptor height within the receiving environment was set at 2m above average ground level, which is representative of a person standing upright.

This was done in order to determine the general visual exposure of the area under investigation, simulating the maximum expected heights of buildings associated with the proposed development.

The analysis does not include the potential shielding effect (i.e. VAC) of the existing environment, and does not take into consideration the limitations of the human eye, therefore signifying a worst-case scenario.

For the purpose of this study a viewshed analysis was generated for the development as a whole. The findings of the generated viewsheds are detailed below:

The potential visual exposure for the Amatikulu ADZ is as follows, (Refer to **Map 3**):

- Potential visual exposure is concentrated on the site itself. High visual exposure is expected in majority of the surrounding areas between 0.5km and 1km. The topography, specifically the sandy dunes, effectively contains visual exposure areas further afield to the beach and portions of the estuary located south and south east of the site, as well as, the road bordering the northern boundary of the site. Sensitive visual receptors that may be affected include settlements and homesteads to the north, north west and west of the site.

- Potential visual exposure within 1km from the site is moderate, reducing slightly between 1km and 2km from the site. Within this zone, visually exposed areas lie mainly to the south west and north east. Scattered areas inland will be exposed and the site will be mostly visible from the Indian Ocean. Sensitive visual receptors that may be affected include settlements and homesteads, the Prawn Shak (a known tourist destination), these are located mainly to the north and north east of the site.

- Between 2km and 3km from the site, potential visual exposure decreases in extent inland, with visually exposed areas largely fragmented and lying to the south west, west and north east of the site. Roads, settlements and homesteads have been identified as potential sensitive visual receptors within this zone.

- Beyond the 3km, the potential visual exposure of the site is considered low and very unlikely to take place. Potential sensitive visual receptors within this zone would mainly be users of the two protected areas, Amatikulu Nature Reserve and Umlalazi Nature Reserve.

7.2 VISUAL DISTANCE AND OBSERVER PROXIMITY

NuLeaf Planning and Environmental determined proximity offsets based on the anticipated visual experience of the observer over varying distances. In general, the severity of the visual impact on visual receptors decreases with increased distance from the proposed development.

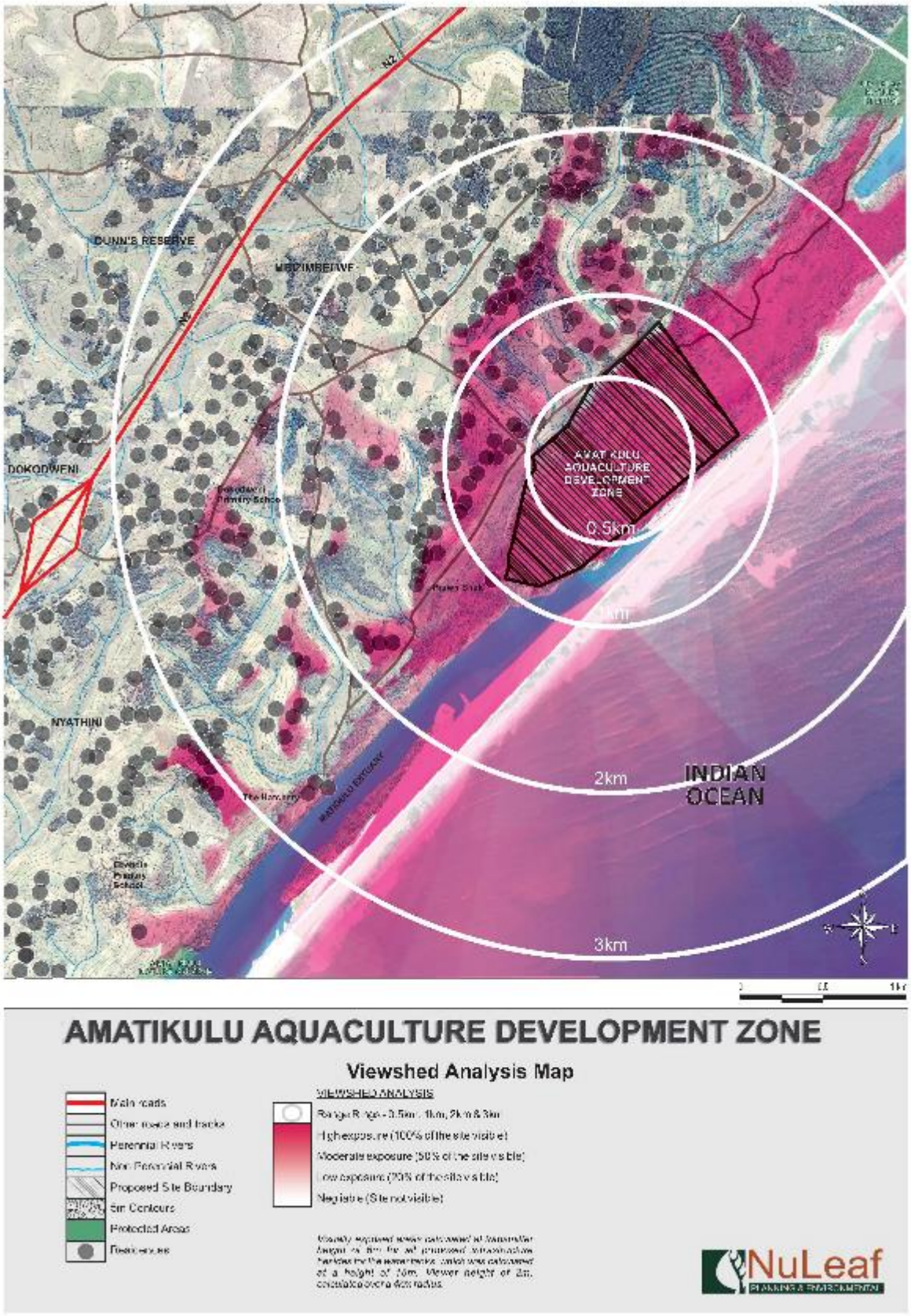
Therefore, in order to refine the visual exposure of the development on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for the proposed development.

Proximity radii for the proposed development site are created in order to indicate the scale and viewing distance of the development and to determine the prominence of the structures in relation to their environment.

The proximity radii are based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for larger facilities and downwards for smaller facilities (i.e. depending on the size and nature of the proposed development).

Typically, the proximity radii, calculated from the boundary of the property, would be as follows for the proposed Amatikulu ADZ, Refer **Map 4**:

- 0.5 – 1km – Very short distance where the development is definitely going to be visible.
- 1 – 2 km - Short distance views where the development would be easily and comfortably visible and recognisable.
- 2 – 3 km - Medium distance view where the development would become part of the visual environment, but could still be visible and recognisable.
- Beyond 3 km - Long distance view where the development might be visible, although this is unlikely.



Map 3: Potential visual exposure of the proposed Amatikulu ADZ

7.3 VIEWER INCIDENCE, PERCEPTION AND SENSITIVITY

It is necessary to identify areas of high viewer incidence, and to classify certain areas according to the observer's visual sensitivity towards the proposed development.

Viewer incidence is highest along the roads surrounding and properties directly adjacent to the site. Second to these, are homesteads in close proximity to the site. These homesteads are concentrated in the south west, west, north west and north of the site. As such tourists using the roads and residents of the area are considered most sensitive to visual intrusion, as they will be exposed to visual intrusion during their rest and relaxation times. Refer **Map 4**.

Tourists and residential receptors in natural and rural contexts are more sensitive than those in urban contexts, due to the absence of visual clutter in these undeveloped and undisturbed areas.

No specific report can be made on viewer perception regarding this proposed development, as no reported stakeholder feedback has been received as of yet.

Considering the proximity of the development to the well known tourist destination, the Prawn Shak and Amatigulu Estuary, it is expected that any potential visual impact along the property boundaries to the west and south west would be viewed in a negative light. Therefore, overall viewer perception of receptors within the study area will be assumed to be mostly negative.

7.4 VISUAL ABSORPTION CAPACITY

Visual Absorption Capacity (VAC) is the capacity of the receiving environment to absorb the potential visual impact of the proposed development. VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC.

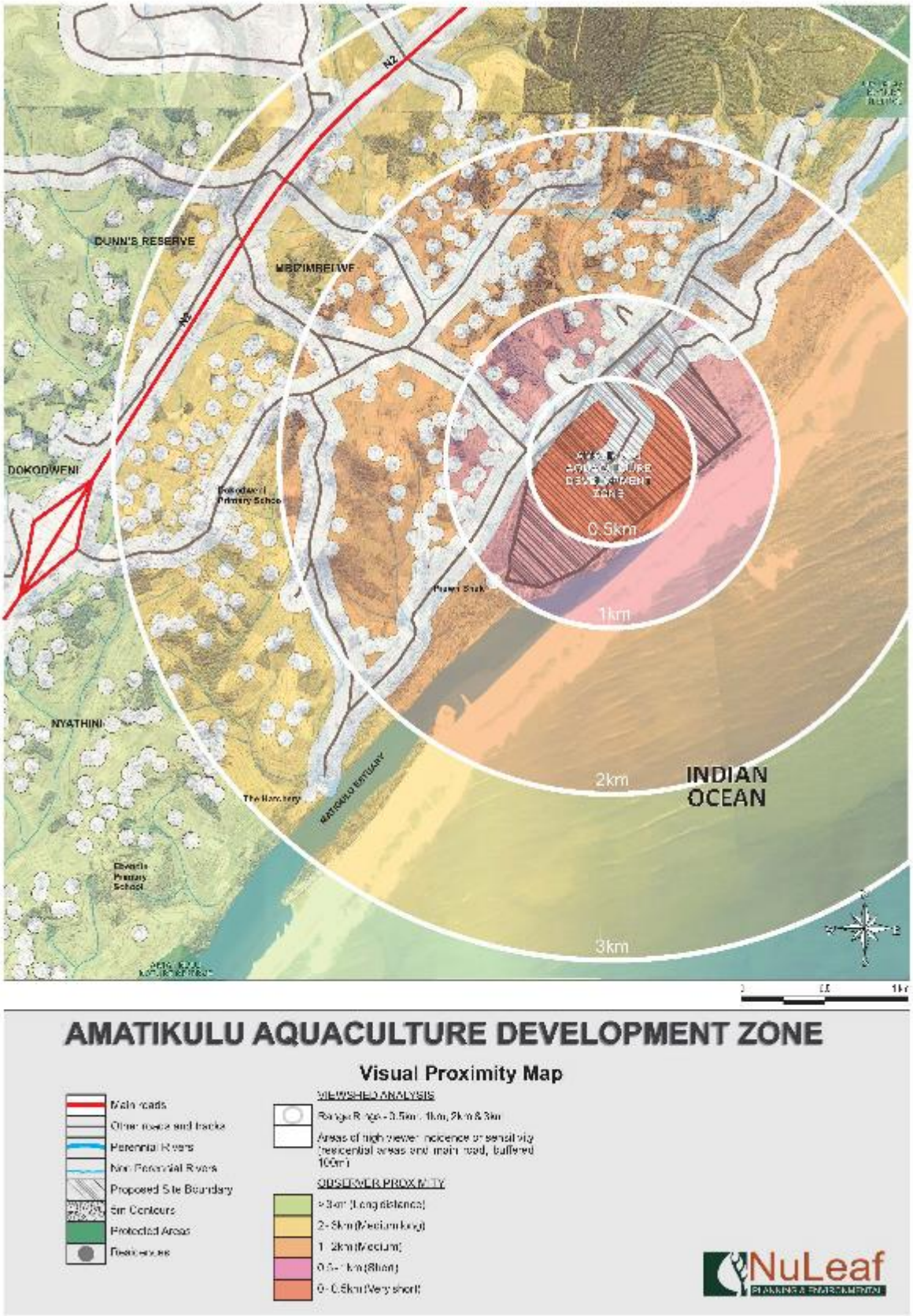
The VAC would also be high where the environment can readily absorb the development in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a development contrasting markedly with one or more of the characteristics of the environment would be low.

The VAC also generally increases with distance, where discernable detail in visual characteristics of both environment and development decreases.

Overall, the Visual Absorption Capacity (VAC) of the site and surrounds is high, due mainly to the nature of the vegetation (i.e. natural bushveld vegetation). Where the natural vegetation has been cleared to make way for agriculture, or where vegetation has been heavily grazed, VAC is low.

Along the district roads in the area, the presence of natural vegetation along the road contributes significantly to VAC. Breaks in the vegetation coinciding with an elevated prospect reduces VAC, but this is an occasional occurrence.

High VAC is considered for all potential visual receptors, with the exception of cleared and denuded areas in close proximity to the proposed site. As such, VAC will be taken into account within the entire study area in the Assessment of Visual Impacts to follow.



Map 4: Visual proximity analysis, observer sensitivity and proximity

Figure 11: High VAC along the site boundary

Figure 12: High VAC associated with the region

7.5 VISUAL IMPACT INDEX

The results of the visual exposure, viewer incidence / perception and visual distance of the proposed development are displayed on **Map 5**. Here the weighted impact and the likely areas of impact have been indicated as a visual impact index.

Values have been assigned for each potential visual impact per data category and merged in order to calculate the visual impact index. An area with short distance, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This helps in focusing the attention to the critical areas of potential impact when evaluating the issues related to the visual impact.

The visual impact index for the proposed development is further described as follows.

- The visual impact index map indicates a core zone of likely and **high** visual impact on the site itself and within 1km of the proposed development. This includes impacts on

  Sensitive visual receptors within this zone comprise mainly residents loacted to the north west and north of the site. These receptors are likely to experience **very high** visual impact.

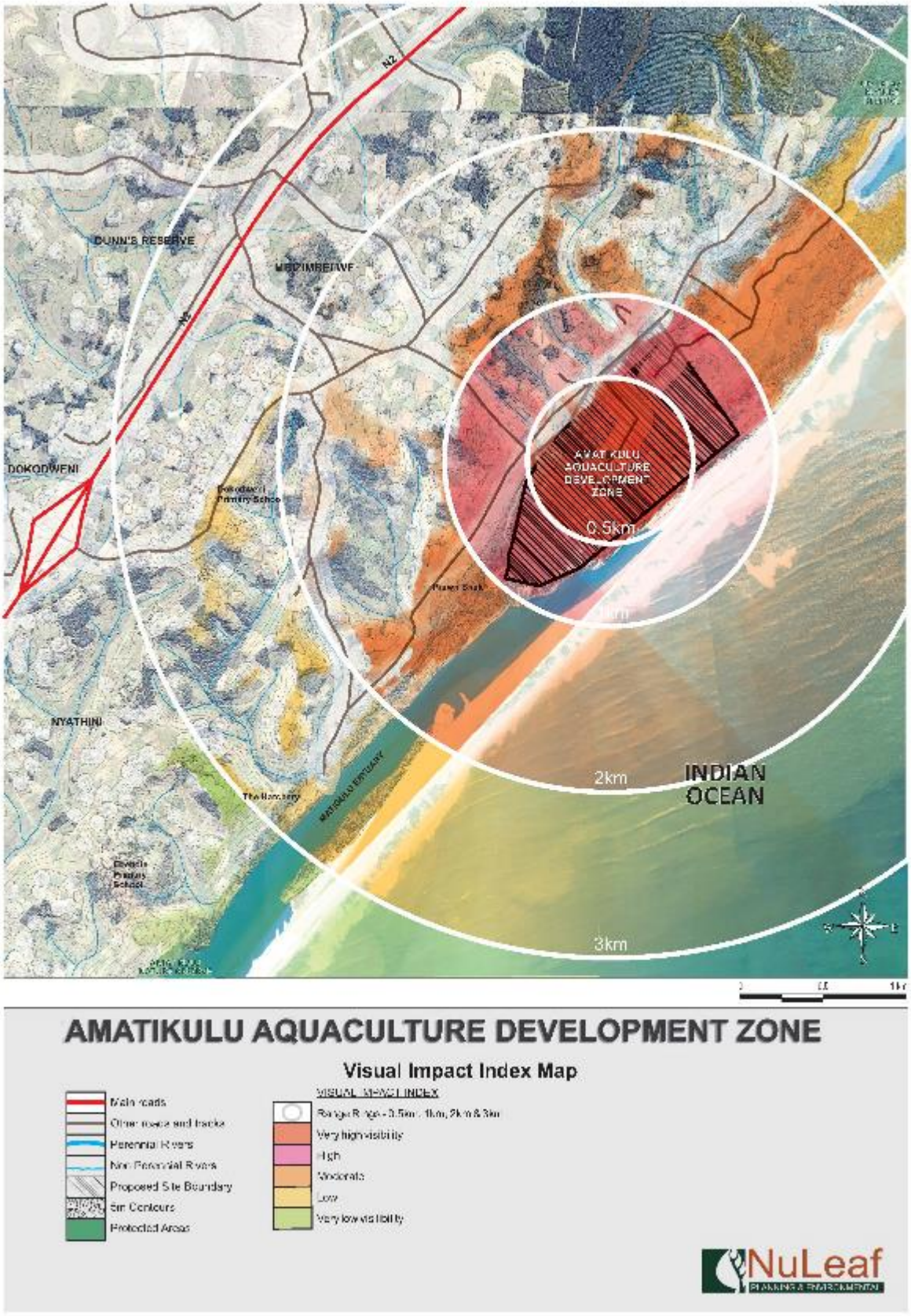
- Visual impact is likely to be **moderate** between 1km and 2km of the proposed development.

  Sensitive visual receptors include users secondary roads, visitors to the prawn shak as well as residents located west, north west and north of the site. These receptors are likely to experience **high** visual impact.

- Between 2km and 3km of the proposed development, the extent of potential visual impact is significantly reduced. Where they occur, visual impacts within this zone are likely to be **low**.

  Sensitive visual receptors at this distance include users of secondary roads, visitors to the the Hatchery and Matigulu Estuary, as well as, residents locatd near the Dokodweni Primary School and south west of the site. Visual impacts on these sensitive receptors are likely to be **moderate.**

- Remaining impacts beyond 3km of the proposed development are expected to be **low** to **very low,** where these occur at all.



Map 5: Visual Impact Index

7.6 VISUAL IMPACT ASSESSMENT: METHODOLOGY

The previous section of the report identified specific areas where likely visual impacts would occur. This section will attempt to quantify these potential visual impacts in their respective geographical locations and in terms of the identified issues related to the visual impact.

The methodology for the assessment of potential visual impacts states the **nature** of the potential visual impact (e.g. the visual impact on users of major roads in the vicinity of the proposed development) and includes a table quantifying the potential visual impact according to the following criteria:

- **Extent** - international (very high = 5), national (high = 4), regional (medium = 3), local (low = 2) or site specific (very low = 1)
- **Duration** - very short (0-1 yrs = 1), short (2-5 yrs = 2), medium (5-15 yrs = 3), long (>15 yrs = 4), and permanent (= 5)
- **Magnitude** - None (= 0), minor (= 2), low (= 4), medium/moderate (= 6), high (= 8) and very high (= 10). This value is read off the Visual Impact Index maps.
- **Probability** – very improbable (= 1), improbable (= 2), probable (= 3), highly probable (= 4) and definite (= 5)
- **Status** (positive, negative or neutral)
- **Reversibility** - reversible (= 1), recoverable (= 3) and irreversible (= 5)
- **Significance** - low, medium or high

The **significance** of the potential visual impact is equal to the **consequence** multiplied by the **probability** of the impact occurring, where the consequence is determined by the sum of the individual scores for magnitude, duration and extent (i.e. **significance = consequence (magnitude + duration + extent) x probability**).

The significance weighting for each potential visual impact (as calculated above) is as follows:

- <30 points: Low (where the impact would not have a direct influence on the decision to develop in the area)
- 31-60 points: Medium/moderate (where the impact could influence the decision to develop in the area)
- >60: High (where the impact must have an influence on the decision to develop in the area)

7.7 VISUAL IMPACT ASSESSMENT: PRIMARY IMPACTS

The proposed development as well as, associated infrastructure is unlikely to exceed the expected height of the proposed development. As such, the visual exposure of these components will fall within the viewsheds generated for the buildings.

Access roads will be required both to construct and to maintain the facility (operational phase). These access roads have the potential of manifesting as landscape scarring, and thus represent a potential visual impact within the viewshed areas. However, as access roads and servitudes have no elevation or height, so the visual impact of this associated infrastructure will be absorbed by the visual impact of the primary development.

7.7.1 POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY

The visual impacts on sensitive visual receptors (i.e. users of roads and residents of homesteads) in close proximity to the proposed development (i.e. within 1km) are expected to be of **high** significance before mitigation and of **moderate** significance post mitigation. The relatively limited extent of visual impact and the high VAC of the area will contribute to reducing the probability of the visual impact of the development somewhat.

The table below illustrates this impact assessment.

Table 2: Impact table summarising the significance of sensitive visual receptors in close proximity to the proposed development

Nature of Impact:
Visual impact on the users of roads and residents of settlements, in close proximity to the proposed development

	No mitigation	***Mitigation considered***
Extent	Local **(2)**	Local **(2)**
Duration	Permanent **(5)**	Permanent **(5)**
Magnitude	High **(10)**	High **(8)**
Probability	High **(4)**	Probable **(3)**
Significance	High **(68)**	Moderate **(45)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation / Management:

Planning:

- Respond to the natural environment during the planning of buildings and infrastructure.
- Retain / re-establish and maintain large trees, natural features and noteworthy natural vegetation in all areas outside of the development footprint. Adapt the development footprint to accommodate these where necessary.
- Retain natural pockets (wetland, river and other sensitive vegetation zones) as buffers within the development and along the perimeter.
- Retain vegetation in all areas outside of actual built footprints wherever possible.
- Soften hard spaces and parking areas through the retention of existing vegetation or the introduction of appropriate indigenous planting.
- Make use of muted earth tones, matt surfaces and natural materials rather than primary colours, reflective surfaces and high-tech finishes for all buildings, structures and infrastructure.
- Tilt large window areas to negate reflection impact.
- Limit the overall height of all buildings to a maximum of 6m.
- Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes.
- Avoid large areas of un-shaded reflective and hard paving surfaces.
- Avoid the placement of unsightly services and infrastructure in visually prominent areas.
- Appropriately screen service areas.

Construction:

- Rehabilitate all construction areas.
- Ensure that vegetation is not cleared unnecessarily to make way for infrastructure.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.
- Monitor rehabilitated areas post construction and implement remedial actions as required.

Operations:

- Maintain the general appearance of the development as a whole.
- Monitor rehabilitated areas, and implement remedial action as and when required.

Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use of the site. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.
Cumulative impacts: The construction and operation of the proposed Amatikulu ADZ together with its associated infrastructure will increase the cumulative visual impact of aquiculture facilities and infrastructure within the region.
Residual impacts: None.

7.7.2 POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS WITHIN THE REGION

The visual impact on sensitive visual receptors (i.e. users of roads and residents of homesteads) within the region (i.e. beyond the 3km offset) is expected to be of **moderate** significance, and may be mitigated to **low.** The relatively limited extent of visual impact and the high VAC of the area will contribute to reducing the probability of the visual impact of the development somewhat.

The table below illustrates this impact assessment.

Table 3: Impact table summarising the significance of visual impacts on sensitive visual receptors within the region

Nature of Impact: Visual impact on the users of roads and residents of settlements on the periphery of the 3km offset and within the region beyond		
	No mitigation	***Mitigation considered***
Extent	Regional **(3)**	Regional **(3)**
Duration	Permanent **(5)**	Permanent **(5)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(42)**	Low **(28)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation / Management: Planning: ➢ Respond to the natural environment during the planning of buildings and infrastructure. ➢ Retain / re-establish and maintain large trees, natural features and noteworthy natural vegetation in all areas outside of the development footprint. Adapt the development footprint to accommodate these where necessary. ➢ Retain natural pockets (wetland, river and other sensitive vegetation zones) as buffers within the development and along the perimeter. ➢ Retain vegetation in all areas outside of actual built footprints wherever possible. ➢ Soften hard spaces and parking areas through the retention of existing vegetation or the introduction of appropriate indigenous planting. ➢ Make use of muted earth tones, matt surfaces and natural materials rather than primary colours, reflective surfaces and high-tech finishes for all buildings, structures and infrastructure. ➢ Tilt large window areas to negate reflection impact. ➢ Limit the overall height of all buildings to a maximum of 12m. ➢ Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes. ➢ Avoid large areas of un-shaded reflective and hard paving surfaces. ➢ Avoid the placement of unsightly services and infrastructure in visually prominent areas.		

➢ Appropriately screen service areas. Construction: ➢ Rehabilitate all construction areas. ➢ Ensure that vegetation is not cleared unnecessarily to make way for infrastructure. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post construction and implement remedial actions as required. Operations: ➢ Maintain the general appearance of the development as a whole. ➢ Monitor rehabilitated areas, and implement remedial action as and when required. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use of the site. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.
Cumulative impacts: The construction and operation of the proposed Amatikulu ADZ together with its associated infrastructure will increase the cumulative visual impact of built infrastructure within the region.
Residual impacts: None.

7.7.3 POTENTIAL VISUAL IMPACT ON CONSERVATION AREAS IN CLOSE PROXIMITY

The potential visual impact on protected and conservation areas in close proximity to the site (i.e. the Amatikulu Nature Reserve and the Umlalazi Nature Reserve) is expected to be of **moderate** significance, and **low** after mitigation.

The relatively limited extent of visual impact and the high VAC of the area will contribute to reducing the probability of the visual impact of the development somewhat. The table below illustrates this impact assessment.

Table 4: Impact table summarising the significance of visual impacts on conservation areas within in close proximity to the proposed development

Nature of Impact: Potential visual impact on conservation areas in close proximity to the proposed development		
	No mitigation	***Mitigation considered***
Extent	Local **(2)**	Local **(2)**
Duration	Permanent **(5)**	Permanent **(5)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(39)**	Low **(26)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation / Management: Planning: ➢ Respond to the natural environment during the planning of buildings and infrastructure. ➢ Retain / re-establish and maintain large trees, natural features and noteworthy natural vegetation in all areas outside of the development footprint. Adapt the development footprint to accommodate these where necessary. ➢ Retain natural pockets (wetland, river and other sensitive vegetation zones) as buffers within the development and along the perimeter. ➢ Retain vegetation in all areas outside of actual built footprints wherever possible. ➢ Soften hard spaces and parking areas through the retention of existing vegetation or		

the introduction of appropriate indigenous planting. ➢ Make use of muted earth tones, matt surfaces and natural materials rather than primary colours, reflective surfaces and high-tech finishes for all buildings, structures and infrastructure. ➢ Tilt large window areas to negate reflection impact. ➢ Limit the overall height of all buildings to a maximum of 12m. ➢ Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes. ➢ Avoid large areas of un-shaded reflective and hard paving surfaces. ➢ Avoid the placement of unsightly services and infrastructure in visually prominent areas. ➢ Appropriately screen service areas. <u>Construction:</u> ➢ Rehabilitate all construction areas. ➢ Ensure that vegetation is not cleared unnecessarily to make way for infrastructure. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post construction and implement remedial actions as required. <u>Operations:</u> ➢ Maintain the general appearance of the development as a whole. ➢ Monitor rehabilitated areas, and implement remedial action as and when required. <u>Decommissioning:</u> ➢ Remove infrastructure not required for the post-decommissioning use of the site. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.
Cumulative impacts: The construction and operation of the proposed Amatikulu ADZ together with its associated infrastructure will increase the cumulative visual impact of built infrastructure within the region.
Residual impacts: None.

7.7.4 POTENTIAL VISUAL IMPACT OF CONSTRUCTION ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY

During the construction period, the development sites will represent a visual disturbance. In addition there will be an increase in heavy vehicles utilising the roads to the construction sites that may cause, at the very least, a visual nuisance to other road users and landowners in the area. Mitigation entails proper planning, management and rehabilitation of all construction sites to forego visual impacts.

The table below illustrates the assessment of the anticipated visual impact of construction on sensitive visual receptors in close proximity to the proposed development. Visual impacts are likely to be of **moderate** significance, and may be mitigated to **low.** The relatively limited extent of visual impact and the high VAC of the area will contribute to reducing the probability of this visual impact somewhat.

The table below illustrates this impact assessment.

Table 5: Impact table summarising the significance of visual impact of construction on visual receptors in close proximity to the proposed development

Nature of Impact: Visual impact of construction activities, vehicles and dust on sensitive visual receptors in close proximity to the proposed development.		
	No mitigation	***Mitigation considered***
Extent	Local **(2)**	Local **(2)**
Duration	Short term **(2)**	Short term **(2)**
Magnitude	High **(8)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(36)**	Low **(20)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: <u>Construction:</u> ➢ Ensure that vegetation is not unnecessarily removed during the construction period. ➢ Reduce the construction period through careful logistical planning and productive implementation of resources. ➢ Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible. ➢ Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. ➢ Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities. ➢ Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent). ➢ Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts. ➢ Rehabilitate all disturbed areas immediately after the completion of construction works.		
Cumulative impacts: None.		
Residual impacts: None, provided rehabilitation works is carried out as specified.		

7.7.5 POTENTIAL VISUAL IMPACT OF LIGHTING AT NIGHT ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY

The rural and conservation areas surrounding the proposed facility represent a low incidence of light sources, resulting in a low level of existing light impact. As such, a potential negative impact may result if the lighting for the facility is not responsively and sensitively designed. The use of floodlights and high impact lights would create light trespass in an otherwise dark environment. This would be especially problematic for sensitive receptors in close proximity.

In addition to the above sky glow is the condition where the night sky is illuminated when light reflects off particles in the atmosphere such as moisture, dust or smog. The sky glow intensifies with the increase in the amount of light sources. Each new light source, especially upwardly directed lighting, contributes to the increase in sky glow.

The table below illustrates the assessment of the anticipated visual impact of lighting at night on sensitive visual receptors in close proximity to the proposed development. Visual impacts are likely to be of **moderate** significance, and may be mitigated to **low.** The relatively limited extent of visual impact and the high

VAC of the area will contribute to reducing the probability of the visual impact of the development somewhat.

Table 6: Impact table summarising the significance of visual impact of lighting at night on visual receptors in close proximity to the proposed development

Nature of Impact: Visual impact of direct lighting and sky glow on sensitive visual receptors in close proximity to the proposed development.		
	No mitigation	***Mitigation considered***
Extent	Local **(2)**	Local **(2)**
Duration	Permanent **(5)**	Permanent **(5)**
Magnitude	Moderate **(6)**	Low **(4)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(39)**	Low **(22)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: <u>Planning & operation</u>: ➢ Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). ➢ Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. ➢ Make use of minimum lumen or wattage in fixtures. ➢ Make use of down-lighters, or shielded fixtures. ➢ Make use of Low Pressure Sodium lighting or other types of low impact lighting. ➢ Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.		
Cumulative impacts: The impact of the proposed Amatikulu ADZ together with its associated infrastructure will contribute to a regional increase in lighting impact.		
Residual impacts: None.		

7.8 VISUAL IMPACT ASSESSMENT: SECONDARY IMPACTS

7.8.1 POTENTIAL VISUAL IMPACT ON THE VISUAL CHARACTER OF THE LANDSCAPE AND SENSE OF PLACE OF THE REGION.

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria and specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.) play a significant role.

A visual impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

In general the landscape character of the greater study area presents as rural and natural, with some agriculture. The site itself is natural in character, with the existing aquaculture infrastructure situated mainly in the northern portion of the site.

The visual quality of the region is generally high. Large tracts of intact vegetation and subsistence agriculture characterising most of the visual environment. There

is no evidence of widespread erosion or natural degradation, and development, where this occurs, is domestic in scale, with the exception of the existing aquaculture and manufacturing activities already taking place on the site.

The entire area where the proposed Amatikulu ADZ lies is considered highly sensitive to visual impacts due to its topography and generally low levels of transformation.

The key visual experience is linked to the use of the road network and associated views of the surrounding landscape, which is characterised by rolling hills, valley bottom wetlands and sandy dunes with low levels of transformation.

The sense of place experience in the region is influenced by the visual picture made up of natural and cultural landscape forms and shapes.

The anticipated visual impact on the visual character and sense of place of the study area is expected to be of **moderate** significance before mitigation and of **low** significance after mitigation.

The relatively limited extent of visual impact and the high VAC of the area will contribute to reducing the probability of the visual impact of the development somewhat. The table below illustrates the assessment of this anticipated impact.

Table 7: Impact table summarising the significance of visual impacts on landscape character and sense of place within the region

Nature of Impact: Visual impact of the proposed development on the visual quality of the landscape and sense of place of the region		
	No mitigation	***Mitigation considered***
Extent	Regional **(3)**	Regional **(3)**
Duration	Permanent **(5)**	Permanent **(5)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(42)**	Low **(24)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation / Management:

Planning:

- Respond to the natural environment during the planning of buildings and infrastructure.
- Retain / re-establish and maintain large trees, natural features and noteworthy natural vegetation in all areas outside of the development footprint. Adapt the development footprint to accommodate these where necessary.
- Retain natural pockets (wetland, river and other sensitive vegetation zones) as buffers within the development and along the perimeter.
- Retain vegetation in all areas outside of actual built footprints wherever possible.
- Soften hard spaces and parking areas through the retention of existing vegetation or the introduction of appropriate indigenous planting.
- Make use of muted earth tones, matt surfaces and natural materials rather than primary colours, reflective surfaces and high-tech finishes for all buildings, structures and infrastructure.
- Tilt large window areas to negate reflection impact.
- Limit the overall height of all buildings to a maximum of 12m.
- Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes.
- Avoid large areas of un-shaded reflective and hard paving surfaces.
- Avoid the placement of unsightly services and infrastructure in visually prominent

areas.
- Appropriately screen service areas.

Construction:
- Rehabilitate all construction areas.
- Ensure that vegetation is not cleared unnecessarily to make way for infrastructure.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.
- Monitor rehabilitated areas post construction and implement remedial actions as required.

Operations:
- Maintain the general appearance of the development as a whole.
- Monitor rehabilitated areas, and implement remedial action as and when required.

Decommissioning:
- Remove infrastructure not required for the post-decommissioning use of the site.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.
- Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.

Cumulative impacts:
The construction and operation of the proposed Amatikulu ADZ together with its associated infrastructure will increase the cumulative visual impact of aquaculture infrastructure within the region.

Residual impacts:
None.

7.9 THE POTENTIAL TO MITIGATE VISUAL IMPACTS

The primary visual impact, namely the presence of the proposed Amatikulu ADZ together with its associated infrastructure, may be mitigated from a visual perspective, due to the nature and scale of the development (i.e. development footprint and height of the buildings). This mitigation potential is further supported by the nature of the receiving environment.

The following mitigation will further contribute to reducing the magnitude of the visual impacts discussed in sections 7.7 – 7.8:

- Some mitigation of primary and secondary impacts may be achieved by ensuring that the preservation and / or re-introduction of vegetation be allowed for in the planning and implementation of the development. This measure will help to soften the appearance of the facility within its context. Such mitigation includes the following:

  - Respond to the natural environment during the planning of buildings and infrastructure.
  - Retain / re-establish and maintain large trees, natural features and noteworthy natural vegetation in all areas outside of the development footprint. Adapt the development footprint to accommodate these where necessary.
  - Retain natural pockets (wetland, river and other sensitive vegetation zones) as buffers within the development and along the perimeter.
  - Retain vegetation in all areas outside of actual built footprints wherever possible.
  - Soften hard spaces and parking areas through the retention of existing vegetation or the introduction of appropriate indigenous planting.
  - Make use of muted earth tones, matt surfaces and natural materials rather than primary colours, reflective surfaces and high-tech finishes for all buildings, structures and infrastructure.
  - Tilt large window areas to negate reflection impact.
  - Limit the overall height of all buildings to a maximum of 12m.

- Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes.
- Avoid large areas of un-shaded reflective and hard paving surface.
- Avoid the placement of unsightly services and infrastructure in visually prominent areas.
- Appropriately screen service areas.

- Mitigation of visual impacts associated with the construction phase, albeit temporary, entails proper planning, management and rehabilitation of all construction sites. Construction should be managed according to the following principles:

  - Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
  - Reduce the construction period through careful logistical planning and productive implementation of resources.
  - Plan the placement of lay-down areas and any potential temporary construction camps along the corridor in order to minimise vegetation clearing.
  - Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
  - Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
  - Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
  - Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
  - Ensure that all infrastructure and the site and general surrounds are maintained and kept neat.
  - Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
  - Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.

- Mitigation of other lighting impacts includes the pro-active design, planning and specification lighting for the development. The correct specification and placement of lighting and light fixtures will go far to contain rather than spread the light. Additional measures include the following:

  - Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself);
  - Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights;
  - Making use of minimum lumen or wattage in fixtures;
  - Making use of down-lighters, or shielded fixtures;
  - Making use of Low Pressure Sodium lighting or other types of low impact lighting.

- Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

- Following construction, the maintenance of the buildings and infrastructure is critical, and will ensure that the development does not degrade or become an eyesore.

The possible mitigation of both primary and secondary visual impacts as listed above should be implemented and maintained on an on-going basis.

8 CONCLUSION AND RECOMMENDATIONS

The construction and operation of the proposed Amatikulu ADZ will have a visual impact on the scenic resources of the study area.

Some visual impact has already occurred as a result of the existing Aquaculture developments on the site. It is therefore expected that the visual impact associated with the new proposed expansion will further contribute to the visual impact currently present on the site.

However, mitigation of visual impact is possible and will go far in reducing the magnitude of visual impacts discussed by softening the appearance of the development within its context. The recommendations made (see Section 7.9) should be followed and the mitigation implemented on an ongoing basis.

Considering all factors, it is concluded that the development is appropriate within its context from a visual perspective, and that the anticipated visual impacts are neither unacceptable in nature nor excessive in magnitude. Potential visual impacts are therefore not considered to be a fatal flaw for this development.

The relatively limited extent of visual impact and the high VAC of the area is a strong consideration in this regard.

Based on the above, it is the recommendation of the author that the proposed development of the Amatikulu ADZ including all proposed components, be supported from a visual perspective, subject to the implementation of the required and recommended optimisation and mitigation measures detailed in Section 7.9.

9 IMPACT STATEMENT

In light of the results and findings of the Visual Impact Assessment undertaken for the proposed Amatikulu ADZ, it is acknowledged that the receiving environment will be visually transformed.

The following is a summary of anticipated cumulative visual impacts, including all proposed components of the development:

- The visual impact on sensitive visual receptors (i.e. users of roads and residents of homesteads) in close proximity to the proposed development (i.e. within 1km) are expected to be of **high** significance, and may be mitigated to **moderate**.
- The visual impact on sensitive visual receptors (i.e. users of roads and residents of homesteads and settlements) within the region (i.e. beyond

the 3km offset) is expected to be of **moderate** significance, and may be mitigated to **low.**

- The potential visual impact on protected and conservation areas in close proximity to the site (i.e. the Amatikulu Nature Reserve and the Umlalazi Nature Reserve) is expected to be of **moderate** significance, and **low** after mitigation.
- The anticipated visual impact of construction on sensitive visual receptors in close proximity to the proposed development. Visual impacts are likely to be of **moderate** significance, and may be mitigated to **low.**
- The anticipated visual impact of lighting at night on sensitive visual receptors in close proximity to the proposed development. Visual impacts are likely to be of **moderate** significance, and may be mitigated to **low.**
- The anticipated visual impact on the visual character of the landscape and sense of place of the region is expected to be of **moderate** significance, and may be mitigated to **low**.

Most impacts above are determined to be of moderate significance and can be mitigated to low, with the exception of sensitive visual receptors within close proximity to the site.

In addition, none are considered to be fatal flaws from a visual perspective. This is based on the relatively high VAC within the study area and the possibility of mitigating the visual impacts expected.

10 REFERENCES / DATA SOURCES

Chief Director of Surveys and Mapping, varying dates. *1:50 000 Topo-cadastral maps and digital data.*

CSIR/ARC, 2000. *National Land-cover Database 2000 (NLC 2000).*

DEADP, Provincial Government of the Western Cape, 2011. *Guideline on Generic Terms of Reference for EAPS and Project Schedules.*

Department of Environmental Affairs and Tourism (DEA&T), 2001. *Environmental Potential Atlas (ENPAT) for the Gauteng Province.*

National Botanical Institute (NBI), 2004. *Vegetation Map of South Africa, Lesotho and Swaziland (Unpublished Beta Version 3.0).*

Oberholzer, B. (2005). *Guideline for involving visual and aesthetic specialists in EIA processes: Edition 1.*