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## **FINAL BASIC ASSESSMENT REPORT**

**EDTEA REF; DC25/0011/2019;  
KZN/EIA/0001265/2019**

**THE PROPOSED DEVELOPMENT OF  
KWAMATHUKUZA PHASE 2 HOUSING  
UNITS WITHIN NEWCASTLE LOCAL  
MUNICIPALITY, AMAJUBA DISTRICT,  
KWAZULU-NATAL.**

**November 2019**

**Prepared by:**

**Emvelo Quality and Environmental  
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**On Behalf of**



**Newcastle Local Municipality**

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## LIST OF ACRONYMS

DWS	Department of Water and Sanitation
DEDTEA	Department of Economic Development, Tourism and Environmental Affairs
EMPr	Environmental Management Programme
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act
I&AP	Interested and Affected Parties
EAP	Environmental Assessment Practitioner
GA	General Authorisation

## PROJECT DETAILS

### Developer (DEV)

<b>Name of the Developer</b>	<b>Newcastle Local Municipality</b>
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### Environmental Assessment Practitioner (EAP) Details

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## **GLOSSARY OF ITEM**

**DEVELOPMENT:** the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.

**BIODIVERSITY:** The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

**BASIC ASSESSMENT:** The process of collecting, organizing, analyzing, interpreting and communicating information that is relevant to the consideration of the application.

**DEVELOPMENT FOOTPRINT:** any evidence of physical alteration because of the undertaking of any activity.

**CONTRACTOR:** companies and or individual persons appointed on behalf of the client to undertake activities, as well as their sub-contractors and suppliers.

**ENVIRONMENTAL CONTROL OFFICER:** an individual nominated through the client to be present on site to act on behalf of the client in matters concerning the implementation and day to day monitoring of the EMPr and conditions stipulated by the authorities as prescribed in NEMA.

**ENVIRONMENT:** in terms of the National Environmental Management Act (NEMA) (No 107 of 1998) (as amended), Environment means the surroundings within which humans exist and that are made up of:

- the land, water and atmosphere of the earth;
- micro-organisms, plants and animal life;
- any part or combination of (i) of (ii) and the interrelationships among and between them;
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence;
- Human health and wellbeing.



**ENVIRONMENTAL IMPACT:** the change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services.

**MITIGATION:** the measures designed to avoid reduce or remedy adverse impacts.

**ENVIRONMENTAL MANAGEMENT PROGRAMME:** a detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of the project. This EMP focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

**POLLUTION:** the National Environmental Management Act, No. 107 of 1998 defined pollution to mean any change in the environment caused by the substances; radioactive or other waves; or noise, odors, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

**WATER POLLUTION:** the National Water Act, 36 of 1998 defined water pollution to be the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it less fit for any beneficial purpose for which it may reasonably be expected to be used; or harmful or potentially harmful (a) to the welfare, health or safety of human beings; (b) to any aquatic or non-aquatic organisms; (c) to the resource quality; or (d) to property.

**REHABILITATION:** rehabilitation is defined as the return of a disturbed area to a state which approximates the state (wherever possible) which it was before disruption.

**WATERCOURSE:** can be a) a river or spring; b) a natural channel or depression in which water flows regularly or intermittently; c) a wetland, lake or dam into which, or from which, water flows; and/or d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water

Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.

**WETLAND:** land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

**INDIGENOUS VEGETATION:** refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

**GENERAL WASTE:** waste that does not pose an immediate hazard or threat to health or the environment, and includes -

- Domestic waste;
- Building and demolition waste;
- Business waste; and
- Inert waste.

**HAZARDOUS WASTE:** hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste have a detrimental impact on health and the environment.

**GENERAL WASTE LANDFILL SITE:** a waste disposal site that is designed, managed, permitted and registered to allow for the disposal of general waste.

**ARCHAEOLOGICAL RESOURCES:** includes (a) material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artifacts, human and hominid remains and artificial features and structures; (b) rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation; wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones

Act, and any cargo, debris or artifacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; features, structures and artifacts associated with military history which are older than 75 years and the site on which they are found.

**INTERESTED AND AFFECTED PARTY:** for the purposes of Chapter 5 of the NEMA and in relation to the assessment of the environmental impact of a listed activity or related activity, an interested and affected party contemplated in Section 24(4) (a) (v), and which includes (a) any person, group of persons or organization interested in or affected by such operation or activity; and (b) any organ of state that may have jurisdiction over any aspect of the operation or activity.

## EXECUTIVE SUMMARY

Newcastle Local Municipality proposes to construct 227 low- income housing units in KwaMathukuza, within the Jurisdiction of Amajuba District, Kwa-Zulu Natal Province. The proposed site is situated, approximately 16 km south of Newcastle town. The current zoning of the property is Residential, and the size of the proposed development is approximately 19, 13ha. The property in question is owned by the municipality.

Emvelo Quality and Environmental Consultant have been appointed by PHUMAF Consulting Engineers on behalf of Newcastle Local Municipality (the applicant), as the independent Environmental Assessment Practitioner (EAP), to facilitate the Basic Assessment Processes required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for this application.

The site is located within V31K quaternary catchment and is bordered by two river systems namely; Ingagane and Ncandu. The terrain (site) is relatively flat with the vegetation cover classified as KwaZulu-Natal High Thornveld (National Threat Status: Least Threatened).

Two species of conservation concern were recorded on 2730CC GRID cell, where the development is located. Namely; *Dasymys incomtus* (Common Dasymys) and *Otomys auratus* (Southern African Vlei Rat), which are both classified as near threatened. The single amphibian SCC is the Giant Bull Frog classified as near threatened.

The National Environmental Management Act (107 of 1998), and the Environmental Impact Assessment Regulations (2017) as amended govern the process of applying for environmental authorization for certain developments. A provision in the EIA Regulations is made for two forms of assessment: Basic Assessment and Scoping and EIA. The EIA regulations specify that: Activities identified in Listing Notice 1 and 3 (GNR 327 and 324 of 2017) requires Basic Assessment; Activities identified in Listing Notice 2 (GNR 325 of 2017) are subject to a Scoping and EIA.

This application will follow a Basic Assessment. The listed activity associated with the proposed development is Listing Notice 1 Activity 27.

The Public Participation Process (PPP) as to date included: conducting a public meeting with the affected community, placing of an advertisement on the Newcastle Advertiser (local newspaper), distribution of Background Information Documents (BIDs) to the relevant Government Stakeholders and other Interested and Affected Parties (I&APS).

## 1. INTRODUCTION

Emvelo Consultant has been appointed by Newcastle Local Municipality, to undertake the Environmental Impact Assessment (EIA) for the proposed construction of 227 low-income housing units in KwaMathukuza, within the Jurisdiction of Amajuba District, Kwa-Zulu Natal Province.

This will include the facilitation of the Basic Assessment Processes required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for this application.

## 2. PROJECT TITLE

The Proposed Development of KwaMathukuza Phase 2 Housing Units within Newcastle Local Municipality, Amajuba District, Kwazulu-Natal.

## 3. PROJECT DESCRIPTION

The proposed development project entails the construction of 227 low-income housing units. Each erf (yard) size is estimated to be approximately 250m<sup>2</sup> to 300m<sup>2</sup>, with slightly larger erven along the main peripheral roads. The house size will be 40 m<sup>2</sup>.

Furthermore, the project involves the demolishing of the existing transit camp and the subsequent relocation of those occupants to the newly developed housing units. The relocation plan is made up of two phases and will entail the following (for layout on the relocation plan please see the attached appendix M);

**Phase 1-** 125 stands to be developed first, 120 families from decanting units to be moved here;

**Phase 2-** 95 stands stand to be developed after decanting units have been demolished.

The internal road reserves will be 10 meters wide and all bulk services including electrical, water, waste and sewage will be connected to the existing municipal system as per development of Phase 1.

This development will take place on the remainder of erven 814 and 815 in KwaMathukuza, Newcastle, KwaZulu-Natal

#### 4. PROJECT LOCALITY

The proposed development is located within the Newcastle Local Municipality found under Amajuba District which is located in the north-west of KwaZulu-Natal Province. The proposed development site is bordered by Ingagane river on the east, provincial road P483 on the south, Industrial Airport on the west and Riverside industrial on the north.

Table 1 below provides Global Positioning System (GPS) coordinates for the proposed development site.

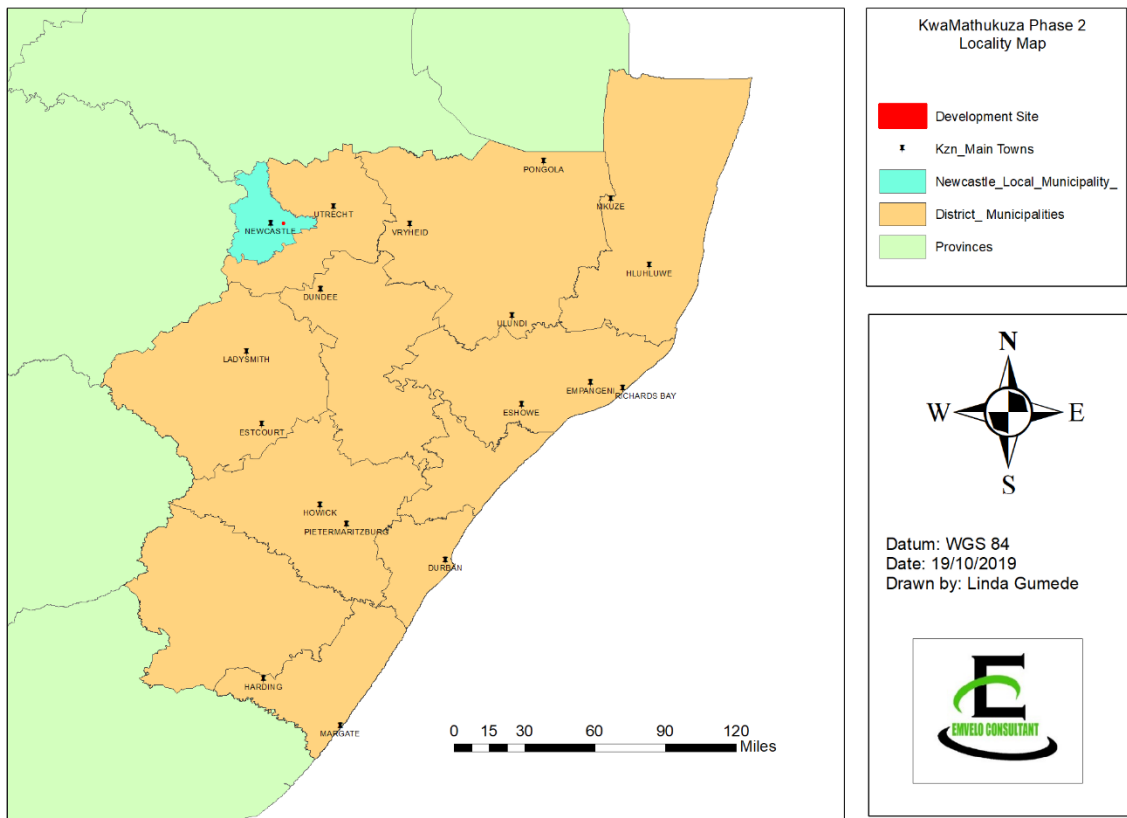
**Table 1: Coordinates**

Latitude /Longitude	Degrees	Minutes	Seconds
<b>South</b>	27 <sup>0</sup>	45'	34.25''
<b>East</b>	30 <sup>0</sup>	0'	11.47''

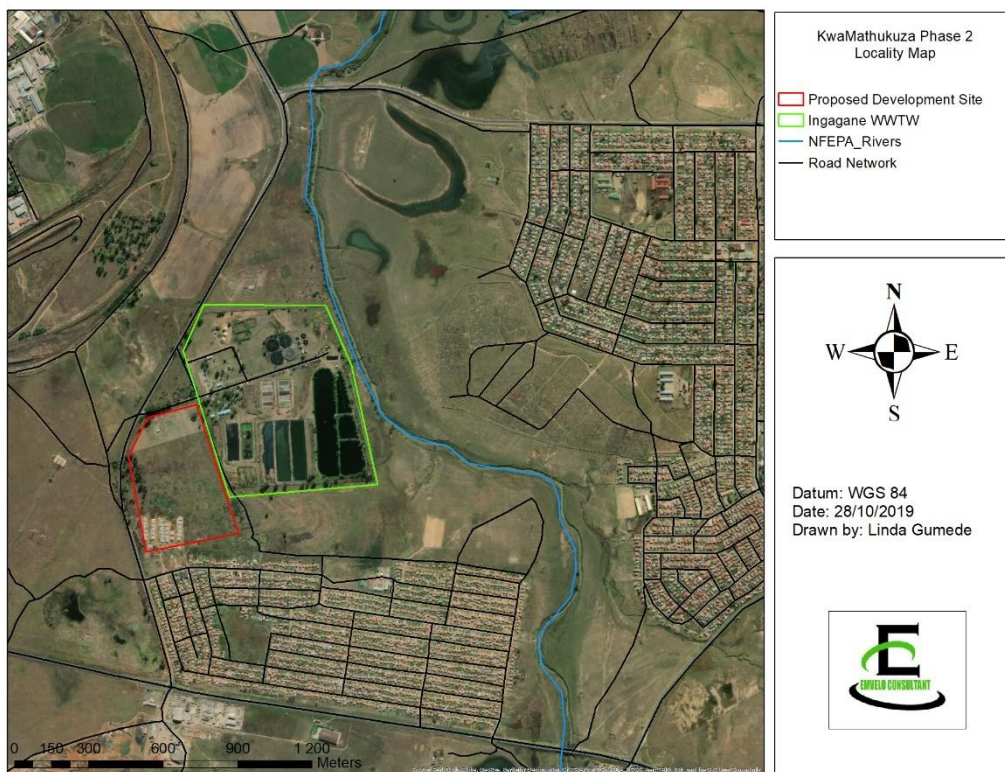
**Table 2: 21-digits Surveyor General Code**

N	0	H	S	0	2	2	1	0	0	0	0	0	8	1	4	0	0	0	0	0

Figure 1 and 2 below indicates the location of the project



**Figure 1: Geographical Context**



**Figure 2: Site Locality**



## 5. SITE ACCESS

The site is situated at the intersection of Asiphephe (Albert Wessels) Drive and Yende Street, just off Madadeni Road and can be accessed in two ways; via Yende Street on the northern side and from Njesuthu and Jonono Roads to the south.

## 6. SERVICES

The proposed development will be connected to the existing municipal bulk water and sewer service system.

### 6.1. WATER SUPPLY

#### 6.1.1 BULK WATER SUPPLY AND INTERNAL WATER RETICULATION

Bulk water for the proposed site will be sourced from 10Mℓ Hilldrop Reservoir which has sufficient capacity. Water supply into the proposed site will be connected to the existing 200mm diameter water pipe running on the southern boundary of the proposed development site.

Furthermore, a proposed water reticulation with a house connection to each stand will be provided. The pipe sizes and type will be 110mm uPVC class 12. The water mains to be installed will be 0.75m from the erf boundary forming a loop. Isolating valves will be placed at the reticulation nodes to provide effective isolation of loops.

### 6.2. SEWER

#### 6.2.1 EXISTING BULK SEWER

Currently there is no pipeline collecting sewer near the proposed development site. However, there is Newcastle Wastewater Treatment Works located adjacent to the site on the eastern boundary as per the information obtained from the municipality, the design capacity for the treatment plant is **25 megaliters** per day and the operating capacity is currently **18 megaliters** per day, for both average dry weather flows. This means that the treatment works is operating at **72% hydraulic loading** average dry weather flows and that there is **28% spare capacity**. The municipality is of the view that this is enough to accommodate the proposed housing development at KwaMathukuza.

## **6.2.2 PROPOSED SEWAGE DISCHARGE AND SEWER RETICULATION**

A waterborne sewerage reticulation with a house connection to each stand will be made available. All sewerage on the development will drain through the gravity waterborne system towards a central collection point on the lowest point of the development.

The pipes will be 160 mm diameter uPVC Class 400 and the manholes will be 1 000 mm diameter precast rings with concrete covers.

## **6.3. ELECTRICITY**

Power to the proposed development will be provided by the Newcastle Municipality. However, this will depend on whether or not the development is approved. There is a 132kw line in close proximity to the proposed development site. Nonetheless, this capacity is not enough to supply the proposed development. A new substation for 10MVA transformer will be required for 132KV switching and the municipality has agreed to address this issue if the development goes ahead. Prior to approving the proposed 10MVA transfer, a feasibility study must be commissioned to assess renewable energy as an alternative. The feasibility study can look into the provision of solar panels for lighting and solar geysers for water heating in order to reduce energy demand.

## **6.4. ROADS**

Access will be taken directly from Njesuthi Road which runs from the south west to the south easterly direction of the site, Njesuthi Road ties into Albert Wessel Drive which runs from the south westerly to the north westerly direction of the site. This roads network will be designed to provide access point to each residential stand.

## **6.5. DOMESTIC WASTE**

During the operational phase, the development will start generating certain amounts of domestic waste. The developer (Newcastle Local Municipality) will collect and manage all domestic waste generated by the development. The waste will be disposed of at the registered Newcastle Landfill site.

## 6.6. STORMWATER MANAGEMENT PLAN

The stormwater system on the existing roads nearby is currently intercepted and channelled by means of mountable kerbs that drain into stormwater concrete pipes and finally discharge into the Ingagane River.

The stormwater will be collected and transported by of roads and v-drains. The total runoff generated by the proposed development is 0,49m<sup>3</sup>/s and 1,2m<sup>3</sup>/s for 1:2 and 1:20 year return periods respectively.

The stormwater run-off will be collected and transported by means of roads and v-drains. Due to the lack of existing stormwater infrastructure, the proposed stormwater system will be extended to reach the Ingagane River as previously mentioned.

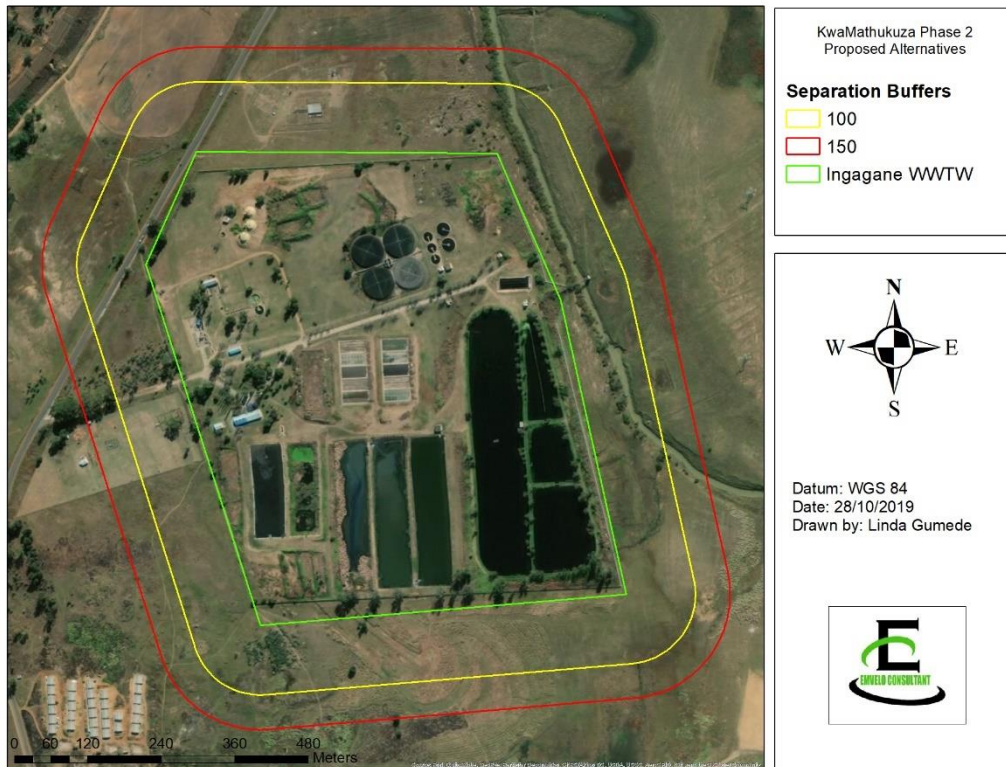
## 7. ALTERNATIVES

The DEA 2006 guidelines on 'assessment of alternatives and impacts' outlines four types of alternatives that need to be considered namely, the no-go, location, activity, and design alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the applicant and EAP, which in some instances culminates in a single preferred project proposal. For this development the following spatial design alternatives were considered.

**Alternative A-**, is proposing a 100-metre buffer/setback from the existing Sewage works and hence providing for approximately 227 units on the site.

**Alternative-B (Preferred)**, is proposing a 150-metre buffer/setback from the existing Sewage works and hence providing for approximately 200 units on the site.

**Refer to figure 3 below**



**Figure 3: Proposed Alternatives**

## **NO-GO**

The No-Go alternative considers no residential development for the KwaMathukuza Phase 2. In the absence of the proposed development the KwaMathukuza transit camp community members will continue to be subjected to the prevailing precarious living conditions until such time a different site is secured by the municipality. Furthermore, the current zoning (which is residential) would have to change.

## **8. ACTIVITY MOTIVATION**

### **8.1. THE NEED**

Approximately more than 200 people have become residents of the temporary/transit camps. These transit camps were built for the sole purpose of decanting people while their houses were constructed during the rectification project. Since these buildings were built as a temporary measure, they do not comply the building standards. During site visit which was conducted on the 15/10/2019, it was discovered that these transit camps are overcrowded, the toilet facilities are inadequate and insufficient to serve the entire population within the transit camps.

One of the community members mentioned, it is unsafe and dangerous for women and children to access these toilet facilities especially at night, as they have to walk a long distance and there has been a number of cases of woman getting mugged and/ or raped within these premises. Refer to table 5. Furthermore, during site inspection conducted, it was also discovered that the temporary toilets were blocked and when flushing residents could see their excreta.



Based on the aforementioned factors there is clear evidence that the prevailing conditions negatively impact on human dignity. No one should be allowed to living in such conditions. As a result, there is a need for the proposed development, as it seeks to address all the aforementioned issues.

## 8.2 DESIRABILITY

The project seeks to facilitate the provision housing in line with the national and provincial norms and standards and hence reduce housing back-logs to meet the provincial and national targets.

Population growth rate in Newcastle is in an upward trajectory with the majority of the growth occurring mainly in the eastern areas – around Madadeni and Osizweni Townships. These are largely underdeveloped areas occupied mainly by low income and poor communities. The project therefore seeks to provide more housing to a municipality that is experiencing population growth and hence higher human settlements demand.

## 9. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

In terms of the Environmental Regulations promulgated under the National Environmental Management Act (NEMA), an EIA must be conducted for any development or activity that requires an Environmental Authorisation. The listed activities in the NEMA, relevant to this project, that trigger the need for Environmental Authorisation are listed below;

**Table 3: Environmental Statutory Framework**

Legislation	Relevance
Constitution of the Republic of South Africa, (No. 108 of 1996)	<ul style="list-style-type: none"> <li>➤ Chapter 2 – Bill of Rights.</li> <li>➤ Section 24 – Environmental Rights.</li> </ul>
National Environmental Management Act (NEMA) (No. 107 of 1998)	<ul style="list-style-type: none"> <li>➤ Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment).</li> <li>➤ Section 28 – Duty of care and remediation of environmental damage.</li> <li>➤ Environmental management principles.</li> <li>➤ Authorities – Department of Environmental Affairs (DEA) (national) and Department of Economic Development Tourism and Environmental Affairs (provincial).</li> </ul>
GN No. 326 (7 April 2017)	<ul style="list-style-type: none"> <li>➤ Purpose - regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to EIA, in order to avoid or</li> </ul>



	mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.	
GN No. 327 (7 April 2017) (Listing Notice 1)	<ul style="list-style-type: none"> <li>➤ Purpose - identify activities that would require environmental authorizations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA.</li> <li>➤ The investigation, assessment, and communication of the potential impact of activities must follow the procedure as prescribed in regulations 19 and 20 of the EIA Regulations published in terms of section 24(5) of the Act. However, according to Regulation 15(3) of GN No. 327, S&amp;EIR must be applied to an application if the application is for two or more activities as part of the same development for which S&amp;EIR must already be applied in respect of any of the activities.</li> <li>➤ Activities under Listing Notice 1 that are relevant to this project are as follows;</li> </ul>	
	<p><b>GN No. 327- Activity no. 27:</b></p> <p>The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-</p> <p>(i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>Approximately 19 hectares of indigenous vegetation would be cleared to pave a way for the proposed development</p>
National Water Act (Act No. 36 of 1998)	<ul style="list-style-type: none"> <li>➤ Chapter 3 – Protection of water resources.</li> <li>➤ Section 19 – Prevention and remedying effects of pollution.</li> <li>➤ Section 20 – Control of emergency incidents.</li> <li>➤ Chapter 4 – Water use.</li> <li>➤ Authority – Department of Water and Sanitation (DWS).</li> </ul>	
National Environmental Management Air Quality Act (Act No. 39 of 2004)	<ul style="list-style-type: none"> <li>➤ Air quality management</li> <li>➤ Section 32 – Dust control.</li> <li>➤ Section 34 – Noise control.</li> <li>➤ Authority – EDTEA.</li> </ul>	

National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	<ul style="list-style-type: none"> <li>➤ Management and conservation of the country’s biodiversity.</li> <li>➤ Protection of species and ecosystems.</li> <li>➤ Authority – EDTEA.</li> </ul>
Occupational Health & Safety Act (Act No. 85 of 1993)	<ul style="list-style-type: none"> <li>➤ Provisions for Occupational Health &amp; Safety</li> <li>➤ Authority – Department of Labour.</li> </ul>
National Heritage Resources Act (Act No. 25 of 1999)	<ul style="list-style-type: none"> <li>➤ Section 34 – protection of structure older than 60 years.</li> <li>➤ Section 35 – protection of heritage resources.</li> <li>➤ Section 36 – protection of graves and burial grounds.</li> <li>➤ Authority – KwaZulu Natal Heritage Resources Authority (KZHRA)</li> </ul>

## 10. A DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE ACTIVITY

This section provides a general description of the status quo of the receiving environment in the project area. This serves to provide the context within which the Basic Assessment exercise was conducted. It also allows for an appreciation and identification of sensitive environmental features and possible receptors of the effects of the proposed project.

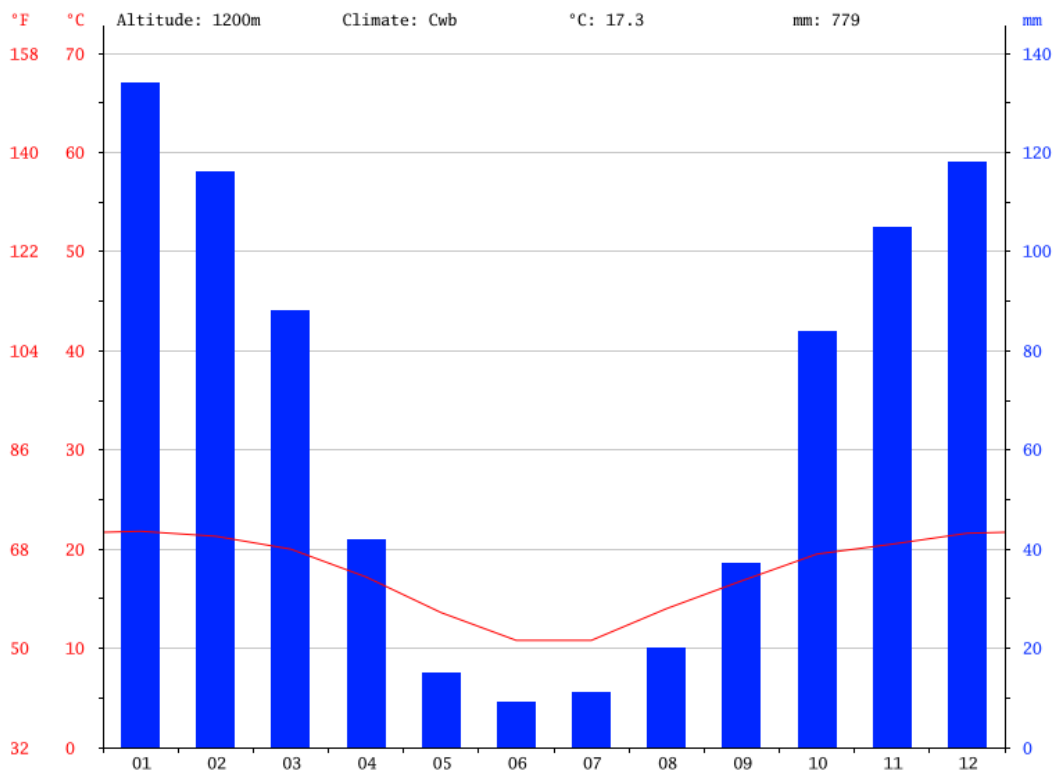
### 10.1. CLIMATE

The regional climatic conditions vary considerably between winter and summer months. The region (Amajuba) usually experiences very cold weather condition in winter dropping up to less than -1 degrees Celsius and very hot weather conditions in summer reaching 30 degrees Celsius and above. The average annual rainfall is estimated to be between 504mm and 1149mm and this is consistent throughout the district with no major deviation between the local municipal regions (Amajuba District Biodiversity Sector Plan, 2014).



Newcastle's Local Municipality climate is classified as warm and temperate. The summer months are much rainier than the winters. This location is classified by Köppen and Geiger as Cwb. The average annual temperature in Newcastle is 17.3 °C and the variation in temperatures through the year is 11.0 °C (Climate-Data.Org).

Throughout the year the average annual rainfall is 779 mm. The variation in the precipitation between the driest and wettest months is 125 mm. Of all months the least amount of rainfall occurs in June. The average rainfall in this month is estimated to be 9 mm. The greatest amount of precipitation occurs in January, with an average of 134 mm (Climate-Data.Org).



**Figure 4: Climatic Graph**

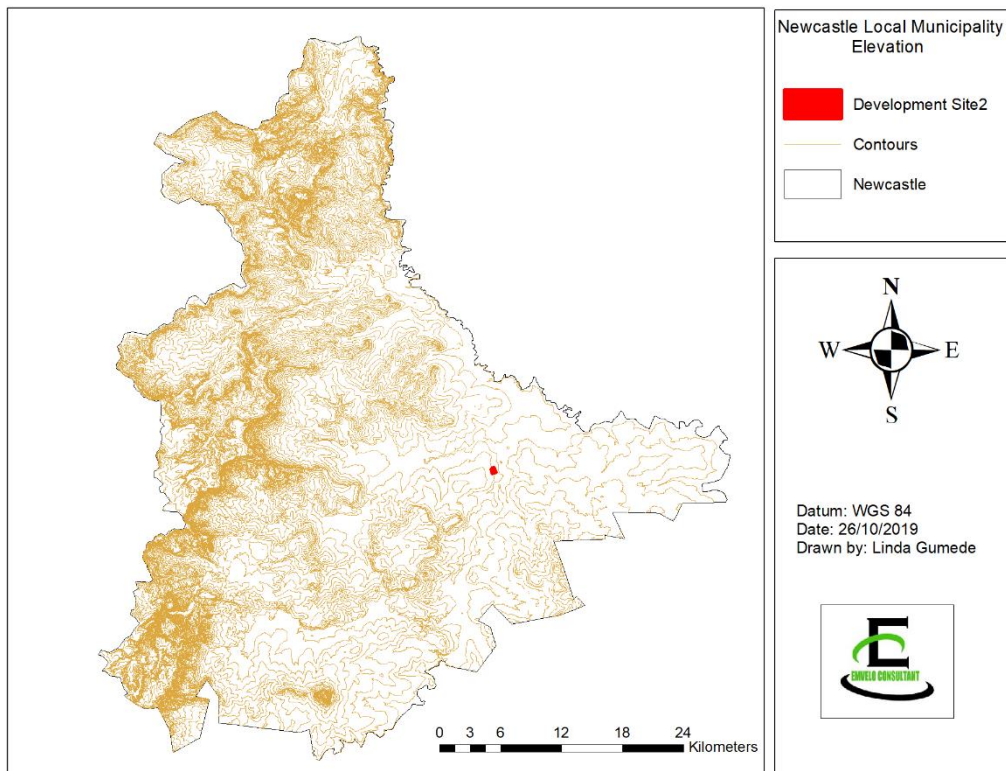
### 10.1.1 POTENTIAL IMPACT

There are no direct adverse impacts foreseen in terms of the project to climate. However, measures to reduce the project’s carbon footprint will be considered further in the EMPr.

Climate change may impact on the project through extreme floods, which may pose a risk to the housing unit.

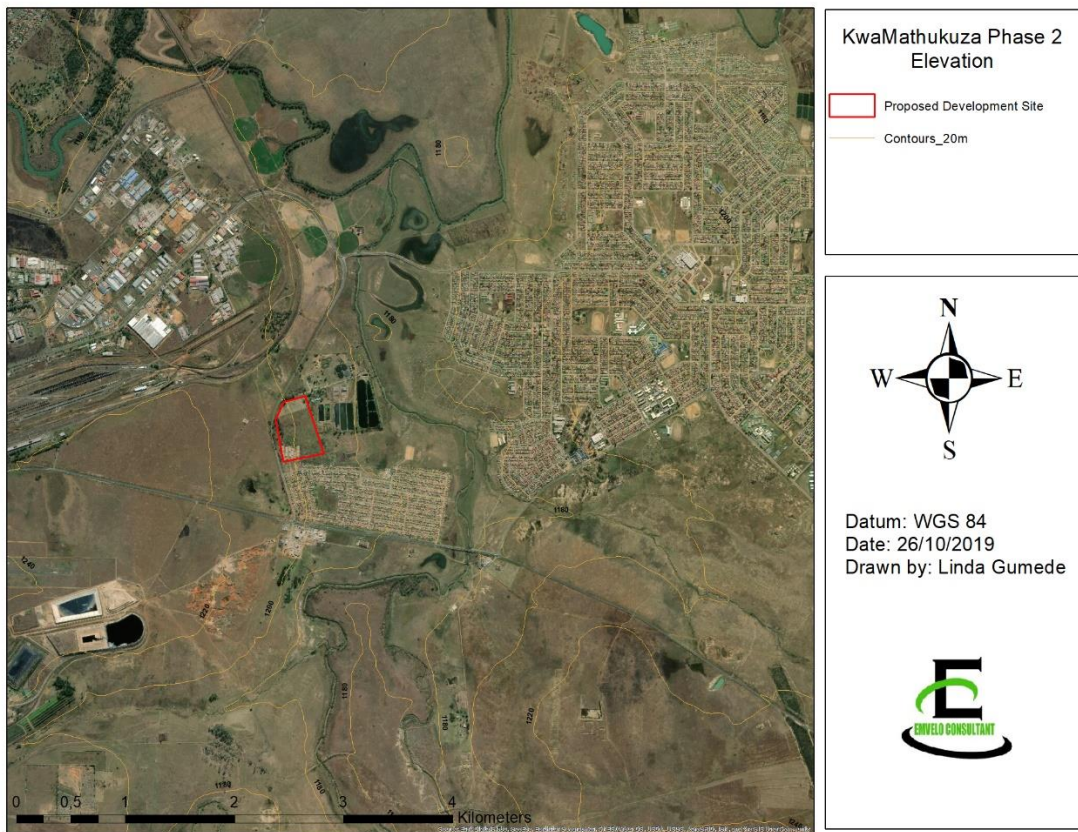
## 10.2. TOPOGRAPHY

The Newcastle Local Municipality (NLM) is characterised by two distinct physical features which almost separate the area into two distinct topographical settings. The eastern region is characterised by flat to gentle surfaces. Whereas the western regions are characterised by gentle to steep surfaces. According to the NLM IDP 2012/2017 the elevated region on the west is referred to as Drakensburg range. For elevation please refer to figure 5 below



**Figure 5: Newcastle Elevation**

The development site is located approximately at 1200 meters above sea level on the eastern section of the municipality which is characterized by gently to flat surfaces as described above. Refer to figure 6



**Figure 6: Site Elevation**

### 10.2.1 POTENTIAL IMPACTS

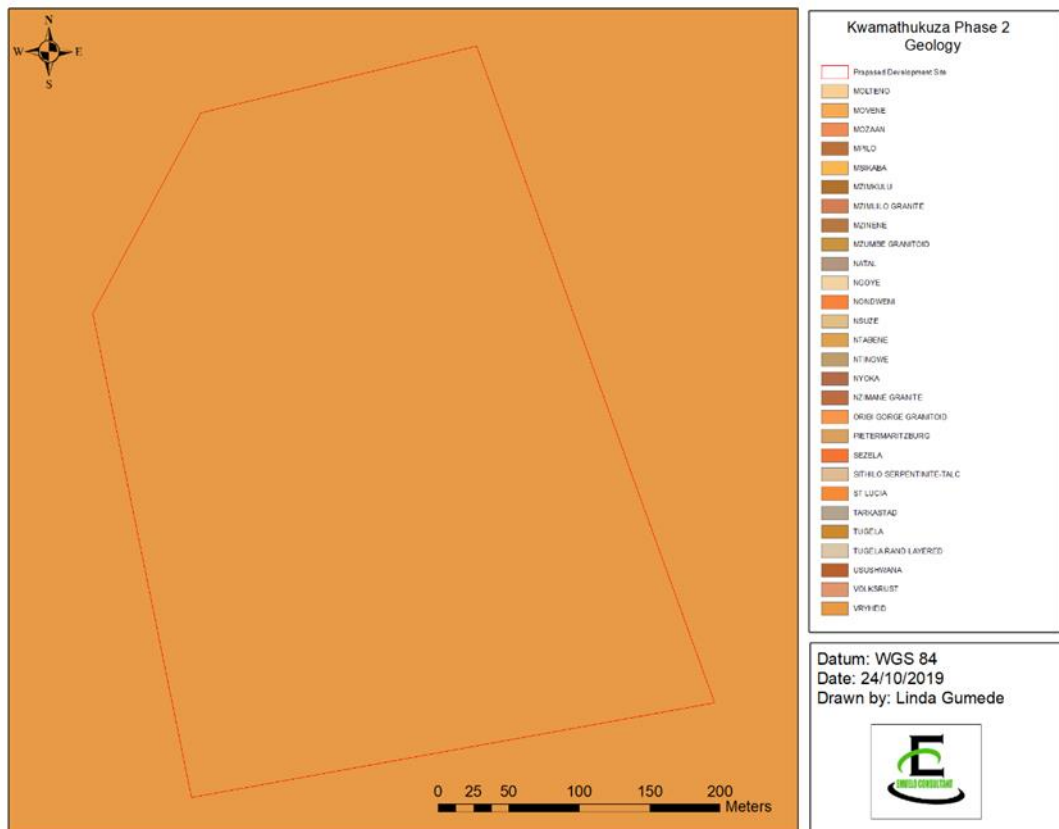
The visual impact caused by proposed project infrastructure.

### 10.3 GEOLOGY AND SOILS

According to the Amajuba District Environmental Management Framework (EMF) of 2019, the regions (within which the local municipality is located) the geological formations of the area is generally comprised of Karoo Supergroup which is mainly represented by the Ecca and the Beaufort Groups. Of these, the Ecca Group is by far the best represented, in particular by the Vryheid Formation.

In terms of soil formation, the area is made up of alluvial deposits mainly found along channels of the larger streams and rivers. Furthermore, the area is an intermix of sandy loam over the Vryheid Formation to clayey loam on shale or mudstone and areas underlain by dolerite are characterized by red to brown or black clayey soils.

The proposed development site as per geotechnical investigations is characterised by the topsoil which is made up of transported materials that are made up of medium to dense silty sand at a depth of 0.4 to 1.2 meters below the surface. Other sections of the site the topsoil is underlain by pedogenic materials consisting of dense and very dense, ferruginised gravel grading into hardpan ferricrete at a depth of 0.4 to 2.1 meters below the ground. Figure 7 below shows the proposed site in relation to regional geology.



**Figure 7: Site Geology**

### 10.3.1 POTENTIAL IMPACT

Clearing of vegetation and the use of heavy machinery could cause soil erosion and compaction respectively. The inappropriate handling and storage of hazardous substances, spillages from equipment and plant and poor management of waste, wastewater and cement mixing could cause soil contamination.

## 10.4 THREATENED ECOSYSTEMS: VEGETATION TYPES

The Amajuba District Municipality (ADM) has four types of biomes: Namely Forest, Savanna, Grasslands, and wetlands. Within these biomes there are 14 different vegetation types (Scott-Shaw and Escott 2011). A list of the vegetation types and their conservation status is set out in table below

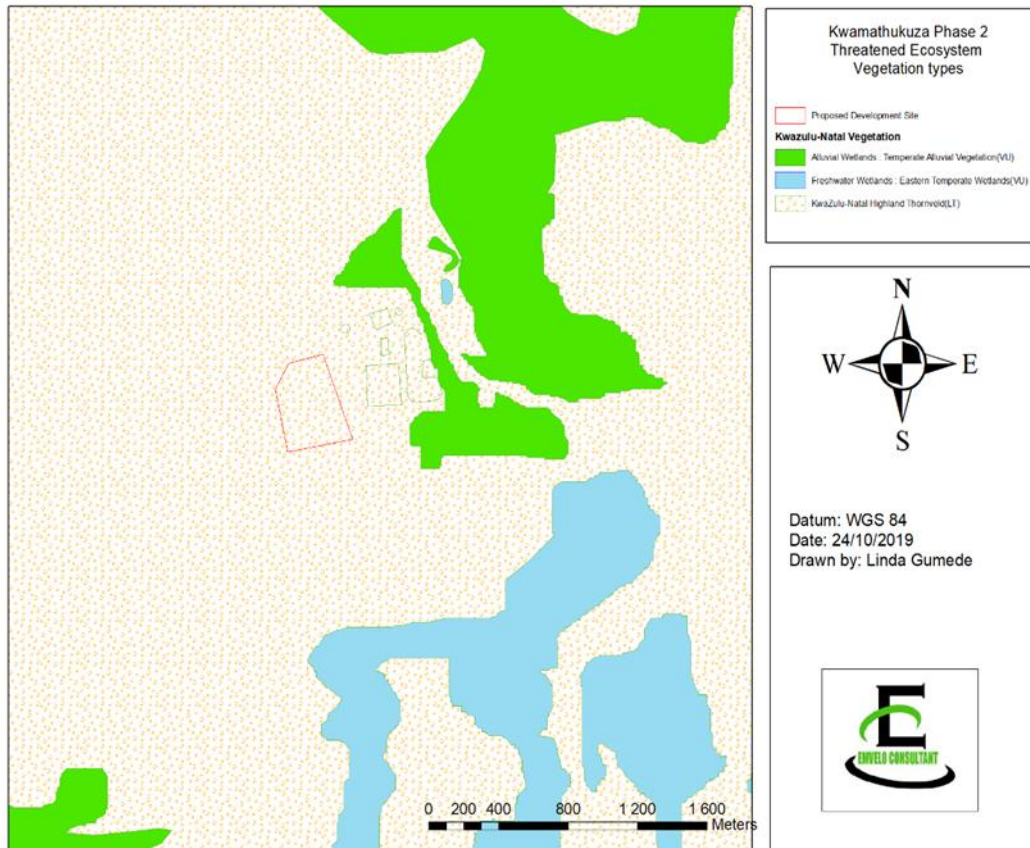
Vegetation type	Conservation status	Historical Area (Ha)	2008 Area (Ha)	Percentage lost (Ha)
<b>Forest Biome</b>				
Eastern Mistbelt Forests	Endangered	5444.14	5289.56	2.84
<b>Savanna Biome</b>				
KwaZulu-Natal Highland Thornveld	Least Threatened	73206.077	54468.829	25.60
Thukela Thornveld	Least Threatened	21.38	21.38	0
<b>Grassland Biome</b>				
Wakkerstroom Montane Grassland	Least Threatened	128535.034	116688.917	9.22
Amersfoort Highveld Clay Grassland	Least Threatened	13214.733	10086.585	23.67
Eastern Free State Sandy Grassland	Least Threatened	268.915	268.915	0
Income Sandy Grassland	Vulnerable	149900.447	94294.226	37.10
Low Escarpment Moist Grassland	Least Threatened	62941.885	56930.63	9.55
Northern KwaZulu-Natal Moist Grassland	Vulnerable	157172.37	109620.616	30.25
Paulpietersburg Moist Grassland	Vulnerable	35547.935	23674.717	33.40
Northern Zululand Mistbelt Grassland	Vulnerable	7007.729	6582.965	6.06
<b>Wetlands Biomes</b>				
Freshwater Wetlands: Eastern Temperate Wetlands	vulnerable	24481.368	20339.582	16.92
Alluvial Wetlands: Temperate Alluvial Vegetation	vulnerable	32996.645	23114.188	29.95
Alluvial Wetlands: Temperate Alluvial Vegetation: Midland Floodplain Grasslands	Least threatened	422.644	361.367	14.50

(Source: Amajuba District Biodiversity Sector Plan, 2014:20)

Over the years particularly between 1990 to 2014 as a result of land-use change, the district has seen a major decline of these vegetation types in terms of their spatial coverage. However, the major impact has been largely on grasslands such as Income sandy grassland, Paul Pietersburg moist grassland, Northern KZN moist grassland, and Amersfoort Highveld Clay grassland (ADM EMF, 2019).



A map showing the distribution and threat status of onsite vegetation types is provided as Figure 8 below. The proposed development site is located on the Kwazulu Natal Highland Thornveld with a national threat status of Least Threatened (LT).



**Figure 8: Site Vegetation Cover**

Upon further investigations by an ecological specialist, the site was found to be extremely degraded and transformed. This transformation was attributed to the presence of discarded spoil heaps overgrown with weeds and grasses, alien and invasive plant species and weeds; various types of garbage and builder’s rubble.

The site was identified to be a transformed grassland, with the graminoid species *Paspalum notatum* being dominant. However, one flower species that is provincially protected was found on-site; *Gladiolus dalenii*. This species may not be removed/destroyed without permit authorization from Ezemvelo KZN Wildlife.

#### **10.4.1 POTENTIAL IMPACT**

Potential impacts to vegetation resulting from the construction of the proposed housing units include the clearance of vegetation within the proposed footprint. The *Gladiolus dalenii* would also be lost should the correct procedure of removing it on site is not followed. Once the housing units have been allocated to people the adjacent vegetation is also at risk of being degraded by community members.

## **10.5 FAUNA**

To determine the fauna likely to occur on-site, the lists for the Quarter Degree Square within which the proposed location is contained were obtained from the FitzPatrick Institute of African Ornithology virtual museum. These lists include all fauna previously recorded from the area. Although it is unlikely that all of these species will be found on-site, primarily due to the influx of people and other anthropogenic disturbance, there are some areas of the site which form suitable habitat for faunal species. A list of expected species can be found in the Appendices L.

### **10.5.1 SPECIES OF CONSERVATION CONCERN (SCC)**

SCC that are likely to be recorded from the site include birds, mammals, and herpetofauna (reptiles and amphibians). The list containing the names of these species is attached as appendix L. According to this list, only two mammal species of conservation importance have been recorded from the proposed area and surroundings and include; *Dasymys incomtus* (Common Dasymys) and *Otomys auratus* (Southern African Vlei Rat), which are both classified as near threatened. The single amphibian SCC is the Giant Bull Frog classified as near threatened.

#### **10.5.1.1 POTENTIAL IMPACT**

- Fragmentation, reduction, and loss of Habitat as a result of vegetation clearance
- Migration of animals away from the areas
- Poaching and willful harming of animals by construction workers

## 10.6 PROTECTED AREAS

Figure 9 indicates that the proposed development boundaries does not fall within any of the identified National Protected or conservation areas as identified by the National Protected Area Expansion Strategy, 2016. In fact, the identified protected areas are located more 20 km away from the proposed development.

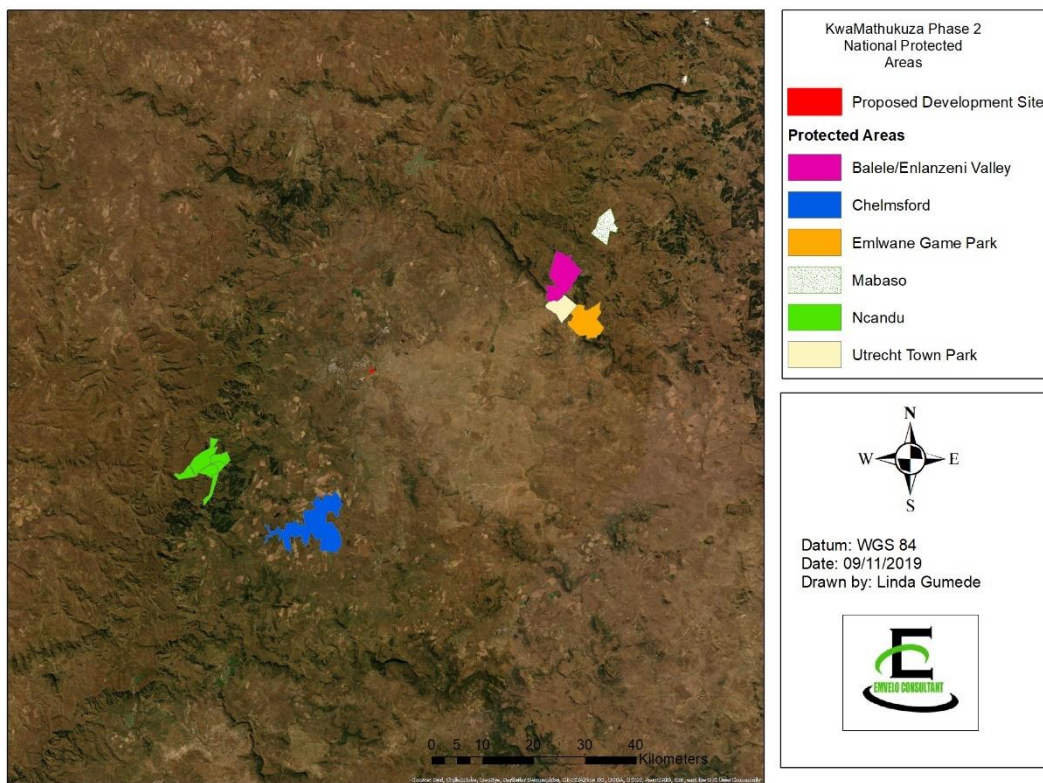


Figure 9: Nearest Protected Areas

### 10.6.1 POTENTIAL IMPACTS

It is envisaged that the development will not have any impact on the protected or conservation areas.

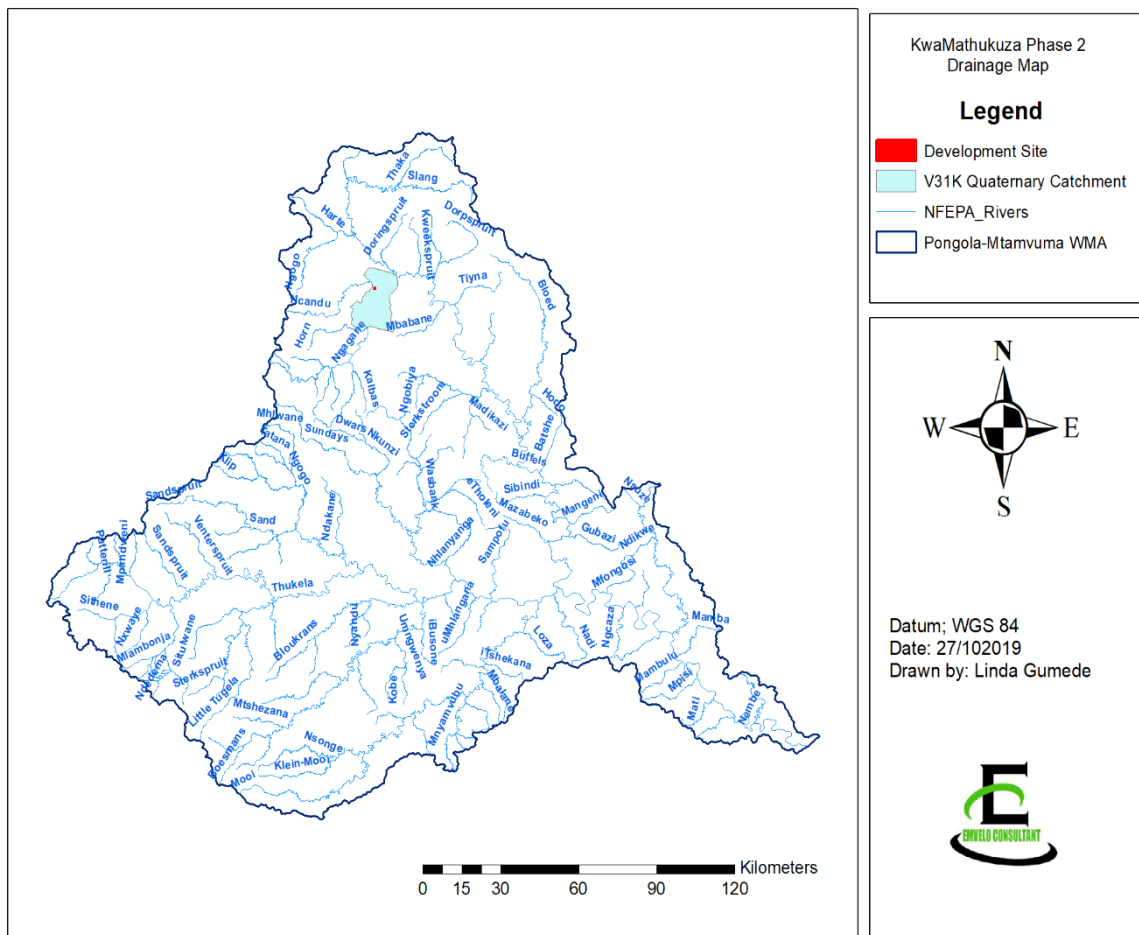
## 10.7 SURFACE WATER

### 10.7.1 HYDROLOGY

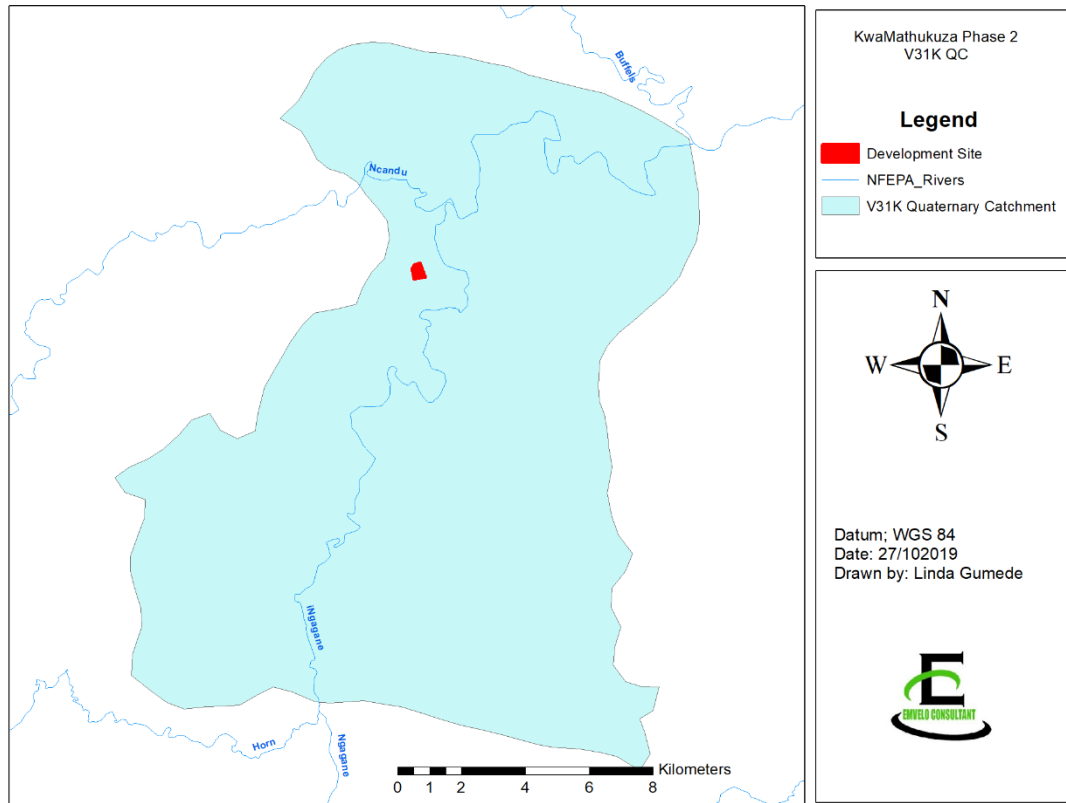


“The Amajuba District Municipality (ADM) falls entirely into two primary catchments namely the Thukela and Pongola catchments. The Ngogo, Ncandu, Horn and Ngagane Rivers are important tributaries of the Buffalo River draining from the western highlands while the Slangspruit, Doringspruit, and Dorpspruit form the main tributaries in the north. The headwaters of the Pongola River (including the Bivane River) are found in the high lying northeastern areas of the ADM and drain eastwards out of the District” (ADM EMF,2019:14).

The project area is situated in between the Ingagane and Ncandu tributaries, which falls within the V31K quaternary catchment and Pongola-Mtavuma Water Management Area (see **Figures 10 – 11**). The Ingagane River flows into the Buffalo River which is one of the major rivers in the Thukela Water Management (Newcastle Local Municipality IDP 2016/2017).



**Figure 10: Drainage Map**



**Figure 11: V31K Quaternary Catchment**

### 10.7.1.1 WATER QUALITY

There is a complete contrast of water quality between the high lying mountainous areas to the lower-lying Buffalo River Basin within ADM. This is attributed to various human activities (domestic, mining, agricultural and industrial activities) taking place, particularly within Newcastle and Dannhauser. Acid mine drainage has been singled out as a real threat to water quality within the district (ADM EMF, 2019).

Within the Newcastle local Municipality, the water quality is mainly affected by poor performing Wastewater Treatment Works or urban run-off with total coliforms and faecal coliforms (NLM IDP 2016/2017).

The ingagane river catchment which runs along the proposed site is mainly affected by industrial activities located alongside the river (NLM IDP 2016/2017).

### 10.7.1.2 NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREAS

With reference to the National Freshwater Ecosystem Priority Areas (NFEPA) GIS dataset, the proposed location is located on Fish Support Areas (Fish Corridor), these are migration corridors identified for threatened fish species as part of the fish sanctuary. The NFEPA GIS dataset, however, did not flag the presence of any wetland FEPA within 500m. However, apart from the area occupied by the Wastewater Treatment Plant (refer to figure 2), there are small patches of wetlands found within 500m (Please note, there is a difference between wetlands and wetlandFEPA). Furthermore, the Ingagane river runs parallel to the proposed location, more than 500 meters away from the site. Refer to figure 11 below.

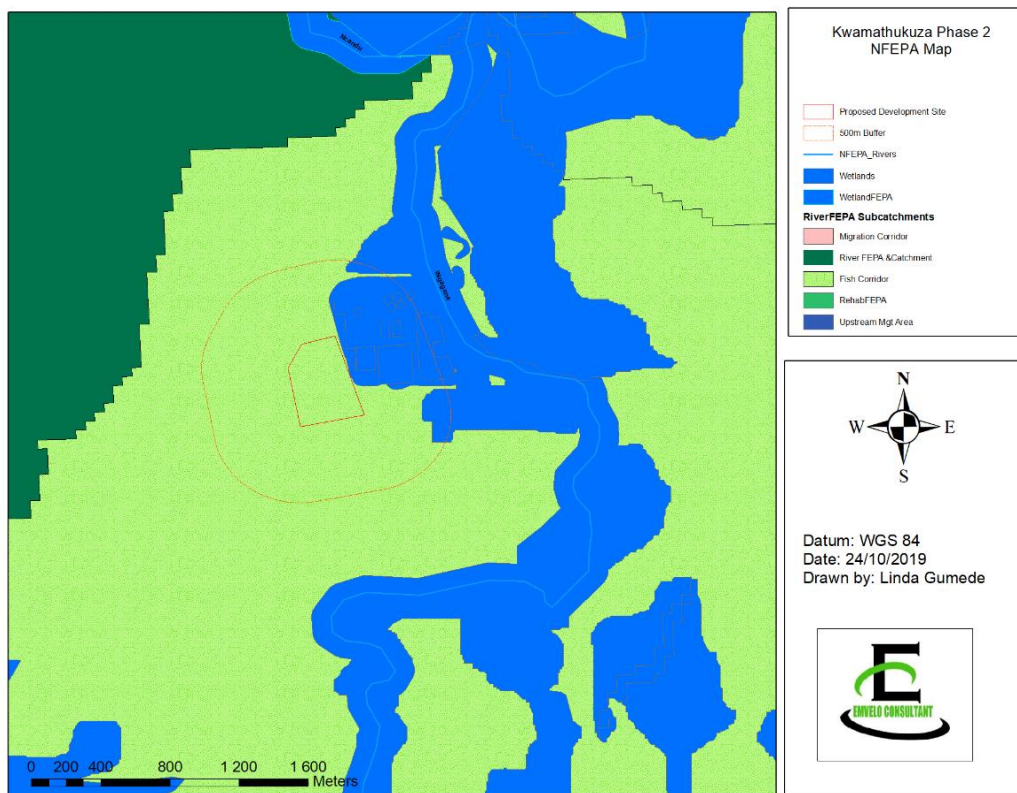


Figure 12: NFEPA Map

#### 10.7.1.2.1 POTENTIAL IMPACT

There are no direct impacts that are envisaged from the proposed development to water quality or nearby wetlands. This is because the Ingagane river is located more than 500 meters away from the proposed development. Wetlands which are located on the eastern section of the site were identified by an ecological specialist, as being extensively transformed with no natural wetlands remaining. The indirect impact on

water quality might be as a result of poor construction practices (e.g. Improper management of wastewater, incorrect storage of material, spillages).

## 10.8 VISUAL ENVIRONMENT AND LAND USE CHARACTER

The site is located within residential areas and it is currently vacant. Adjacent to the site and approximately 300m on the east, there is ingagane Wastewater treatment plant. The entire site is covered in grass and is surrounded by residential areas such as Madadeni on the far east and Mathukuza Phase I township on the south.



Figure 13: Image showing Madadeni Township.



**Figure 14: Image showing KwaMathukuza Township.**

The current zoning of the property is Residential, and the size of the proposed development is approximately 19, 13ha. The property in question is owned by the municipality

### **10.9. HERITAGE AND CULTURAL ASPECTS**

The inquiry has been lodged with AMAFA to ascertain whether there are any cultural and heritage sites within the study area. Findings will be incorporated into the final Basic Assessment Report.

### **10.10 AIR QUALITY STATUS**

The air quality within Amajuba district is affected by wide variety of factors. As outlined by the Amajuba Air Quality Management Plan 2018 these factors include emission from; Domestic Fuel burning, vehicle emissions, veld fires especially in winter, agricultural activities, denuded land, industrial activities, mining mainly concentrated in Newcastle Local Municipality, landfill sites and Waste Water Treatment Works (

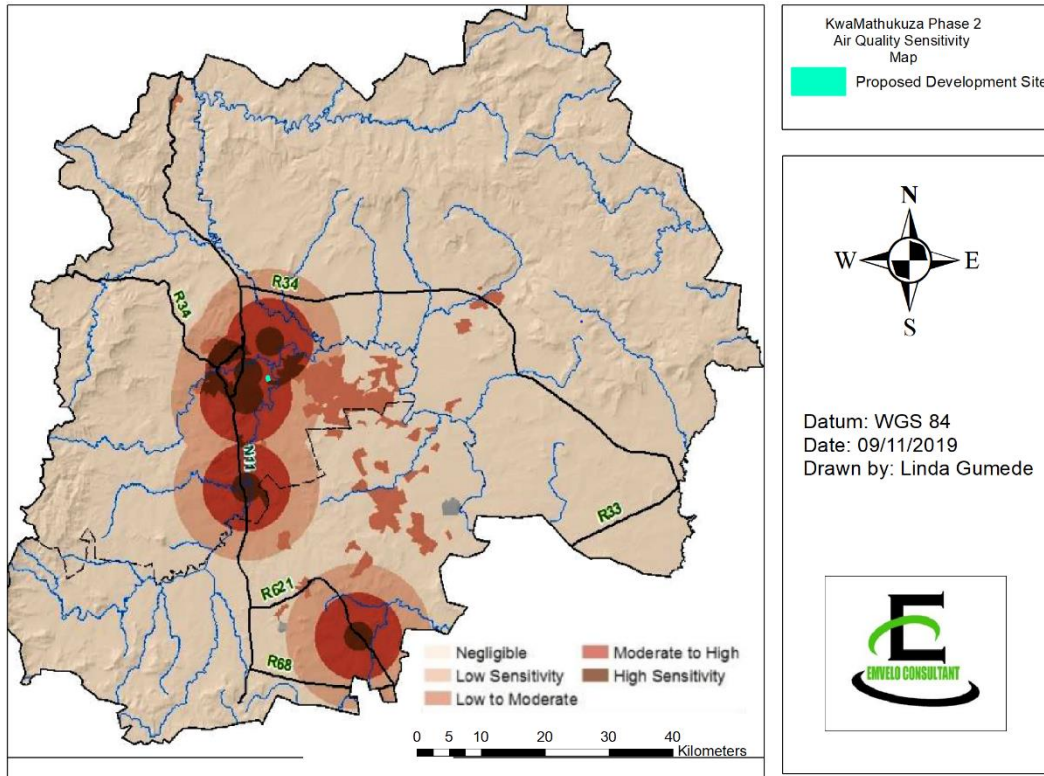


WWTW) that treat approximately 7 592 110 m<sup>3</sup> /year and produce approximately 7.6 thousand kg of VOC emissions per year.

Air quality sensitive zone have been delineated using emission data collected from registered emitters (Amajuba Environmental Management Framework, 2019:48). This data was used in conjunction with the road density data to accommodate the finding that vehicular emissions are a significant contributor to air quality problems. The base map as seen in figure 15 below was then produced.

In order to understand and locate the proposed development to the air quality sensitive zones, the map produced by the Amajuba District EMF was geo-referenced using Quantum GIS tool, and the proposed site was then overlaid to the geo-referenced base map. As per the outcome of that analysis the proposed development is located on moderate to high sensitivity (Refer to figure 15 below). This can be attributed to the fact that Newcastle Local Municipality has a high concentration of industries and mining activities and the proposed site itself is surrounded by the following air pollution sources;

- Karbochem, African Amines (Pty) Ltd, Lanxess Chrome International SA (Pty) Ltd, SA Calcium Carbide (Pty) Ltd and Newcastle Cogeneration (Pty) Ltd (Located South-West of the proposed site),
- NPC Cimpor (Located North-east),
- Silicon Technology (Pty) Ltd and ArcelorMittal (Located North-East of the proposed site).



**Figure 15: Air Quality Sensitivity Map**

### 10.10.1 POTENTIAL IMPACT

The proposed development itself will not directly contribute to air pollution, except the dust nuisance that will be generated during construction period and that would be managed using an Environmental Management Programme. The above-mentioned air pollution sources are continually polluting air around Newcastle and this development is not an exception. However, the cumulative impact could be incurred when air pollution from these industrial is merged with the air quality impacts from a WWTW near the proposed site (For more on cumulative Impact Assessment refer to section 8).

## 11. AMAJUBA BIODIVERSITY SECTOR PLAN

According to the Amajuba Biodiversity Sector Plan, the following terminologies describe features on the Biodiversity Plan. These definitions were adapted from the Document describing the Conservation Planning Terms for the EKZNW Spatial Planning Product (EKZNW, 2014).

### ➤ Critical Biodiversity Areas: Irreplaceable

Areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable populations of species and the functionality of ecosystems.

➤ **Critical Biodiversity Areas: Optimal**

Areas that represent an optimized solution to meet the required biodiversity conservation targets while avoiding areas where the risk of biodiversity loss is high. Category driven primarily by the process but is also informed by expert input.

➤ **Ecological Support Areas (ESAs)**

Functional but not necessarily entirely natural areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the critical biodiversity areas. The area also contributes significantly to the maintenance of ecological infrastructure.

➤ **Ecological Support Areas: Species Specific**

Terrestrial modified areas that provide a support function to a threatened or protected species, for example, agricultural land.

➤ **Ecological Infrastructure (EI)**

Ecological Infrastructure (EI) refers to the functioning ecosystems, within landscapes, that provide environmental services that contribute positively to the economy and human welfare. The ecological infrastructure that provides such services includes healthy and well-maintained wetlands, rivers, catchments, coastal dunes, grasslands and forests (Amajuba BSP, 2014:46).

Services provided include the promotion of water security through for example the provision of clean water and increased lifespan of dams; reduction in disaster risk through for example the control of flood intensities & coastal erosion; the prevention of soil loss, and climate regulation.

➤ **Other Natural Areas**

Are natural, near-natural vegetation and functional habitats or landscapes not yet classified as one of the above categories (i.e. CBAs, ESAs, or EI).

The proposed development is not located in CBA and ecological support areas.



## **12. WASTE, EFFLUENT, EMISSIONS AND NOISE MANAGEMENT**

### **12.1. GENERAL WASTE MANAGEMENT: CONSTRUCTION PHASE**

Weather and vermin proof bins in and around the site will be provided for the disposal of solid/construction waste and emptied out regularly. The general waste during the construction phase will be sorted into recyclable and non-recyclable waste. Non-recyclable waste will be disposed of at the Newcastle Municipal Landfill Site.

Suitable portable sanitation/ablution systems for all construction workers will be provided and maintained on-site for the duration of construction. One ablution facility per 20 workers must be provided on-site each labelled male/female. All suitable excavated material from site levelling and landscaping activities will be used as far as possible on-site as fill material.

### **12.2. GENERAL WASTE MANAGEMENT: OPERATIONAL PHASE**

Operational phase waste will be managed by the municipality. Domestic Waste collection and disposal services. Non-recyclable waste along with hazardous waste that will be generated during the operation of the development will be disposed of at the Newcastle registered and licensed landfill site.

### **12.3. EFFLUENT**

No effluent will be generated during the construction phase of the project. Proper measures will be put in place to contain any spillages (i.e. diesel or spills) occurring during construction before it reaches the near-by streams or drainages.

### **12.4. GENERATION OF NOISE**

During the construction phase, it is anticipated that there will be noise generated from the construction vehicles, earthworks and machinery. The mitigation measures to reduce the level of noise will be implemented during construction.

### **12.5. WATER USE**

Water to be used during construction will be supplied by the Municipality.

## **13. THE PUBLIC PARTICIPATION PROCESS**

### **13.1 BACKGROUND**

Public participation is part of the EIA process which is governed under the principles of NEMA as well as the EIA regulations. It is defined as the process by which an organization consults with all interested or affected parties (I&APs) which include organizations, government entities, community, NGOs, etc., before deciding. It is a two-way communication and collaborative problem solving with the goal of achieving better and more acceptable decisions.

It provides all the stakeholders including the community with a platform to raise their concerns before the Competent Authority can make a final decision about the environmental authorization. This prevents and minimizes disputes before they become unsolvable. Chapter 6 of the EIA regulations emphasize that the information related to the proposed project must be made available to I&APs, prior to a final decision. Therefore, this process will allow I&APs to have access to the information relating to this project. The Application was conducted according to Chapter 6 of the EIA Regulations 2017.

### **13.2 OBJECTIVES OF PUBLIC PARTICIPATION**

- To inform and involve the community and the stakeholders about the development happening in KwaMathukuza.
- To identify and address the community and stakeholder's concerns regarding this activity.
- To provide opportunities for the community, relevant government departments, surrounding businesses, the residents and other stakeholders to raise their concerns, suggest solutions and identify priorities or issues.

### **13.3 NOTIFICATION OF THE INTERESTED AND AFFECTED PARTIES (I&APS)**

Section 41 of Chapter 6 of the EIA regulations have listed the following options, to be used when notifying the interested and affected parties (I&APs):

**Table 4: Public Participation Processes**

<i>All the Interested and Affected parties were notified of the application by-</i>		
Fixing a notice board at the place conspicuous to and accessible by the public at the boundary, on the fence, or along the corridor of any alternative sites.	YES	NO
Any alternative site also mentioned in the application	YES	NO
<i>Has a written notice been given to-</i>		
Landowner or person in control if the applicant is not in control of the land	YES	NO
The municipal councillor of the Ward in which the site and alternative site of the proposed activity.	YES	NO
The municipality which has jurisdiction in the area and other organs of state	YES	NO
<i>Placing an advertisement in-</i>		
One local newspaper	YES	NO
Any official Gazette that is published specifically for providing public notice of applications	YES	NO
One* provincial newspaper, any official Gazette that is published with the purpose of providing public notice of applications.	YES	NO

#### **13.4 COMMENTS FROM THE REGISTERED INTERESTED AND AFFECTED PARTIES (I&APS)**

Section 43 of Chapter 6 indicates that all interested and affected parties are entitled to comment in writing on all reports produced by the applicant during the EIA process. This will bring the concerns raised to the attention of the applicant.

The KwaMathukuza Phase 2 Public Meeting was held on the 15<sup>th</sup> of October 2019, within the transit camps. All comments received were acknowledged and have been addressed in Table 5 below and are indicated by means of communication.

**Table 5: Comments and Response Report (CRR) for The KwaMathukuza Phase2: Newcastle**

NO	NAME OF I&AP	MEANS OF COMMUNICATION	COMMENT	RESPONSE BY EAP
1.	Zero Msibi	Public Meeting	It has been a very long time since the municipality promised us houses. No one has ever died as a result of unpleasant odour emanating from a Wastewater treatment works. We've been living in this place for almost ten years now. It very painful, especially for women, children and the older generation, that they have to walk sometimes at night for a long-distance just to access the toilets. Sometimes they get raped and mugged and there has been a number of cases related to that. We are pleading to the Newcastle Local Municipality, the Department of Economic Development Tourism and Environmental Affairs and the appointed consultant, to agree and fast track this project.	The EAP has acknowledged the comment brought forward by the affected party. With regard to fast-tracking the project, we can only do our part, which is to prioritize the assessment. Once the document has been finished, certain protocols would have to be followed which are mandated by the EIA regulation 2017.
2.	Nokuthula Sibiya	Public Meeting	If you guys are really concerned about us and our wellbeing as you claim to be, you would prioritize this matter. As we speak, almost all the toilets that we are using are blocked and when flushing you can see your feaces.	As mentioned, we can only do our part that is to prioritize the assessment without compromising the quality of our work. As for the malfunctioning sewage system, this matter would be directed to the municipality, as they are ones who are responsible for these camps.

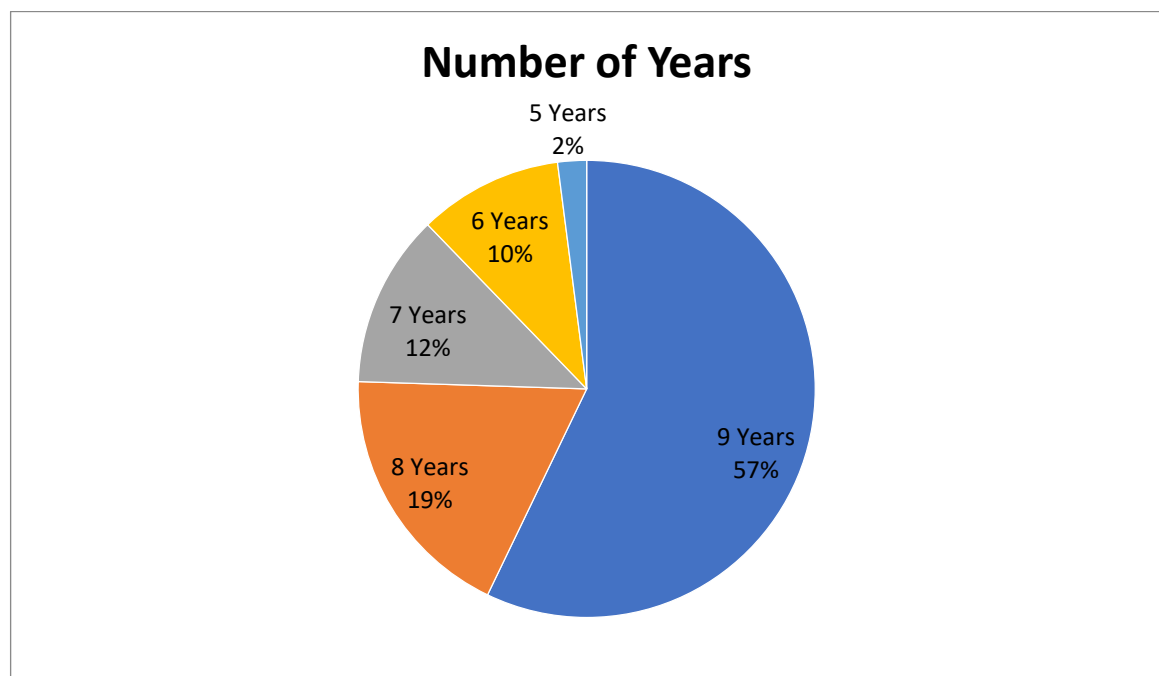
NO	NAME OF I&AP	MEANS OF COMMUNICATION	COMMENT	RESPONSE BY EAP
3.	Jabulani Mpungose	Public Meeting	What are your findings in terms of the proposed site, so that we do not find ourselves in this very same situation again? I would also like to make the proposal for the relocation processes, considering that we cannot wait any longer, is it possible maybe after ten houses have been built, to relocate the same number of families to those houses until the project is completed.	First, our findings would be made available to the public, once the basic assessment report is completed. With regards to the relocation process, what we know based on the information available to us, is that the municipality intends to complete the proposed units and then relocate people to those houses. Once those people have been relocated, then the municipality would demolish the existing camps and construct new houses on those sites.
4.	Ntombifuthi Ndlovu	Public Meeting	Can the appointed EAP please prioritize this issue. we are no longer happy with these temporary houses. During periods of heavy rainfall, we cannot sleep, the rain droplets would come straight from the roof to our furniture's.	As mentioned, we can only do our part that is to prioritize the assessment without compromising the quality of our work.

NO	NAME OF I&AP	MEANS OF COMMUNICATION	COMMENT	RESPONSE BY EAP/DEVELOPER
5.	Fack cwilashe	Public Meeting	We do not want any other place; we have agreed as members of the community that we are for the proposed site	The EAP has acknowledged this comment.

#### 14. KWAMATHUKUZA TRANSIT CAMP COMMUNITY SURVEY

Upon engaging with a few community members, who could make it to the public meeting, further clarity was needed as to ascertain whether or not the entire camps shared their views. 49 participants were randomly selected from the camp and were asked a number of questions relating to the proposed site. These questions are outlined below

**Question 1:** How long have you been living in this current location?



**Figure 16: Number of years within transit camps**

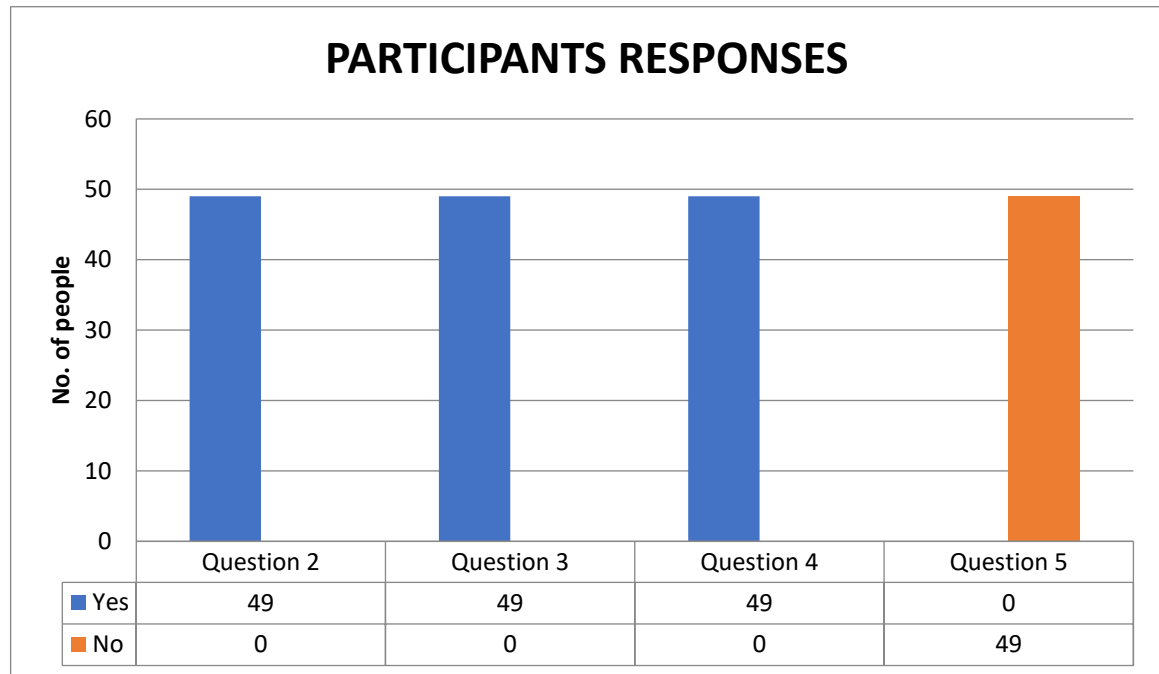
Out of a total of 49 individuals who completed the questionnaire, when asked as to how long they have been occupying the current location(transit camps), 28 (57%) respondents indicated that they have been living there for more than 9 years, with only 9 (18%) who have been living there for about 8 years. Six (12%) individuals indicated that they have been living in the location for 7 years, and 5 (10%) for 6 years with only 1 (2%) stating that they have been living there for 5 years.

**Question 2:** Do you know or understand what a Waste Water Treatment Plant is?

**Question 3:** Knowing what a wastewater treatment plant is, are you happy with the proposed location?

**Question 4:** Are you aware of the health risks that are associated with living closer to a treatment plant?

**Question 5:** Would you rather prefer to wait for the municipality to find an alternative site for your house?



**Figure 17: Bar Graph representing answers from the respondents**

The graph above, figure 17, represents the answers provided by the participants for questions 2, 3, 4 and 5. Each of the questions had two options (Yes/No), and the respondent had to indicate by ticking the relevant box indicating their answer to that specific question.

On the issues of understanding what a waste water treatment plant is and whether or not they are happy with the proposed location of their new houses (next to the treatment plant), all respondents indicated that they understand what a waste water treatment is and that they are happy with the location of their houses near it.

Also, all respondents indicated that they are aware of the health risks that are associated with living closer to a treatment plant, and preferred that they would rather have their houses built there than to wait for an alternative site, as they need their houses.



## 15. IMPACT ASSESSMENT AND MITIGATION MEASURES

Table 7 below shows the Environmental Impact Assessment (EIA) conducted for the planning and design phase, the construction phase and the operational phase, for the preferred alternative site.

Each impact identified is assessed in terms of probability (Likelihood of occurring), scale (spatial scale), magnitude (severity) and duration (temporal scale). To effectively implement the adopted scientific approach in determining the significance of the environmental impact, a numerical value was linked to each rating scale.

The following criteria will be applied to the impact assessment for the proposed development:

### Occurrence

- ✚ Probability- The probability of the impact describes the likelihood of the impact actually occurring.
- ✚ Impact Duration- the Duration of the impact describes the period of time during which an environmental system or component is changed by the impact.

### Severity

- ✚ Magnitude –refers to the ‘Degree of Disturbance’ to biophysical systems and components expresses the change in the health, functioning and/or role of the system or component as a result of an activity
- ✚ Scale/extent - The Extent of the impact generally expresses the spatial influence of the effects produced by a disturbance to an environmental system or component

The following ranking scales were used:

<i>Probability: =P</i>	<i>Duration: =D</i>
5 – Definite (More than 80 % chance of occurrence)	5 – Permanent- The only class of impact that will be non-transitory (Indefinite)
4 – Probable (Between 60-80% chance of occurrence)	4 - Long-term-: The impact and its effects will continue or last for the entire operational life of the development (15- 50years)
3 – Possible (Between 40-60% chance of occurrence)	

<p>2 – Fairly Unlikely (Between 20-40% chance of occurrence)</p> <p>1 – Unlikely (Less than 20% chance of occurrence)</p>	<p>3 - Medium-term-: The impact and its effects will continue or last for some time after the construction phase (5-15 years)</p> <p>2 – Medium-short- The impact and its effects will continue or last for the period of a relatively long construction period and/or limited recovery time after this construction period (2-5 years)</p> <p>1 – Short Term- Likely to disappear with mitigation measures or through natural processes span shorter than construction phase (0-2 years)</p>
<p><i>Scale: =S</i></p> <p>5 – International (beyond 200km)</p> <p>4 – Regional (50-200km radius)</p> <p>3 – Local (2-50km radius)</p> <p>2 – Surrounding Area (within 2km)</p> <p>1 – Site (within100m)</p>	<p><i>Magnitude: =M</i></p> <p>5 - High</p> <p>4– Medium High</p> <p>3 – Medium</p> <p>2 – Medium Low</p> <p>1 – Low</p>

*Status of Impact*

+ Positive / -Negative or 0-Neutral

The overall impact significance score/points (**SP**) for each identified impact is calculated by multiplying magnitude, duration, and scale by the probability of all this happening.

The range of possible significance scores is classified into seven rating classes as shown in Table 1 below.

$$SP = (\text{Magnitude} + \text{Duration} + \text{Scale}) \times \text{Probability}$$

The impacts status can either be positive, negative or neutral as depicted in table 1.1

**Table 6: Impact significance Ratings**

Significance	Environmental Significance Points	Colour Code
High (+)	60-100	H

<b>Medium (+)</b>	31-59	M
<b>Low (+)</b>	0-30	L
<b>Neutral</b>	0	N
<b>Low (-)</b>	0-30	L
<b>Medium (-)</b>	31 - 59	M
<b>High (-)</b>	60 - 100	H



Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
<p><b>Loss of indigenous vegetation and plant species of concern:</b></p> <p>The proposed activity will definitely result in a loss of indigenous of more than 19 hectares. One plant species of concern (<i>Gladiolus dalenii</i>) was recorded on site. The species is provincially protected and is at risk of being lost due to site clearance.</p>	<b>High (60)</b>	<ul style="list-style-type: none"> <li>➤ Given that the species of conservation importance was recorded by the ecological specialist on-site, a site walk-about survey must be conducted for plant species of conservation importance and threatened species that may occur on the project area and they are to addressed through a search and rescue plan.</li> <li>➤ Prior to removing <i>Gladiolus dalenii</i> which is located on the following co-ordinates A (Lat: -27.76119°; Long: 30.00261°) B (Lat: -27.76119°; Long: 30.00248°), a permit must be obtained Ezemvelo KZN Wildlife.</li> <li>➤ Indigenous vegetation naturally growing on-site, that would otherwise be destroyed must be incorporated into landscaping.</li> <li>➤ Rehabilitate all disturbed areas as soon as the construction is completed within the proposed development area</li> </ul>	<b>Low (20)</b>
<p><b>Loss of Fauna:</b></p> <p>The proposed development is located within 2730 CC GRID, where a number of rat species can be anticipated. The Dasymys Incomtus which is found within -</p>	<b>Medium (32)</b>	<ul style="list-style-type: none"> <li>➤ All workers must be trained to recognize threatened species on site.</li> <li>➤ During site preparation, special care must be taken during the clearing of the works area in order to minimize damage or disturbance of roosting and nesting sites.</li> <li>➤ No faunal species are to be disturbed, trapped, hunted or killed during the construction phase.</li> </ul>	<b>Low (16)</b>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
the same grid is regarded as near threatened. The proposed construction activities might result in a loss of animal species that could be found on site.		<ul style="list-style-type: none"> <li>➤ All construction and maintenance vehicles must stick to properly demarcated and prepared roads. Off-road driving should be strictly prohibited.</li> <li>➤ No fires should be allowed at the site.</li> <li>➤ No dogs or other pets should be allowed at the site</li> </ul>	
<p><b>Loss and Fragmentation of Habitats;</b></p> <p>Habitat fragmentation has been recognized as the leading factor in species loss, on both a local and global level (Wilcove et al. 1986; Wilcox and Murphy 1985). birds and large mammals are often the first to be affected by habitat fragmentation due to its effects on population viability. Reptiles and small mammals with limited mobility may be separated into distinct populations.</p>	<b>High (60)</b>	<ul style="list-style-type: none"> <li>➤ All construction activities must take place within an area demarcated for the development.</li> </ul>	<b>Medium (55)</b>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
<p><b>Encroachment of Alien Invasive Species:</b> Disturbed areas are most likely to be infested by alien vegetation</p>	<b>Medium (50)</b>	<ul style="list-style-type: none"> <li>➤ An on-going proper alien invasive management plan must be developed and applied to prevent the spreading and new invasions by alien species.</li> <li>➤ All sites disturbed by construction activities should be monitored for colonization by exotics or invasive plants and should be controlled as they emerge.</li> <li>➤ The clearing/eradication of alien species must be undertaken during both the construction and rehabilitation phases of the development.</li> </ul>	<b>Low (15)</b>
<p><b>Degradation of soil quality:</b> The most significant impact will be the changes in the soil structure and degradation of soil quality as a result of erosion and compaction. Additionally, spills and leaks may also occur from vehicles and heavy equipment used during the construction operations, which may result in soil contamination</p>	<b>Medium (55)</b>	<ul style="list-style-type: none"> <li>➤ Illegal sand mining is strictly prohibited on-site or in adjacent areas.</li> <li>➤ Digging of foundations must be limited to areas demarcated for constructing proposed housing units.</li> <li>➤ All vehicles, machinery, and delivery trucks must be in good working conditions to avoid any possible leakages.</li> <li>➤ Heavy machinery operating onsite must be routinely checked for fuel leaks or malfunctions to minimize the risk of a pollutant spill.</li> <li>➤ All stationery plants containing hazardous substances (e.g. generators) must be placed on bunded area.</li> <li>➤ Concrete/Cement mixing must be done on hard surfaces or mixing mats to avoid soil contamination.</li> <li>➤</li> </ul>	<b>Low (27)</b>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
		<ul style="list-style-type: none"> <li>➤ Cleaning of cement mixing and handling equipment must be done using proper cleaning trays</li> <li>➤ All excess cement and concrete must be contained properly and be disposed of at a suitable approved landfill site.</li> </ul>	
<p><b>Groundwater Contamination:</b> The main impacts on groundwater quality associated with construction activities include the following; Potential chemicals/fuel spills or leaks, and improper mixing of cement, as well as the improper disposal of concrete washout.</p>	<b>Low (18)</b>	<ul style="list-style-type: none"> <li>➤ Suitable storage facilities for handling and storage of oils, paints, grease, fuels, chemicals, and any hazardous materials to be used, must be provided to prevent the migration of spillage into the ground and possible ingress into the groundwater regime.</li> <li>➤ All visible remains of excess concrete must be physically removed on completion of the plaster or concrete pour section and disposed of. Washing the remains into the ground is not acceptable as groundwater contamination could occur.</li> <li>➤ Machinery used on site should be placed on an impermeable layer to avoid groundwater contamination.</li> </ul>	<b>Low (9)</b>
<p><b>Noise pollution;</b> The main sources of noise associated with the proposed construction activities include the following; Construction activities and</p>	<b>Low (6)</b>	<ul style="list-style-type: none"> <li>➤ All construction activities, as far as possible must not be undertaken during night hours. If it is not possible to avoid carrying out construction work during night hours, this will be subject to approval by relevant authorities, as well as by the engineer and every effort should be made to comply with noise standards.</li> <li>➤</li> </ul>	<b>Low (6)</b>



Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
equipment delivery. Construction activities are likely to be confined to daytime and the noise levels will only affect the adjacent areas for a relatively short period of time, while the spread passes through.		<ul style="list-style-type: none"> <li>➤ Noise dampening mechanisms must be installed on the moving machinery.</li> <li>➤ No delivery of working equipment is allowed after working hours.</li> <li>➤ Unnecessary movement of vehicles and trucks must be prohibited</li> <li>➤ All vehicles must be maintained in accordance with manufactures specifications and manuals to avoid excessive noise.</li> <li>➤ All vehicles not in use must be turned off.</li> </ul>	
<p><b>Air pollution: Dust</b></p> <p>Dust generated during construction will result from clearing and earthworks. The major dust sources will be from the movement of vehicles over the cleared working area and from vehicles transporting material and equipment to the working areas. The occurrence and significance</p>	<b>Low (20)</b>	<ul style="list-style-type: none"> <li>➤ Remove the vegetation cover as it becomes necessary for work to proceed.</li> <li>➤ Limit on-site vehicle speed to 15-20 km/ph.</li> <li>➤ Apply dust suppressant during to unpaved or cleared areas.</li> <li>➤ Water exposed areas before high winds</li> <li>➤ Prohibits activities during windy conditions</li> </ul>	<b>Low (15)</b>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
of the dust, generation will depend upon meteorological conditions at the time. However, under normal meteorological conditions, dust impacts will be limited to within several hundred meters of the construction area			
<b>Paleontology:</b> In an event that fossils do exist underneath the surface, they could be potentially destroyed during excavations.	<b>Medium (40)</b>	<ul style="list-style-type: none"> <li>➤ Should any artifact or heritage resource be encountered, the contractor is advised to stop the operation immediately and report the matter to the municipality.</li> <li>➤ Should these discoveries be made, those fossils must be protected if possible, in situ and the appointed EO must report the matter to SAHRA.</li> </ul>	<b>Low (30)</b>
<b>Aesthetic Impact;</b> During the construction phase, residents who live in close proximity to or overlook the proposed project site will	<b>Low (25)</b>	<ul style="list-style-type: none"> <li>➤ The contractor should maintain good housekeeping on-site to avoid litter and minimize waste</li> <li>➤ Dust suppression is important as dust will raise the visibility of the development.</li> </ul>	<b>Low (25)</b>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
experience a change in their existing views. During construction, this view will be altered significantly as residents will have a view of a construction site characterized by exposed earth, construction materials, and machinery			
<p><b>Traffic Impact</b></p> <p>The transportation of the required materials and machinery will necessitate the use of heavy-duty vehicles. In addition, there will also be an increase in construction vehicles in and around the proposed site. The most significant impacts will be felt on Albert Wessels Drive and Madadeni Road. This impact will, however, be of temporary</p>	<b>Medium (35)</b>	<ul style="list-style-type: none"> <li>➤ Construction activities must comply with the recommendations of the Traffic Impact Assessment (TIA) report</li> <li>➤ Prior to construction, engage with the relevant road authorities (KZN Department of Transport, and any other relevant road authority) to jointly monitor road conditions during the construction period.</li> <li>➤ Establish a set route that will be used by heavy-duty vehicles so as to limit potential damages.</li> <li>➤ Visible signs must be installed to guide all movement of vehicles in and around the construction site.</li> </ul>	<b>Low (30)</b>

duration as it will only last for the construction duration of the project			
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**Table 7: Direct and Indirect Impact**

## **16. CUMULATIVE IMPACT ASSESSMENT AND MITIGATION MEASURES**

In terms of the EIA regulations, the cumulative impact is considered from the holistic point of view. It means that the impacts of an activity are considered from the past, present and foreseeable future together with the impact of activities associated with that activity. The activity itself may not be significant, but when combined with the existing and reasonably foreseeable impacts eventuating from similar or diverse activities may result in a significant change. "Cumulative impacts can be: Additive, synergistic, time crowding, neutralizing and space crowding" (DEA, 2017;14).

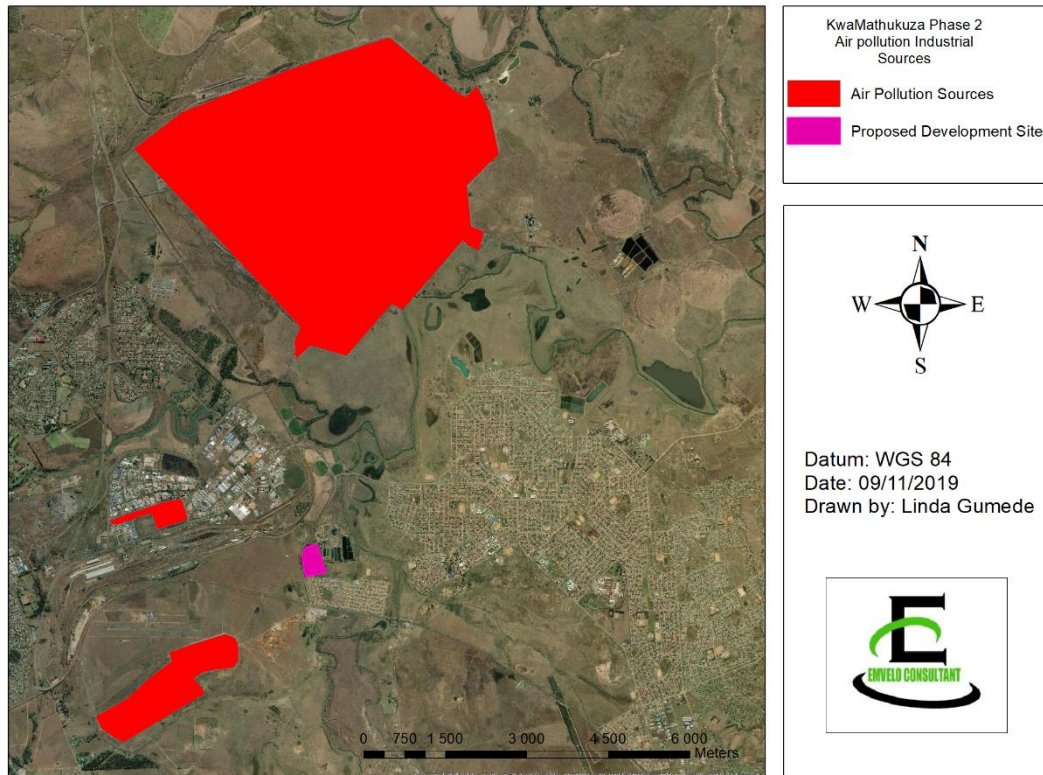
### **16.1 AIR QUALITY**

#### **16.1 USE OF THE HYSPLIT MODEL TO STUDY AIR QUALITY AROUND THE PROPOSED SITE.**

A particular place, city and country's air quality is a product of local and regional emissions as well as meteorological conditions. More specifically the proposed site is surrounded by industries and therefore subject to air masses potentially carrying pollutants from these sources. The use of HYSPLIT Model is therefore imperative, in trying to understand the probability of neighbouring industrial air pollution sources as well as the adjacent WWTW would having an influence on the proposed site air quality. Influence does not necessarily mean that the neighbouring environment will/is negatively contributing to air quality issues on the proposed site. However, for influence to assume the status of air pollution the following conditions must simultaneously occur;

(a) a place (i.e. industry) is a source of air pollutants; b) an air mass path collects the air pollutants from the source area and transports them to the proposed site in sufficiently short time that the pollutants are still present and viable; and c) upon arriving at the proposed site, the polluted air mass path must be at an elevation that would affect the local respirable air or else deposit the pollutants, making the proposed site a sink for the air pollutants.

The general perception by Newcastle residents is that major pollution problems are caused by the following industries; Karbochem, African Amines (Pty) Ltd, Lanxess Chrome International SA (Pty) Ltd, SA Calcium Carbide (Pty) Ltd and Newcastle Cogeneration (Pty) Ltd (Located South-West of the proposed site), NPC Cimpor (Located North-east), Silicon Technology (Pty) Ltd and ArcelorMittal (Located North-East of the proposed site), refer to figure 18. "Pollutant releases include carbon monoxide, particulate Matter, sulphur dioxide, nitrogen oxides, and total organic compounds" (Amajuba District Air Quality Management Plan, 2014:48).



**Figure 18: Air pollution sources in close proximity to the proposed site**

“Air quality models are widely used tools in studying source-receptor relationships” (Anastassopoulos et al., 2004:518). The Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPPLIT) which is also adopted on this study is one of many tools commonly used to estimate the air mass movement over space and time. This model does two things, it helps us to understand where the air (in some cases containing air pollutants) is coming from to the source location (This is known as Backward Trajectory) and where that air is going to (This is known as Forward Trajectory). HYSPPLIT calculates advection and dispersion using either puff or particle approaches under a Lagrangian framework (Anastassopoulos et al., 2004:518). For this project the reason why, we ran a HYSPPLIT model was to try and understand that whether or not the prevailing air circulation possibly carrying pollutants from industries as well as from the WWTW would have any impact on the proposed location.

## **16.1.1 METHODOLOGY**

### **16.1.1 (A) Modelling**

An entire calendar year (2018) was modelled so that seasonal variations would be observed and included in the analysis. Table 8 illustrate the parameters which were used to run the model. Analysis was restricted to one temporal resolution: 1 day (24 hours).

For each modelling run, a 24-hr HYSPLIT backward was modelled with the proposed site as the starting point. This 1-day time scale is well suited to capturing potential short-range transport of air pollutants, particularly considering that most pollutants are coming from nearby industries or the nearby WWTW. Also, the 0-24 hr trajectory, being necessarily closer to the proposed site, offers a slightly higher level of accuracy because modelling errors accumulate with increasing simulation time (Rolph and Draxler, 1990).

Table 8: Model parameters used for all runs.

<b>Model Parameters</b>	<b>Setting</b>
Meteorological Dataset	GDAS1 2018
Trajectory Direction	Backward (-27.758494; 30.002918)
Total Run Time	24hr
Start Point	Proposed Site
Start Time	19:00 UTC
Start Height	100m

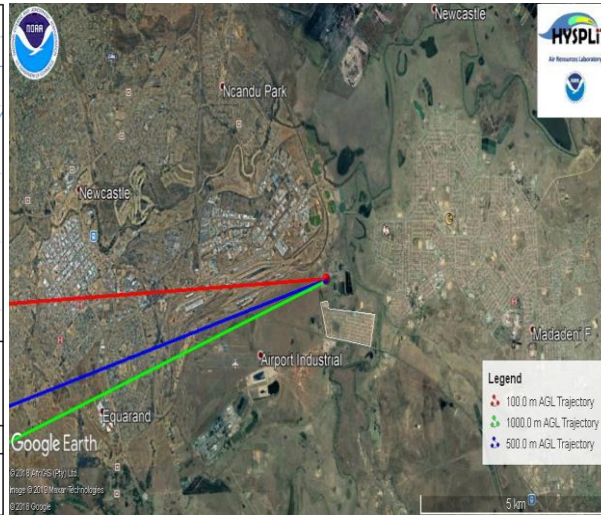
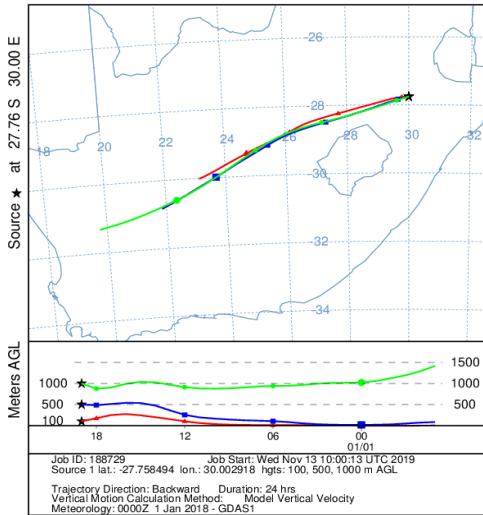
### 16.1.1 (B) Analysis of Simulation Result

Each modelling run (i.e., each day modelled) generated an aerial plot of a trajectory arriving at the proposed site. The majority of aerial plots showed that the air mass paths have significant changes of direction.

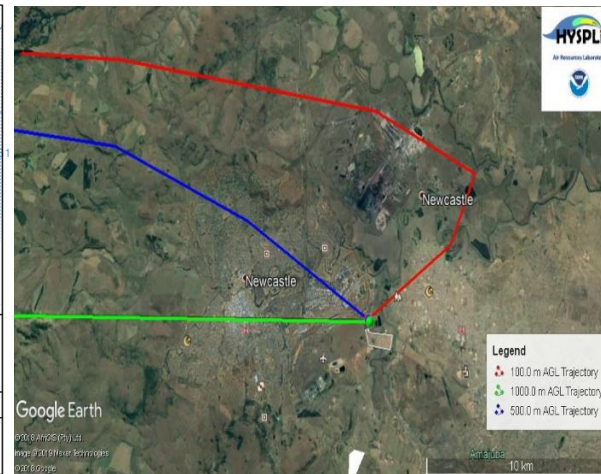
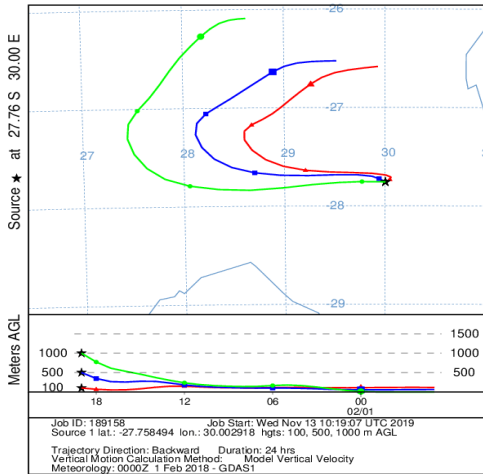
As shown in Figure 17, the majority of the air mass arriving at the proposed site in 2018 were from the West (SW, W, and NW), suggesting that air pollution sources to the West of the proposed site most often influence its air quality. However, this is not to downplay the air pollution sources to the east, and this has been proven by the model itself, some air masses arriving at the proposed site were coming from East and South East direction suggesting that the WWTP plant would have air quality impact on the proposed location.



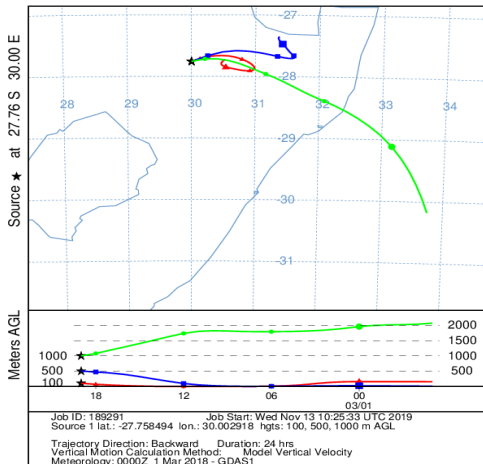
NOAA HYSPLIT MODEL  
Backward trajectories ending at 1900 UTC 01 Jan 18  
GDAS Meteorological Data



NOAA HYSPLIT MODEL  
Backward trajectories ending at 1900 UTC 01 Feb 18  
GDAS Meteorological Data

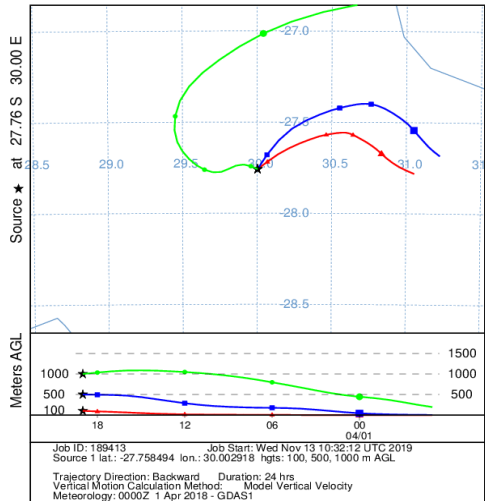


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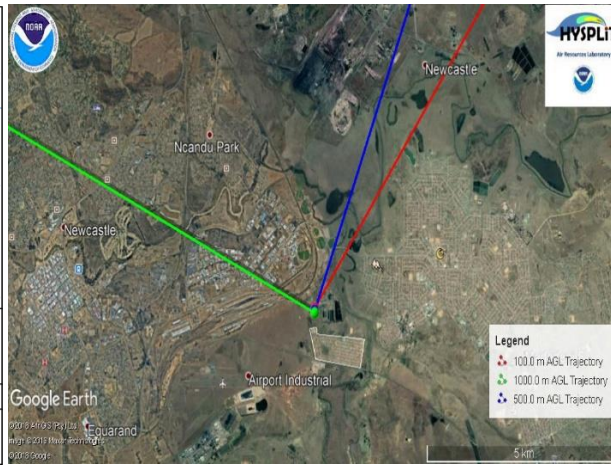
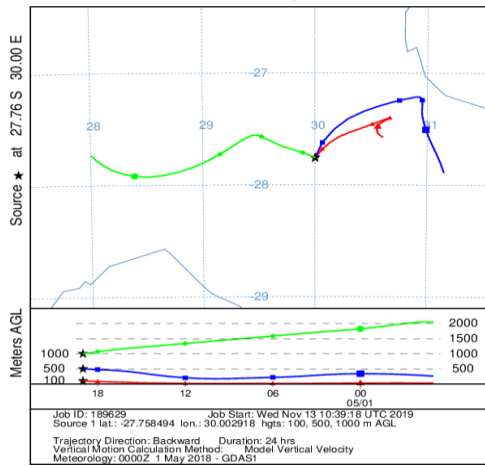




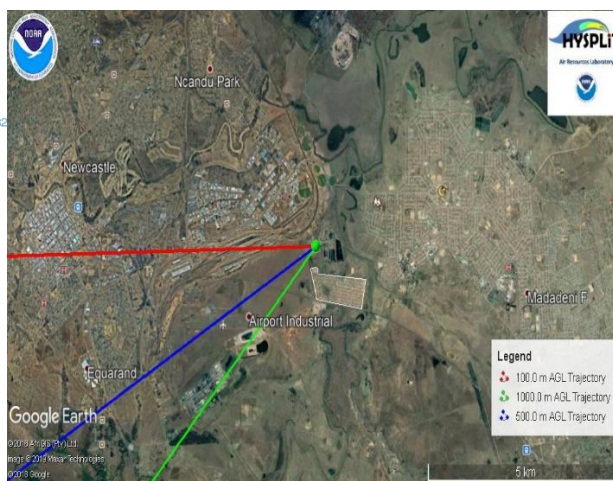
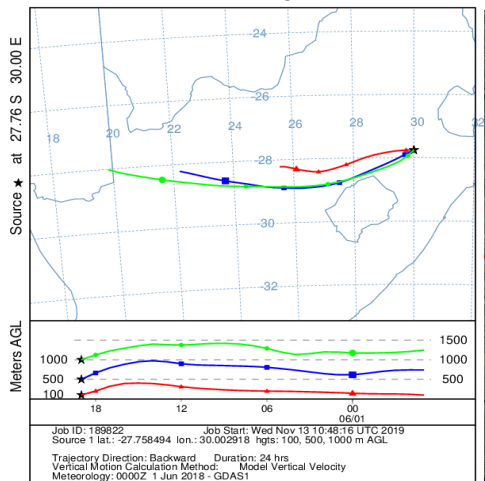
NOAA HYSPLIT MODEL  
Backward trajectories ending at 1900 UTC 01 Apr 18  
GDAS Meteorological Data



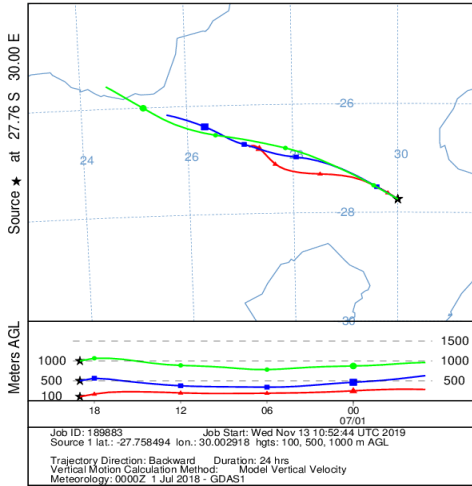
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GDAS Meteorological Data



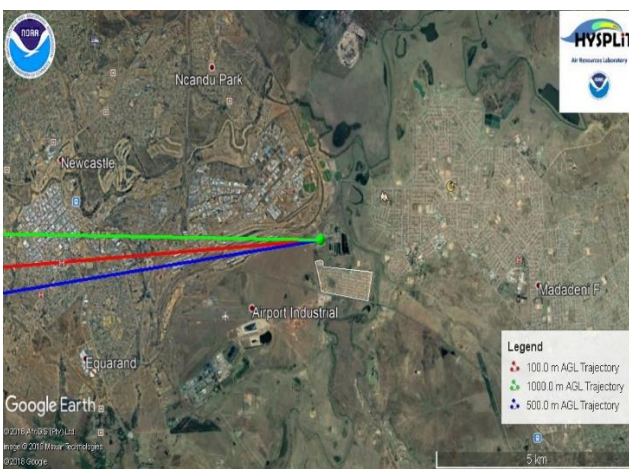
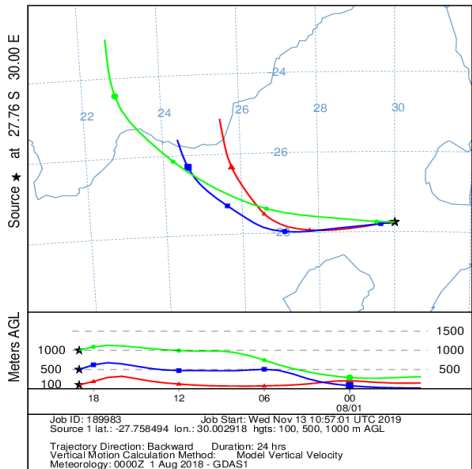
NOAA HYSPLIT MODEL  
Backward trajectories ending at 1900 UTC 01 Jun 18  
GDAS Meteorological Data



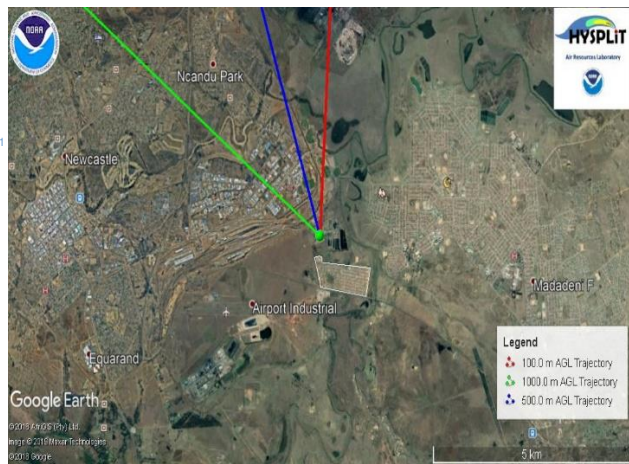
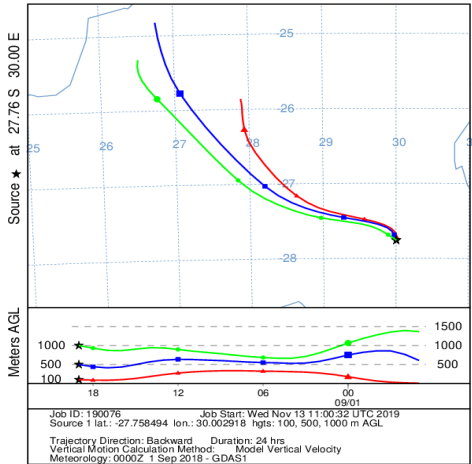
NOAA HYSPLIT MODEL  
Backward trajectories ending at 1900 UTC 01 Jul 18  
GDAS Meteorological Data



NOAA HYSPLIT MODEL  
Backward trajectories ending at 1900 UTC 01 Aug 18  
GDAS Meteorological Data



NOAA HYSPLIT MODEL  
Backward trajectories ending at 1900 UTC 01 Sep 18  
GDAS Meteorological Data





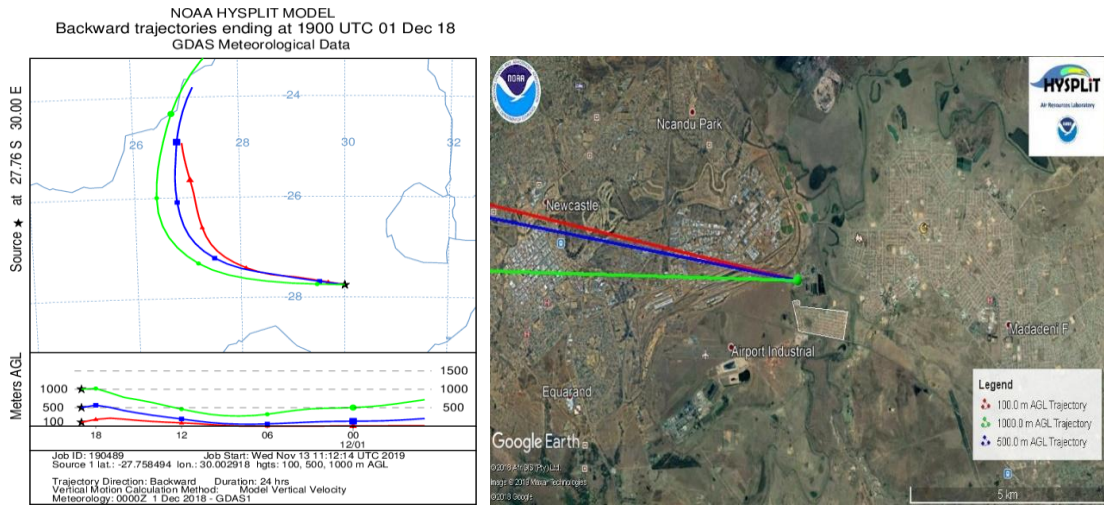
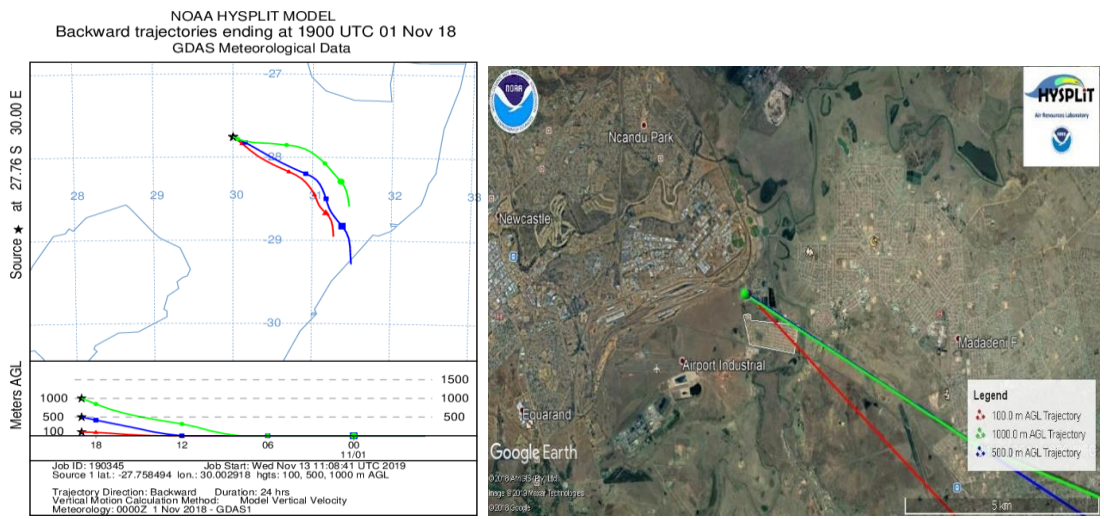
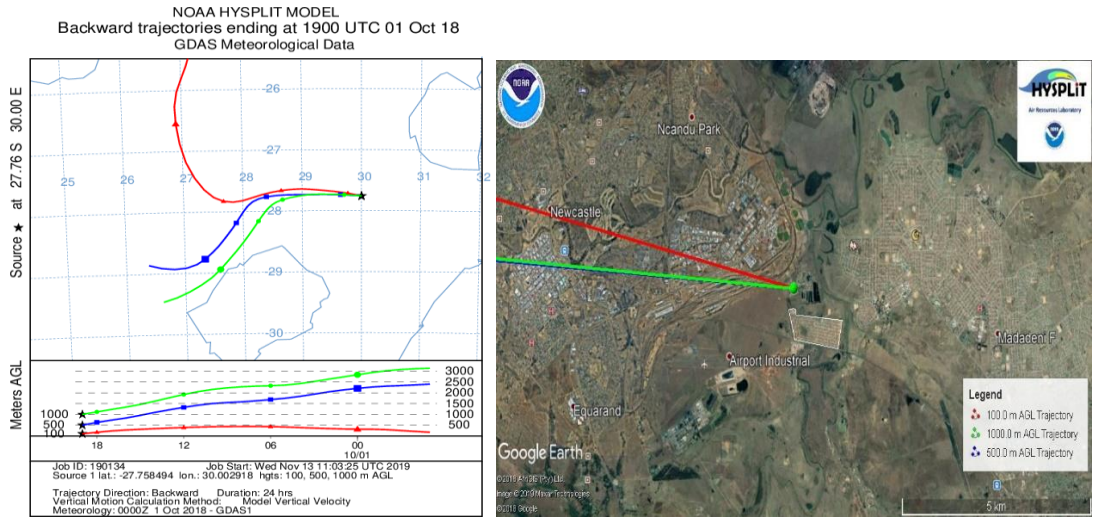


Figure 19: Air trajectory simulation

## 17. POTENTIAL HEALTH HAZARDS

The proposed location for housing unit development must be understood from a critical point of view. A survey questionnaire (**refer to section 14**), was rolled out in order to understand people's perceptions regarding the proposed site. All of them indicated that they are aware of the health implications associated with living in close proximity to the Wastewater Treatment Plant, yet they still want their houses to be built of the same location. This should not come as a surprise. Their responses should be contextualized; these people have been promised proper houses for a very long time (close to 10 years), and their current situation particularly where they are living, the conditions are very dire. The temporary camps are uninhabitable, the place has no stormwater infrastructure in place, there is a lack of formal adequate sewage system, the area is extremely overcrowded. Therefore, their responses should not come as a surprise since they are extremely pressurized by their current living conditions.

Despite their responses, there is still a health risk associated with the proposed development site. According to Palmiotto et al., (2014) The unpleasant odour can induce deterioration of the quality of the natural environment and can generate human health problems such as stress, headache, irritated eyes, nose and throat, nausea, anxiety, respiratory problems. Although regular exposure may result in tolerance and loss of recognition of the odour. In some cases, this can be potentially dangerous as exposure to hydrogen sulphide where loss of appreciation of the presence of the gas can lead to increased exposure. As clearly outlined by the World Health Organization (2000) on The Right to Healthy Indoor Air, Principle I. The Human Right to Health, everyone has the right to breathe healthy indoor air (WHO, 2000). "The quality of indoor air not only has a bearing on health but also on the quality of life.

The aeration tanks of wastewater treatment plants do produce microbial aerosols. Various potentially infectious agents have frequently been recovered from the air around wastewater treatment plants (Hickey and Parker 1975; Millner et al. 1980; Fannin et al. 1985). Thus, inhalation of high concentrations of airborne bacteria and fungi by the local community may pose a serious health risk to them. Moreover, Residents living close to wastewater treatment plants have been found to be more likely to experience rhinitis. However, it is important to note that the type of oxygenation systems being used in a treatment plant plays a major role in determining the levels of airborne transmission of pathogenic bacteria and fungi. Therefore, it is better to use submerged oxygenation systems of the sludge as opposed to mechanical oxygenation systems

## **17.1 PROPOSED MITIGATION MEASURES.**

The issue of odour from the nearby Wastewater Treatment Plant can never be entirely eliminated, however mitigation measures can be put in place to minimize the impact.

### **SEPARATION BUFFER RECOMMENDATION**

#### **17.1.1 Separation Distance Buffers**

When two or more activities of different and sometimes conflicting nature happen within a specific area, this usually gives rise to land-use conflict. According to Dawes (2006) conflict usually occurs as a result of the encroachment of residential buildings around areas of high industrial or within certain distances from Wastewater Treatment Plants creating amenity issues for those new residents.

Separation zones are a method of solving the land-use conflicts mentioned earlier. They are put in place to reduce or eliminate the impact of particular land use (Kozlowski and Peterson, 2005). Separation buffer, especially around Wastewater Treatment Plants (WWTP), plays an important role in the management of odour impact so that odour impact from WWTP particularly under maintenance and plant upset conditions can disperse and dilute to acceptable low levels by the time they reach odor-sensitive premises, such as residential households (Wallis and Oma, 2009).

According to Wallis and Oma (2009:3) "The rate of odour emissions from treatment plants varies considerably, hourly, daily, and seasonally. Even with odour control equipment, there is fugitive odour released, as well as higher emissions during maintenance operations. The combination of higher odour emissions and lower odour dispersion (light winds during the evening or early morning) leads to higher odour concentrations and a greater risk of odour nuisance".

WWTP needs to be located in such a way that they are able to deliver on their mandate in a cost-effective way. However, the problem is that if a buffer zone is not established, residences are inevitably built near the plant, creating an odour conflict.

The provision of buffer zones around land uses that generate excessive levels of dust or odour are rarely used in South Africa. The Air Quality Act is silent about such matters. As a result, a methodology in adopting the proposed buffer for this application was sourced from foreign land (Australia), although concerns can be raised over different sites (or countries being South Africa and Australia) having different physical and social issues. However, in the absence of

South Africa's guidelines with regards to the provision of buffers for odour management this methodology can be explored.

In utilizing this methodology, the distance is adjusted for vegetation/surface roughness between the source and the receptors and the terrain effect around the site, particularly the effect of terrain features on meteorology of the area. The recommended separation distance for air quality purposes as outlined in appendix 1 of the methodology is multiplied by the appropriate surface roughness factor and the terrain weighing factor to give the final recommended separation distance. (For more on this methodology please refer to **appendix L**).

**Recommended distance = value in appendix 1 x surface roughness x terrain weighing factor.**

For the establishment of residential buildings with less than 1000 households next to a WWTP, the recommended distance is 100m. For the surface roughness with open space or scarred trees, where the topography is predominately flat as in the case of the proposed site, the factor is 1. The terrain weighing factor for flat terrain in all directions as in the case of the proposed development site, the factor for both downslope and upslope is 1. Based on this criterion the recommended separation distance is 100m (100m x 1x 1). Bear in mind that the wind direction, climate and surface conditions in Australia are different from that of South Africa. As a precautionary measure, 50 meters should be added to 100m. Hence the preferred alternative is that of 150 meters.

The proposed and preferred buffers should not be seen as an alternative to odour control works, but they have a role in managing the interface between odour generating facilities and surrounding sensitive land uses.

### **17.1.2 PLANTING OF TREES AROUND SENSITIVE RECEPTORS**

Apart from applying the separation buffer between the Wastewater Treatment Plant and the proposed site location, it is also proposed that newly constructed housing units be surrounded with trees especially on the north and the east sections of the site. These trees will help to cut down on aerosol transmission and so further protect the surrounding environment. As to what tree would best suit the local conditions, a qualified horticulturalist would need to be employed in order to give that advice. Preferably these trees must be located at least within 5 meters from the edge of the proposed site.

### **17.1.3 UPGRADING OF THE INGAGANE WASTEWATER TREATMENT PLANT**

In addition to the proposed separation buffer and the planting of trees around sensitive receptors, measures to control odour at the source were considered. As a result, the following mitigation measure is proposed;

#### **17.1.4. ODOR CONTROL COVER**

The primary sources of odors within a Wastewater Treatment Plants are well understood by many researchers. According to Karageorgos et al. (2010:2637), these sources include “preliminary treatment operations (i.e. screening facilities, grit removal tanks, flow equalization basins, primary clarifiers) and the solids processing facilities (anaerobic digestion, sludge storage basins, mechanical dewatering)”.

The most common and world-wide accepted way to deal with the unpleasant smell emanating from these locations includes the installation of odour control covers, the odorous gases is then directed to a central chemical scrubber operating with hydrogen peroxide oxidation.

It, therefore, proposed that the municipality consider this measure for the suppression of odour at Ingagane WWTW. The feasibility study must be commissioned prior to the implementation of such measures, in order to find an affordable cover for the municipality.

### **18. DECOMMISSIONING AND REHABILITATION PLAN FOR AREAS OCCUPIED BY SEPTIC TANKS**

The temporary sewage system currently serving the transit camps makes use of septic tanks. Since these houses would be demolished and the newly constructed housing unit will be connected to the formal municipal sewage system, the septic tanks must be removed and the area occupied them must be rehabilitated.

In order to ensure that the permanent removal and closure of the septic tanks does not have adverse impact on the environment, a decommissioning and rehabilitation plan must be developed by the municipality and be approved the Department of Economic Development Tourism and Environmental Affairs prior to commencement of septic closure activities. The decommissioning plan would have to address, the removal of hazardous material, impacts and mitigation associated with closure activities, possible groundwater contamination, schedule of closure activities, conformance of the plan with the applicable regulatory requirements. The septic tanks closure or removal plan may include the following;

- Removal of underground facilities and filling the area with sand or alternatively once solids and liquids have been removed filling of empty tank with clean sand, gravel or other acceptable material and sealed
- Removal and Disposal of chemical and hazardous waste by registered hauler
- Regrading and restoration of the original site contours
- Revegetation of areas disturbed by activities in accordance with site rehabilitation plan etc.

## **19. RECOMMENDATIONS BY SPECIALISTS**

### **19.1 RECOMMENDATIONS BY ECOLOGICAL IMPACT ASSESSMENT SPECIALIST**

According to an ecological specialist the proposed site was found to be of low ecological sensitivity due to the following reasons;

- The site was found to be significantly disturbed and vegetation transformed by anthropogenic disturbance,
- The site is composed of alien & invasive plant species, weeds, and graminoids, with virtually none of the reference vegetation type remaining
- The site does not fall within, nor is it close to any protected areas or other conservation significant areas, threatened terrestrial ecosystems, or provincial and district CBA or ESA areas.

The only exception was the presence of *Gladiolus dalenii* which is provincially protected. This species may not be removed/destroyed without permit authorization from eKZN Wildlife.

### **19.2 RECOMMENDATIONS BY TRAFFIC IMPACT ASSESSMENT SPECIALIST**

The following recommendations were made by the specialist following the assessment of the potential impact of the proposed development on traffic:

#### **Access A**

- The T-intersection (West Access) of Albert Wessel Drive and KwaMathukuza Access Road 1 requires no geometric improvements because the intersection is operating at high LoS in the current and future development.
- The intersection of P483 and Albert Wessel Road which links the proposed development to Newcastle and Madadeni would require a 50m slip lane from Albert Wessel north bound link. Even though the intersection is operating at acceptable LoS for both AM and PM peaks in the base year; nonetheless the analysis indicates a possible decline of the performance in the future base year.
- The east Access from KwaMathukuza to P483 would require an upgrade to a 3.0m width.



### **Access B**

- For Yende street and Albert Wessel Road, a three-way priority intersection is proposed, with priority along Albert Wessel road and stop from Main Road 1.

### **Access C**

- For access C and Road 1, a four-way priority intersection is recommended, with a priority along Road 1 and stop from access road c.

### **Access D**

- For access D and Yende street, a three-way priority intersection is recommended, with a priority along Yende Street and a stop from access road D.

It was observed that along the main roads and Karbochem Road from Vezobuhle to Karborchem/Newcastle, there is no infrastructure for non-motorized transport e.g. Paved sidewalks. As a result, traffic safety remains a big concern for pedestrians and cyclists around the area. The following measures were deemed suitable to ameliorate this issue;

- Stops signs
- Pedestrian crossings (next to schools, shops, clinics, and churches)
- Taxi/bus bays
- Street lighting
- Law enforcement (Warning signs)

## **19.3 RECOMMENDATIONS BY GEOTECHNICAL SPECIALIST**

For Geotechnical investigations, the following are the recommendations for the proposed development:

### **Bulk Earthworks**

Dumped rubble with debris present on the surface, in the central portions of the proposed site, must be removed and discarded at a dumpsite.

Any backfilling/filling should be brought up to level in layers not exceeding 150mm, with each layer wetted to optimum moisture content and adequately compacted to specification.

Fill material for structural purposes must conform to at least G6 quality as per the COLTO specifications. It could be imported from external sources.

## **Structural Buildings**

Residential site Class: C

It is recommended that structures be founded at nominal, 0.3m to 0.6m depth, utilizing reinforced spread footings foundations and/or slab on the ground type foundation; at allowable bearing, pressure limited to 100kPa on or within the pedogenic materials.

Foundation trenches must be wetted and compacted prior to construction. Site drainage and plumbing/services precautions should also be ensured.

## **Residential Site Class: C1/C2**

### **Option 1: Deep Strip Foundations >**

- Normal construction with drainage precautions.
- Founding on the competent horizon (pedogenic) below the problem horizon (Transported soils).
- Ensure adequate site drainage and plumbing/services precautions.

### **Option 2: Stiffened Strip Footings, Stiffened or Cellular Raft**

- Stiffened strip footings or stiffened or cellular raft with articulation joints, reinforced masonry.
- Bearing capacity and not to exceed 50 kPa
- Site drainage and plumbing must be ensured.

## **Layer works Preparations**

Layer works must be designed and placed based on the analysis of the volume and type of traffic expected.

The following generic layer works are proposed:

- Remove topsoil material, typically 0.2m thick and excess material to achieving design levels. Rip and re-compact 150mm deep to 93% Modified AASHTO density, to form subgrade.

- Construct 150m thick stabilized subbase type material and compact to 95% Modified AASHTO density at OMC. (C4 as per TRH 14).
- Place and compact a 150m thick base of G1 (Graded and crushed stone), compacted to 88% of the apparent density of G4 (Natural Gravel), compacted to 95% Modified AASHTO density at optimum moisture content on top of the stabilized subbase prior to priming and sealing with either asphalt or chip and spray
- If paving blocks are favored, place a layer of 25mm bedding sand on top of a stabilized subbase layer followed by the placement of 60/80mm interlocking paving blocks, contained between kerbs or other nonmovable structures.
- Adequate sub-surface drainage and surface drainage must be ensured

## **19.5. RECOMMENDATIONS FROM THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)**

The envisaged negative impact would not outweigh the positive impact provided that the proposed recommendations are properly implemented. The need and desirability for the housing development is of high priority for the affected parties (Transit camp residents). Nonetheless, this should not come at the expense of their health. The responsibility rest with the Department of Economic Development Tourism and Environmental Affairs (EDTEA) who are presiding over this application and the Newcastle Local Municipality who is the applicant. The EAP is of the view that Environmental Authorization should be granted on certain conditions which would be outline (d on this section. After an Authorization has been granted, it is the applicant's responsibility(municipal's) to ensure that all recommendation outline in this report as well as on the EMPr are properly implemented.

### **19.5.1 Recommendation for Health Risk Minimization**

The most burning issue in relation to the proposed development, is the fact that it is located next to a Waste Water Treatment Works. This will expose residents to health-related problems and odor nuisance especially during weather upset conditions. To minimize this foreseeable impact the Authorization must be granted on condition that the following recommendation are properly implemented;

- A 150 meters buffer must be applied between the proposed location and the WWTW. To ensure an effective implementation of this buffer, prior to site establishment a site walk-

about must be conducted and a 150 meters buffer must be clearly marked during site walk-about either using a red tape or any appropriate material. On this site-walk about, site manager must be accompanied by an Appointed Environmental Control Officer, Safety and Health Officer, Engineer, one municipal and community representative. The application of the proposed buffer should not be seen as an alternative to odor control works, but it is only there to mitigate the impacts.

- Trees must be planted within 5 meters (at most two lines) from the edge of the proposed site especially on the eastern and northern sections. To ensure an effective implementation of this recommendation, qualified personnel in plants or trees species must be appointed. Trees to be planted must be a combination of both short and tall trees so that they would act as a shield in protecting the community.
- Odor control covers must be applied on the WWTW. On this recommendation the municipality can first, conduct a feasibility study. The feasibility study should look into the affordability of the different material that can be used. The study should then propose the material the municipality can afford.
- Half-way through the construction activities or alternatively prior to undertaking construction activities, a Health Impact Assessment Specialist must be appointed to undertake a study on how the WWTW would affect the health of the affected parties. Recommendation by the specialist must then be implemented. Preferably this should be done prior to relocating the transit camp residents.
- Immediately after completing the 125 stands and having relocated people to those houses, the remaining transit camp houses must be demolished.

#### **19.5.2 Decommissioning and Rehabilitation Plan For Areas Occupied By Septic Tanks**

Whether in use or not in use septic tanks pose a major threat to human health and the surrounding environment. Since the proposed development will now be joined into the existing municipal sewer system, areas occupied by septic tanks must be rehabilitated. For the decommissioning of septic tanks and the rehabilitation of the areas occupied by the septic tanks structures/ equipment the following recommendations must be considered;

- A qualified person within the municipality or if no such person exist an independent specialist must be appointed to compile a decommissioning and rehabilitation plan for the areas affected by septic tanks. The report produced by that responsible party must first be approved by the Department of Economic Development and Environmental Affairs.
- The Decommissioning and Rehabilitation report must assess all the possible environmental impacts which could arise as a result of decommissioning activities and provide mitigation measures.
- The report should either look into removing the septic tanks or filling the areas with sand, gravel or any environmental acceptable material.

- The report should also address how the area affected by septic tanks would be rehabilitated.

### **Recommendations During Construction**

- ✚ Appoint an Environmental Control Officer (ECO) to oversee and advise on site-specific environmental management requirements when needed.
- ✚ Mitigation measures for Carbon footprint reduction must be considered to reduce risks of climate change.
- ✚ All reasonable precautions must be taken to minimize noise generated on-site.
- ✚ Delivery trucks and vehicles must be kept in good working order so as not to generate excessive noise.
- ✚ Maintenance done on vehicles coming in and out of the site must be done in such a manner to maintain good transportation of raw materials to the site.
- ✚ Storage areas must be managed properly by applying the suggested mitigation measures on this EMPr.
- ✚ Non-recyclable material should be removed on-site to private recycles who utilize it or be disposed of at the local Municipal Landfill site.
- ✚ If excessive spillage of diesel and fuel etc. should occur due to accidents, it should be cleaned up immediately.
- ✚ All employees must be trained about the Spill Management, Waste management, Emergency Procedures and Evacuation Procedures in place.
- ✚ Stormwater management must be drawn to separate clean water from dirty water.
- ✚ No workers are permitted to be accommodated overnight in the site except for skeleton security personnel.
- ✚ Re-vegetate and rehabilitate after day a day's work if any vegetation is removed.
- ✚ Where possible limit the removal of existing trees or shrubs.
- ✚ Only indigenous vegetation should be used during rehabilitation.
- ✚ Rehabilitation success should be monitored.

## **20. CONCLUSIONS**

The above report provides a detailed Basic Assessment Report (BA) for the proposed KwaMathukuza Phase 2 project. This report and documentation attached are sufficient to decide in respect of the activity applied for in the view of the EAP.

The EIA process was conducted according to Appendix 1 of the EIA regulations, December 2014 and the NEMA as amended in 2017. The assessment was based on the information

provided, the site inspection conducted by the EAP, as well as the comments by the Stakeholders.

This Final report will also provide the Interested and Affected Parties (I&APs) with an opportunity to comment.

The Competent Authority (CA) is required to assess the report based on the information currently provided and take a final decision once the information submitted is complete. Emvelo Consultant will continue to liaise with all the I&APs during the process.

**APPENDIX A:**

**DECLARATION OF INFORMATION**

I, the undersigned **Phumzile Lembede**, on behalf of **Emvelo Quality and Environmental Consultant**, hereby declare that the information provided in this application is correct and true.

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Signature

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Date

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Position

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Company

**APPENDIX B:**  
**ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)**



**APPENDIX C:  
SITE PHOTOGRAPHS AND LOCALITY MAPS**

**APPENDIX D**  
**LAYOUT PLANS**

**APPENDIX E:  
PUBLIC PARTICIPATION PROCESS**

**APPENDIX F:**

**EAP's cv(s)**

**APPENDIX G:  
ECOLOGICAL ASSESSMENT REPORT**

**APPENDIX H:  
TRAFFIC IMPACT ASSESSMENT**

**APPENDIX I:  
GEOTECHNICAL INVESTIGATIONS REPORT**

**APPENDIX J:**  
**COMMUNITY SURVEY QUESTIONNAIRES**



**APPENDIX L**  
**GUIDELINES FOR SEPARATION DISTANCE**