

EDENDALE BULWER SUBSIDISED HOUSING
DEVELOPMENT

PRELIMINARY ENVIRONMENTAL ASSESSMENT



May 2013

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

The Msunduzi Local Municipality has, through its IDP process, and extensive consultation with respective beneficiary communities residing within the Msunduzi Local Municipality, identified the need to provide subsidised housing throughout its entire area of jurisdiction. This process was initiated as a means to address the municipality's predominantly traditional/informal housing profile, and in doing so improve the living conditions and quality of life of its communities.

The purpose of this document is to provide a preliminary environmental assessment for the development of the Edendale Bulwer Subsidised Housing Development. The development area is made-up out of a number of privately owned farm portions situated within Ward 14 of the Msunduzi Local Municipality. The proposed Edendale Bulwer Subsidised Housing Project is aimed at providing suitable housing to beneficiaries residing in Ward 14 of the Msunduzi Local Municipality and will entail the construction of approximately 1000 new top structures. The project shall be titled and referred to as the "Edendale Bulwer Housing Project/ Project Area" for the purpose of easy reference in report writing.

This preliminary environmental assessment will only provide an initial baseline environmental report that briefly describes potential environmental impacts of the proposed development and some preliminary recommended mitigation measures. This initial screening report will also provide an assessment of the viability of the proposed development for the developer in terms of environmental criteria. This document thus does not constitute an environmental scoping report as per the EIA Regulations, but is an initial environmental study for the purposes outlined above.

1.2 SITE DESCRIPTION



The project area is situated within Ward 14 of the Msunduzi Local Municipality, which is one of seven local municipalities making up the Umgungundlovu District Municipality of KwaZulu-Natal. The size of the project area is approximately 286 Ha and is largely being utilised for agricultural purposes.

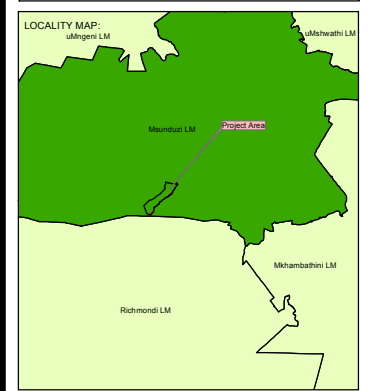
The Edendale Bulwer project area accounts for approximately 0.45% of Msunduzi Municipal land. The total population of the Msunduzi Local Municipality, as recorded in the Census 2011 is estimated at 618 536 persons while the overall population of the Edendale Bulwer Housing project area is approximately 15 318 persons residing in approximately 3039 households within the project area. The location of the project area, relative to the Msunduzi LM, is depicted in the attached thematic map.

MSUNDUZI LOCAL MUNICIPALITY

EDENDALE/BULWER SUBSIDISED HOUSING DEVELOPMENT

PROJECT AREA

-  Project Area
-  Local Municipal Boundaries




DATE : APRIL 2013

MAP REFERENCE/ VERSION NUMBER : Version 1

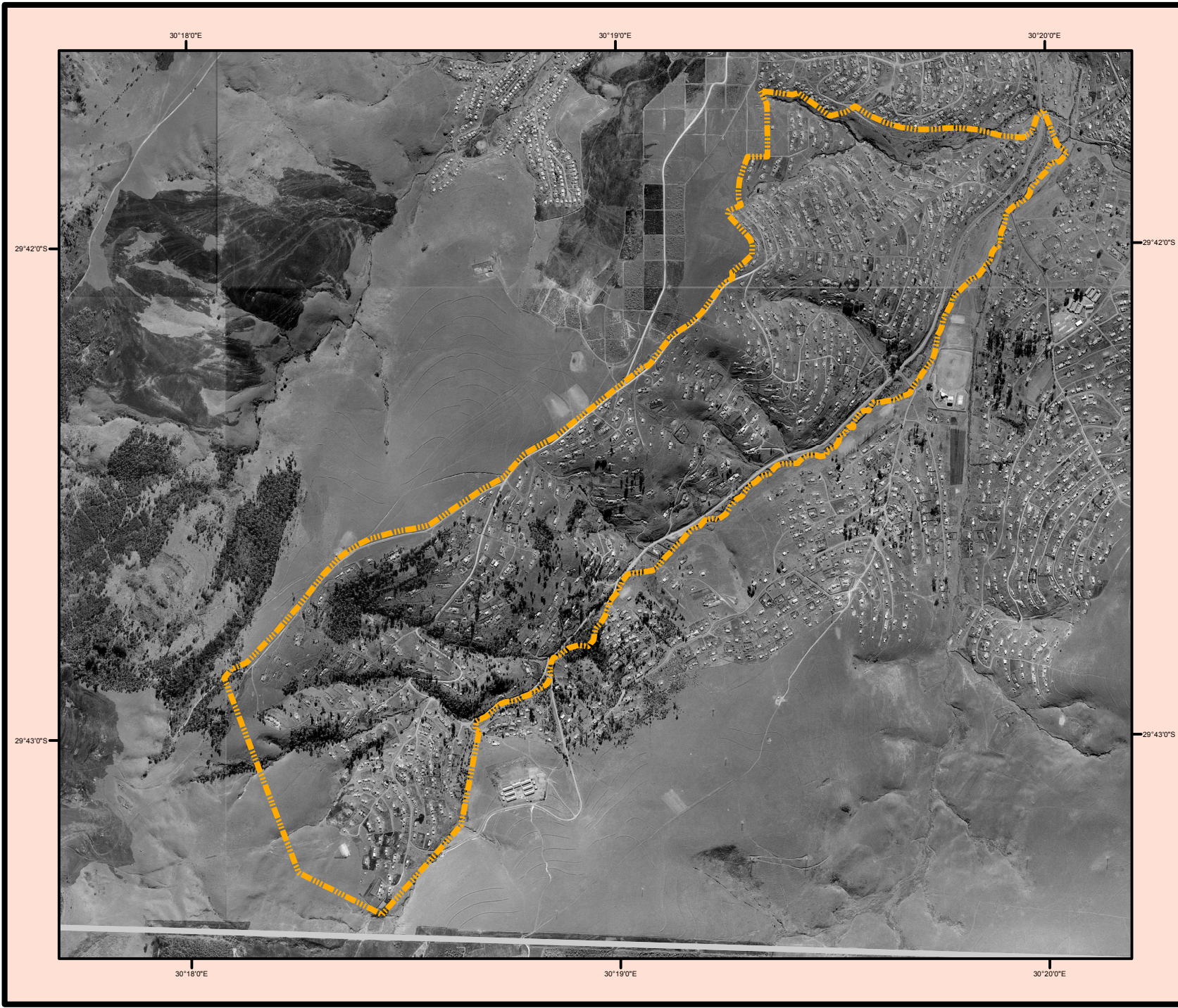
COORDINATE SYSTEM : Municipal WGS84 (Lo31)

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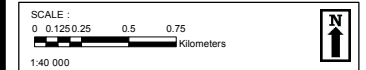
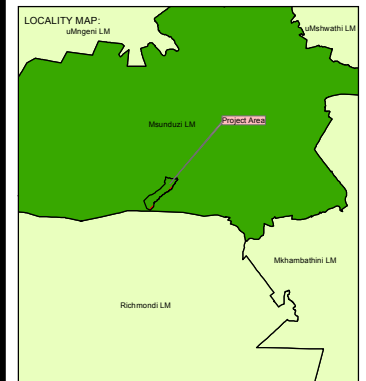
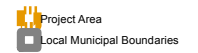
Environmental Assessments	Water Management	Waste Management	Soil Conservation
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MSUNDUZI LOCAL MUNICIPALITY

EDENDALE/BULWER SUBSIDISED HOUSING DEVELOPMENT

LOCALITY PLAN



DATE : APRIL 2013

MAP REFERENCE/ VERSION NUMBER : Version 1

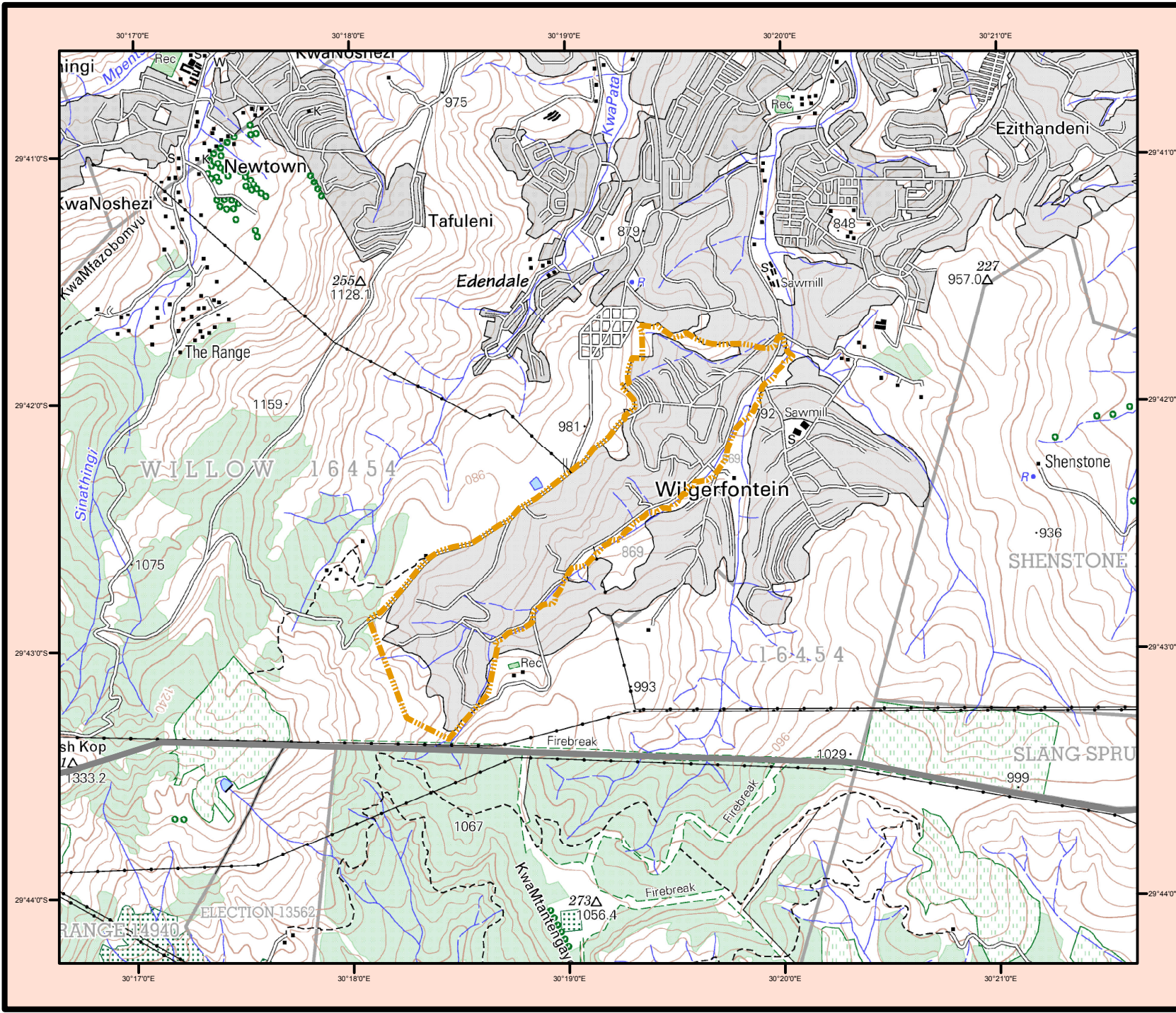
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2 APPROACH AND METHODOLOGY

2.1 APPROACH

2.1.1 Applicable legislation

The National Environmental Management Act (No. 107 of 1998) provides for the control of certain listed activities which “*may have a detrimental effect on the environment*” if not controlled. In terms of the Environmental Impact Assessment (EIA) Regulations Listing Notice 1, Listing Notice 2 and Listing Notice 3 of 2010, such activities are prohibited until written authorisation is obtained from the Minister or his delegated authority. Activities listed in EIA Regulations Listing Notice 1 (Gov. Notice No. R544) and Listing Notice 3 (GNR R546) of 18 June 2010 will require a Basic Assessment to be conducted while activities listed EIA Regulations Listing Notice 2 (GNR R545) of 18 June 2010 will require a Full EIA process which includes a Scoping phase and an Environmental Impact Assessment phase. Any development on the site must be screened in light of these regulations and authorisation must be acquired prior to construction should it be concluded that the development trigger any of the activities listed in the above-mentioned regulations.

The purpose of this preliminary environmental assessment is thus to identify possible strategic environmental issues at the earliest possible stage in the planning process to:

- Ensure that environmental issues are addressed in a pro-active manner in the development of the housing process.
- Improve the assessment of strategic environmental impacts that might be caused by the envisaged developments, and
- Ensure that the concept of sustainability is integrated with developmental decision making.

The overall approach towards this preliminary assessment is therefore based on the concept of sustainable development within the context of the official definition of sustainable development being: “*development that aims for equity within and between generations and adopts an approach*”

where the economic, social and environmental aspects of development are considered in a holistic fashion”.

2.2 METHODOLOGY

This Preliminary Environmental Assessment thus provides a summarized overview of some of the key aspects relating to the social, economic, infrastructural, service and biophysical environments which impact on, and are similarly impacted upon by the Edendale Bulwer Subsidised Housing project area. The summarized overviews of various aspects contained within the Preliminary Environmental Assessment have been based on a combination of existing available desktop information sources as well as the findings and observations derived from the recent on-site survey conducted of the project area.

Available desktop information sources include information derived from the 2011 South African Census, as well as the Msunduzi Local Municipality Integrated Development Plan 2010/2011; and various spatial GIS information. These information sources were initially made use of to establish the general status quo conditions of various social, economic, service and infrastructural demographics which impact on and are subsequently impacted upon by the project area and its local population. As a supplement to the information provided and discussed within the assessment report a number of accompanying thematic maps have also been included within the report, which provide a graphical representation of various biophysical factors at play within the project area.

The report has generally been structured as follows:

- **Section 3** deals with the **Socio-Economic Development component** of the project area. The social component addresses aspects such as age, gender, education and housing, while the economic component addresses aspects such as monthly household income, employment status, and a profile of the economic sectors within which the employed proportion of the project area population are involved in within the Edendale Bulwer Housing project area.
- **Section 4** deals with the **services and infrastructural component** of the project area. The services component therefore addresses residents' access to water, sanitation, electricity, telecommunication infrastructure and waste removal services, while the

infrastructural component addresses the road network and stormwater management systems within the project area.

- **Section 5** deals with the **biophysical characteristics** of the project area, and therefore covers aspects such as land cover, topography and drainage, floodline areas, soils, geology, vegetation, Ezemvelo KwaZulu-Natal's C-Plan irreplaceability value, mineral deposits, archaeological, cultural and historical sites, and potential sources of pollution.
- **Section 6** provides a brief overview of the **preliminary environmental impacts and proposed mitigation measures** for the Edendale Bulwer Housing project area, and discusses some of the impacts associated therewith.
- **Section 7** provides a **summary conclusion** of the findings of the Preliminary Environmental Assessment Report and the potential impact of the proposed development on the environment and local population, while also providing some recommendations with which to minimize or negate any negative impacts.

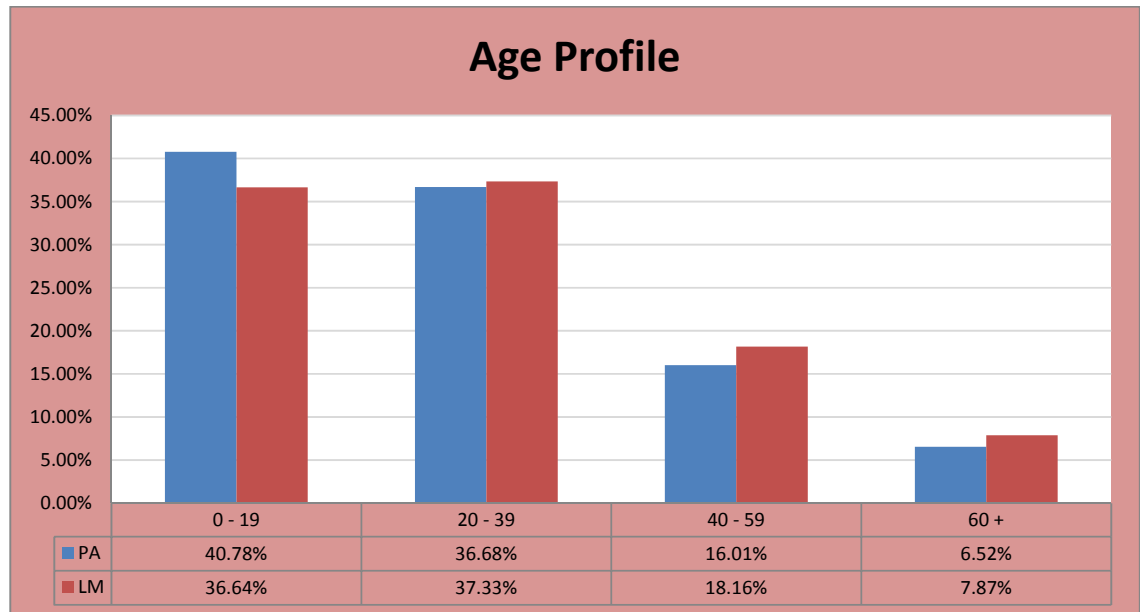
3 SOCIO-ECONOMIC COMPONENT

3.1 SOCIAL DEMOGRAPHIC CHARACTERISTICS

The figures illustrated below were prepared from the Census 2011 data and present a socio-economic overview of the study area. The Edendale Bulwer Housing project area falls within the jurisdiction of the Msunduzi Local Municipality; the figures of the study area are therefore presented together with the overall figures of the municipality to yield a comparative socio-economic overview of the study area. The total population of the study area is approximately 15 318 persons and the population of the municipality is estimated at 618 536 persons. The Edendale Bulwer Housing project area accounts for 2.48% of the total population of the Msunduzi Municipality.

3.1.1 Age Profile

The age profile of the Edendale Bulwer Housing (project area) and of the Msunduzi local municipality is depicted in Figure 3.1 below. It is evident that the majority of the population (40.78%) of the project area are younger than the age of 19 years while a total of 36.68% are between the ages of 20 and 39 years. As much as 16.01% of the population fall in the age category of 40 – 59 years while only 6.52% of the total population of the project area are older than the age of 60 years. The age distribution figures suggest that the population of the study area mostly consists of young individuals who will become the adults in the near future. The overall figures of the municipality show relatively similar trend of age distribution to the study area as indicated in Figure 3.1 below.

Figure 3.1: Age Profile

Source: Statistics SA, Census 2011.

3.1.1.1 Implications for the Subsidised Housing Project:

Age distribution patterns are of utmost importance when planning future development and allocating subsidies as various subsidised facilities will be better enjoyed by individuals of certain ages now and in the future. Age distribution is also considered when determining the need for other supporting facilities necessary to ensure maximal yield of benefits of any given development, such as the proposed subsidised housing project. The age distribution structure of the population of the project area has various implication as far as subsidised housing is concerned, which must be considered during the planning (location) and implementation of the project, these include:

- Provision of sufficient and appropriate education facilities within close proximity to the housing development, and thereby ensuring that scholars do not travel unnecessary distances.
- Provision of economic and/ or employment opportunities within close proximity of the houses as a large number of young people will be entering the economically active age category over the next five to ten years and will thus be seeking appropriate employment opportunities.
- Provision of adequate social services and amenities: as the young age profile increases the proportion of the population which are not yet economically active which results in a high dependency ratio which places increased pressure on social services, facilities, and

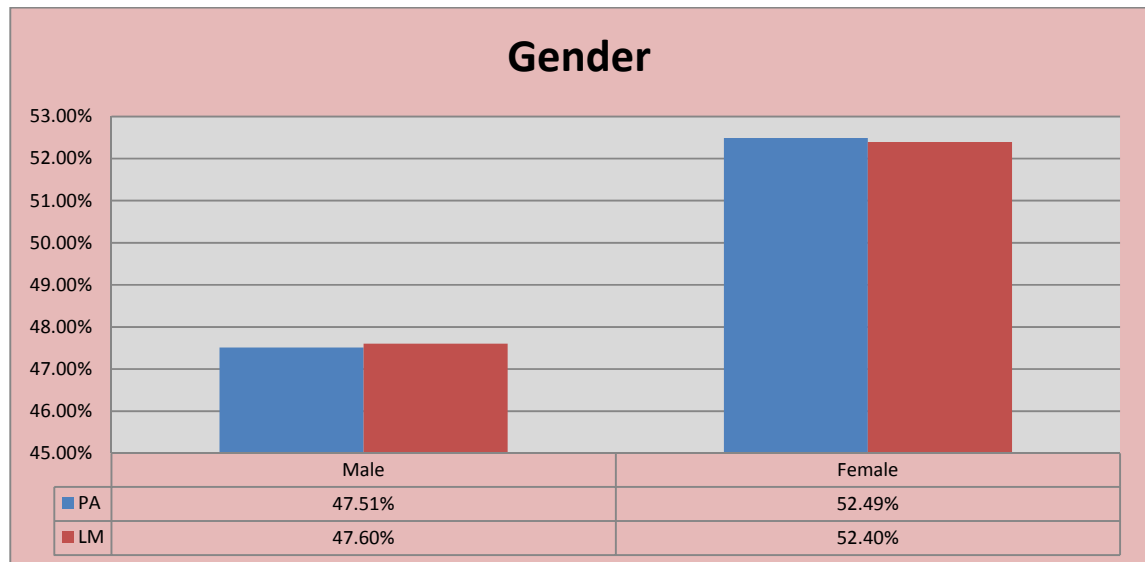
amenities. Provision of such services will not only benefit young individuals but rather the community at large.

The lack of such facilities and services within close proximity to the area will result in the individuals and families relocating to areas where such services are available and therefore leaving the subsidised houses which were meant to improve their quality of life, thereby limiting the success of the proposed housing project.

3.1.2 Gender Profile

According to the 2011 census information as much as 52.49% of the total population of the study area is female and 47.51% are male. Relatively similar trends of a female dominant population are evident for the overall Msunduzi municipal area with 52.40% of the total population being female and 47.60% being male. The Figure 3.2 below illustrates a female dominant population within the study area and the overall municipality. The Figure 3.2 below illustrates a female dominant population within the study area and the overall municipality.

Figure 3.2: Gender Profile



Source: Statistics SA, Census 2011.

3.1.2.1 Implications for the Subsidised Housing Project:

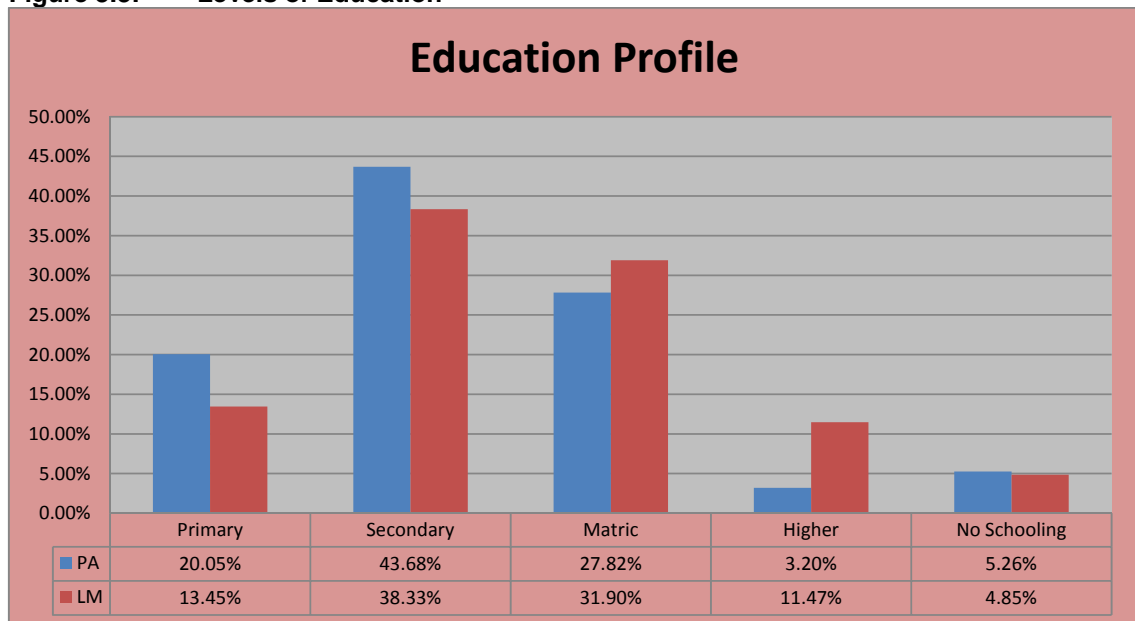
The implication of gender roles within the Edendale Bulwer Housing project area therefore needs to be given due consideration with regards to the implementation of the envisaged subsidised housing

project. Practices of gender equality and empowerment are necessary to ensure that benefits derived from the implementation of the proposed development are distributed in such a way that is reflective of the population structure as a whole.

3.1.3 Education Profile

The 2011 education profile of the study area and the Msunduzi Local Municipality is illustrated in Figure 3.3 below. These figures illustrate the education levels of persons over the age of 15 years and therefore falling into the economically active categories of the population. The figures suggest relatively low education and literacy levels within the study area with as much as 5.26% of the population have indicated that they have not undergone any formal schooling and only 20.05% have completed primary schooling, 43.68% of the adult population of the project area indicated to have some secondary education with only 27.82% of the population indicating to have completed Grade 12 and only 3.20% of the total population have undergone some form of post matric/ tertiary education training. The figures of the overall Msunduzi municipal area indicate a relatively similar low education profile for the municipality with as much as 4.85% of the economically active population having undergone no formal schooling, 13.45% has completed some primary level education and only 31.90% and 11.47% having completed Grade 12 and tertiary education respectively.

Figure 3.3: Levels of Education



Source: Statistics SA, Census 2011.

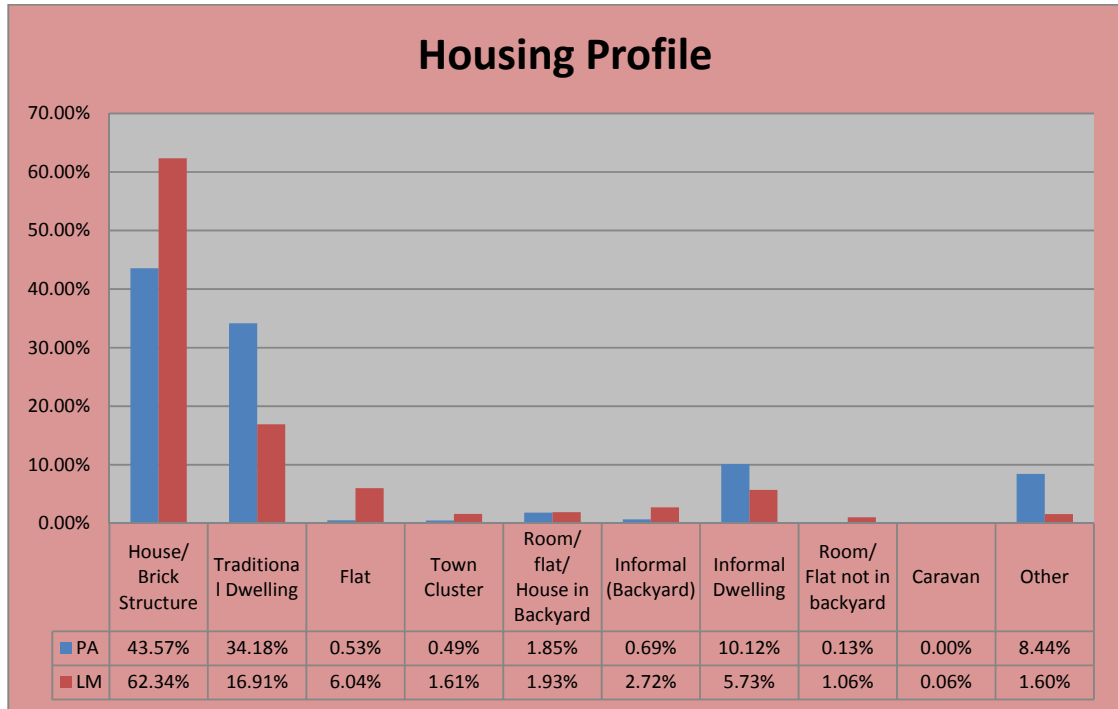
3.1.3.1 Implications for the Subsidised Housing Project:

The level of illiteracy within the Edendale Bulwer Housing project area will need to be taken into consideration with regards to the implementation of the proposed project to ensure that that proportion of the study area population which are illiterate are assisted, included and involved in community participation practices, and are not discriminated against as a result. Technical aspects of the proposed housing project may have to be communicated as they need to be clearly understood by the beneficiary communities. Specific provisions will need to be made to include those members of the project area population who may be illiterate in the development process, so as to avoid the possibility of exclusion of certain demographics. Facilities with which to cater to adult education could similarly constitute a viable option for future municipal developments of the area. In terms of overall project development and management it is important to ensure that all beneficiaries fully understand and grasp the implications and technical aspects relating to this housing initiative.

3.1.4 **Housing Profile**

Figure 3.4 below depicts the housing profile of the study area and for the Msunduzi Local Municipality. The most predominant housing type within the study area is “House/ Brick Structure” with the majority (43.57%) of household within the project area residing in structures of this nature; the second most predominant housing type is the “Traditional Dwelling” with 34.18% of houses within the project area falling into this category. Traditional dwellings include mud houses, clay houses and huts made of animal manure. Other housing types exist within the study area but in relatively low numbers as depicted in the graph below. The overall figures for the municipality area depict a housing profile with the most predominant housing type being “House or brick structure”.

Figure 3.4: Housing Profile



Source: Statistics SA, Census 2011.

3.1.4.1 Implications for the Subsidised Housing Project:

According to the Housing Act, 1997, it is pertinent that all citizens and permanent residents of the Republic will, on a progressive basis, have access to:

- Permanent residential structures with secure tenure, ensuring internal and external privacy and providing adequate protection against the elements.

The National legislated (RDP) minimum norms and standards in respect of housing supply in South Africa is considered to be a brick top structure of 40 m² (minimum), of which 43.57% of households in the project area; and 62.34% of the households within Msunduzi Local Municipality; have access to housing services at this level. This national standard has been accepted by the Department of Human Settlement as their minimum norms and standards for the housing instrument as far as subsidised housing provision is concerned.

Due to the informal and traditional nature of a significant number (34.18%) of houses situated within the Edendale Bulwer Housing project area, the need for the implementation of a subsidized housing

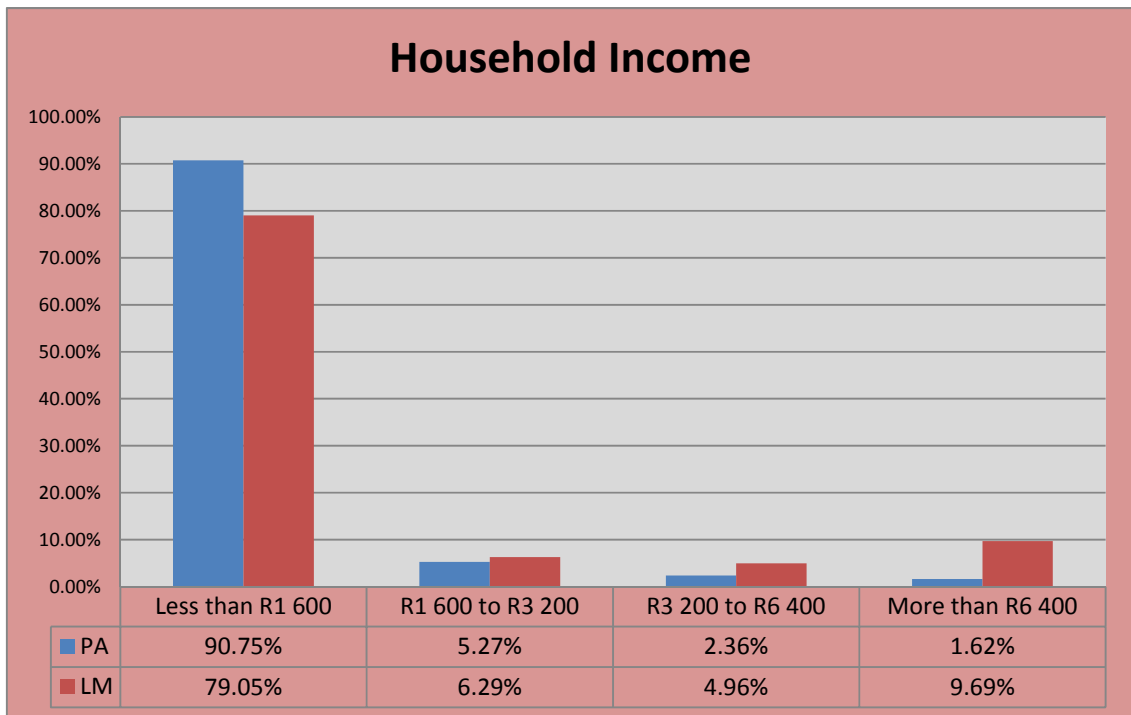
project is clearly evident. Such a factor should therefore support and favour the implementation of the proposed project on the Edendale Bulwer Housing project area.

3.2 ECONOMIC DEMOGRAPHIC CHARACTERISTICS

3.2.1 Household Income and Affordability Profile

Figure 3.5 below illustrates a relatively low household income profile within the Edendale Bulwer Housing project area and the overall Msunduzi Local Municipality. As much as 90.75% of the total number of households within the study area indicated a collective monthly household income of R1600 and less, 5.27% fall within the income range of R1600 – R3200, 2.36% earn between R3200 and R6400 while only 1.62% of the total number of households indicating a collective monthly household income of more than R6400. Relatively similar monthly household income trends can be seen for the overall Msunduzi Local Municipality in figure 3.5 below.

Figure 3.5: Monthly household income



Source: Statistics SA, Census 2011.

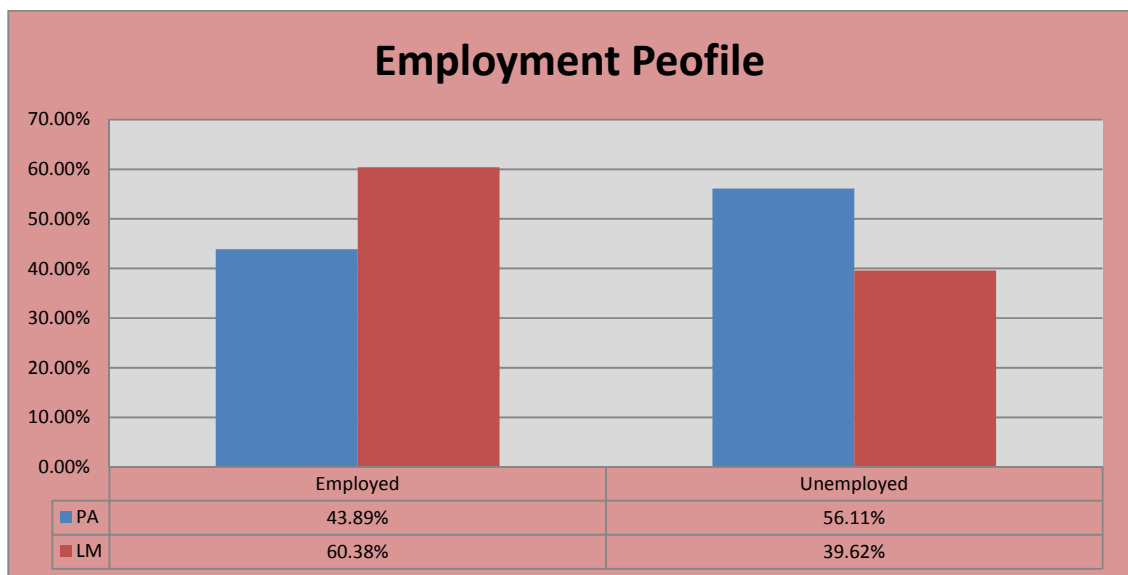
3.2.1.1 Implications for the Subsidised Housing Project:

The figure above indicates relatively low affordability levels within the project area and the overall municipal area. The proposed subsidised housing project will benefit many households with low monthly income and who cannot afford proper housing. The ability of residents to pay for service levels above the minimum required standards will also be very limited.

3.2.2 Employment Profile

Figure 3.6 below illustrates the employment profile of the study area and the overall municipal profile. As much as 56.11% of the adult economically active population indicated to be unemployed. These figures include persons older than the age of 15 who indicated that they were unemployed at the time of the survey but seeking employment and that they were willing to take up any employment position should it be presented. Only 43.89% of the economically active population within the study area indicated that they were employed at the time of the survey. The survey on the overall employment profile of the Msunduzi Local Municipality indicated relatively similar situation with only 60.38% of the population being employed and as much as 39.62% being unemployed. The very low affordability levels of the study area population are directly related to the high unemployment rate within the area.

Figure 3.6: Percentage of Economically Active population unemployed



Source: Statistics SA, Census 2011

3.2.2.1 Implications for the Subsidised Housing Project:

The potential role of the envisaged housing project in providing some employment and income generating opportunities during the construction and implementation phases should clearly be a key consideration in the project plan. The development of technical skills relating to construction which could benefit the project beneficiaries after completion of the housing project should also be considered in the project implementation and management stages.

3.2.3 Economic Sector Profile

3.2.3.1 Implications for the Subsidised Housing Project:

In the development of housing development projects within the Edendale Bulwer Housing project area, it can be expected that a number of additional employment opportunities could be created within the construction sector. Local employment creation opportunities should be optimized during the implementation stages to contribute towards longer term economic sustainability in the project area.

4 SERVICES AND INFRASTRUCTURE

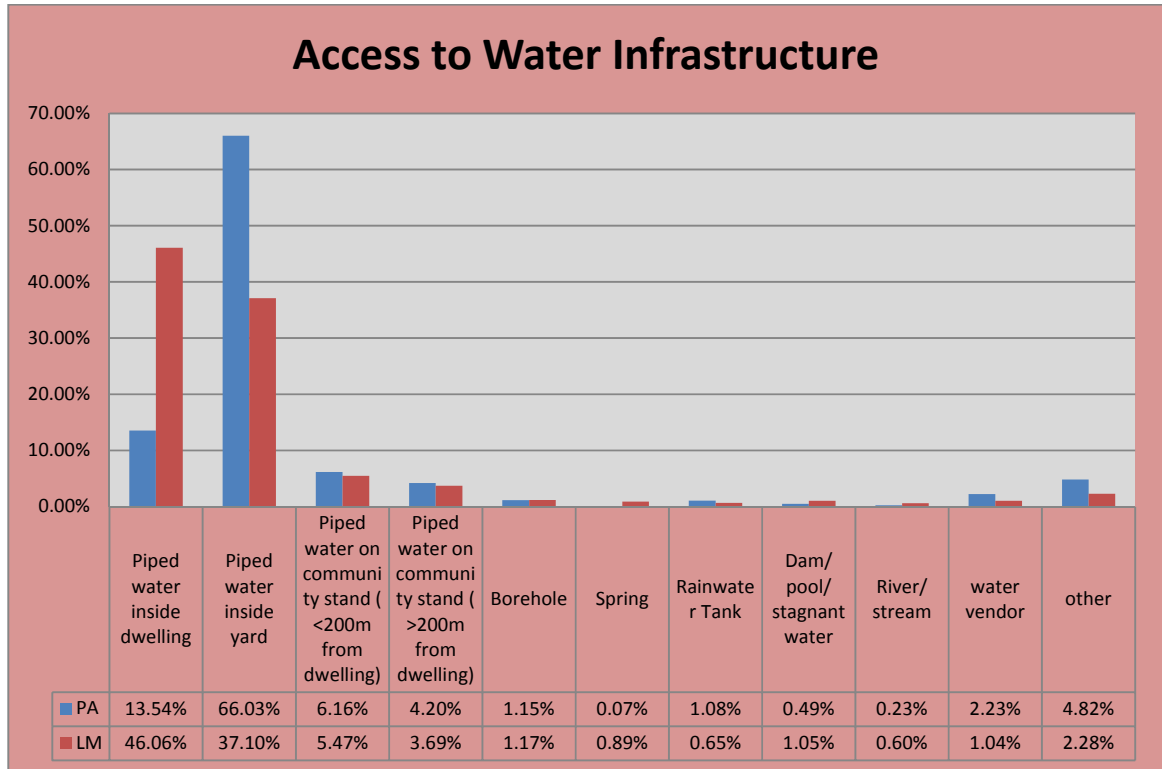
4.1 SERVICES DEMOGRAPHICS

4.1.1 Access to water infrastructure

Figure 4.1 below illustrates the various sources of water, for drinking and other auxiliary household uses, for communities residing within the project area and the overall Msunduzi Local Municipality. The figure shows relatively good access to running water in the project area with 13.54% of the total number of households having access to piped water “inside dwelling”, 66.03% having access to piped water “inside yard” while 6.16% “access water from a communal stand pipe situated within 200m” from the dwelling. 4.20% make use of piped water on community stand (>200m from dwelling), a further 1.08% utilise water from a rainwater tank, 0.23% from rivers and streams and 1.15% make use of borehole water. It is quite clear that access to clean reliable running water was very limited at the time that the survey was conducted within the Edendale Bulwer area. The area is rather developed as far as water infrastructure is considered, but there is still 20% in need of a proper water infrastructure..

The overall figures for the Msunduzi Local Municipality, on the other hand, suggest better provision of water to households with as much as 46.06% and 37.10% of households having access to piped water “inside dwelling” and “piped water inside yard” respectively. A further 5.47% of households indicated to source water from a communal tap situated within a distance of 200meters while 3.69% would source water from a communal tap situated more than 200 meters from the dwelling. However, a number (0.60%) of household within the municipality would utilise water from rivers and streams and 0.89% from natural springs. These figures suggest that the project area is relatively underdeveloped as far as water infrastructure provision is compared to that of the average figure (overall municipality).

Figure 4.1: Access to water infrastructure



Source : Statistics SA, Census 2011.

4.1.1.1 Implications for the Subsidised Housing Project:

The levels of service delivery derived from acceptable national policy frameworks which are relevant for the level of water services indicate the following definitions as being applicable:

- A 'Survival' level of service providing five (5) to eight (8) litres of water per capita per day at 800 – 1500 meters walking distance;
- The RDP level of service providing twenty five (25) litres of water per capita per day at 200 meters walking distance; and
- A higher level of service providing more than twenty five (25) litres of water per capita per day and at less than 200 meters walking distance. It even includes a yard or house connection.

The National legislated (RDP) minimum norms and standards in respect of water supply in South Africa are therefore considered to be a maximum 200 m's walking distance between a communal stand pipe and ones residence, of which approximately 5.47% of the total Msunduzi Local municipal population and 6.16% of the Edendale Bulwer Housing project areas total population have access to water services at this level. This national standard has been accepted by the

Department of Housing as their minimum norms and standards for the housing instrument as far as subsidised housing provision is concerned. Therefore, due to the fact that the provision of water amounts to housing purposes in terms of the Housing Board/Department of Human Settlements explanation of subsidies, the provision of water at the minimum RDP level of service provision at least should constitute a key municipal objective for implementation in the Edendale Bulwer Housing project area, as well as the Msunduzi Local Municipality as a whole. The provision of Subsidised Housing should therefore not occur in isolation but should be supported by various other necessary infrastructural and service provision projects.

4.1.2 Access to Sanitation Infrastructure

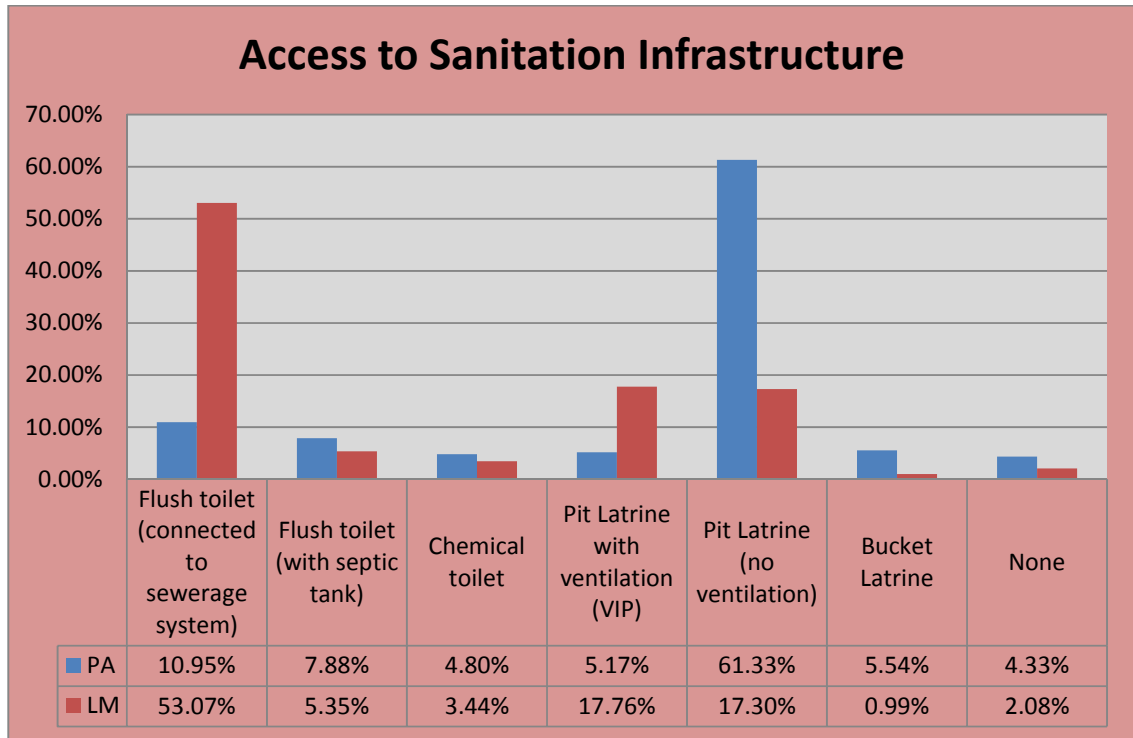
As much as 61.33% of the total number households with in the Edendale Bulwer Housing project area make use of “unimproved non ventilated Pit latrine” toilet facilities and only 5.17% having improved “ventilated pit latrine” toilets. As much as 4.33% of the households were recorded as having no access to and sanitation facilities. Only 10.95% of households in the project area indicated to use of flush toilets connected to a sewage system and 7.88% connected to a septic tank system.

The statistics of the overall Msunduzi Local municipality indicate that 17.3% of households making use of “non-ventilated pit toilets” with 17.76% having “ventilated pits toilets. A total of 3.44% of households at municipal level make use of chemical toilets and 0.99% is on the bucket system. A similar percentage of households (2.08%) within the overall municipal area indicated to not have any sanitation facility. As much as 53.07% of the total number of households within the Msunduzi local municipality makes use of flush toilets connected of a sewer system while 5.35% use flush toilets connected to a septic tank. The absence of appropriate sanitation infrastructure in the project area is clearly evident from the information depicted in Figure 4.2 below. The comparative figure of households with no access to any sanitation facilities indicate the Edendale Bulwer TA (4.33%) being relatively under-service. The average number of households with flush toilets in Msunduzi LM is relatively higher than that of the project area and chemical toilets are used more in the overall municipal area compared to the project area. The figures however indicate a relatively high need of proper sanitation facilities but the limited access to running water within the area could be a major reason for the lack of sanitation infrastructure in the Edendale Bulwer Housing project area.

The potential impact of the extensive utilization of unimproved pit latrines and other forms of inappropriate sanitation infrastructure, on biophysical aspects such as surface and ground water, as

well as the potential health implications is clearly evident from these figures, as is the need for improved access to sanitation infrastructure in both the Edendale Bulwer Housing project area and the greater Msunduzi Local Municipality.

Figure 4.2: Access to sanitation infrastructure



Source: Statistics SA, Census 2011.

4.1.2.1 Implications for the Subsidised Housing Project:

The levels of service delivery derived from acceptable national policy frameworks which are relevant for the level of sanitation services indicate the following definitions as being applicable:

- a Ventilated Improved Pit latrine (VIP) level of service;
- the interim level of service providing on-site sanitation that could include amongst others a on-site dry system (single, double pit or organic systems such as the Enviroloo) or an on-site wet system (such as a low flush or a septic tank and french drain); and
- a waterborne level of service providing treatment of raw sewage by means of a Sewage Treatment Works.

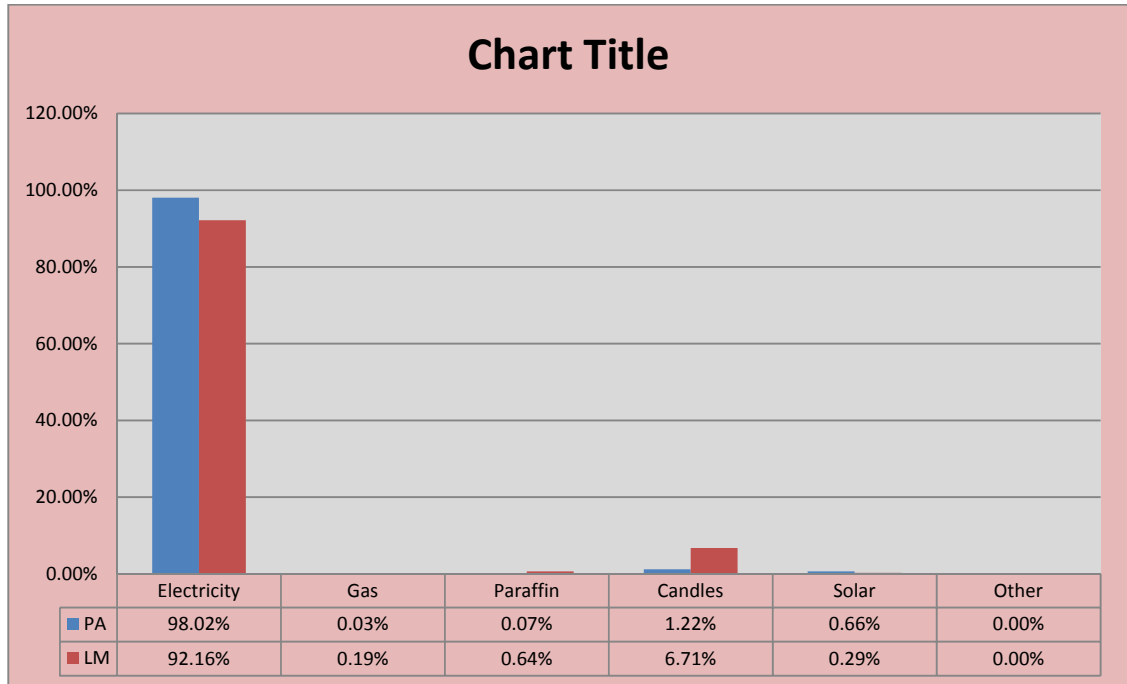
The National legislated (RDP) minimum norms and standards in respect of sanitation service provision in South Africa is considered to be ventilated improved pit toilet (VIP), of which

approximately 17.76% of the total households in Msunduzi Local municipal area and 5.17% of the Edendale Bulwer Housing project areas total population have access to sanitation services at this level. This national standard has been accepted by the Department of Human Settlements as their minimum norms and standards for all housing instruments as far as subsidised housing provision is concerned. Therefore, due to the fact that the provision of sanitation amounts to housing purposes in terms of the Housing Board/Department of Human Settlements explanation of subsidies, the provision of sanitation at the minimum RDP level of service provision at least should constitute a key municipal objective for implementation in the Edendale Bulwer Housing project area, as well as the Msunduzi Local Municipality as a whole. The provision of Subsidised Housing should therefore not occur in isolation but should be supported by various other necessary infrastructural and service provision projects.

4.1.3 Access to electricity infrastructure

Figure 4.3 below indicates the various energy sources used for lighting purposes by households within the Edendale Bulwer Housing project area and overall Msunduzi municipal area. During the time of the survey, the majority (98.02%) of households within the project area was well serviced regarding electricity while only 1.22% used to candles. A further 0.07% and 0.03% made use of paraffin and gas lighting respectively. The trends in “energy for lighting” statistics recorded for the overall municipal area were relatively lower with 6.71% of the households within the overall Msunduzi municipality indicating to make use of candles for lighting while as much as 92.16% used electricity for lighting in 2011. Paraffin (0.64%) and Gas (0.19%) were also recorded as lighting source respectively; while 0.29% of the total number of households within the municipal area indicated the use of solar energy as a source of lighting. The proportion of households with access to electricity in the study area is relatively higher than the comparative figure for the Local Municipality.

Figure 4.3: Access to electricity infrastructure



Source: Statistics SA, Census 2011.

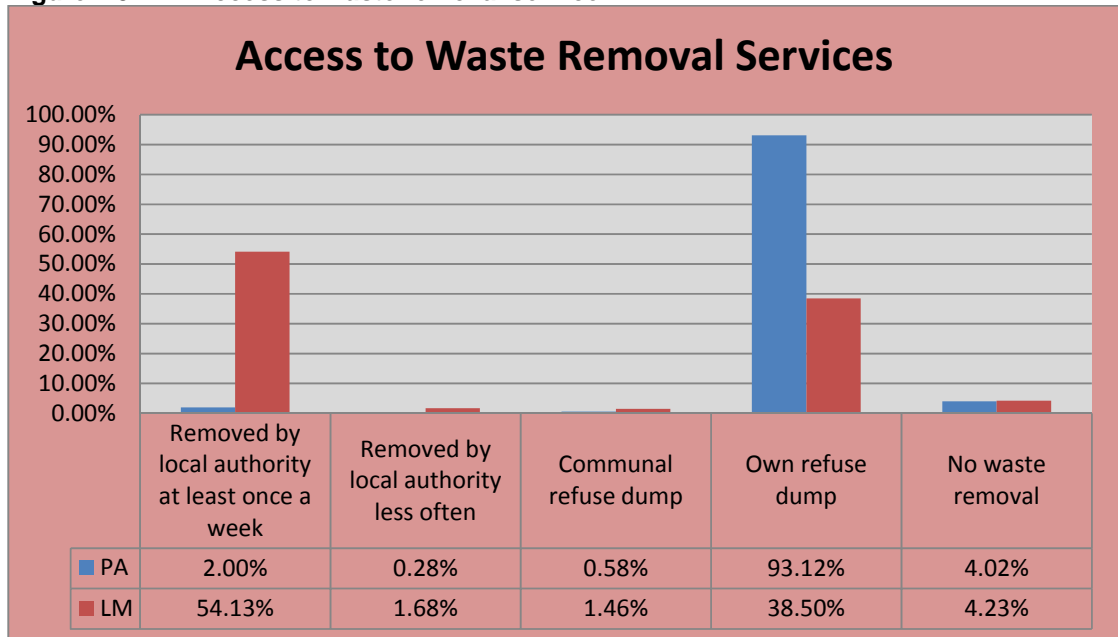
4.1.3.1 Implications for the Subsidised Housing Project:

The provision of an internal electrical reticulation network is not viewed as a minimum requirement as far as subsidised housing is concerned, and as such the provision of an internal electrical reticulation network does not form part of the proposed subsidised housing project. The absence of appropriate electricity infrastructure can often result in the extensive utilization of firewood for cooking and heating purposes with the resulting potential negative impact on natural vegetation. Limited access to electricity infrastructure often contributes to the general deforestation of the surrounding area, and increased levels of air pollution arising from the use of firewood for cooking and heating purposes.

4.1.4 Access to Waste Removal Services

The graph in Figure 4.5 below depicts the various waste management/ removal methods recorded as being used by the various households within the project area and the overall local municipality. The limited availability of any form of formalized refuse removal system in the Edendale Bulwer Housing project area and the overall Msunduzi Local Municipality at the time of the survey is clearly illustrated in the graph. As much as 98.47% of the total number of households within the project area indicated that they make use of their own refuse dump, be it pit holes in the yard or in close proximity to the house. A relatively high percentage (46.87%) of households within the entire Msunduzi local municipality indicated to use the same method of waste disposal. A further 0.77% of households in the project area and 6.15% in the overall municipal area indicated that they had no practised waste disposal method in place. A figure of 0% of households within the Edendale Bulwer TA project area was recorded for households whose refuse was collected by the municipality once a week, and 0.77% of households in Edendale Bulwer indicated that their refuse was collected by the local municipal authority less often than weekly basis. The figures from the graph indicate that only 43.45% of the households in Msunduzi local municipality had their refuse collected once a week and 1.72% collected less often than on a weekly basis while 1.8% made use of communal dump sites. From the graph it is evident that the majority of households in the Edendale Bulwer Housing project area and the overall Msunduzi municipal area have no access to any form of waste removal or disposal services and dispose of their refuse through means of their own refuse dumps.

Figure 4.5: Access to waste removal service



Source: Statistics SA, Census 2011.

4.1.4.1 Implications for the Subsidised Housing Project:

The Msunduzi Local Municipality, who is also the service provider responsible for the provision of a functional waste removal and disposal system within the Edendale Bulwer Housing project area, does not currently provide any form of refuse removal and disposal services to the areas of its municipal area. The absence of waste removal services in the study area can not only impact negatively on the biophysical environment, but also on the aesthetic appearance of the area, and the overall health profile of the resident communities, as well as their livestock as a result of livestock ingesting such waste.

4.2 INFRASTRUCTURE

4.2.1 Roads

This section of the report provides an overview of existing road networks occurring across and providing access to the Edendale Bulwer Housing (project area). Access to the project area can be obtained through the Willow Fountain Road. **It must however be noted that the scope of proposed Edendale Bulwer Subsidised Housing Project does not include any construction or major maintenance of new or existing access roads to the project area.**

(i) National Roads

There are no National Roads that have been proclaimed through the project area.

(ii) Provincial Roads

There are no Provincial Roads that have been proclaimed through the project area.

(iii) District Roads

There are no Provincial Roads that have been proclaimed through the project area.

(iv) Numbered Local Access Roads

There are no Local Access Roads that have been proclaimed through the project area.

4.2.1.1 Implications for the Subsidised Housing Project:

The National legislated (RDP) minimum norms and standards in respect of roads in South Africa are considered to be “access to all even with graded or gravel paved roads”. This national standard has been accepted by the Department of Housing as their minimum norms and standards for the housing instrument as far as road provision is concerned. It is important to note however that *no new access roads* are planned as part of the Edendale Bulwer Housing Area’s Subsidised Housing Development. Grading processes may be conducted on some existing roads as part of the proposed project in an attempt to improve the current condition of these roads within the Edendale Bulwer Housing project area, and will therefore form part of a road maintenance programme, however such a process will not extend to the creation of any new road networks. Furthermore due to the fact that no new road networks are planned as part of the proposed development, and due to

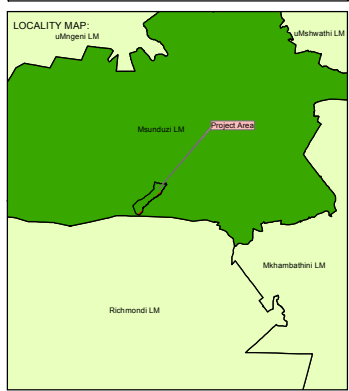
MSUNDUZI LOCAL MUNICIPALITY

EDENDALE/BULWER SUBSIDISED HOUSING DEVELOPMENT

ROAD NETWORK

Legend

	Road Network



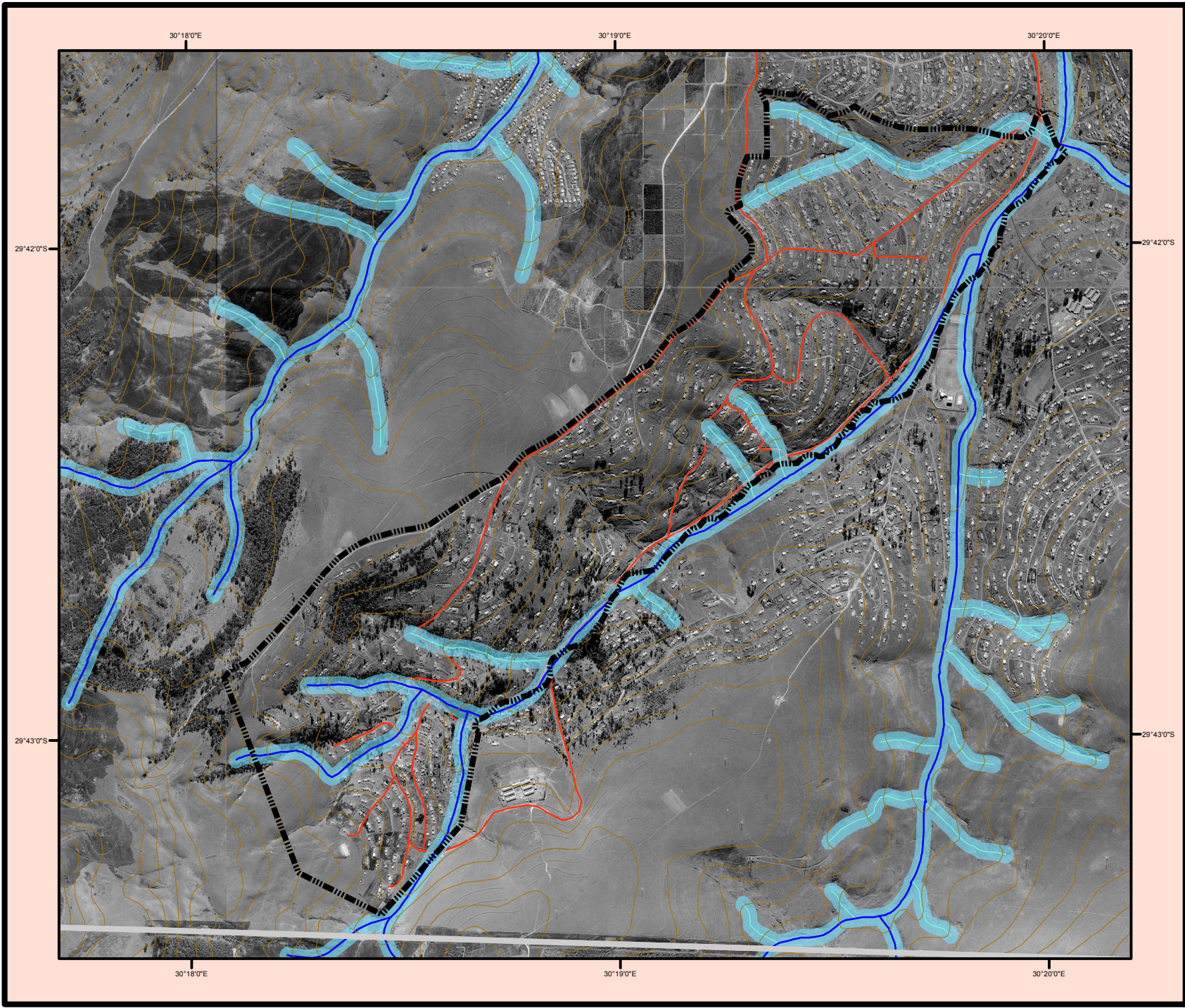
DATE : APRIL 2013

MAP REFERENCE/ VERSION NUMBER : Version 1

COORDINATE SYSTEM : Municipal WGS84 (Lo31)

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the fact that grading purposes form part of routine road maintenance the surrounding natural environment will not be adversely impacted upon.

It should also be noted that all District Roads will be allocated a 30 m road reserve, to which an additional 15 m building line will be added onto either side, while all Local Access roads will be afforded a minimum 15 m building line within which no construction activities may occur. This therefore ensures that no construction activities associated with the proposed housing project will result in any adverse negative impacts on the existing road network.

4.2.2 Stormwater

Whilst low income subsidised housing developments have huge budgetary constraints on the design and implementation of stormwater management and control systems, it is vitally important to dispose of stormwater as effectively and efficiently as possible. This is due to the fact that uncontrolled stormwater runoff can cause damage to property and may erode and destabilise fill and cut banks. The objectives of the stormwater management system should be as follows:

- To adequately dispose of runoff from developed areas without causing soil saturation or erosion. This is particularly important on any sites underlain by erodible soils and on steep slopes;
- To provide overland flow routes through developments to cater for major storms and thereby minimising any risk of damage to property infrastructure and other immovable assets;
- Stormwater systems should be designed to function adequately with low maintenance in the long term, and should cater for silting, etc.

4.2.2.1 Implications for the Subsidised Housing Project:

While the National legislated (RDP) minimum norms and standards in respect of stormwater management in South Africa is considered to be "Lined open channels" the logistics and costs involved with the implementation thereof mean that such a minimum norm and standard is not feasible for implementation as part of the Edendale Bulwer Subsidised Housing development.

5 BIO-PHYSICAL COMPONENT

5.1 LAND COVER AND TOPOGRAPHY

The overall land cover within the study area is summarized in Table 5.1 below and graphically depicted on the attached thematic map. The dominant land cover within the study area is described as “Unimproved grassland” and covers 48.25% of the Edendale Bulwer Housing project area. The second most dominant land cover type is known as “Urban/ Built up land: Residential” and covers 45.94% of the project area.

A land cover thematic map is attached to give a visual illustration of the distribution of the various land covers discussed above and listed in Table 5.1 below.

Table 5.1: Land Cover

Land Cover	Area (Ha)	Percentage of Total Area
Unimproved grassland	138.06	48.25%
Urban/ Built up land: residential	131.39	45.94%
Forest plantations	16.55	5.79%
Total Area	286	100%

Source: LANDSAT Landcover

The overall topography of the study area is summarized in Table 5.2 below and clearly depicted on the attached thematic map. The slope analysis study indicates that the majority of the project area (34.9%) is characterized by fairly steep slopes (Between 1:5 – 1:3) and 28.7% of the area’s topography has a slope character “1:7.5 – 1:5” while 18.4% of the area has a slope of flatter than 1:20. Appropriate planning and design principles suitable for the topography of the area and taking due cognizance of the characteristics of the area, will thus have to be applied during the detailed planning stages of the envisaged housing process. Table 5.2 below illustrates the slope analysis summary of the project area

MSUNDUZI LOCAL MUNICIPALITY

EDENDALE/BULWER SUBSIDISED HOUSING DEVELOPMENT

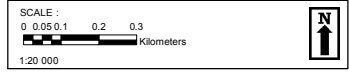
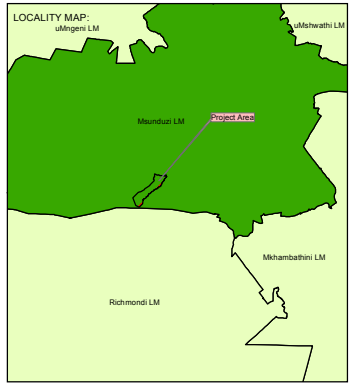
LAND COVER

Legend

	Road Network
	District Road
	Local Access Road
	Main Road
	National Road
	Provincial Road

Land Cover

	Forest plantations
	Unimproved grassland
	Urban / built-up land: residential



DATE : APRIL 2013

MAP REFERENCE/ VERSION NUMBER : Version 1

COORDINATE SYSTEM : Municipal WGS84 (L031)

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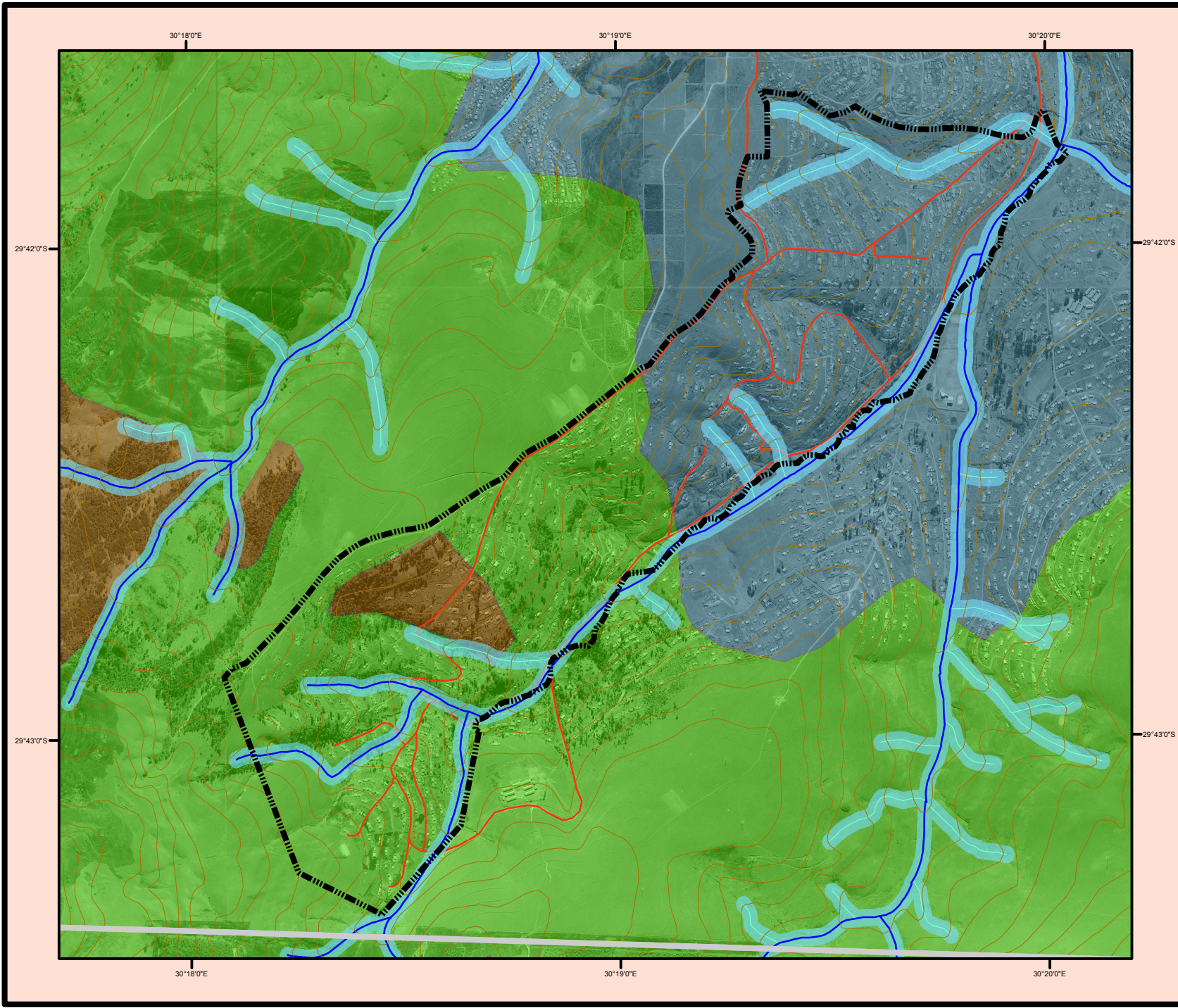


Table 5.2: Slope Analysis

Slope	Area (Ha)	Percentage of Total Area
Flatter than 1:20	52.75	18.4%
1:20 – 1:10	6	2.0%
1:10 – 1:7.5	21.5	7.5%
1:7.5 – 1:5	82.25	28.7%
1:5 – 1:3	100	34.9%
Steeper than 1:3	24.25	8.5%
Total Area	286	100.00%

Source: LANDSAT Landcover.

5.2 FLOOD LINE AREAS

The Edendale Bulwer project area is traversed by a number of perennial and non-perennial water courses. The perennial and non perennial streams occurring within the project area are depicted on the attached thematic map. The predominant perennial and non perennial streams which have been named are summarized in Table 5.3 below:

Table 5.3: Streams and Rivers of the Edendale Bulwer Housing Project Area

Water Course Name	Category	Location within Project Area	Drainage
Wilgerfontein	Perennial	North Eastern border	South-eastern direction

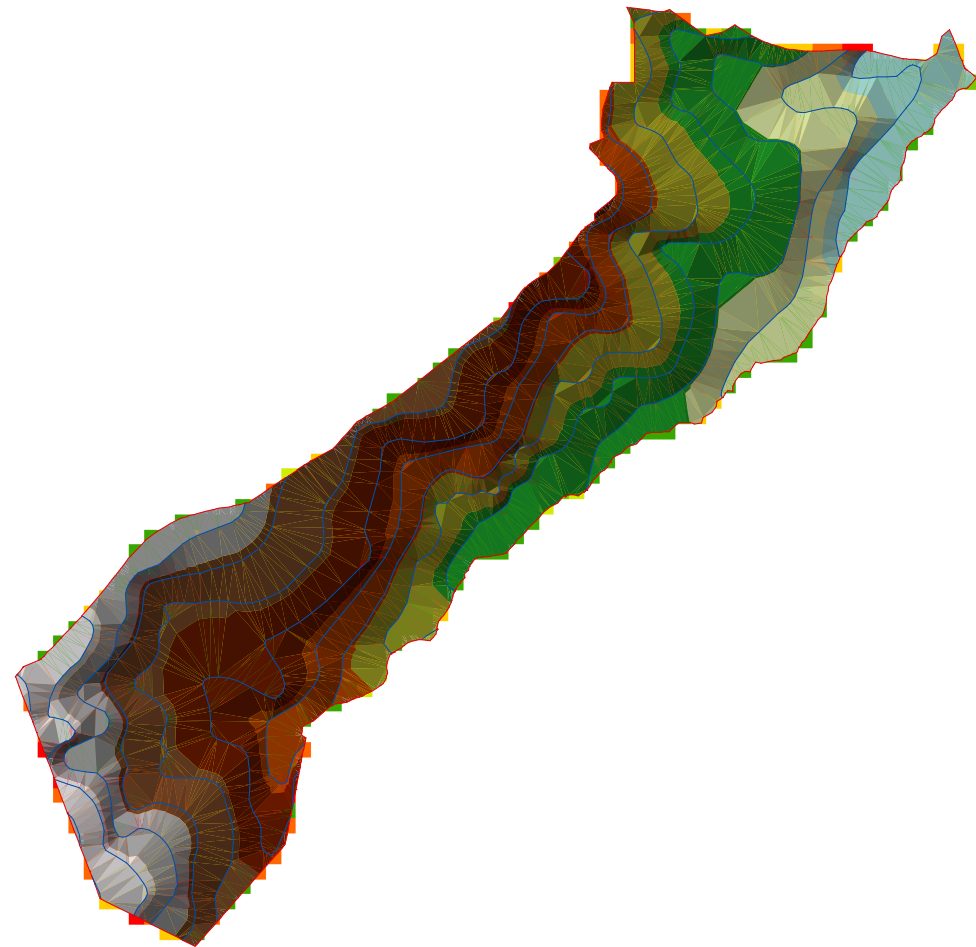
The above noted water course within the proposed development area, whether perennial or non-perennial, are subject to periodic flooding depending on the rainfall and subsequent runoff at any point in time, either within or upstream of the specific catchment area. Therefore, in terms of the Water Act, as well as various other applicable developmental legislation, these areas are subject to a 1:100 year flood line restriction as far as any form of formal development is concerned.

The nature of the settlement pattern and topography of the area has however resulted in most of the beneficiaries tending to settle and develop their traditional houses along hill tops, ridges, saddles and valley lines, etc. Furthermore, in some instances, households have been handed down from one generation to the next, and therefore it is unlikely that a large number of these shelters would be located within areas conducive to periodic flooding. All new households to be constructed as part of the proposed development will however be located outside of the 1:100 year floodline, and where this 1:100 year floodline is not known, all new household structures will be located at least 32 m's away from the bank of any river, wetland or stream. This 32 m default floodline area has been demarcated on the attached thematic map.

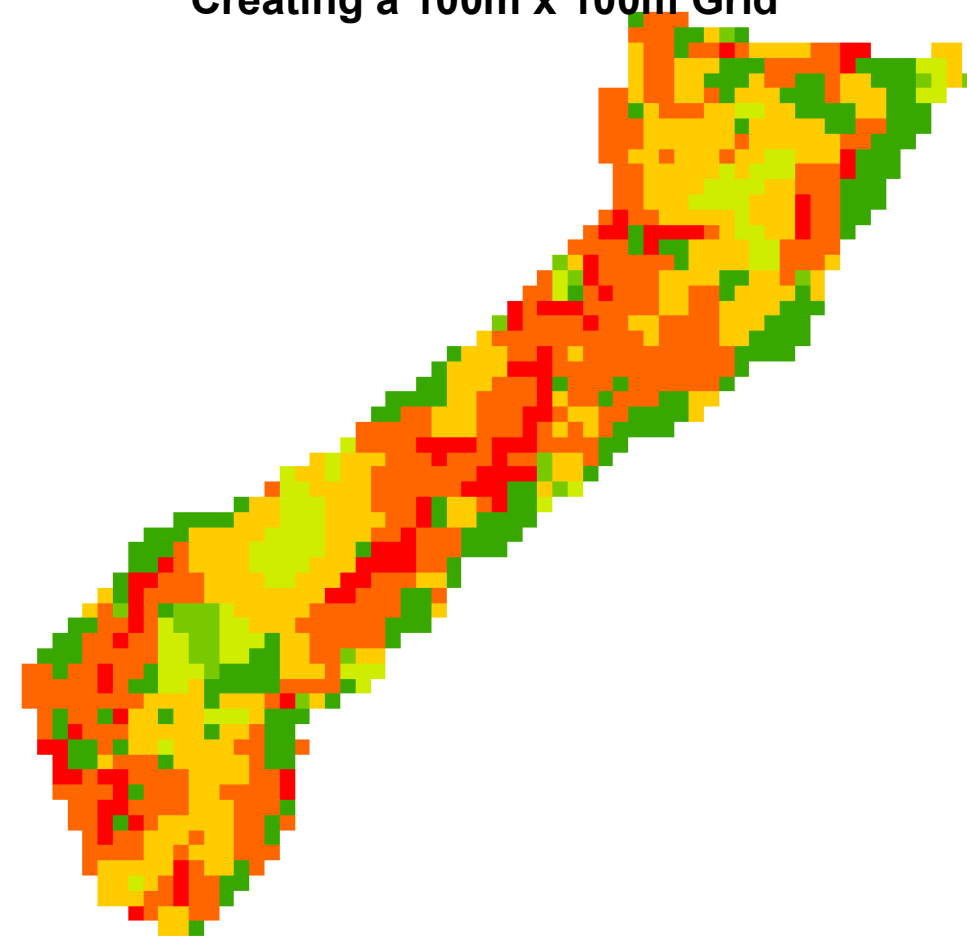
SLOPE ANALYSIS

TOPOGRAPHY ON SITE		
CATEGORY	TYPE	AREA (Ha)
1	Flatter than 1:20	52.75
2	1:20 - 1:10	6
3	1:10 - 1:7.5	21.5
4	1:7.5 - 1:5	82.25
5	1:5 - 1:3	100
6	Steeper than 1:3	24.25

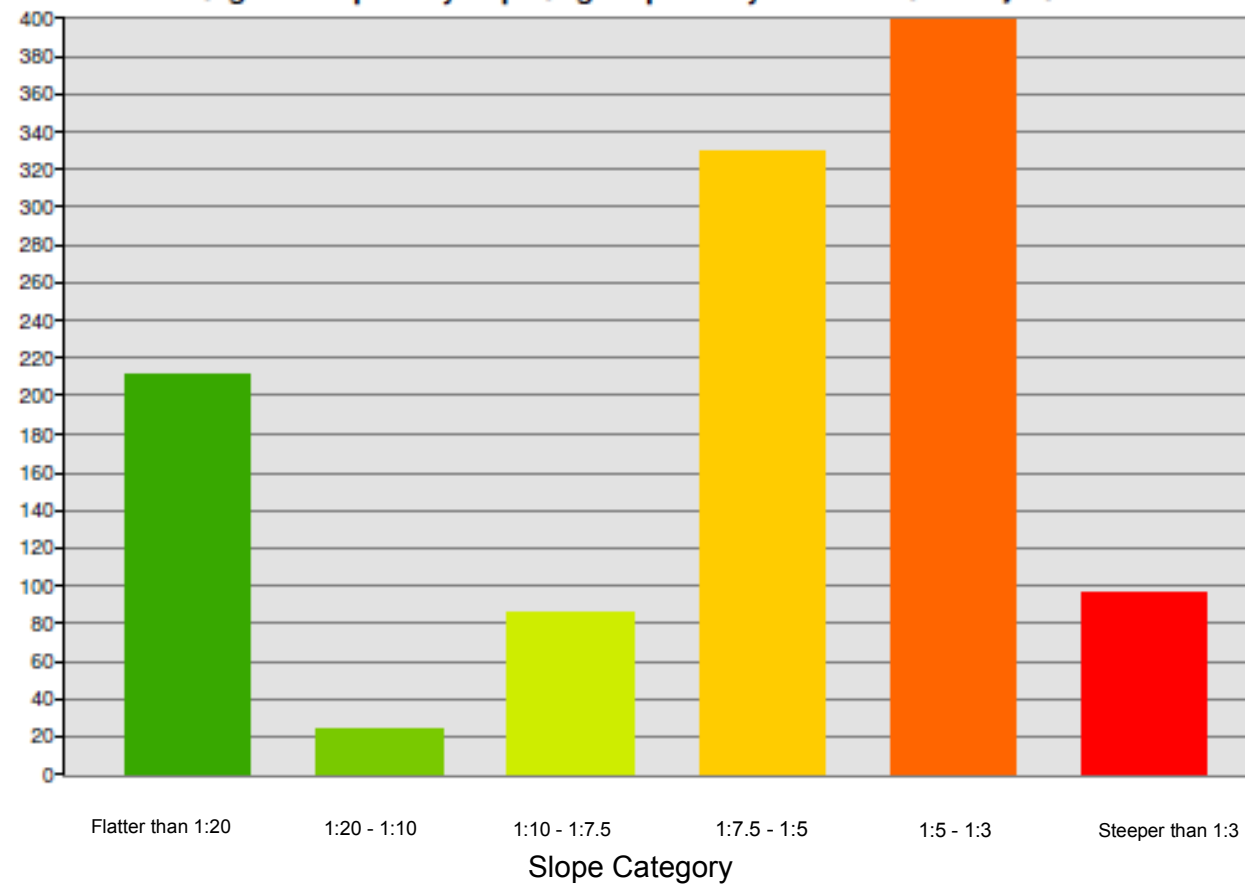
3D Tin Showing Elevation



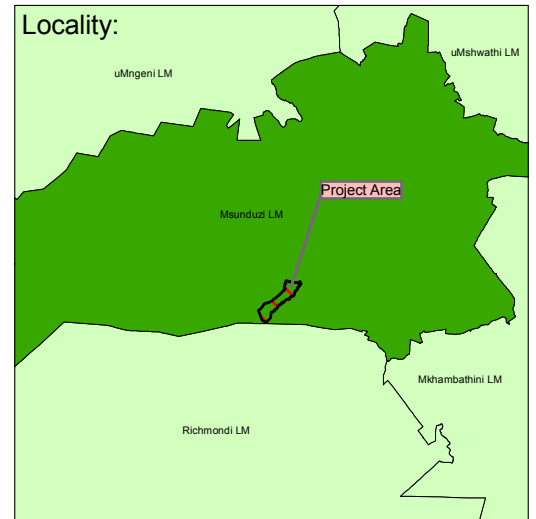
**Slope Analysis Usind 3D-Tin and
Creating a 100m x 100m Grid**



Histogram Graphically Depicting Slope Analysis across the Project Area



- Flatter than 1:20
- Between 1:20 - 1:10
- Between 1:10 - 1:7.5
- Between 1:7.5 - 1:5
- Between 1:5 - 1:3
- Steeper than 1:3



SCALE:
Not drawn to scale



DATE : May 2013

MAP REFERENCE / VERSION NUMBER : Version 1.1

COORDINATE SYSTEM : Geographic Coordinates WGS84 (Lo31)

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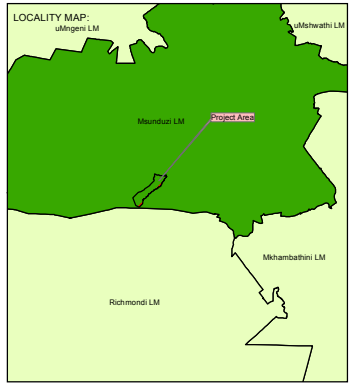
MSUNDUZI LOCAL MUNICIPALITY

EDENDALE/BULWER SUBSIDISED HOUSING DEVELOPMENT

RIVERS

Legend

	Road Network
	District Road
	Local Access Road
	Main Road
	National Road
	Provincial Road



DATE : APRIL 2013

MAP REFERENCE/ VERSION NUMBER : Version 1

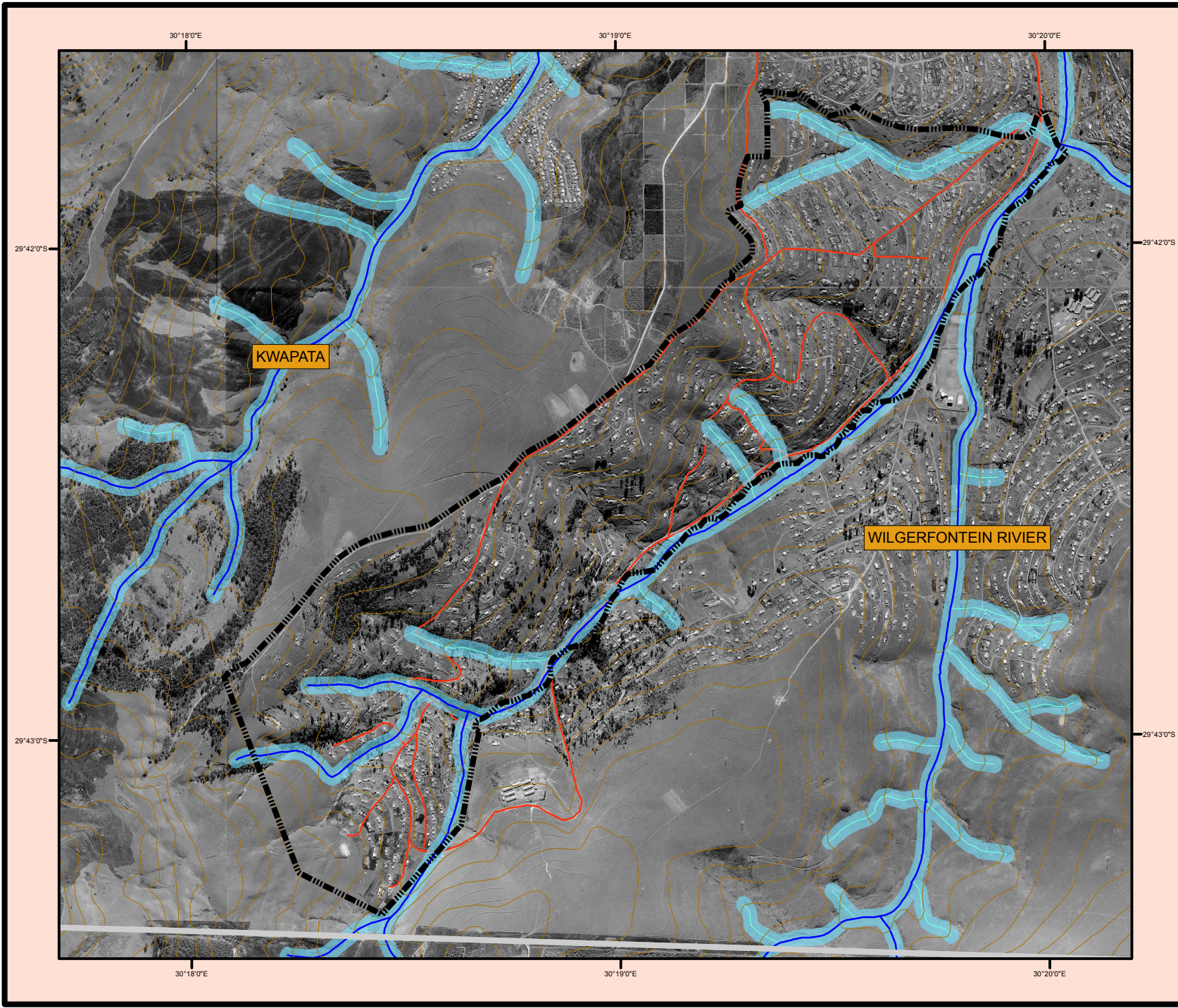
COORDINATE SYSTEM : Municipal WGS84 (Lo31)

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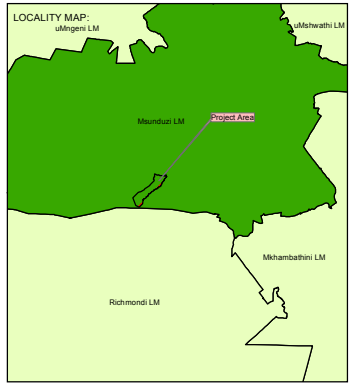
MSUNDUZI LOCAL MUNICIPALITY

EDENDALE/BULWER SUBSIDISED HOUSING DEVELOPMENT

32M BUFFER

Legend

	Road Network
	District Road
	Local Access Road
	Main Road
	National Road
	Provincial Road



DATE : APRIL 2013

MAP REFERENCE/ VERSION NUMBER : Version 1

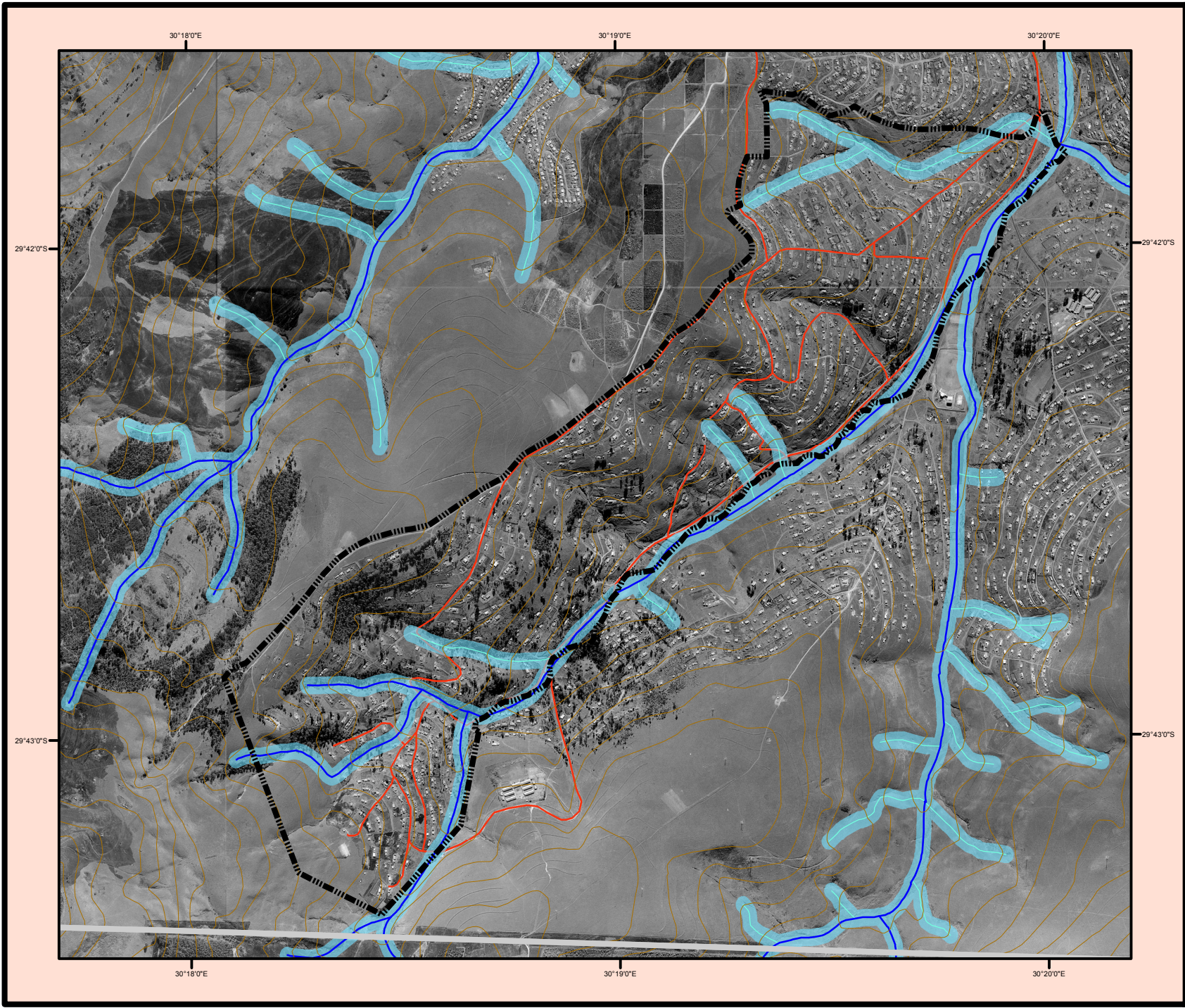
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5.3 SOIL DESCRIPTION, POTENTIAL AND DEPTH

As indicated in Table 5.4 below and on the attached thematic map, three soil types occur within the Edendale Bulwer Housing project area. The dominant soil in the project area can be described as “Red-yellow apedal, freely drained soils, red and yellow, dystrophic and/or mesotrophic” which underlies 76.8% of the total project area, and is located across the whole project area. The second most dominant soil type is “Glenrosa and/or Mispah forms (other soils may occur) limerare or absent in the entire landscape” which cover 22.23% of the project area. This soil type can be seen in the north eastern part of the project area.

Table 5.4: Soils

Soil Description	Area (Ha)	Percentage of Total Area
Plinthic catena: eutrophic; red soils not widespread, upland duplex and marginalitic soils rare.	2.74	0.96%
Glenrosa and/or Mispah forms (other soils may occur) limerare or absent in the entire landscape.	63.59	22.23%
Red-yellow apedal, freely drained soils, red and yellow, dystrophic and/or mesotrophic	219.66	76.8%
Total Area	286	100%

Source: KZN Environmental Potential Atlas

The implication of the soil descriptions outlined above together with the other influencing physical factors from an agricultural point of view are depicted in Table 5.5 and graphically portrayed on the attached thematic map. The soil potential of the predominant soils within the study area are described as “Soils of intermediate suitability for agriculture, where climate permits”, which underlie approximately 70.43% of study area, these soils are distributed over the entire project area and include the entire extent of all privately owned land within the project area; but are only absent in the most southern part and northern part which is underlain by the “Soils not suitable for arable agriculture; suitable for forestry or grazing where climate permits” which account for 28.6% soils type of the project area. It is however evident that 0.96% of the soil potential can be classified as “No dominant class” and is located in the most northern part of the project area. Table 5.5 below depicts the soil potential distribution within the Edendale Bulwer TA project area.

MSUNDUZI LOCAL MUNICIPALITY

EDENDALE/BULWER SUBSIDISED HOUSING DEVELOPMENT

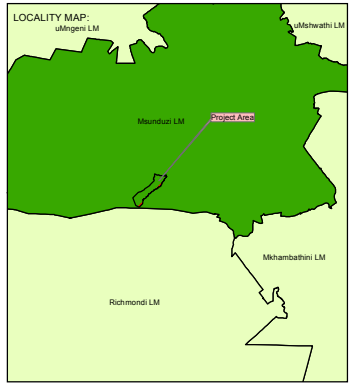
SOILS

Legend

	Road Network
	District Road
	Local Access Road
	Main Road
	National Road
	Provincial Road

Soils

- Clerosea and/or Mispah forms (other soils may occur), time rare or absent in the entire landscape
- Pistic catena: eutrophic, red soils not widespread, upland duplex and mangatic soils rare
- Red-yellow apedal, freely drained soils, red and yellow, dystrophic and/or mesotrophic



DATE : APRIL 2013

MAP REFERENCE/ VERSION NUMBER : Version 1

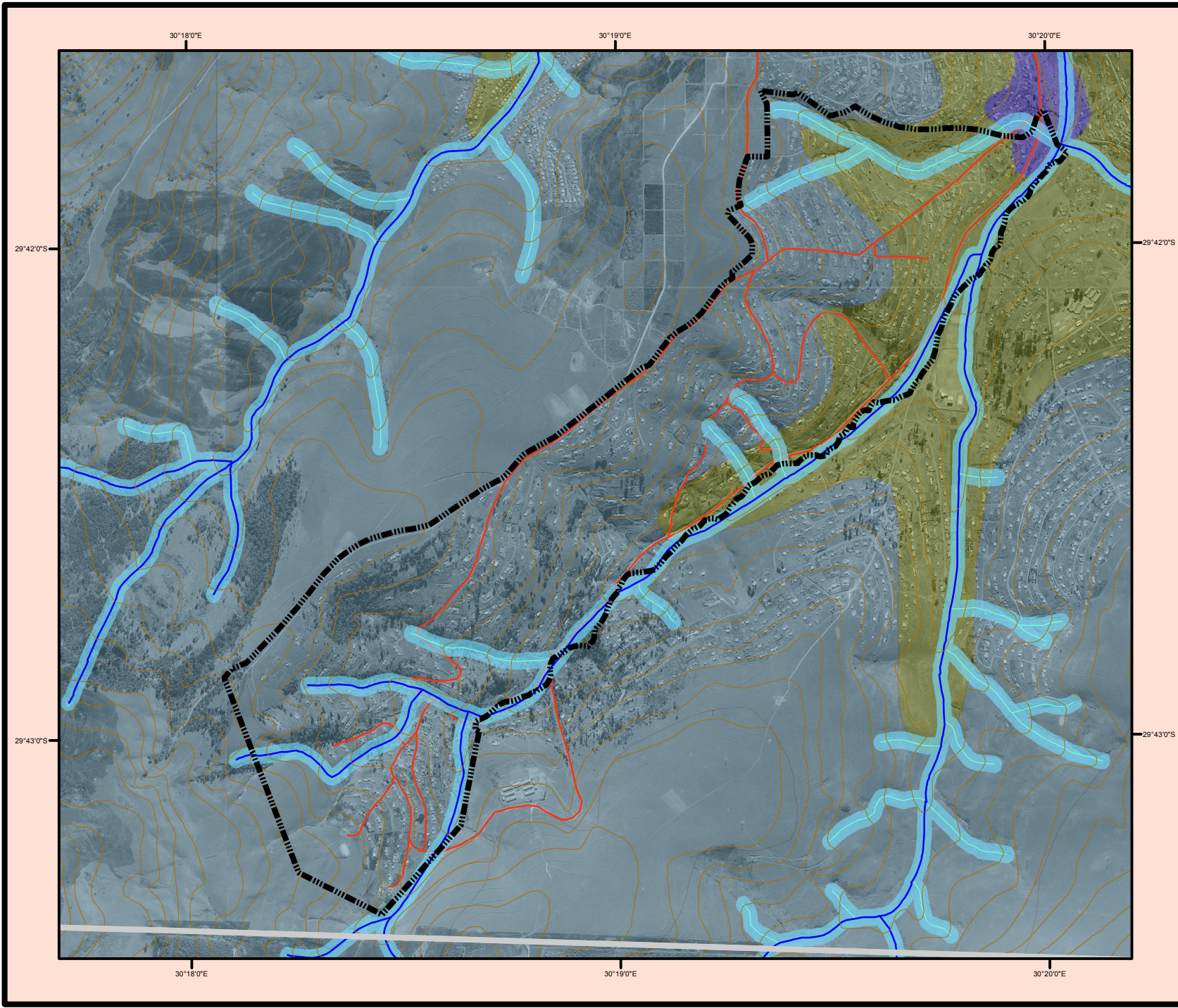
COORDINATE SYSTEM : Municipal WGS84 (Lc31)

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MSUNDUZI LOCAL MUNICIPALITY

EDENDALE/BULWER SUBSIDISED HOUSING DEVELOPMENT

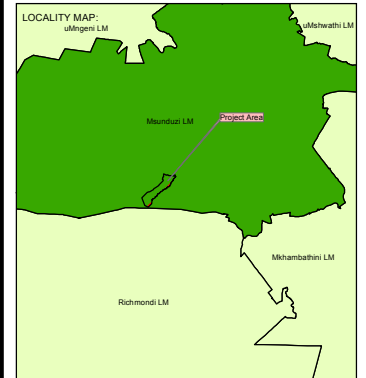
SOIL POTENTIAL

Legend

- | | |
|------------------------------------|-------------------|
| Project Area | Road Network |
| Local Municipal Boundaries | District Road |
| 20m Contours | Local Access Road |
| Non - Perennial rivers and Streams | Main Road |
| Perennial Rivers and Streams | National Road |
| 32m Buffer of Rivers and Streams | Provincial Road |

Soil Potential

- No dominant class
- Soils highly suited to arable agriculture where climate permits
- Soils not suitable for arable agriculture; suitable for forestry or grazing where climate permits
- Soils of intermediate suitability for arable agriculture where climate permits



SCALE :
0 0.05 0.1 0.2 0.3
Kilometers
1:20 000



DATE : APRIL 2013

MAP REFERENCE/ VERSION NUMBER : Version 1

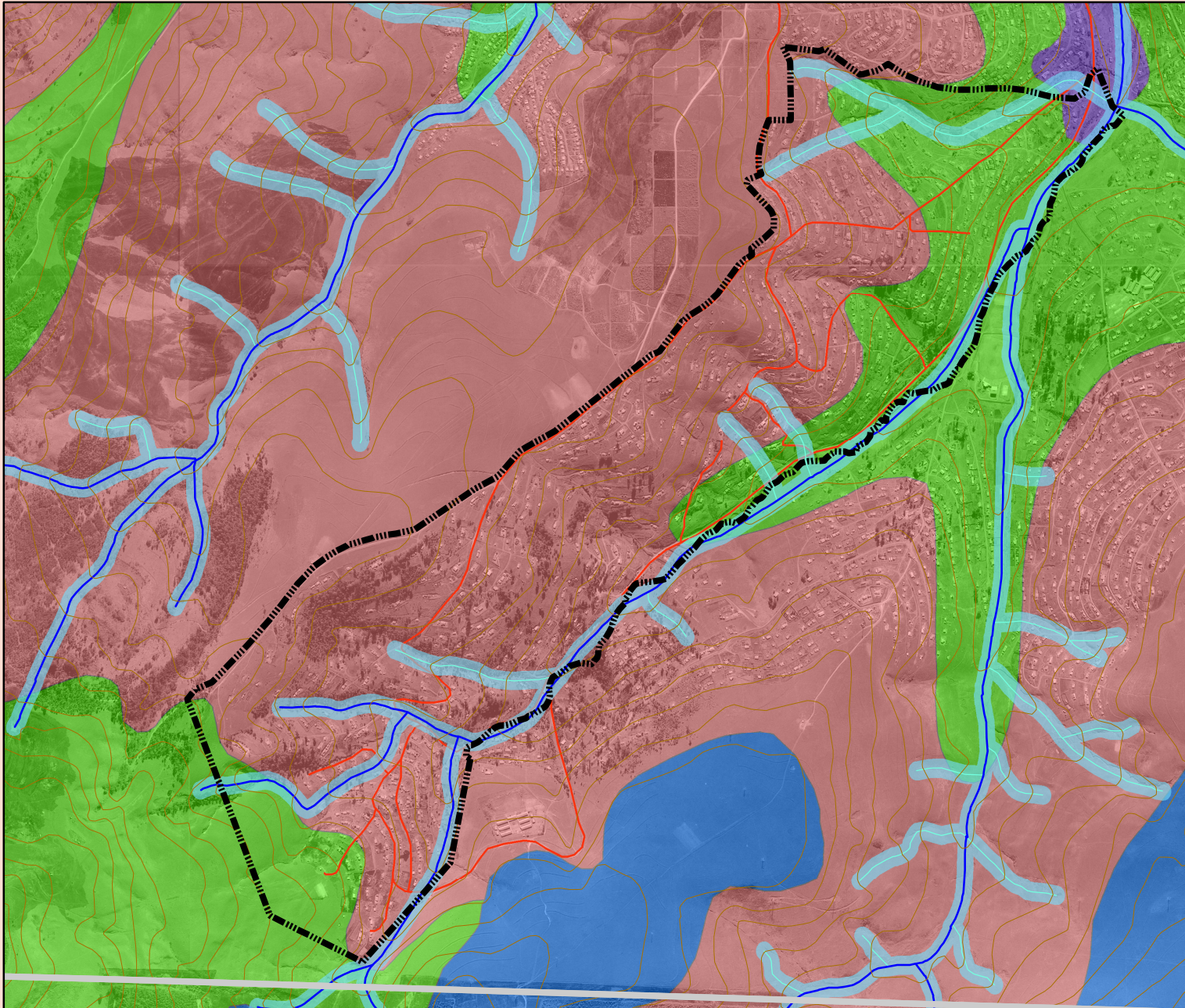
COORDINATE SYSTEM : Municipal WGS84 (Lc31)

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MSUNDUZI LOCAL MUNICIPALITY

EDENDALE/BULWER SUBSIDISED HOUSING DEVELOPMENT

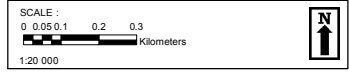
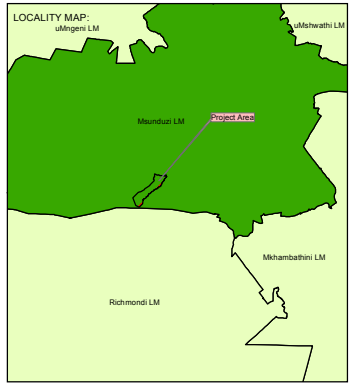
SOIL DEPTH

Legend

Project Area	District Road
Local Municipal Boundaries	Local Access Road
20m Contours	Main Road
Non-Perennial rivers and Streams	National Road
Perennial Rivers and Streams	Provincial Road
32m Buffer of Rivers and Streams	

Soil Depth

< 450mm
450mm - 750mm
> 750mm



DATE : APRIL 2013

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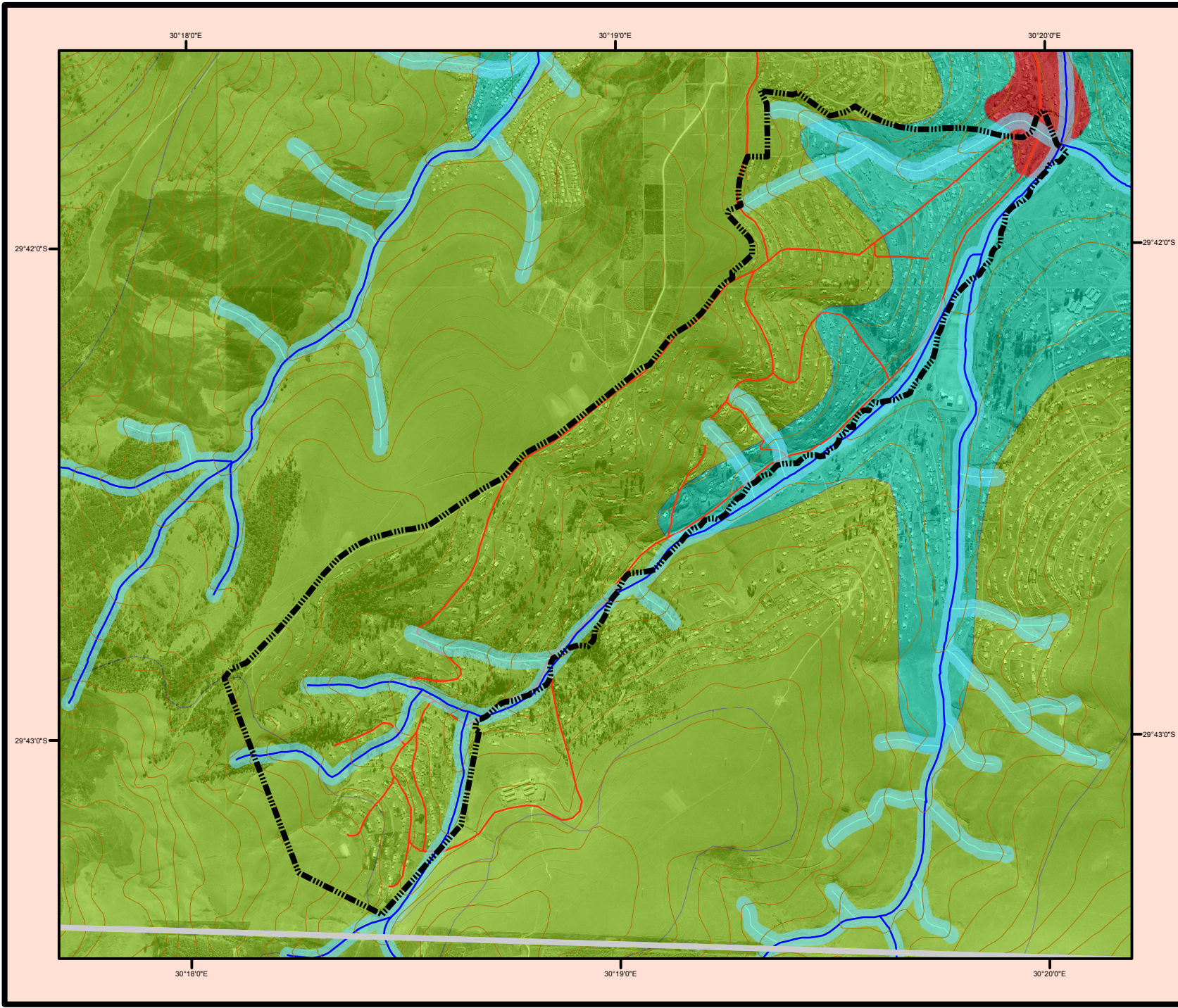


Table 5.5: Soil Potential

Soil Potential	Area (Ha)	Percentage of Total Area
No dominant class	2.74	0.96%
Soils of intermediate suitability for agriculture, where climate permits	201.43	70.43%
Soils not suitable for arable agriculture; suitable for forestry or grazing where climate permits	81.82	28.6%
Total Area	286	100%

Source: KZN Environmental Potential Atlas

The approximate depths of the various soil types occurring across the Edendale Bulwer Housing project area are depicted on the attached thematic map and indicated in Table 5.6 below. The information provided indicates that the soil depths of the various soil types of project area range from less than 450mm to 750 mm.

Table 5.6: Soil Depth

Soil Depth	Area (Ha)	Percentage of Total Area
<450 mm	2.74	0.96%
450 mm – 750 mm	219.66	76.8%
>750 mm	63.59	22.23%
Total Area	286	100%

Source: KZN Environmental Potential Atlas

5.4 GEOLOGY

Table 5.7 below depicts the geological characteristics of the Edendale Bulwer Housing project area; this geological overview gives an overall description of the various geological formations of the area. The area is underlain by only one distinct rock type, "Shale" which covers the whole project area (100%) of the Edendale Bulwer TA project area. The Shale geology type predominantly occurs over the whole project area.

Table 5.7: Geology

Geology	Area (Ha)	Percentage of Total Area
Shale	286	100%
Total Area	286	100%

Source: KZN Environmental Potential Atlas

MSUNDUZI LOCAL MUNICIPALITY

EDENDALE/BULWER SUBSIDISED HOUSING DEVELOPMENT

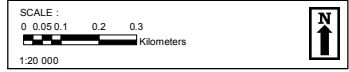
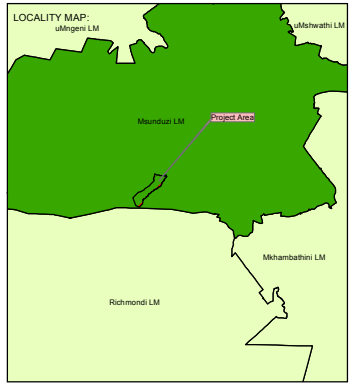
GEOLOGY

Legend

Project Area	District Road
Local Municipal Boundaries	Local Access Road
20m Contours	Main Road
Non-Perennial rivers and Streams	National Road
Perennial Rivers and Streams	Provincial Road
32m Buffer of Rivers and Streams	

Geology

ARENITE
SHALE



DATE : APRIL 2013

MAP REFERENCE/ VERSION NUMBER : Version 1

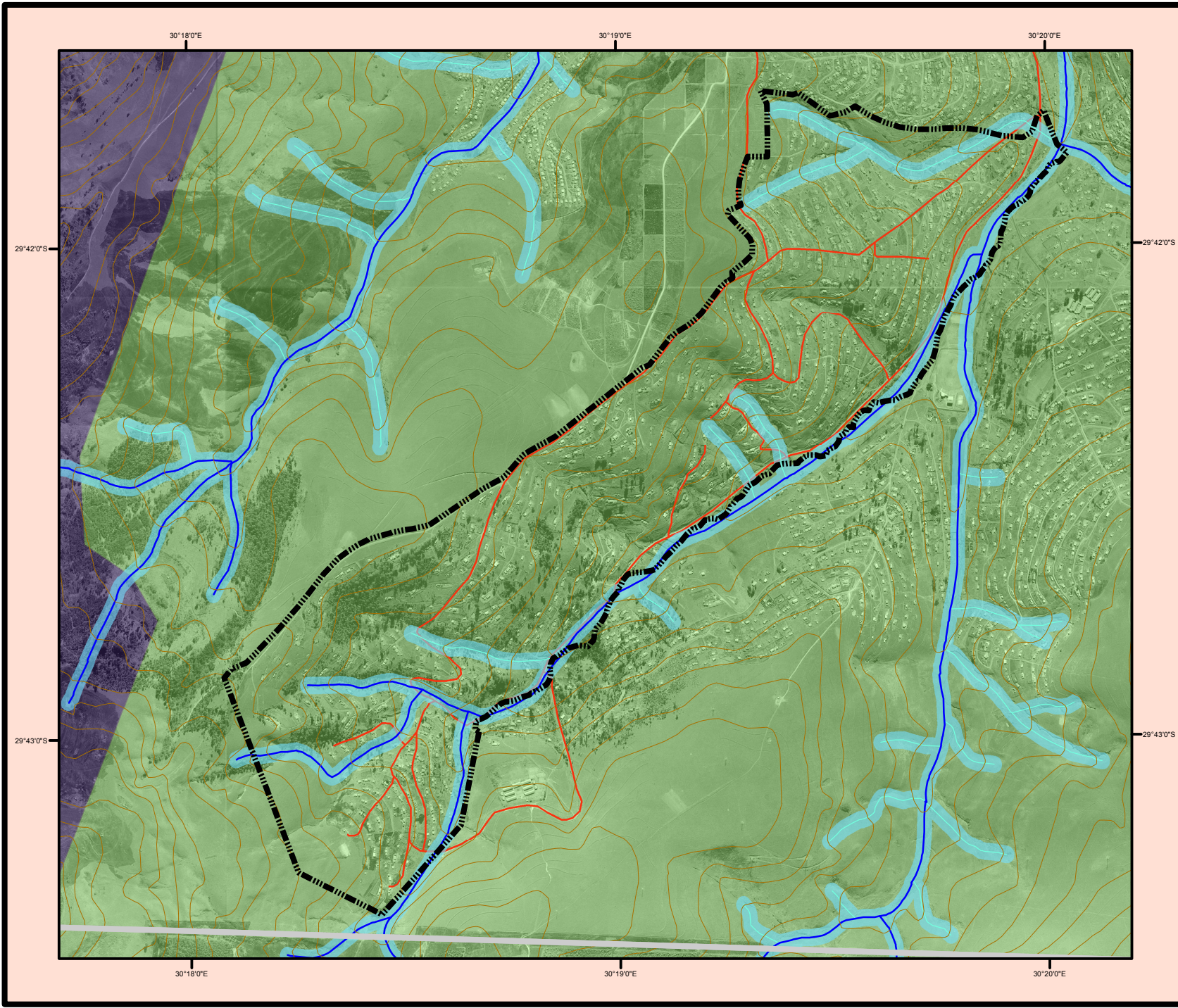
COORDINATE SYSTEM : Municipal WGS84 (Lc31)

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More detailed information on the geotechnical conditions of the study area is contained in a preliminary geotechnical report. This report indicates the physical implications and impact of these geotechnical conditions on overall development.

5.5 VEGETATION

The Edendale Bulwer Housing project area is characterised by two vegetation types which occur within the area. Table 5.8 below indicates that the dominant vegetation type of the project area is characterized by the “Midlands Mistbelt Grassland” vegetation type which covers 79.8% of the project area (in the north western, central and southern parts of the area). The second vegetation type can be described as “Ngongoni veld” which covers 20.8% of the project area. The Ngongoni veld vegetation occurs in the north eastern part of the project area. The vegetation type discussed above is indicated in table 5.5 below and on the attached thematic map.

Table 5.8: Vegetation

Vegetation	Area (Ha)	Percentage of Total Area
Midlands Mistbelt Grassland	228.25	79.8%
Ngongoni Veld	57.75	20.2%
Total Area	286	100%

Source: KZN Environmental Potential Atlas

The vegetation unit which occurs across the Edendale Bulwer Housing project area is discussed in further detail under the respective heading below.

5.5.1 Midlands Mistbelt Grassland (Musina & Rutherford, 2006)

The Midlands Mistbelt Grassland vegetation group can be found in the KwaZulu-Natal and Eastern Cape Provinces: KwaZulu-Natal Midlands-scattered in broad belt in the form of several major patches including Melmoth-Babanango area, Kranskop and Grey town, Howick Lions River, Karkloof, Balgowan, Cedara, Edendale, Hilton, Richmond, the Ixopo- Highflats area, Mount Malowe in the Umzimkhulu enclave of the Eastern Cape Province and the HardIng-Weza area. The south western most section in the Eastern Cape Province falls in the Bulembu, Gxwaleni, Longweni and Flagstaff areas. This vegetation group is located at an altitude of 760m - 1 400 m above sea level. The vegetation category is characterised as hilly and rolling landscape mainly associated with a discontinuous east-facing scarp formed by dolerite intrusions (south of the Thukela River).

MSUNDUZI LOCAL MUNICIPALITY

EDENDALE/BULWER SUBSIDISED HOUSING DEVELOPMENT

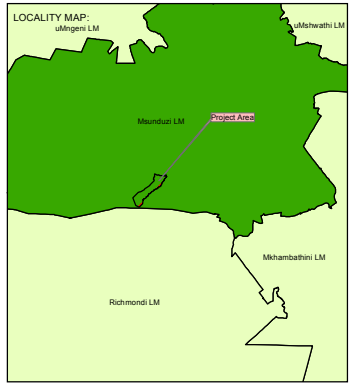
VEGETATION

Legend

	Road Network
	District Road
	Local Access Road
	Main Road
	National Road
	Provincial Road

Vegetation

	Midlands Mistbelt Grassland
	Ngongoni Veld



DATE : APRIL 2013

MAP REFERENCE/ VERSION NUMBER : Version 1

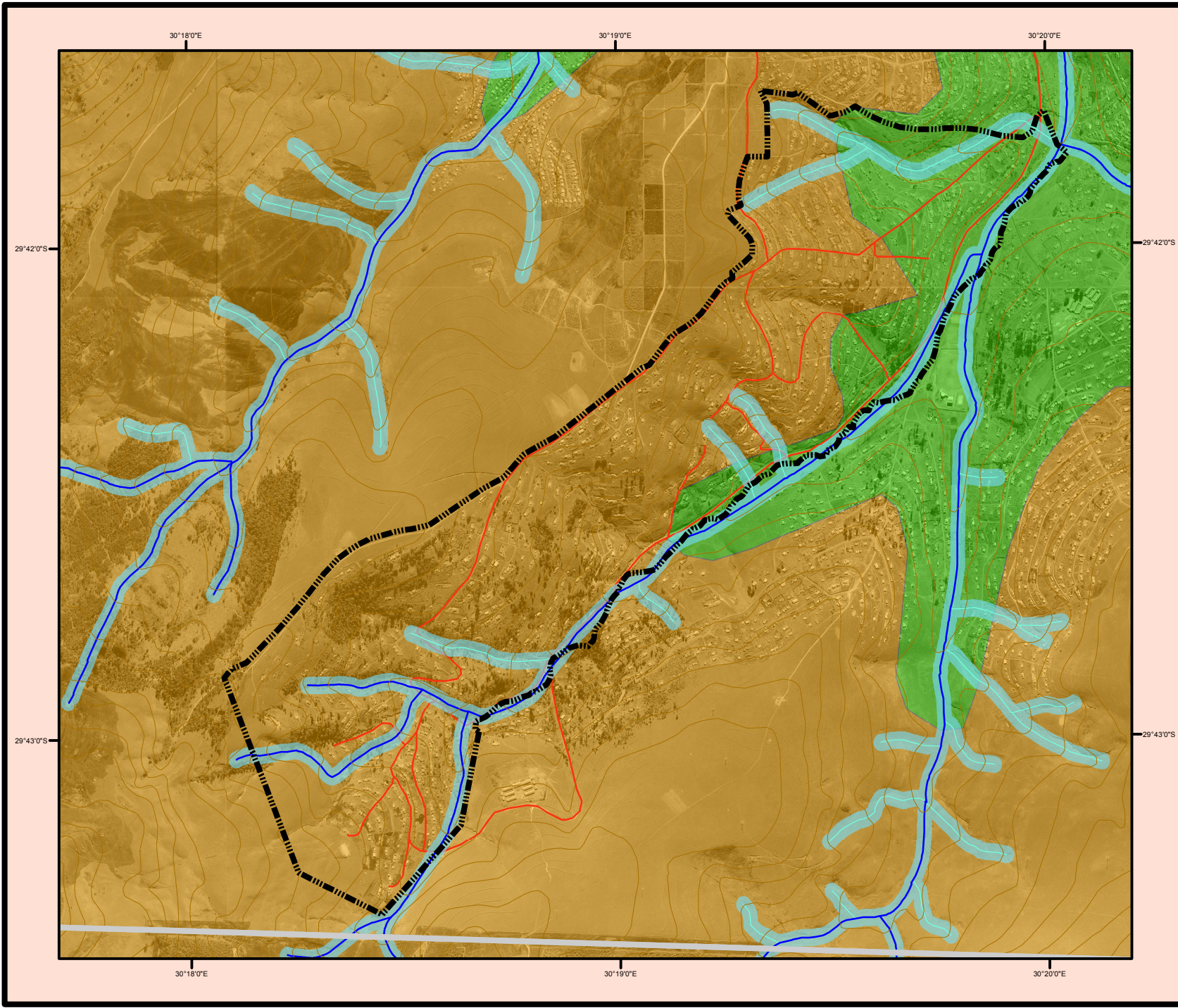
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Dominated by forb-rich, tall, sour *Themeda triandra* grasslands transformed by the invasion of native 'Ngongoni grass (*Aristida junciformis* subsp. *Junciformis*). Only a few patches of the original species-rich grasslands remain.

The geology and soils of this vegetation group can be characterised as Apedal and plinthic soil forms derived mostly from Ecca Group (Karoo Supergroup) shale and minor sandstone and less importantly from Jurassic dolerite dykes and sillis.

The climate can be described as summer rainfall, with MAP of 915 mm, range 730-1 280 mm. Heavy and frequent occurrence of mist provides significant amounts of additional moisture (Cedara near Pietermaritzburg has 46 misty days per year). Some of the rain is in the form of cold frontal activity, mainly in winter, spring and early summer. Thunderstorms are common in summer and autumn (Cedara: 60 days of thunderstorms per year). Mean annual evaporation 1 463-1 797 mm. MAT 15.8°C, absolute minimum temperature was recorded in this region in June (-10. 8°C). Frosts are generally moderate, but occasional severe frost may also occur. Further climatic conditions include short-term drought spells, hail and hot north western berg winds occurring particularly in spring and early summer.

The conservation is described as endangered (one of the most threatened vegetation types of KwaZulu-Natal) with a target of 23%. Only a small fraction (about 0.5%) statutorily conserved in number of reserves such as Ngeli, Impendle, Blinkwater, Qudeni, Doreen Clark, Karkloof and Queen Elizabeth Park-still heavily underrepresented in conservation plans.

5.5.2 Ngongoni Veld (Musina & Rutherford, 2006)

The Ngongoni Veld vegetation group can be found in the KwaZulu-Natal and Eastern Cape provinces from Melmoth in the north to near Libode in the former Transkei (including Eshowe, New Hanover, Camperdown, Eston, Richmond, Dumisa, Harding, Lusikisiki and the Libode area), at an altitude of 400 to 900 m's above sea level. The vegetation category is characterised as dense, tall grassland overwhelmingly dominated by unpalatable, wiry Ngongoni grass (*Aristida junciformis*). The dominance of this species in Ngongoni veld results in low species diversity. Wooded areas (thornveld) are found in valleys at lower altitudes, where the vegetation unit grades into KwaZulu-Natal Hinterland Thornveld and Bhisho Thornveld. Termitaria support bush clumps with *Acacia* species, *Cussonia spicata*, *Ziziphus mucronata*, *Coddia rudis* and *Ehretia rigida* etc.

The geology and soils associated with this vegetation include acidic, leached, heavy soils derived from Karoo Supergroup sediments (including significant Dwyka tillites) and intrusive Karoo dolerites, while Glenrosa and Mispah soils also occur.

The Ngongoni Veld vegetation category occurs in areas characterized as receiving summer rainfall with some rain in winter, with a mean annual precipitation of between 700 – 1100 mm's. Mean monthly maximum and minimum temperatures of 37.0 °C and 4.9 °C for Melmoth and 38.2 °C and -0.2 °C for New Hanover were recorded for January and June respectively. Some valleys are sheltered and may show weak rain shadow effects, while Frost is infrequent, it occurs in areas where cold air becomes trapped in valleys. This vegetation type is regarded as being vulnerable, with a conservation target of 25%, of which only less than 1% is statutorily conserved in the Ophathe and Vernon Crookes Nature Reserves. Approximately 39% has been transformed for cultivation, plantations and urban development purposes.



Figure 5.5.2: Example of Ngongoni Veld in the Vernon Crookes Nature Reserve near Scottburgh, southern KwaZulu-Natal.

5.6 EZEMVELO KZN CONSERVATION PLAN

South Africa has ratified the International Convention on Biological Diversity, which commits the country, including KwaZulu-Natal, to develop and implement a strategy for the conservation, sustainable use and equitable sharing of the benefits of biodiversity. This requires Provincial Authorities together with the Department of Environment and Tourism, to compile and implement a 'Bioregional Plan' for the province that ensures that a minimum area of each bioregion with all its representative ecosystems is protected. In order to address these requirements in a logical manner, KZN Wildlife in collaboration with the Development Bank of Southern Africa and the KZN Town and Regional Planning Commission has collaborated on a project which aimed to develop a systematic but flexible decision-framework for the conservation of the province's biodiversity. The project was entitled the 'Systematic Conservation Plan and Decision-Framework for KwaZulu-Natal'. The first product of the conservation planning analysis in C-Plan is an irreplaceability map of the planning area, in this case the province of KwaZulu-Natal. A low irreplaceability value indicates that many options are available for meeting the conservation targets set for each element of biodiversity that is likely to be found in the area. Conservation targets represent the amount (e.g. area or population size) required to conserve that biodiversity element in perpetuity and is determined prior to each element being included into the analysis.

The irreplaceability map for the study area indicates that the area's irreplaceability value is 0, thus indicating that the Edendale Bulwer Housing project area is considered relatively replaceable with regards to biodiversity (see Attached Thematic Map). The project area's biodiversity is therefore likely to be characterized as not being threatened or endangered. The implementation of the proposed housing project should be well planned and wary not have any adverse or negative impact on the areas biodiversity. A diverse approach to biological protection should however be adopted and implemented as part of the proposed project as part of the good practice principle and to protect any biologically diverse features which may occur within the area. **It should however be noted that the proposed housing development is an in-situ project and will therefore only entail the construction of houses within existing homestead/iMuzi areas and will therefore not have a negative impact on the surrounding environment. Care should however still be taken to ensure no areas adjacent to the existing iMuzi's are impacted on.**

5.7 MINERAL DEPOSITS

There are no known mineral deposits occurring within the boundary of the Edendale Bulwer Housing project area.

5.8 ARCHAEOLOGICAL, HISTORICAL AND CULTURAL SITES

No detailed information is currently available on existing archaeological, historical or cultural sites within the boundaries of the study area. The Kwazulu Natal Heritage Act requires that Amafa Akwazulu Natali (Heritage KwaZulu Natal) is to comment on the need for an archaeological assessment for proposed development if:

- Development area is larger than 10 000 m²
- Development is longer than 300m
- The development area contains known archaeological sites.

However due to the fact that the proposed project constitutes an in-situ type upgrade, it is not expected that the implementation and operation of the proposed project will result in any new adverse impacts on any archaeological, historical or cultural sites which may be present within the area. This aspect will however have to be further investigated during the environmental scoping phase and be informed by detailed land use information emanating from the planning component of the project.

6 PRELIMINARY ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 WETLAND SYSTEM

The removal of the sugarcane from the property will increase the surface flow of stormwater dramatically and will result in soil erosion. Therefore the removal of the sugarcane and the rehabilitation and re-vegetation of the wetlands will have to be done concurrently as far as possible to reduce erosion of the already degraded wetland system of the study area. To determine the impact of the development on the surface water flow, a Stormwater flow Assessment will have to be conducted as part of the EIA Process. This stormwater assessment/plan should compare the existing surface water flow with the possible water flow once the area has been developed.

The rehabilitation and re-vegetation of the wetland systems are closely linked and the key to the success of any rehabilitation is the deactivation and plugging of the drains within all of the wetland drainage lines. The blocking of drains will improve flooding and increase the wetted perimeter of the current degraded systems. With the increased moisture levels, hydrophilic vegetation will soon re-colonise these systems and improve biodiversity. Initial re-vegetation should focus on restoring a protective ground cover once the sugar cane has been removed to prevent erosion. Indigenous turf grasses such as *Stenotaphrum secundatum* and *Cynodon dactylon* should be used to establish an initial cover. Natural successional processes should drive the shift in vegetation composition from hygrophilous turf grasses to true hydrophilic species once flooding is restored. Indigenous riparian tree species such as *Ficus sp.*, *Rauvolfia caffra*, *Voacanga thouarsii*, *Syzygium cordatum* should be planted within all the drainage lines to further stabilise the water courses. In the lower wetland portions *Barringtonia racemosa* should be planted. The removal and ongoing control of alien invasive plants is essential across the site. The removal of the sugar cane will create an ideal habitat for many alien plants and control of these species should be constant during both the construction phase as well as a stipulated function of the Msunduzi Local Municipality (managing authority for the open spaces / wetlands) during the operational phase of the development.

The following principles for successful wetland rehabilitation used by the Mondri Wetlands Project can also be useful:

- **Remove the cause** of the damage, not the symptoms and manage the resource correctly.
- **Re-establish the natural water flow** patterns within the wetland.
- Do not concentrate water always try and spread it out, this should reduce the possibility of erosion occurring.
- Do not underestimate the **force of the water** during high flow periods.
- Many **wetland soils** are **highly erodible**, be aware of this when designing structures.
- There are two ways of deciding what method of rehabilitation to initiate and that is either **stabilising the problem area and maintaining the present condition** of the wetland or secondly to try and **reclaim the wetland area that has been lost**.

Herbaceous plants with their rapidly spreading capabilities and dense near surface root mat, and surface cover, are also extremely effective firstly against scouring of wetlands, and secondly for enhancing the stability of gentle or shallow banks. Herbaceous plants absorb the energy of fast flowing water rather than reflecting it and its strong regenerative powers, makes them ideal for rehabilitating wetland erosion.

For rehabilitation it is important to be deliberate in both the selecting and placing of plants with vigorous rooting growth characteristics that will accelerate natural plant succession and deal directly with the problem on site. Local plant species native to streambanks and wetlands should be used. The best is to look around and see what indigenous species are growing in the area you are about to rehabilitate.

6.2 DRAINAGE AND FLOODLINE

Appropriate stormwater control and management as well as attenuation measures will have to be implemented as part of the development to limit the impact of stormwater run-off (especially during the occurrence of heavy rain or storms) on potentially more sensitive wetland areas. It will also be necessary to put the necessary measures in place to eradicate invader plant species and restore the natural indigenous vegetation along drainage and floodlines. No development should be allowed within the 1:100 year floodline.

6.3 ROADS AND STORMWATER RUNOFF

The current road network of the project area will not satisfy the requirements of the proposed development. New roads will have to be constructed to provide access to all the areas of the development. These roads will have to be aligned in such a manner to minimise any negative impacts on the wetland system. The flow rate of the stormwater runoff should be reduced before it reaches the wetland system to reduce the possibility of erosion within the wetland system.

The main factors influencing **storm water** runoff in the project area will be an increase in the impermeable surface area due to the construction of houses and access roads. An increase in both impermeabilities, which reduce rainwater infiltration into the ground, together with the rapid draining of storm-water from the development sites are likely to result in an increase in storm-water runoff into drainage lines and watercourses. Appropriate storm-water control measures, thus needs to be installed in an environmentally sensitive manner to reduce the flow rate of the stormwater. Insufficient and inappropriate storm-water control measures can result in:

- Increased levels of soil erosion.
- Risk of pollution.
- Detrimental ecological effects in the river catchments downstream of the proposed development site.
- Risk of flooding of dwellings.

Any outlet areas in watercourses that will receive storm-water must be specially protected against degradation and soil erosion. Storm water discharge points into natural watercourses are of particular concern and outlet control structures and water course protection measures that can sustain the magnitude of expected runoff must be installed.

6.4 SOIL EROSION AND EARTHWORKS

The Conservation of Agricultural Resources Act, No. 43 of 1983 (as amended) provides for the control and prevention of soil erosion. Increased runoff during and after rainfall events, especially torrential rainfall events, may result in increased erosion in surrounding areas and water courses feeding into the tributaries and main rivers.

Restoration of excavated areas must be carried out and appropriate erosion control measures must be implemented such as the planting of indigenous grass and other indigenous vegetation found naturally in the area to prevent erosion. The planted vegetation will have to be monitored to ensure continued growth.

During project implementation, the **revegetation specifications for civil engineering construction projects** will have to be adhered to. These specifications provide clear guidelines for:

- Type and source of materials to be used for re-vegetation
- Re-vegetation methods
- Planting guidelines
- Maintenance of re-vegetated areas

6.5 SANITATION AND SOLID WASTE

In terms of the proposed Edendale Bulwer Subsidised Housing Development four sewer disposal options will be assessed as part of the Bulk Engineering Report, which include:

- Full water borne sewage - discharge to a municipal plant.
- An onsite package plant that falls within the general authorisation for the site.

- Septic Tank and soakaways
- Ventilated Improved Pit Latrines (VIP System)

The recommended sewage disposal system will be assessed in detail as part of the Environmental Authorization Application. These four alternatives will be compared in terms of its impacts on the environment, implementation cost, etc.

6.6 PHYSICAL AND LANDSCAPE CHARACTERISTICS

The physical and landscape characteristics of the study area have been affected by the agricultural activities. The benefits of the proposed housing development through the provision of housing units and the creation of employment opportunities to the community as part of the construction process outweigh the loss of productive agricultural land and the development will have a net positive impact on the physical and landscape characteristics of the development area if mitigation measures and recommendations are implemented.

The crossing of potentially environmentally sensitive areas such as the wetland system should be limited as far as possible. Where these crossings are unavoidable, specific management and mitigation measures will have to be considered during the EIA process as part of the detailed planning and implementation process.

6.7 ECOLOGICAL CHARACTERISTICS

It will be necessary to fully rehabilitate and re-vegetate the wetland system of the property as well as to remove alien invasive plants on a continual basis during the construction and operational period of the development. Because the area has been largely utilized for sugarcane cultivation the majority of indigenous vegetation has been clear from the site. The re-introduction of indigenous vegetation into the area as part of the development should be encouraged. Implementing of these measures will help in the rehabilitation and promotion of the natural ecology of the development area and its surroundings.

6.8 ARCHAEOLOGICAL, HISTORICAL AND CULTURAL SIGNIFICANCE

Since the total development footprint will exceed 10 000 m², Amafa will have to comment on the need for an archaeological assessment as part of the EIA process before environmental authorization for the development is considered by the KwaZulu-Natal Department of Agriculture and Environmental Affairs.

6.9 POLLUTION

All waste generated during the construction and the operational phase of the housing project should be collected and disposed of at the nearest permitted municipal landfill site.

The proposed development may generate some additional noise during the construction phase, but this can be managed if contractors abide by stipulated working hours and other mitigation measures that will be specified in the Environmental Management Plan. Additional noise pollution during the operational phase of the development will mainly be associated with increased traffic volumes in this area.

6.10 SOCIAL AND ECONOMIC IMPACTS

The introduction of appropriate mitigation and management measures can result in a number of positive social and economic impacts resulting from the project:

- Provision of proper housing to a large number of destitute households.
- Ecological revival of the property's wetland system, road-sides, and cleared agricultural areas through the planting and long-term care of suitable indigenous vegetation.
- Employment of people from local community during the construction phase of the project.
- Sorting of solid waste for recycling at special designated sites and creation and managing of community compost facilities. The compost can be used in community permaculture vegetable gardens.

7 CONCLUSIONS AND RECOMMENDATIONS

The total number of households in need of housing (including those residing in traditional houses constructed of traditional materials, backyard structures or informal structures) is approximately 77.75%. The purpose of this preliminary assessment is thus to provide a brief overview of the social, economic, biophysical and infrastructural characteristics of the broader area within which this total estimated housing need will have to be addressed.

7.1 SOCIO-ECONOMIC ASPECTS

A number of important aspects and recommendations relating to the **socio-economic characteristics** of the study area include:

- Approximately 40.75% of the total population of the study area is younger than 19 years of age. This implies two important aspects as far as the development and implementation of the proposed housing project is concerned:
 - Sufficient and appropriate education facilities according to accepted national norms and standards will have to be provided.
 - A large number of people will be entering the economically active age category over the next five to ten years and will thus be seeking appropriate employment opportunities.
- The study area is characterized as being female dominated with the majority of approximately 52.49% of the project area's total population being represented by females. Measures with which to ensure gender equality will thus have to be implemented as part of the proposed projects development phase.
- The study area is characterized by fairly low levels of literacy with approximately 5.26% of the population of the study area older than 20 years of age not having received any form of schooling. In terms of overall project development and management it is important to ensure that all beneficiaries fully understand and grasp the implications and technical aspects relating to this housing initiative.

- The information depicted in Section 3 indicated a total of 77.75% of all households are potentially in need of formalized housing. It was furthermore indicated in Section 4 that the majority of households are expected to qualify for housing subsidies in terms of their income profile. The proposed housing development could thus make a significant positive contribution towards the overall living conditions of the study area beneficiaries.
- Affordability levels in the study area are very low with approximately 90.75% of all households earning less than R 1600 per household per month.
- The low affordability levels in the study area are clearly the result of the high unemployment rate which is estimated to be as high as 56.11% in the Edendale Bulwer project area.

7.2 SERVICES ASPECT

A number of important summary observations regarding the **services characteristics** of the study area population include:

- Only 6.16% of households in the study area receive water at levels above the minimum RDP standards according to the 2001 Census information (piped water within a 200 m radius). In addition, approximately 0.23% of households utilize untreated water directly from rivers and streams within the area.
- Approximately 4.33% of all households in the study area do not have access to any form of sanitation infrastructure, while an additional 61.33% are reliant on unimproved pit latrines. The potential impact of the extensive utilization of unimproved pit latrines and other forms of inappropriate sanitation infrastructure, together with the widespread use of untreated surface and ground water as far as potential health implication is clearly evident from this information.
- As much as 98.02% of the total number of households within the study area does have access to electricity for lighting purposes. These high access levels to electricity infrastructure mean that it is unlikely to result in the extensive use of firewood and other alternative forms of energy for heating and cooking purposes with no resulting negative impact on the biophysical environmental.

- There are no formalized waste collection and waste management services provided within the study area. This aspect does not only impact negatively on the biophysical environment but also the aesthetic appearance of the area and the overall health profile of resident communities.

7.3 INFRASTRUCTURAL ASPECTS

A number of important summary observations regarding the **infrastructural characteristics** of the study area population include:

- The project area seems to be lacking service with regards to access; with only one access road, namely the Willow Fountain Road traversing the project area, and a few local footpaths and tracks service access to the area.

7.4 BIO-PHYSICAL ASPECTS

As far as the **biophysical characteristics** of the study area are concerned, the key aspects can be summarized as follows:

- There are three different types of land cover within the study area and the dominant land cover type is “Unimproved grassland” (48.25% of the total land area). The second most dominant type is known as “Urban / Built upland: Residential” which covers 45.94% of the project area. From a development perspective it is important to take due consideration of cultivated areas of land which are made use of for subsistence purposes, so as to minimize any loss of, or impact to, subsistence land which may in turn negatively impact on the residents of the project area.
- The majority of the project area (34.9%) is characterized by fairly steep slopes (between 1:5 – 1:3) and 28.7% of the area has a slope character “1:7.5 – 1:5” while 18.4% of the area has a slope of Flatter than 1:20. Appropriate planning and design principles suitable

for the areas topography taking due cognizance of the characteristics of the area must be applied during the planning and design stages of this housing process.

- The area is traversed by a number of perennial and non-perennial water courses comprising rivers, wetlands and streams, all of which are conducive to periodic flooding. Due cognizance of the 32 m Buffer must be taken to ensure no construction activities occur within floodline areas.
- There are three types of soil located in the project area. The dominant soil type which underlies 76.8% of the project area is that of “Red – Yellow apedal, freely drained soils, red and yellow, dystrophic and/or mesotrophic”. The second soil type is known as “Glenrosa and/or Mispah forms (other soils may occur), lime rare or absent in the entire landscape” which covers 22.23% of the project area.
- As much as 70.43% of the project area is underlain by soils with a characteristic “soil potential” described as “Soils of intermediate suitability for arable agriculture where climate permits”. A percentage of 76.8% of the project area is characterised by soils depths between 450 mm and 750mm.
- The predominant geology type underlying the project area is known as “Shale”. This geology type covers the whole extent of the project area (100%).
- The project area is covered by two distinct vegetation categories occurring across project area. The predominant vegetation unit being the “Midlands Mistbelt Grassland” which covers 79.8% of the total project area.
- According to Ezemvelo KwaZulu-Natal Wildlife’s C-Plan information for the Umgungundlovu District, the Edendale Bulwer Housing project area has an irreplaceability value of 0 across the total extent of the project area. Whereas an irreplaceability value of 1 indicates that the area is considered to be completely irreplaceable with regards to biodiversity, the figures for the Edendale Bulwer Housing area thus indicate that the area is considered fairly replaceable in terms of the biodiversity contained therein.
- There are no known mineral deposits occurring within the boundary of the Edendale Bulwer Housing project area.

- There are no known archaeological, cultural or historical sites or artefacts located within the Edendale Bulwer Housing project area. Due to the “in-situ” type nature of the proposed project, should any sites or artefacts of archeological, cultural or historical significance be located within the project area, it is not expected or anticipated that these will not be impacted upon as a result of the proposed development. The Developer is however aware of his responsibilities with regards to the Amafa Heritage Act.
- No detailed quantifiable information is currently available on various forms of pollution in the study area. A number of important observations can however be made in this regard:
 - Elevated levels of air pollution, especially during the winter months, are common in the area due to the extensive use of firewood and fossil fuels for heating and cooking purposes.
 - High levels of environmental pollution are evident resulting from the absence of any form of waste collection and management system within the area.

7.5 EXISTING SETTLEMENT ASPECTS

As far as the **settlement characteristics** of the study area are concerned, the key aspects can be summarized as follows:

- The area is generally classified as Cultivated Land made use of for Subsistence purposes.
- The project area is characterized by low to medium density scattered households.
- The majority of the project area (34.9%) is characterized by fairly steep slopes (Between 1:5 – 1:3) and 28.7% of the area has a slope character “1:7.5 - 1:5” while 18.4% of the area has a slope of flatter than 1:20.

7.6 RECOMMENDATIONS

Based on the existing available desktop overview, it does not appear as if there are any material barriers to the proposed housing development from an environmental impact perspective. It is however important to take cognisance of the fact that the proposed development are exceeds 20

ha's therefore a full Scoping and Environmental Impact Assessment will be required as part of the Environmental Authorisation Application.

7.7 LEGISLATIVE REQUIREMENTS

Possible considerations from a legislation point of view are briefly summarized in the table below.

Act ¹	Section ¹	Summary of requirement ¹	Implication for project
National Water Act (Act 36 of 1998) and regulations	S21, 32, 41	"Water use" in terms of the Act includes "impeding or diverting the flow of water in a watercourse" and "altering the bed, banks, course or characteristics of a watercourse". Department of Water Affairs and Forestry will require water licences for all water uses unless the water use is an "existing lawful water use", or it is a permissible water use in terms of the Schedule 1 of the Act or can be generally authorized. It is advised that the Department of Water Affairs and Forestry be consulted as to their licensing requirements for each development. Licences are not required where water is obtained from the local council or another bulk water supplier.	If part of the housing subsidy will be utilized for the provision of water the necessary permits will have to be obtained from the Department of Water Affairs and Forestry (depending on the existing water service authority and water service provider arrangement in the area)
	S144	A person is prohibited from establishing a township unless the layout plan shows, in a form acceptable to the local authority, the 1/100 year flood level, for the purposes of ensuring that all persons who might be affected have access to information regarding potential flood hazards.	Depending on the exact location of the housing components, a 1/100 year floodline will have to be determined.
Water Services Act (Act 108 of 1997)	S6	Access to water services must be through a nominated water services provider, failing which approval should be obtained from the water services authority.	Applicable if water provision will form part of the subsidy application.
Water Services Act (Act 108 of 1997)	S7	Water for industrial use must be obtained through a nominated water services provider and no person may dispose of industrial effluent in any manner other than that approved by the water services provider nominated by the water services authority having jurisdiction in the area of question.	It is not anticipated at this stage that any industrial development will form part of the housing development project.
Environmental Conservation Act (Act 73 of 1989)	S20	Waste must be disposed of at a waste disposal facility licensed in terms of the provisions of the Act. Any hazardous waste such as paints, varnishes, waste oils etc accumulated at the construction sites must be disposed of at hazardous waste sites. If waste dumps are established for housing developments, a waste disposal license will be required from the Department of Water Affairs and Forestry.	A waste disposal license for a waste dump will be required if a formal waste collection and removal system is implemented as part of housing project. Waste which is may be generated during the construction process, will have to appropriately disposed of.
National Building Regulations and Building Standards Act (Act 103 of 1997) and Regulations	Reg F6 of Part F	No person may on specified days and during specified times generate noise from a construction site which may unreasonably disturb or interfere with the amenity of the neighborhood, unless authorized to do so by the local authority.	Appropriate specifications will have to be included in the tender documentation
National Heritage Resources Act (Act 25 of 1999)	S34	No person may alter or demolish any structure or part of a structure that is older than 60 years without a permit issued by the relevant provincial heritage resources authority	The existence of graves, archaeological or palaeontological sites will have to be further investigated, once the exact location of the housing project components is known.
	S35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site.	
	S36	No person may, without a permit issued by the South African Heritage Resources Association or a provincial heritage resources authority, destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by the local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.	
National	CH 3 Part 1	There is a prohibition against damaging or cutting protected	Indigenous trees will have to be

Forest Act (Act 84 of 1998)		indigenous trees unless a license has been obtained or an exemption has been published in the Government Gazette.	protected, where possible, during the implementation phase of the project
Conservation of Agricultural Resources Act (Act 43 of 1983 and GN R1048)		This regulation requires the control of weeds and invader plants, which occur on any land or inland water surface in SA. Category 1 plants are declared weeds and may only occur in biological control reserves. Category 2 plants are declared invader plants and may only occur in demarcated areas and biological control reserves. Category 3 plants are declared invader plants and may occur in biological control reserves. All weeds and invader plants not within the demarcated areas or biological control reserves must be eradicated and control methods are stipulated	Weeds and invader plants should be eradicated if occurring at the final project location.
National Building Regulations and Building Standards Act (Act 103 of 1997) and Regulations R2378	Reg F6 of Part F	The owner of any land on which excavation work is in progress must take precautions in the working area and on surrounding roads and footways to limit to a reasonable level the amount of dust arising from these areas.	Appropriate stipulations should be included in the tender documentation for construction.
Minerals Act (Act 50 of 1991)	S 5 and 9	No person may prospect or mine for any mineral without the necessary authorization granted to him in accordance with the provisions of the Minerals Act (Act 50 of 1991). Should construction material be excavated from borrow pits, the provision of the Minerals Act, are applicable and the Department of Minerals and Energy needs to be contacted in order to determine their requirements in this regard.	If any borrow pits are to be excavated during the construction process in the implementation phase, the necessary permits will have to be acquired from the Department of Minerals and Energy

¹ National Department of Housing – Environmental services for Housing developments

7.8 CONCLUSION

In view of the Bio-physical and Socio-economic characteristics of the study area as described in Section 4 and 5, and the potential impacts and possible mitigation measures described in the preceding sections, no negative impacts which cannot be mitigated to a reasonable level is anticipated.

From the initial assessment it can thus be concluded that there are no environmental factors, which will substantially influence the viability of the proposed project. It is recommended that a thorough EIA process (e.g. Scoping & EIA Report) as required by the 2010 Environmental Impact Assessment Regulations be conducted as part of the detailed project planning phase to confirm the initial findings outlined in this report and to fulfill the legal requirements of the National Environmental Management Act.

EDENDALE BULWER SUBSIDISED HOUSING DEVELOPMENT
PRELIMINARY ENVIRONMENTAL ASSESSMENT



Mr. Gert Watson
K2M Environmental (Pty) Ltd
DIRECTOR

May 2013

Date