

CHAPTER THREE: DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This section of the report provides an overview of the affected environment as well as a brief description of surrounding land use activities. It includes desktop level information regarding the biophysical, socio-economic and heritage attributes of the site, which aid in the process of identifying project activities that may have potential impacts on the environment and require further investigation. This information also highlights potential constraints which the affected environment may place on the development. The information presented in this chapter is based on a desktop review of available literature, maps, planning frameworks; web based information resources, as well as a site visit to the affected property.

The provisional development proposal entails the subdivision of a portion of the site (62/10 Little Chelsea) for the establishment of a rural-residential estate with 10 peri-urban erven; as well as the provision of associated services infrastructure (access, water, electricity, and sanitation). The portion of the site proposed for subdivision and development will cover an estimated 20.2 ha of the farm (total extent of approximately 42.8ha). The development will include the clearing of vegetation, landscaping and levelling the portion of the site which is to be developed, the provision of bulk services to the individual erven and the establishment of an access road (Detail in Chapter 2).

3.2 SITE LOCALITY AND OVERVIEW

Portion 62 of Farm 10 Little Chelsea is a smallholding in the Colleen Glen area on the outskirts of the Nelson Mandela Bay Municipality. The site can be accessed via a gravel access road located approximately 650m south of the N2 freeway off-ramp along the Seaview Road.

According to the NMBM SDF the site falls within Peri-urban zone 1 and has a distinct rural character. All of the existing structures on the site are restricted to the northern portion of the site. There are two existing residential units on the property (located on proposed erf no 6) that are currently tenanted and stables, used for the stabling of horses. Other infrastructure includes paddocks and exercise arenas for horses on the property. There are also a few disused water reservoirs and dilapidated farm workers dwelling units. Adjacent to the access road in the north western portion of the site is a small citrus orchard.

The dwellings in the northern portion of the property are surrounded by ornamental gardens which contain a number of exotic tree species as well as a few declared alien invasive species. There is a small vegetable garden established close to the farm worker dwellings.

It would seem that historically the southern portion of the site was used as an informal horse race training track. However, it has become heavily overgrown by exotics and weedy vegetation, thus there are only remnants of the track and footpaths over this portion of the site.

Two dams/wetlands were identified on the site, one of which straddles the boundary between Portion 62 of farm 10, and Portion 80 of farm 10.



Photo 3.1 Most of the southern half of the site is heavily overgrown by exotic and weedy vegetation.



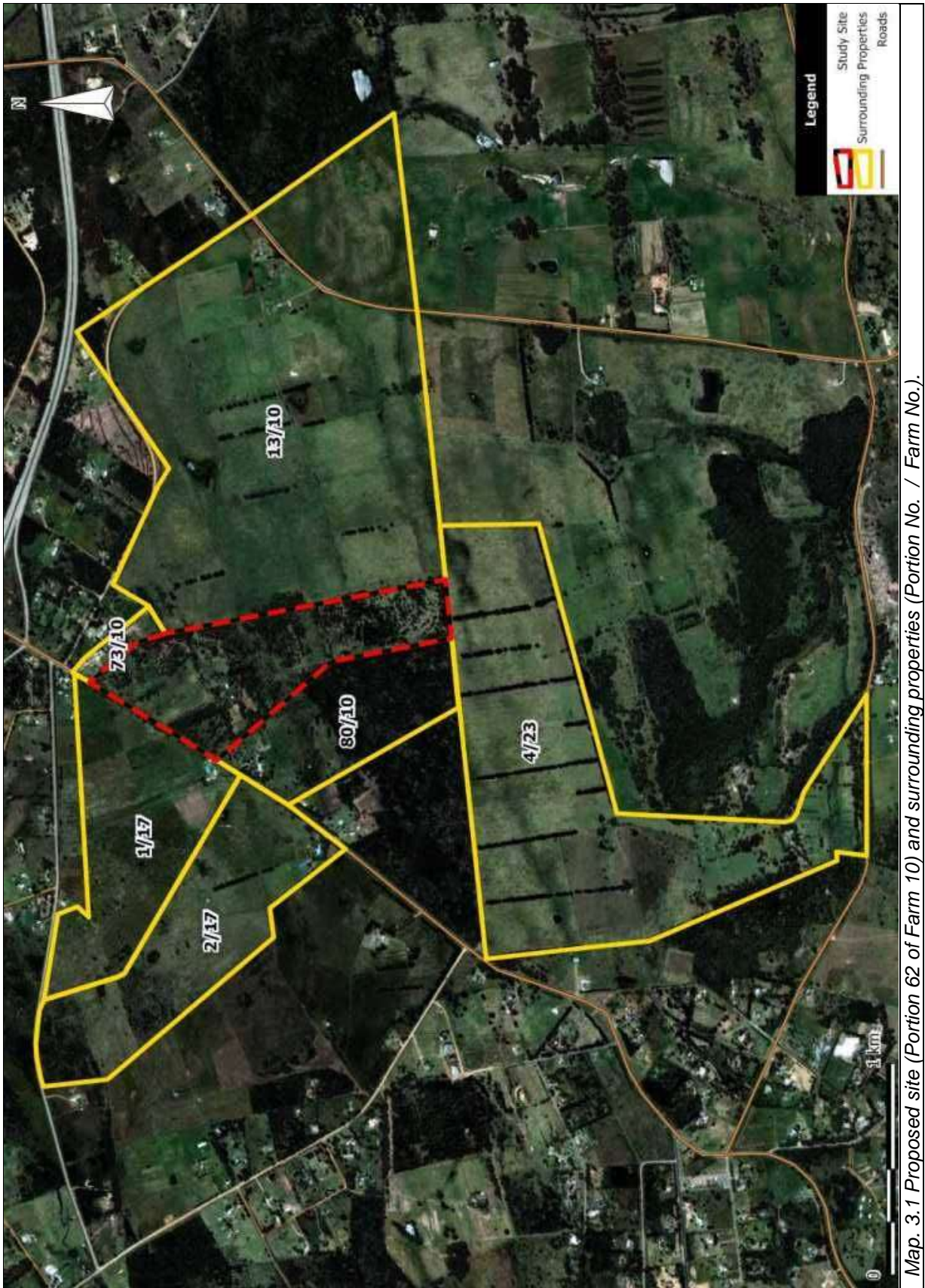
Photo 3.2. Ornamental gardens surrounding the dwellings in the northern half of the site.

3.3 SURROUNDING LAND USES

The surrounding farms and small holdings have a distinct rural character and a mixed land use. Activities on the land surrounding the study site identified to date include:

- | | |
|--|--|
| • Portion 1 of Farm 17 Goedemoedsfontein | Agriculture - Pastures / grazing |
| • Portion 2 of Farm 17 Goedemoedsfontein | Agriculture - Pastures / grazing |
| • Portion 13 of Farm 10 Little Chelsea | Agriculture - Pastures / grazing |
| • Portion 73 of Farm 10 Little Chelsea | Agriculture - Pastures / grazing |
| • Portion 80 of Farm 10 Little Chelsea | Agriculture - Pastures / grazing
Animal Kennels |
| • Portion 4 of Farm 23 | Agriculture - Pastures / grazing |

Map 3.1 below provides an overview of properties adjacent to the study area.



3.4 BIOPHYSICAL ENVIRONMENT

Wind conditions are expected to be very similar to that experienced in Port Elizabeth. The area is exposed to both South-westerly and South-easterly winds on a regular basis, with wind from other directions making a minor contribution. Both winds with Easterly and Westerly components reach speeds in excess of 60 km / h, however most of the winds are between 14 and 40 km / h in speed (Lubke & De Moor 1998).

The region experiences a 9 to 13 °C variation between minimum and maximum temperatures, with an annual mean temperature of about 17°C. The mean summer temperature is about 21°C, with a mean winter temperature of 14°C.

The Port Elizabeth region receives rainfall throughout the year, with an annual mean rainfall of about 614 mm. Most of the rain falls over the winter months, from May to August. Rainfall peaks in June and August, with means of 65 and 60 mm respectively.

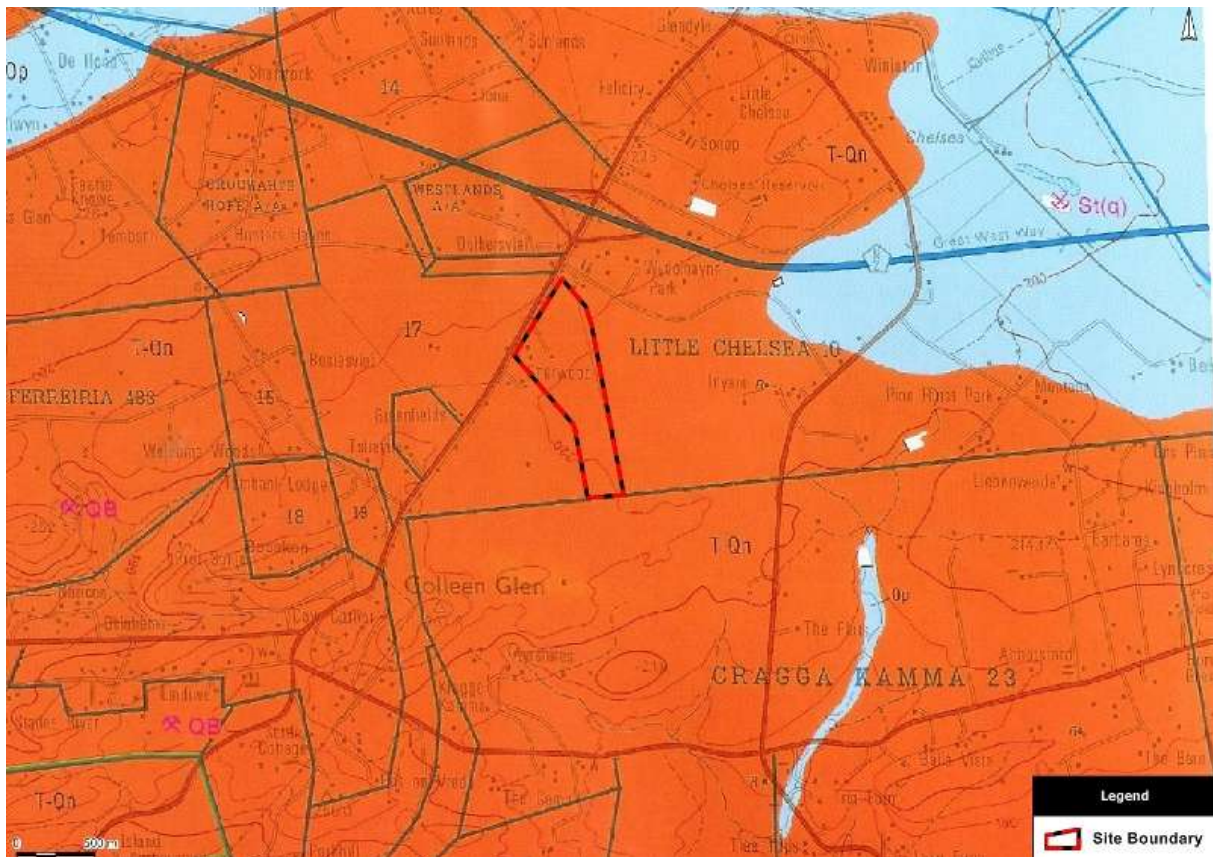
3.4.1 LANDSCAPE AND GEOLOGY

Geology

According to the geological maps for the area (Sheet 1:250 000, Geological Series - 3324 Port Elizabeth), the site is underlain by sediments of the Nanaga formation in the Algoa Group (Shown as T-Qn on the published maps). The Nanaga formation is dominated by semi- to well consolidated aeolianite¹, calcareous sandstone², and sand; overlying Alexandria formation and Cape Supergroup rock. The sandstone of this formation is fine to medium grained, and usually calcareous as result of a high concentration of shell fragments. These deposits represent fossil dune fields, which developed during past sea level fluctuations.

¹ Rock made up of dune sand which has been bonded and hardened with a natural cement, the most common cement being calcium carbonate.

² Sedimentary rock formed by the consolidation and compaction of sand and held together by a natural cement, such as silica.



Map 3.2 Geology of the study area – Nanaga Formation shown in orange (T-Qn), Peninsula Formation Sandstone in blue (Op).

Topography

The topography of the landscape is generally gently sloping towards the centre of the site from the northern and southern boundary. Elevation is highest in the western corner at 230masl and lowest on the eastern boundary towards the centre of the site at 214masl.

A small ridge extends the width of the site, the southern slope of which roughly marks the edge of the portion of the site proposed for development. The ridge is steeper on the south facing slope and may be prone to erosion, as is evident at some locations, particularly previously disturbed portions of the ridge.



Map 3.3 Contour map showing topography of Portion 62 of Farm 10.

3.4.2 GEOHYDROLOGY AND SURFACE WATER

Drainage

It is anticipated that the drainage will follow the topography as described above, draining towards the centre of the site, in particular, towards the eastern boundary. However, as the slope is gentle in this portion of the site, local water logging may be expected to occur periodically during periods of prolonged or heavy rainfall although no distinct drainage lines or streams were noted during the site visit.

Dams / Wetlands

During the site visit two man-made dams were noted on the site. These surface water bodies may represent wetland areas as defined in terms of the National Water Act, 1998 (Act 39 of 1998). One straddles the boundary of the property with Portion 80 of Farm 10 in the south western corner, and consists of an excavation with a large earthen embankment along its eastern edge. This dam contained standing water and associated hydrophytic vegetation, for example sedges / rushes and reeds. The other dam represents a roughly round excavated area at the base of the southern slope of the ridge that runs the width of the property. A disused vehicle track passes along its edge. At the time of the site visit it did not contain standing water; however hydrophytic vegetation was present in the excavation.

No development is currently proposed within the dams / wetland on the property, however, these areas should be appropriately mapped and if necessary, suitable buffers established. No abstraction of water from the wetlands on the property is proposed.



Photo 3.3. Dam containing standing water and hydrophytic vegetation in the south western corner of the property.



Photo 3.4. Dam in the northern portion of the site which at present does not contain standing water, although hydrophytic vegetation is present.

3.5 VEGETATION

The vegetation expected to occur at the site is noted in a number of conservation planning framework documents relevant to the general area. The resolution of the planning framework mapping is limited to a landscape level and the vegetation types and distribution on individual erven is subject to confirmation by a botanical specialist. The section below outlines the findings of the relevant conservation planning frameworks.

3.5.1 NATIONAL CONTEXT

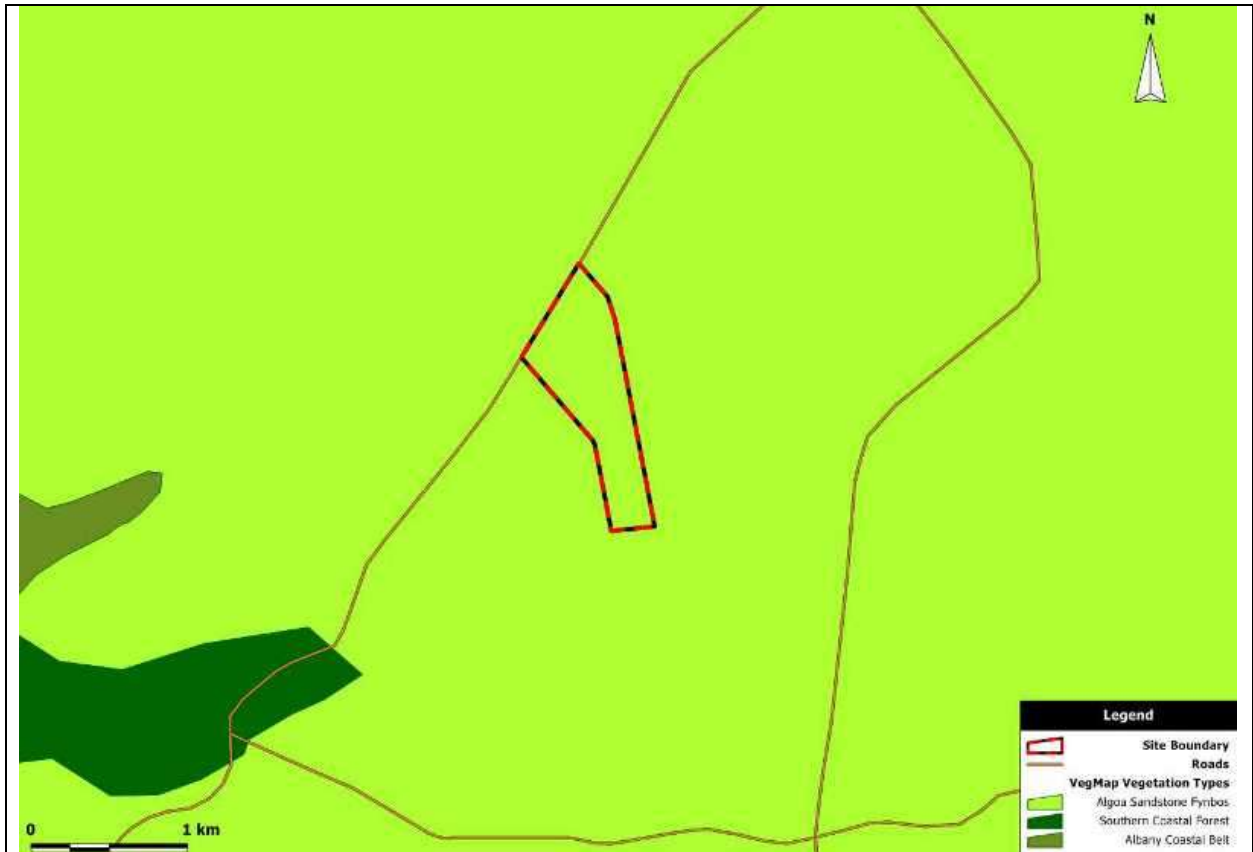
The **NSBA** (National Spatial Biodiversity Assessment) and the Vegetation Map of South Africa, Lesotho and Swaziland (VEGMAP, Mucina and Rutherford, 2006) maps show the vegetation on the subject sites as Algoa Sandstone Fynbos. The vegetation usually includes as endemic taxa *Agathosma gonaquensis*, *Cyclopia pubescence*, *Erica etheliae* and *Holothrix longicornu*. This vegetation type is considered Endangered and poorly protected, as its conservation target is set at 23%, while only 2% is formally conserved. Approximately 50% of Algoa Sandstone Fynbos has been transformed due to cultivation and urban sprawl, while invasion by alien species is considered a further threat.

3.5.2 REGIONAL CONTEXT

The **CAPE** (Cape Action for People and the Environment) maps indicate the vegetation expected to occur on site is Alexandria Indian Ocean Forest, but does not assign a conservation status to the vegetation.

STEP (Subtropical Thicket Ecosystem Programme) (Pierce & Mader 2006.) - According to the STEP mapping resources the majority of the site is covered by Algoa Grassy Fynbos, which is considered *Vulnerable*. A small portion of the site, in the south western corner is mapped as Thornhill Forest and Thornveld. This vegetation type is considered *Currently Not Vulnerable*. The STEP Transformation maps further show that a large portion of the site is currently transformed.

The **ECBCP** (Eastern Cape Biodiversity Conservation Plan) maps indicate a portion in the centre of the site is classed as "CBA2" (green) while the majority of the site is classed as "cultivated land" (yellow).



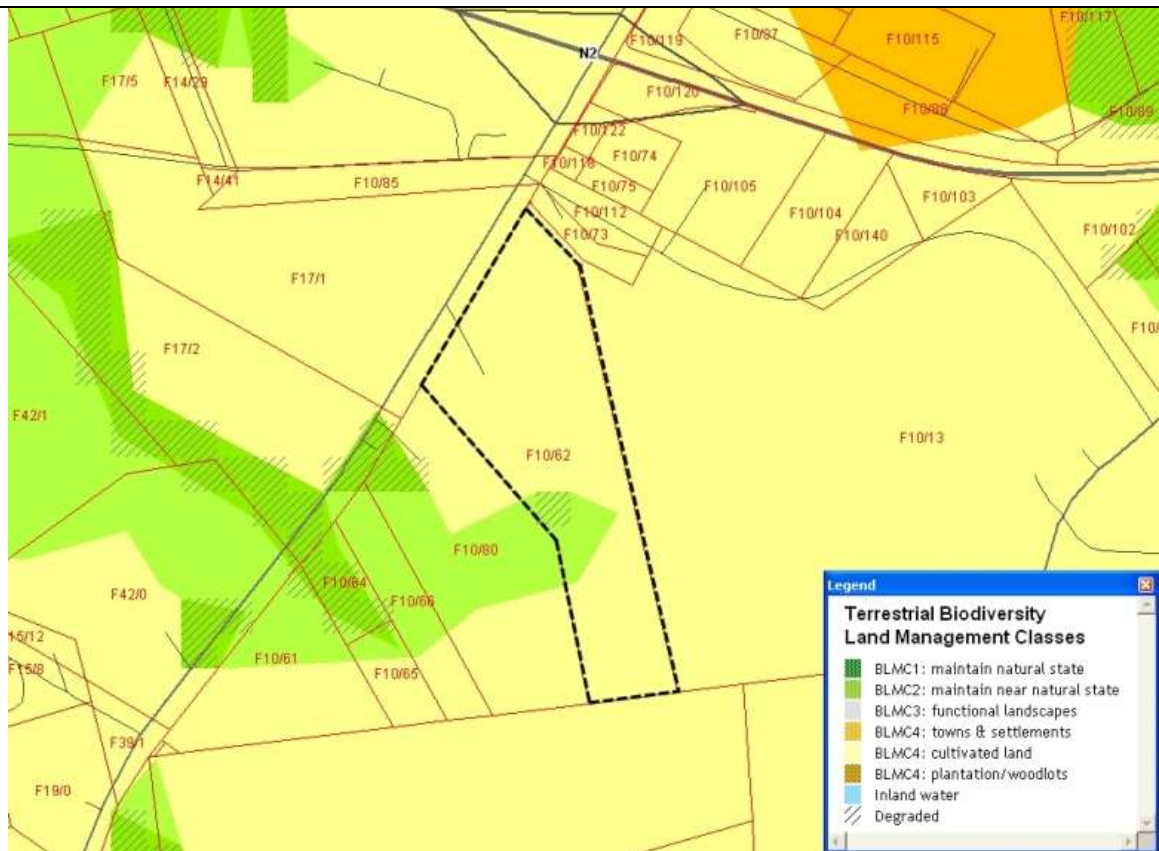
Map 3.4. Vegetation on the proposed site as mapped in VegMap showing Algoa Sandstone Fynbos present on site.



Map 3.5. Vegetation on the proposed site as mapped in CAPE showing Alexandria Indian Ocean Forest present on site.



Map 3.6. Vegetation on the proposed site as mapped in STEP showing Algoa Grassy Fynbos as well as the level of transformation of the site



Map 3.7. The site has a patch of CBA2, a portion of which is degraded while the rest is mapped as “cultivated land” in the ECBCP.



Map 3.8. Vegetation on the proposed site as mapped in the NMBM Conservation Assessment and Plan (NMBM CAP) showing Colleen Glen Grassy Fynbos present on site and CBAs in the vicinity



Map 3.9. Landcover Map from the NMBM CAP showing the whole site has been transformed for agriculture.

3.5.3 LOCAL CONTEXT

NMBM CAP (Nelson Mandela Bay Municipality Conservation Assessment & Plan) - The NMBM CAP indicates the site is expected to have *Colleen Glen Grassy Fynbos*, a Critically Endangered vegetation type, as its natural vegetation cover. However the NMBM CAP Land-cover map further indicates the vegetation on the entire site has been transformed by agriculture.

3.5.4 VEGETATION ON SITE

3.5.4.1 *Transformed/ degraded vegetation*

The initial site visit and overview of the vegetation at the site seemed to confirm the transformed nature of the site that has been described in the STEP and NMBM CAP mapping. The northern portion of the site is largely transformed into dwellings, ornamental gardens and outbuildings associated with the small scale agricultural activities on site which include equestrian activities as well as a small citrus orchard and planted crops.

Most of the site has been overgrown by weedy and exotic vegetation. In particular, species of the Genus *Pinus* as well as *Eucalyptus* dominate the tree canopy. The groundcover for the most part consists of grasses, with a few herbaceous shrubs - remnants of the original fynbos vegetation. These include *Metalasia muricata*, *Helichrysum aureum* and *Aspalathus chortophila*.



Photo 3.5. Transformed nature of the vegetation in the northern portion of the site

3.5.4.2 *Wetland habitat*

The vegetation associated with the two dams on the site is characteristic of wetland habitat including a number of sedge species, water lilies (*Nymphaoides indica*) and other hydrophytic species.



Photo 3.6 Typical wetland vegetation associated with the wetlands on the site.

3.5.5. CRITICAL ECOLOGICAL PROCESS AND BIODIVERSITY AREAS

In terms of the STEP mapping the site does not fall within any STEP Corridors or Process Areas, neither is it mapped as a Critical Ecological Process or Critical Biodiversity Area in terms of the NMBM CAP mapping.

As noted above, however, a portion towards the centre of the site (approximately 4ha) has been mapped as a CBA2 in terms of the ECBCP. Critical Biodiversity Areas are features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning.

3.5.6 CONCLUDING REMARKS

The findings and recommendations of the conservation planning frameworks for the area should be confirmed by a biodiversity / vegetation specialist in the EIA phase of the assessment. If necessary, suitable recommendations should be made for the incorporation of the requirements of the conservation planning frameworks in the development.

The biophysical assessment should include an opinion by a wetland specialist with regards to the dams on the site. The wetland specialist should comment whether these dams qualify as wetlands in terms of the National Water Act and relevant General Authorisations; as well as recommending suitable buffers if required.

3.6 FAUNA

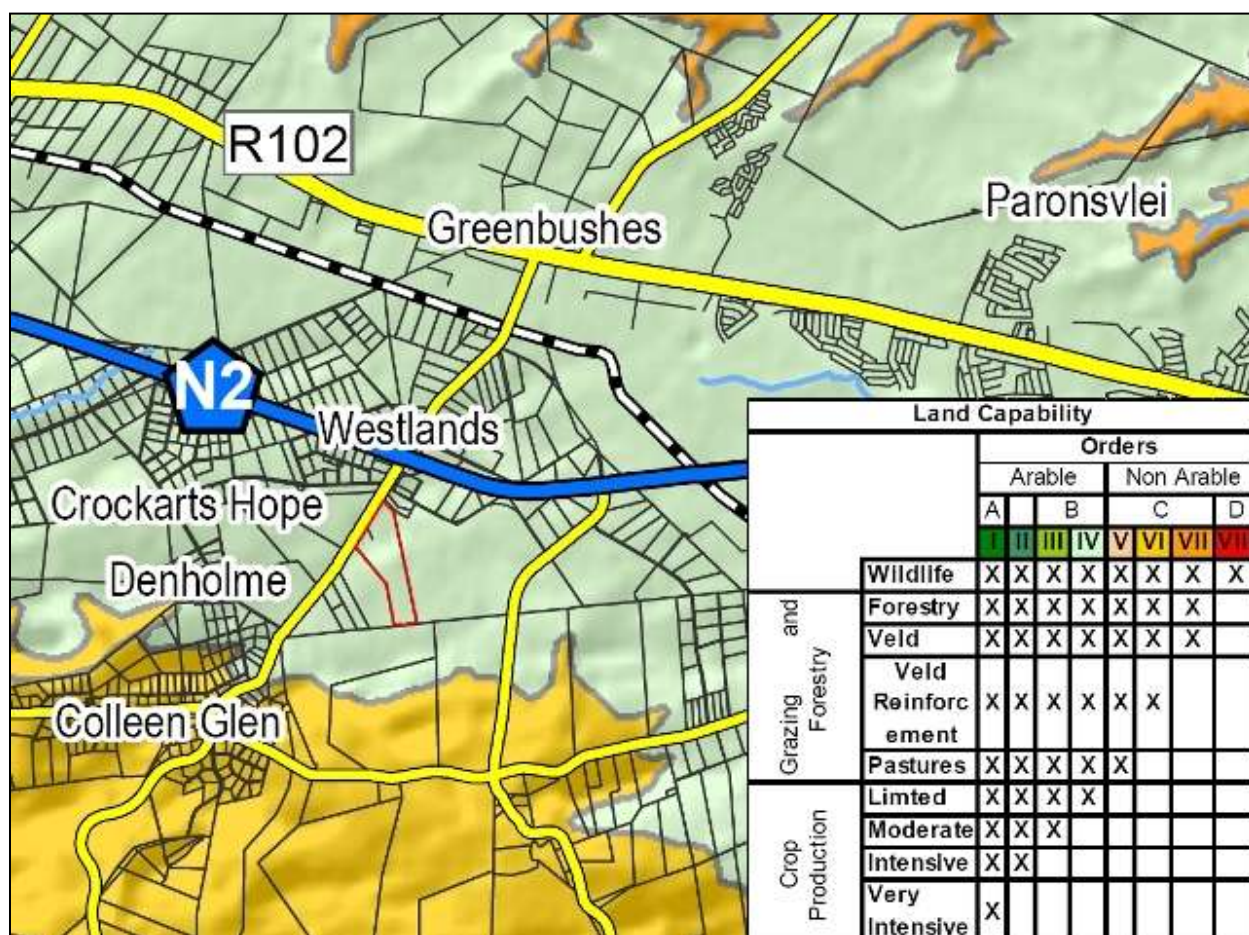
The extensive habitat transformation across most of the site is expected to have made most of the property unsuitable as habitat for the natural fauna of the area. The area is expected to have a very low faunal abundance. However, it is anticipated that faunal abundance may be higher in the habitat associated with the wetlands on the site.

The Ecological Specialist Assessment that will form part of the EIA phase of the assessment should consider the potential occurrence of Rare and Endangered fauna on the site within the context of the type and extent of faunal habitat on the site.

3.7 AGRICULTURAL POTENTIAL

Information on the agricultural potential of the site was obtained from the Draft Urban Edge Review Study which considered the agricultural development potential of land within the Nelson Mandela Bay Municipal (NMBM) boundaries in the development of the Spatial Development Framework. The Land Capacity Index was used as a measure of the agricultural development potential for the area.

"Land capability is the total suitability for use, in an ecologically sustainable way, for crops, for grazing, for woodland and for wildlife. A land capability class is an interpretive grouping of land units with similar potentials and continuing limitations or hazards. It is a more general term than land suitability and is more conservation oriented. It involves consideration of (i) the risk of land damage from erosion and other causes and (ii) the difficulties in use owing to physical land characteristics, including climate." (Draft Urban Edge Review Study - Urban Dynamics, 2007)



Map 3.6. Extract of the NMBM Agriculture Land Capability Map analysis completed as part of the Urban Edge Review Project (Urban Dynamics 2007). (The proposed site in red.)

The site falls within a land capability Class (iv) which indicates that it may be cultivated for crops, but careful management is required and conservation practices are more difficult to

implement. The use of Class iv land for cultivated crops is limited due to a number of potential reasons, which include: "*Steep slopes; severe susceptibility to water or wind erosion or severe effects of past erosion; shallow soils; low water holding capacity; frequently flooding accompanied by severe crop damage; excessive wetness with continuing hazard of waterlogging after drainage.*" (Draft Urban Edge Review Study - Urban Dynamics 2007)

The Urban Edge Review process identified areas within the boundaries of the NMBM which are most suitable for agriculture and included these areas in Agriculture promotion zones, which include the "*large cadastral units or farms partially unspoilt and developed located on the northern periphery of the built up areas of Uitenhage, Despatch and Motherwell.*" (Draft Urban Edge Review Study - Urban Dynamics 2007)

Due to the inherent limitations of the Agricultural Potential of the area, Portion 62 of Farm 10 does not fall within the Agriculture Promotion Zone, but rather in the Peri-Urban Zone 1 (Hinterland) of the NMBM SDF. "*The zone is characterised by cadastral units ranging from 1 hectare to larger portions of farm land located primarily on the western boundary of the zone. The portion of land is affected by arable and non-arable land capability in terms of agriculture production.*" (Draft Urban Edge Review Study - Urban Dynamics 2007)

The permitted uses for land included in Peri-urban Zone 1 include "*Agriculture, tourism, low density residential estate development, guest farms, golf estates, sports fields & service trades.*"

The portion of the site that is proposed for residential development will be rezoned to *Residential 1* and *Special Zone (Private Access)* while the remainder of the site will remain zoned *Agriculture 1* although it is not anticipated that any large scale or intensive agriculture will be undertaken on the site during the operational phase of the project.

3.8 HERITAGE RESOURCES

Certain cultural and heritage resources are protected under the National Heritage Resources Act, No 25 of 1999. These may include structures older than 60 years; archaeological and palaeontological sites and materials, and meteorites; certain burial grounds and graves; declared heritage objects; and declared heritage sites.

The current homestead and outbuildings at the site are not anticipated to be older than 60 years. No other buildings or structures older than 60 years were noted at the site during the site visit. No graves or burial sites were noted at the site during the site visit. However the site should be surveyed for the presence of graves or burial grounds and potential impacts on these addressed in the EIA phase of the assessment.

It is recommended that a phase 1 Archaeological Impact Assessment is undertaken for the site.

3.9 SOCIO- ECONOMIC FEATURES

Ward statistics for the area were obtained from the Municipal Demarcation Board website, and are based on 2001 census data. These data are presented below. Portion 62 of Farm 10 falls within Ward 40 of the Nelson Mandela bay Municipality, which includes rural areas on the western edge of the NMBM covering approximately 390 square kilometres.

More than 50% of the population is between the ages of 15 and 40 years. The population is mainly isiXhosa (49.6%) speaking followed by Afrikaans (36.8%) and English (12.6%). The dominant racial group in the area is black (51.3%), followed by white (25.7%) and coloured (22.8%) inhabitants.



Figure 3.1 Age structure of the population of Ward 40 in the Nelson Mandela Metropolitan Area.

More than 80% of the population in the area have received at least some schooling. About 20% of the population have received no schooling at all while approximately 20% have completed their schooling up to Grade 12.

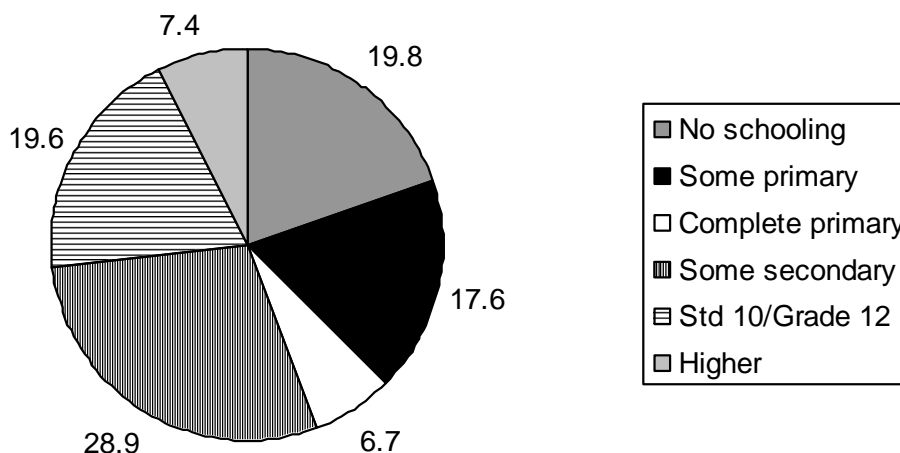


Figure 3.2 Level of education of the population of Ward 40 in the Nelson Mandela Metropolitan Area.

The unemployment rate in the area is about 14%, with about 50% being formally employed, while about 36% of the population is not economically active. The household income in the area is generally low, with almost 16% of households receiving no income at all. More than 50% of households have an annual income of less than R20 000 per year.

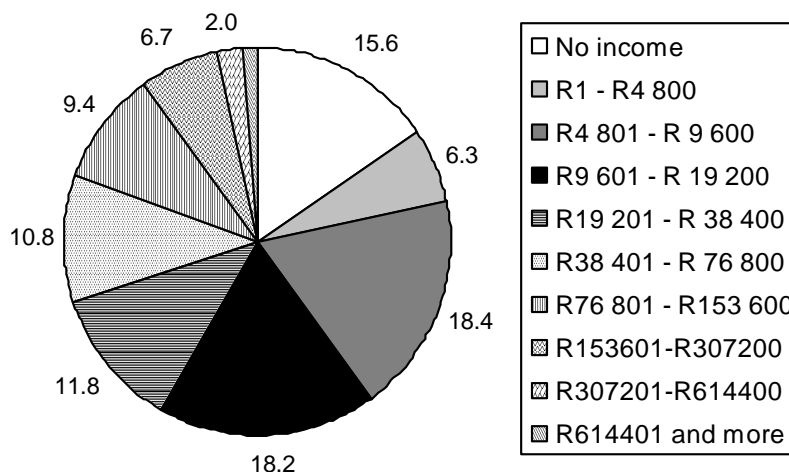


Figure 3.3 Breakdown of the income of the population of Ward 40 in the Nelson Mandela Metropolitan Area.

The largest proportion of the population derives their income from undetermined sources, followed by employment in Agriculture, Community Services, Private Households, or in Retail and Manufacturing.

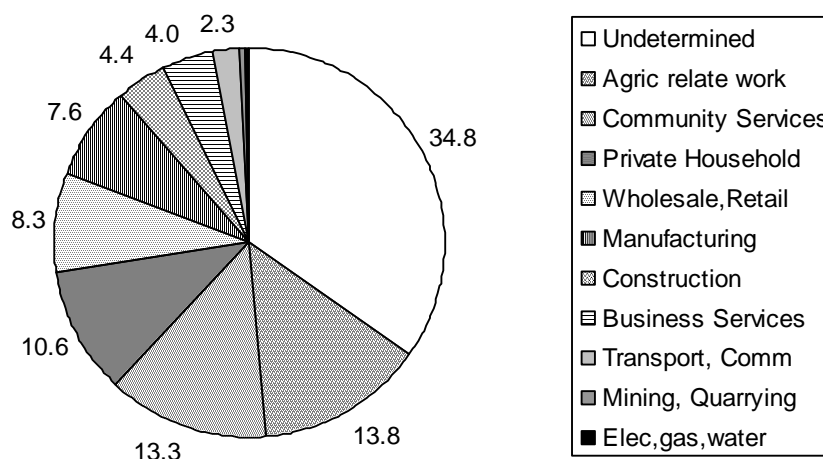


Figure 3.4 Employment profile of the population of Ward 40 in the Nelson Mandela Metropolitan Area.

More than 25% of households in Ward 40 have only two members, with about 21% of households having 5 or more members. Most of the population lives in 2 – 3 room dwellings, with only 12.6% staying in single room structures.

The main source of power in the area is electricity, with between 40 and 50% of the population using this as source of power for heating, cooking and lighting. Paraffin is second in popularity to electricity, with 20 – 37% of the population using paraffin, depending on the use. Wood is also used in many households for cooking (11%) and heating (28%). More than 80% of the population have access to sanitation in the form of flush toilets or pit latrines.

3.10 CONCLUSION AND RECOMMENDATIONS

Key issues identified thus far and which require specialist assessment in the EIA phase of the assessment, are:

- Biophysical site assessment to include:
 - Identification and verification of Critical Biodiversity Areas on the site
 - Potential project related impacts on natural vegetation and faunal habitat need to be considered
 - Should include an opinion by a wetland specialist with regards to the dams on the site; in particular whether these qualify as wetlands in terms of the National Water Act and relevant General Authorisations; as well as recommending suitable buffers for these if required.
- It is recommended that a phase 1 Archaeological Impact Assessment is undertaken.
- Provision of bulk services infrastructure – water, electricity, storm water and suitable sanitation.