6.5 FAUNA

6.5.1 Faunal habitats

There are varying faunal habitats. These habitats vary from being anthropogenically transformed open grassland areas to largely natural rocky ridge habitats and secluded riparian areas.

6.5.2 Mammals

The mammal species observed within and surrounding the proposed Lalini and Ntabelanga Dams are considered to be mostly common species, found throughout South Africa, that are adaptable to changing and transformed habitats, as well as being known to occur around human settlements. None of the observed species are considered to be threatened on a national level or provincial level. Currently mammal species within the study area are subjected to high levels of impact from subsistence hunting as well as habitat loss and transformation.

Figure 45: *Procavia capensis* (Rock hyrax) on the left with spoor of *Atilax paludinosus* (Water mongoose) on the right (DWS, 2014b)

6.5.3 Avifauna

A large diversity of avifaunal species was observed in the study area. The majority of avifauna observed was within the mountain bushveld, rocky outcrop and riparian habitat zones.

The mountain bushveld habitat unit located near the dam wall of the Lalini Dam is a unique habitat with a varying number of woody species, providing a large diversity of avifaunal species breeding habitat.

The flowering shrubs and aloes in these habitats provide a food source for many of the smaller specialized avifaunal feeders, notably the sunbirds as well as the small insectivorous birds such as the flycatchers.

One of the avifaunal species that is of concern is that of *Balearica regulorum* (Grey-Crowned Crane) (**Figure 46**). This species was observed foraging in the grassland/ transformed habitat units alongside the river system in the vicinity of the Ntabelanga Dam. Cranes throughout South Africa are already threatened with extinction due to habitat loss, and this will further exasperate conservation efforts to protect and

increase this species numbers. *B.regulorum* is listed as endangered by the IUCN, and with a rapidly decreasing population.

A second avifaunal species of concern within the study area and surrounds is *Gyps coprotheres* (Cape Vulture) (**Figure 46**). This species is listed as Vulnerable by the IUCN, and also listed as an endangered and protected species by NEMBA (Act 10 of 2004), and is endemic to South Africa.

Although none were observed during the time of assessment, NFEPA has indicated that the study area is a recognized breeding and foraging area for protected crane species, namely *Anthropoides paradisea* (Blue crane) and *Grus carunculatus* (Wattled crane). Both these species are listed as Vulnerable by the IUCN, and are listed protected species by NEMBA (Act 10 of 2004). *A. Paradisea* (Blue Crane) is of particular concern as it is indigenous to South Africa, as well as being South Africa's national bird.

Figure 46: On the left *Gyps coprotheres* (Cape Vulture) pair seen flying above the Lalini Dam study area; and on the right *Balearica regulorum* (Grey Crowned Crane) flock seen in the vicinity of Ntabelanga Dam study area (DWS, 2014b)

6.5.4 Reptiles

Reptiles are notoriously hard to detect in the field due to the shy nature, and as such an intensive search was undertaken within suitable reptile habitat, specifically in the mountain bushveld and rocky outcrop habitat units. Due to the habitat availability and study area location, a high diversity of reptiles was not expected to occur. The reptiles that were observed are commonly occurring species in the region. The rocky ridge outcrop and mountain bushveld habitat units are most suited to inhabitation by reptile species.

Figure 47: *Agama atra* (Southern Rock Agama) observed in the mountain bushveld habitat

6.5.5 Amphibians

A very low diversity of amphibians was observed at both the dams and surrounding areas. Although the dams presented a low diversity of amphibian species, the species that were observed were in fairly high numbers. The fairly isolated nature of the study area from surrounding amphibian populations in other active rivers, as well as the Titsa waterfall presenting an unsurpassable obstacle may be contributing factors to the low species diversity in the rivers. The mountains surrounding the river system and the waterfall would have limited amphibian colonisation of the river systems, resulting in only a few of the hardier and more far ranging common species being present in the river systems.

Figure 48: *Afrana angolensis* (Common river frog) observed throughout the study area.

6.5.6 Invertebrates

A wide variety of invertebrates was observed at both dam locations, and to a lesser extent along the proposed pipelines and power line routes as these predominantly followed existing roads. No NEMBA or Eastern Cape SoER (2004) listed invertebrates were observed during the site visit. As expected, the mountain bushveld, rocky outcrops and riparian zones provided the highest diversity of

invertebrate species, with the transformed grassland areas providing habitat for common grasshoppers and locusts that are better suited to those habitats.

Figure 49:*Onthophagus taurus* (Dung Beetle) on the left; *Zonocerus elegans* (Elegant Grasshopper) on the right.

6.5.7 Spiders and scorpions

Only four species of spiders were observed during the site visit; however it is expected that more species do inhabit the study areas. Due to their reclusive nature when faced by a threat as well as their ability to camouflage themselves well, they are very hard to locate. None of the spider species observed are considered to be threatened or of conservation value, nor are any endangered species thought to persist within the study areas.

One scorpion was located in the mountain bushveld habitat near the dam wall of the Lalini Dam (**Figure 50**). The scorpion belongs to the Genus *Hadogenes* (Rock scorpion), of which all species in this genus are listed under NEMBA (Act10 of 2004). *Hadogenes* sp fall under the category of nationally protected species, and are an indigenous species of high conservation value or national importance that require national protection. The mountain bushveld habitat located by the Lalini Dam wall will invariably provide habitat for many of these scorpions, as well as other scorpion species. When the Lalini Dam reaches full supply level, and in the process of reaching such, the habitat availability for the scorpions will be greatly reduced. At full supply level, the scorpions would be restricted to the higher rocky areas on the mountainside. Although the higher mountainside does is of suitable habitat for the *Hadogenes* (Rock scorpion), the habitat size that remains may be a limiting factor, along with the increased rates of predation on the scorpions.

Figure 50: *Hadogenes sp* (Rock scorpion) observed near the Lalini Dam wall

6.5.8 RDL species

RDL species taken into consideration for calculation of the Red Data Sensitivity Index Score (RDSIS) are listed below:

- *Balearica regulorum* (Crowned Crane);
- *Hadogenes sp.*(Rock Scorpions);
- *Eupodotis caerulescense* (Blue Korhaan);
- *Anthropoides paradiseus* (Blue Crane);
- *Gyps africanus* (Cape Vulture);
- *Ciconia ciconia* (Black Stork);
- *Tyto capensis* (Grass Owl); and
- *Sagittarius serpentarius* (Secretarybird).

The species listed above were then used to calculate the RDSIS for the entire study area, the results of which are presented in **Table 14**.

Table 14: RDSIS score attained

Red Data Sensitivity Index Score	
Average Total Species Score	**84**
Average Threatened Taxa Score	**84**
Average (Ave TSS + Ave TT/2)	**84**
% Species greater than 60% POC	**8%**
RDSIS of Site	**46%**

Table 15: Species with a probability of occurrence of >60%

Common name	Scientific Name	Threatened Status	POC
Black Stork	*Ciconia nigra*	NT	60.67
Secretary bird	*Sagittarius serpentarius*	NT	100.00
Blue Crane	*Anthropoides paradiseus*	VU	61.67
Blue Korhaan	*Eupodotis caerulescens*	NT	65.00
Grass Owl	*Tyto capensis*	VU	64.00
Cape Vulture	*Gyps coprotheres*	VU	100.00
Rock scorpion	*Hadogenes sp*	VU	100.00
Crowned crane	*Balearica regulorum*	VU	100.00

VU = Vulnerable, NT = Near Threatened, LC = Least Concern, NYBA = Not Yet Been Assessed, EN = Endangered

The RDSIS assessment of the study areas potential RDL fauna yielded a score of 46%, indicating a medium importance with regards to RDL faunal species conservation within the region. All species with a Probability of Occurrence (POC) of 60% or more have an increased probability of either permanently or occasionally inhabiting the study area. The species that have a POC of 100% are those species that were directly observed at the time of the site visit. The species listed in **Table 15** are the only species that attained a POC of greater than 60%.

The majority of the above listed species would have a greater possibility of occurring at the Lalini Dam than the Ntabelanga Dam, as the Lalini Dam site provides more intact faunal habitats with lower levels of anthropogenic activities.

6.6 SURFACE WATER RESOURCES

The study area falls within the South Eastern Uplands Aquatic Ecoregion and the Mzimvubu to Kieskamma Water Management Area (WMA) (**Figure 51** and **Figure 52**). The subWMA indicated for the study area is Mzimvubu.

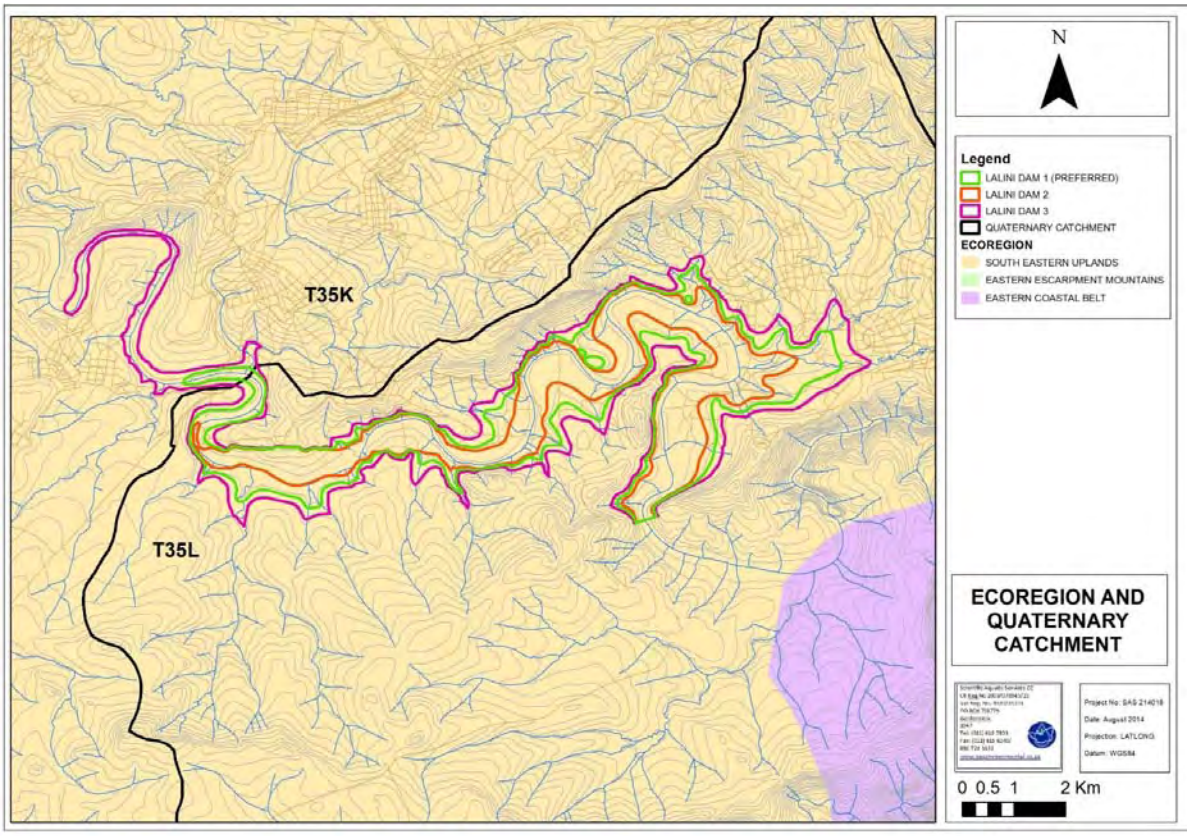


Figure 51: Aquatic Ecoregion and quaternary catchment associated with the Lalini Dam

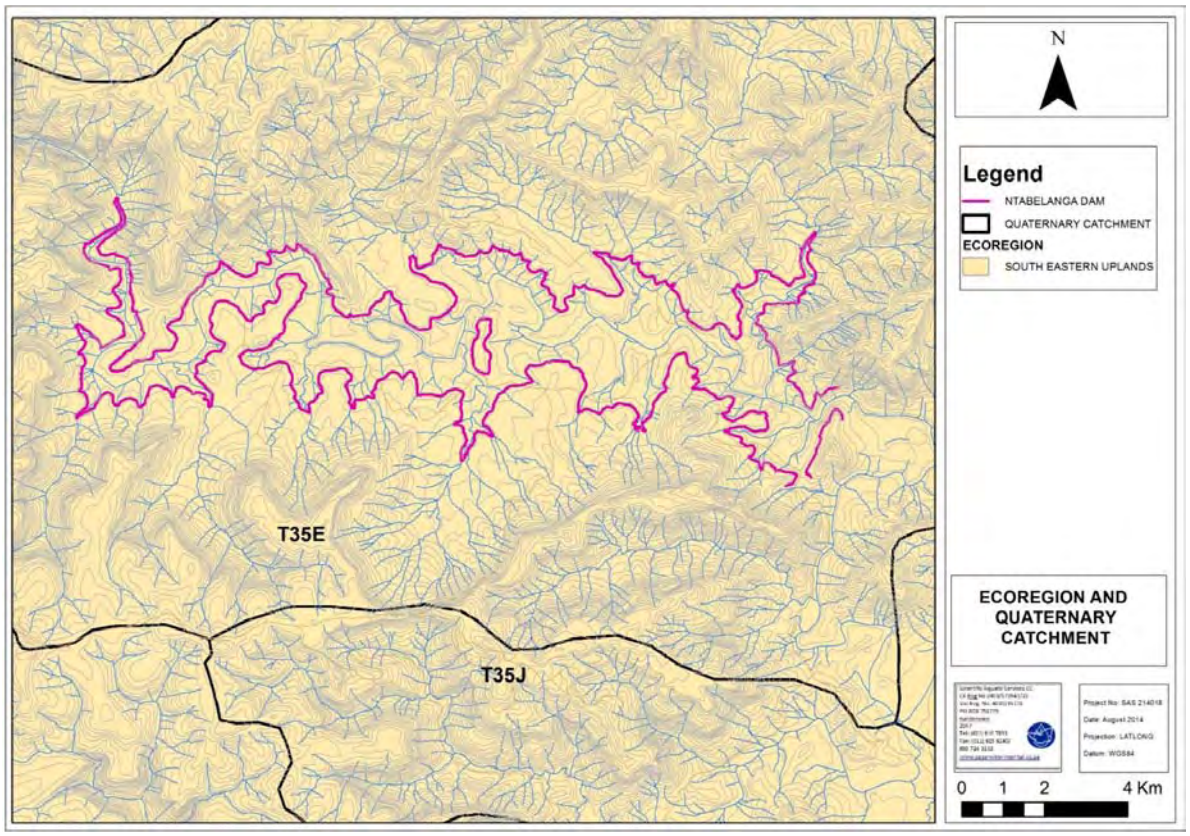


Figure 52: Ecoregion and quaternary catchment associated with the Ntabelanga Dam and the road upgrades

The Lalini Dam is located within the T35L and T35K Quaternary Catchments, whilst the Ntabelanga Dam and road upgrades are located within the T35E quaternary catchment and the particular river resource in the area is the Upper Ntata, Mzimvubu River. The pipelines traverse over several quaternary catchments, namely T20B, T34H, T34 J, T35E, T35H and T35K.

The mean annual Quaternary Catchment runoff for the Tsitsa River catchment ranged from 42.45 million m^3 in T35F (area of 359.6 km^2) to 110.29 million m^3 in T35H (area of 521.0 km^2).

The Tsitsa River is tributary of the Mzimvubu River and will be partially inundated by both dams. It is a perennial river that is classified in Category C condition (Moderately modified).

The north-eastern areas of WMA12 catchment have the highest rainfall in the Eastern Cape Province. The mountain/highland grasslands in these areas maintain high water quality and yield, which is critical for the neighbouring rural communities and also for downstream consumption. This catchment therefore provides goods (water quantity) and services (clean water) to the downstream communities. These areas are however degraded and are characterised by severe soil erosion.

Although soil erosion is a natural process, in the Mzimvubu and Tsitsa River catchments is exacerbated by human activities and affects ecosystem health. Land degradation therefore negatively impacts the majority of downstream rivers, which are characterised by high turbidity and increased siltation. This phenomenon is dominant in the catchments that will yield water to the proposed Ntabelanga dam namely T35A (Upper Tsitsana), T35D (Pott Tsitsa), T35C (Mooi River), T35B (Pott River), and T35E.

Water quality is currently not a major concern in this catchment. The catchment is in a natural state with little, if any, contamination by nutrients and the water quality falls mostly in the ideal range.

The study area falls within the South Eastern Uplands Aquatic Ecoregion and the Mzimvubu to Kieskamma Water Management Area (WMA). The subWMA indicated for the study area is Mzimvubu.

The PES Category of the various river systems in the affected quaternary catchments varies between PES B and PES C. Impacts in the systems are primarily related to increased sediment input, overgrazing and concomitant bank erosion and localised alien invasive plant infestation. The Tsitsa River, specifically, is classified as a PES Category B river, whilst the Inxu is considered to be in a PES Category C. All systems are considered to have a ‘moderate’ Ecological Importance (EI) whilst the

Ecological Sensitivity (ES) varies between High to Medium sensitivity. The Tsitsa River is considered to be of moderate sensitivity whilst the Inxu River is deemed to be highly sensitive. The default Ecological Class (EC) of the river systems in these quaternary catchments, based on the median PES and highest of EI or ES means is considered to be either a Class B or a Class C. The Tsitsa River is deemed to be a Class C, and the Inxu is deemed to be a Class B system.

The subWMA, in which the proposed Lalini Dam will be located, is regarded as important with regards to fish corridors for movement of threatened fish between habitats and for the conservation of crane species and falls within the Sub-escarpment Savanna wetland vegetation group. The wetlands in the vicinity of the proposed Lalini Dam are classified as channelled-valley bottom wetlands in Category Z1 condition (critically modified) (**Figure 53**). This sub-WMA is classified as a FEPA system, with a rank of 2 indicating that the majority of its area is within a sub-quaternary catchment that has sightings or breeding areas for threatened *Balearica regulorum (*Grey Crowned Crane) and *Anthropoides paradiseus* (Blue Crane).

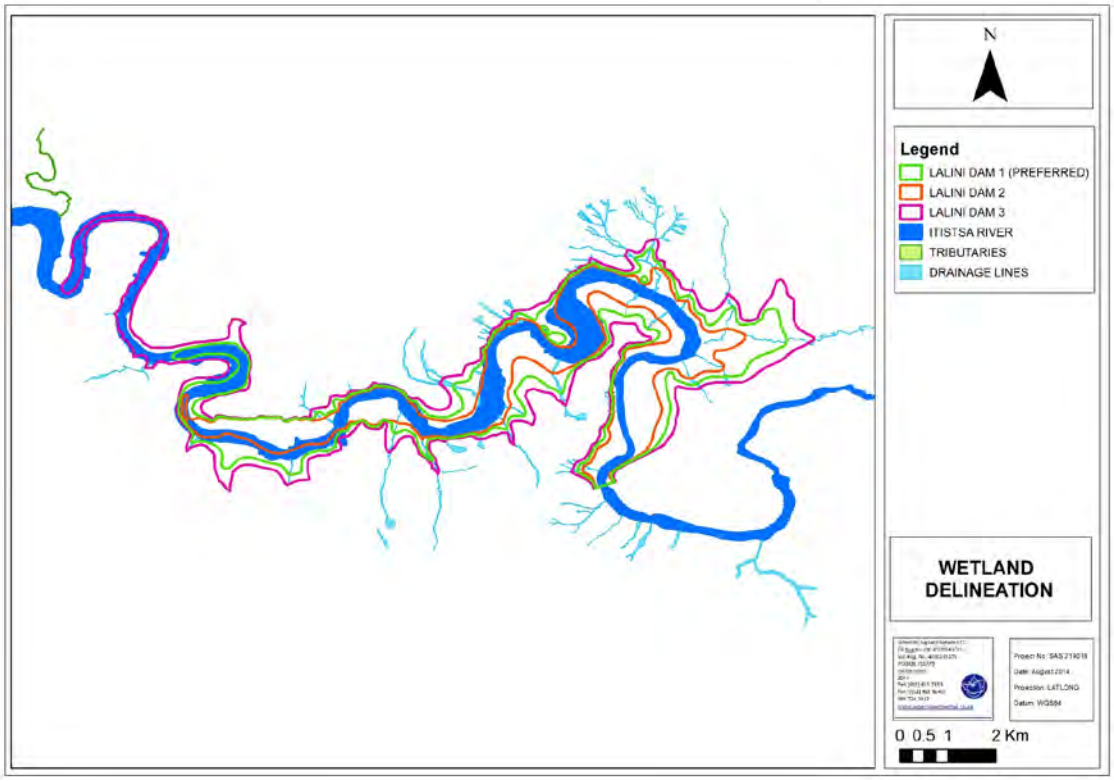


Figure 53: Wetland features identified within the study area, in relation to the proposed Lalini Dam site (DWS, 2014d)

The subWMA, in which the proposed Ntabelanga Dam will be located, is regarded as important in terms of the conservation of crane species and the wetland vegetation group is identified as Sub-escarpment Grassland Group 6. Wetland features identified in the Ntabelanga Dam area are indicated in **Figure 54**.

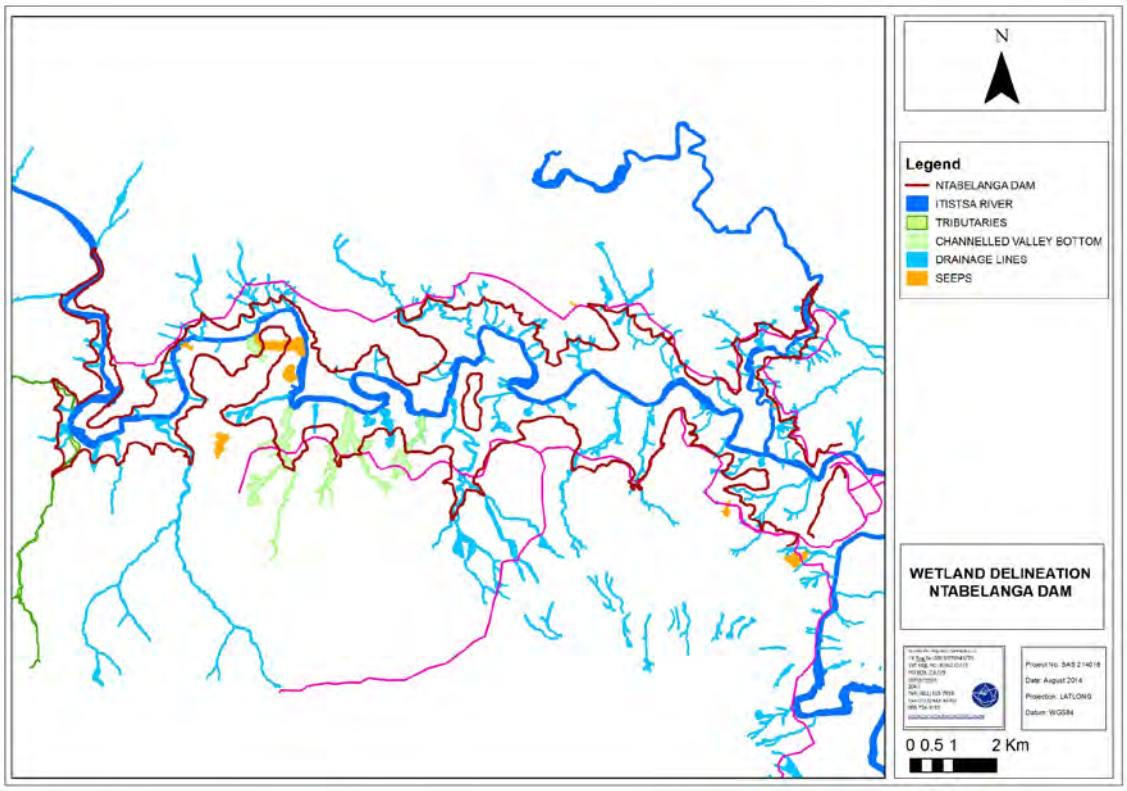


Figure 54: Wetland features identified within the study area, in relation to the proposed Ntabelanga Dam site (DWS, 2014d)

The northern pipelines cross the Thina River which is classified as being in Category C condition (moderately modified). The Thina River is regarded as an important fish sanctuary, translocation and relocation zone and is classified as being a fish support area.

6.7 GROUNDWATER RESOURCES

According to DWA (2013) a comprehensive desktop review was undertaken by Africa Geo-Environmental Services (Pty) Ltd (AGES) as a component of the BKS pre-feasibility study. Several sources of data were used to determine the potential for groundwater as a supply source. Some of the more pertinent data sources included:

- Eastern Cape GRIP Programme (hydrocensus);
- 1:500 000 DWA Geological Maps; and
- National Groundwater Database;

The 1:500 000 DWA hydrogeological maps were used to describe the groundwater potential and character of the study area based on the geological formations underlying the catchment. Areas underlain by the Tarkastad sub-group are described as predominantly argillaceous while the Katberg and Molteno formations are described as argillaceous and arenaceous in approximately equal proportions. All lithologies underlying the study area are described as having groundwater occurring intergranular and in fracture zones, with predominantly fractured aquifers to be found

associated with the small section of Natal Group sedimentary rocks near the Mzimvubu River mouth. Groundwater potential assessments and aquifer types occurring within the study area are dependent on the type of dolerite intrusion associated with the specific site, as well as considering the geological formation present (AGES, 2010).

The expected median of the borehole yield class in the Natal Group sedimentary rocks could be described as 0.5 ℓ/s to 2 ℓ/s, although occasional higher yielding boreholes may be expected in ideally sited locations. Median borehole yields in Quaternary alluvium deposits in the Cedarville and Matatiele region are known to be between 2 ℓ/s and 5 ℓ/s (AGES, 2010).

AGES (2010) described the following groundwater occurrences associated with the study area:

- Aquifers associated with doleritic intrusion;
- Aquifers associated with fracturing unrelated to doleritic intrusion; and
- Intergranular aquifers.

For the bulk of the study area groundwater occurs in dual porosity aquifers, comprising large, but infrequent principle transmissive fractures with relatively low storage capacity, and secondary but numerous microfissures with high storativity but lower transmissivity. The upper and lower zones are hydraulically linked and the microfissures are usually concentrated towards the surface (typically first 30 m), resulting in a higher storage capacity than the deeper lying rocks. The deeper fractures often have a high transmissivity but lower storativity when compared to the shallow zone fractures.

The study area is characterised by a range of groundwater levels varying across the area. The values vary from very close to the surface (1 to 2 m) to approximately 50 m below surface.

There was insufficient groundwater quality data to assess the potential for water supply based on expected water classes. General descriptions of the area provided on the 1:500 000 hydrogeological maps describe the groundwater as a Calcium Magnesium Bicarbonate water with sodium enrichment, which is most prevalent in the Burgersdorp formation in the study area. This can be used to conclude that there is active groundwater circulation with sodium and chloride enrichment occurring through ionic exchange in the groundwater flow paths (AGES, 2010). Groundwater conductivities (EC) are expected to generally range between 70 and 300 mS/m in the study area, while higher EC values (higher than 1 000 mS/m) have been noted in faulted Dwyka and Natal Group sandstone and also possibly alluvium associated with the Mzimvubu River near the river mouth at Port St Johns (AGES, 2010).

The findings from the review highlighted that there was a low to moderate supply potential distributed across the Mzimvubu Catchment that could possibly meet the individual demands of selected towns or irrigation schemes. However, this type of supply scheme would involve multiple abstraction sites spread across vast geographical areas. In consultation with thestakeholders during the project steering committee meetings, the water services authorities in the area stipulated that they would prefer one single surface water source rather than multiple groundwater sources.

The main concerns regarding multiple groundwater sources were:

- Maintaining a scheme with multiple abstraction sites spread across a vast spatial area has practical limitations regarding manpower and logistics when considering the operations and maintenance of the infrastructure.
- Operations and maintenance costs associated with a widespread, multi-abstraction scheme.
- The reliability of groundwater is not always as good as a large-scale surface water supply option, i.e. during the dry years, groundwater schemes can often experience shortages and, thus, restrictions could be imposed before they would be necessary in a large single-source scheme.
- Management of groundwater resources is critical in order to ensure the sustainability of the resource. This cannot always be monitored comprehensively in a widely dispersed supply scheme as would be required in this case, thus, the resource is open to misuse which could have negative impacts for water supply and for the aquifer.

Based on the above and discussions with DWA, it was decided that groundwater would not feature as a water supply option in this study and, hence, it was discarded from any further aspects of the project.

6.8 CONSERVATION IMPORTANCE

The Eastern Cape Biodiversity Conservation Plan (ECBCP) (2007) is a broad scale-biodiversity plan based on identifying Critical Biodiversity Areas (CBAs) and associated land use guidelines. It recommends limits to the total amount of land transformation that should be allowed if biodiversity is to be conserved. The approach rests on the concept of Biodiversity Land Management Classes (BLMCs). Each BLMC sets out the desired ecological state that an area should be kept in to ensure biodiversity persistence. Only land use types that are compatible with maintaining this desired state should be allowed.

Large areas within the project area have been identified as Critical Biodiversity Areas (CBAs) in terms of the ECBCP (**Figure 55** and **Figure 56**). These areas are of conservation importance due to the presence of Red Data species, endemic species and potential habitat for these species to occur.

The bulk of the project area falls within a Terrestrial CBA 2 (BLMC 2 - *Near Natural landscape)* while sections of the pipelines traverse terrestrial and aquatic CBAs 1 (BLMC 1- *Natural Landscape*).

According to the ECBCP's land use guidelines, while the conversion of virgin land to irrigated agriculture is not permissible in areas identified as CBAs 2, irrigated agriculture on existing and fallow cultivated land is allowed, on condition that an Environmental Authorisation is granted. Most of the areas earmarked for irrigated agriculture are cultivated, although many fields have not been planted in the recent past (DWA, 2013a).

There are no formal or informal protected areas within the project area. However, the National Protected Areas Expansion Strategy (NPAES) identified two Focus Areas in the north and east of the project area: Pondoland and Southern Berg Griqualand. A gauging station, and possibly a section of the Lalini Dam tunnel and the power line fall within the Pondoland Focus Area, while a section of the secondary distribution lines in the north of the study area falls within the Southern Berg Griqualand Focus Area (**Figure 57**).

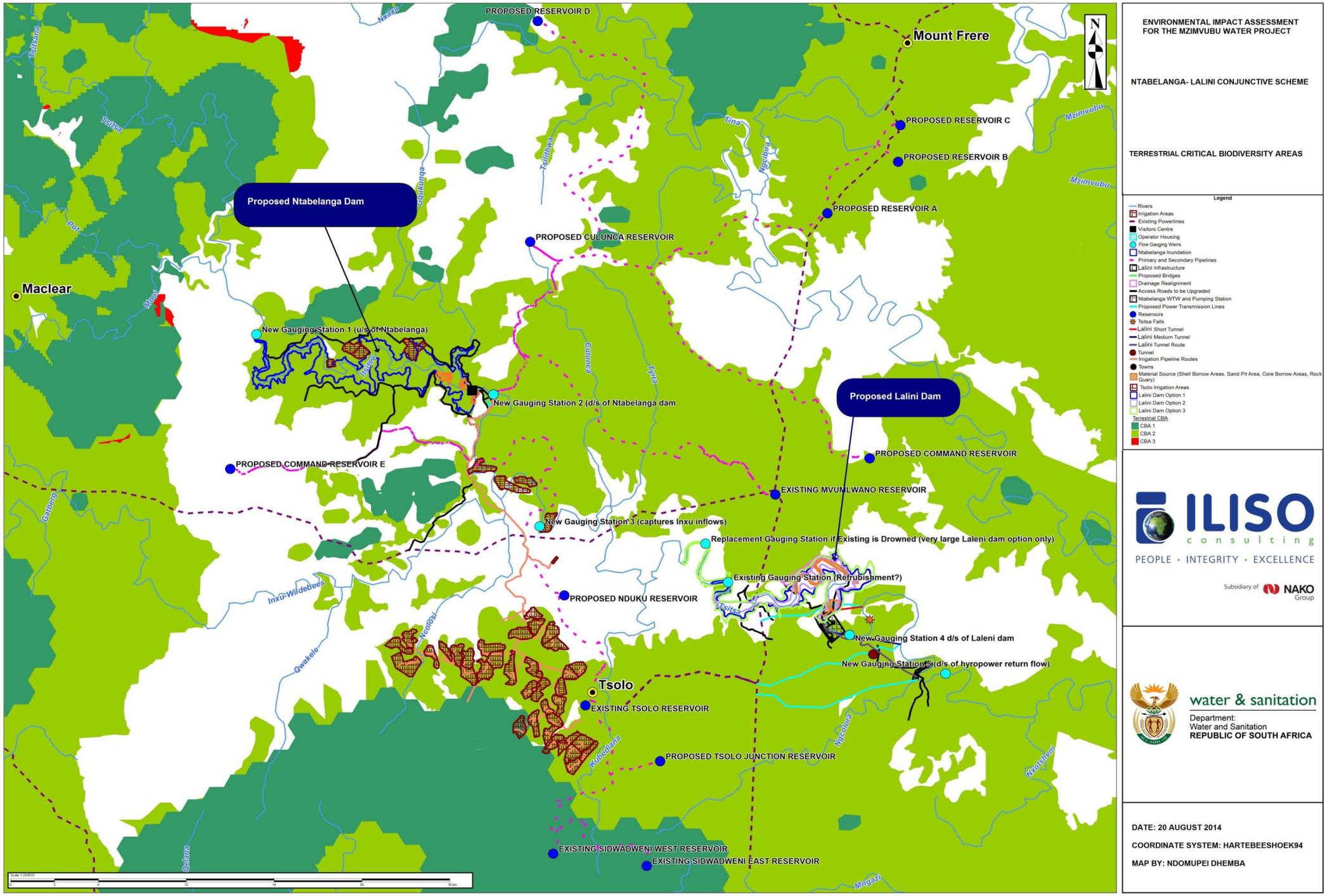


Figure 55: Terrestrial Critical Biodiversity Areas (CBAs)

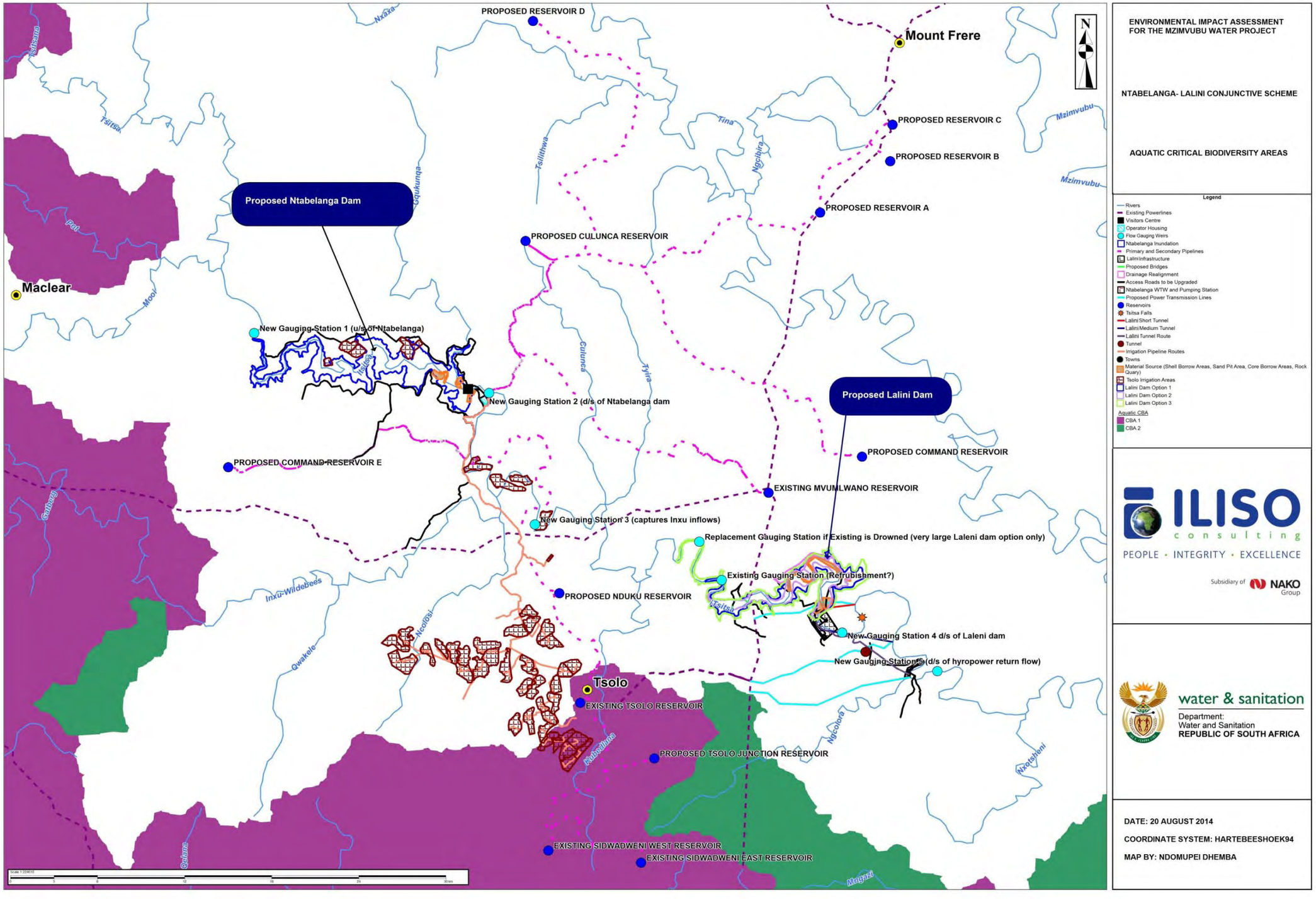


Figure 56: Aquatic Critical Biodiversity Areas (CBAs)

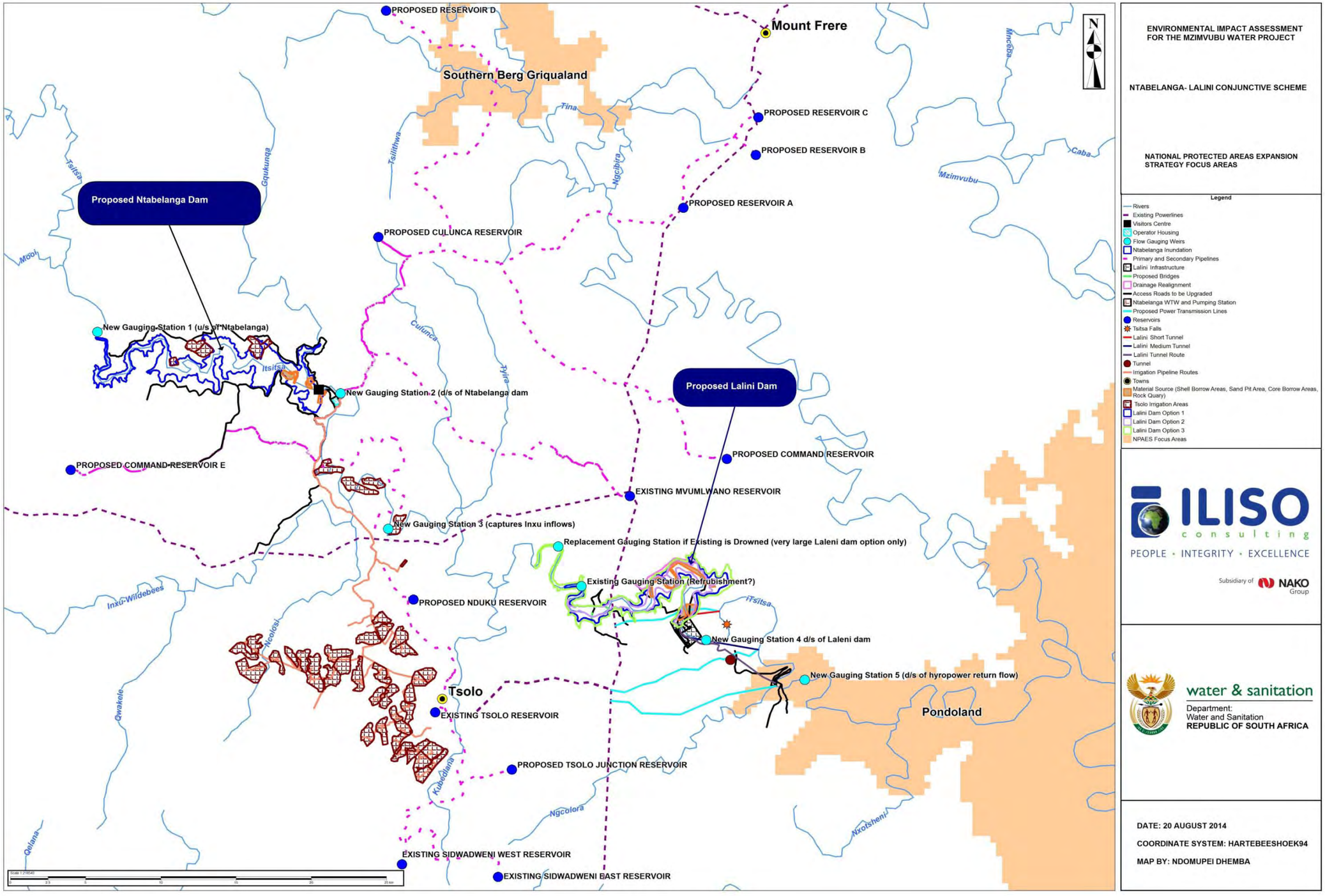
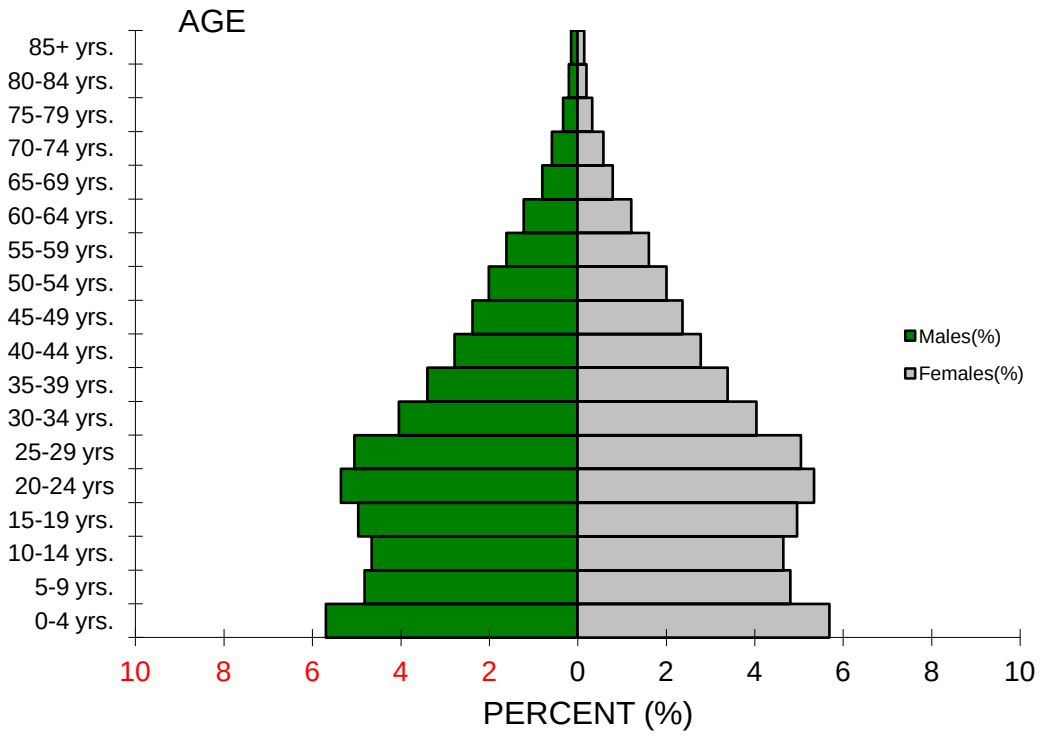


Figure 57: National Protected Areas Expansion Strategy Focus Areas

6.9 SOCIO-ECONOMICS OF THE EASTERN CAPE PROVINCE

6.9.1 Demography

The Eastern Cape Province covers an area of 168 966 km^2 making it the second largest province by geographical area, covering 13.8 % of South Africa's total land mass. This is only surpassed by the Northern Cape which covers an area of 372 889 km^2 accounting for 30.5 % of the total land area of the country. The total population of the province stood at 6 562 053 people in 2011 (Statistics South Africa, 2012) and was estimated at 6 620 100 people in June, 2013 (Statistics South Africa, 2013, p. 3). Consequently, the province is ranked third in respect of population size and has a population density of 39/km^2. This makes it the sixth densely populated province in South Africa. In respect of age structure, 33.0 % of the population is under 15 years of age, while 60.2 % is between 15 and 64 years with 6.7 % being over the age of 65 years. The population pyramid of the province is illustrated in **Figure 58.**



Data source: (Statistics South Africa, 2012)

Figure 58: Population pyramid Eastern Cape Province

In the Eastern Cape Province, 86.3% of the population are black African, 8.3 % are coloured, 4.7% are white and 0.4% are Indian or Asian people. IsiXhosa is spoken by 78.8 % of the population, followed by Afrikaans (10.6 %), English (5.6 %), and Sesotho (2.5 %).

The 2011 Census indicated that there were 1,687,385 households in the province with an average household size of 3.9. Of these households, 49.6 % were female headed, 63.2 % lived in formal dwellings and 59.6 % either owned or were paying off their dwelling.

The 2011 Census also indicated that 40.4 % of households in the province had flush toilets connected to the sewerage system, while 41 % had their refuse removed on a weekly basis. Piped water was delivered to 32.8 % of households and 75 % of Eastern Cape households used electricity as a means of energy for lighting.

The sex ratio across the study area indicates a higher number of females compared to males.

6.9.2 Unemployment

In the 4th quarter of 2013 the official unemployment rate in the province was 27.8 %, the second highest rate of unemployment in the country (after the Free State). It increased to 30.4 % in the 2nd quarter of 2014.

The expanded unemployment rate (which includes disillusioned work seekers) in the 4th quarter of 2013 was however 43.3 %, and increased to 44.4 % in the 2nd quarter of 2014, thus giving the province the highest expanded rate of unemployment in the country. The LMs in the study area have unemployment rates of between 40 and 50 % (*The Local Government Handbook*, 2014).

6.9.3 Poverty

Although there have been some improvements across the province, the study area remains one of the poorest parts of the country, characterised by high poverty and out-migration resulting in sex ratio imbalances, a high proportion of female headed households and a low or even negative population growth rate. At large the population lacks basic amenities and relies heavily on subsistence farming which is not highly successful.

The proportion of households owning household goods across the area is lower than that of the province.

The study area is characterised by a high dependency ratio which indicates the burden of supporting children under 15 years and people over 65 years placed on the working population aged 15–64 years.

6.9.4 Health

In addition to HIV AIDS, a further issue concerning health in the province relates to cancer. It is indicated that "[t]*he rate of the cancer in the Eastern Cape is six times the national average*" (Stassen, 2011) and new research is linking this with the processing of home-grown maize and the silica from the grid stones that may cause throat irritations (Sewram, 2011).

6.9.5 Education

The situation regarding schooling in the area improved somewhat between 2001 and 2011. Notwithstanding this, all the district and local municipalities within the study area (with the exception of uMzimvubu LM) are above the provincial level (10.5 %) in terms of the percentage of the population with no education.

6.10 MUNICIPAL DESCRIPTION

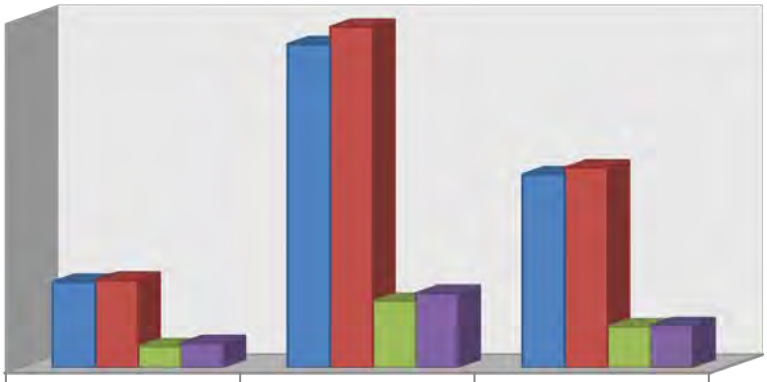
The project impacts the three district municipalities of Joe Gqabi, O. R. Tambo and Alfred Nzo. Of these districts Joe Gqabi covers the greatest land area and has the lowest population density across the region at 14 people/km^2 while O. R. Tambo has the largest population and the highest population density at 110 people/km^2. With regard to population group, black African people are the dominant group across all districts at over 90 %. Xhosa is the dominant language spoken in the area ranging between 70.5 and 94.2 percent. This data is represented below in **Table 16**.

Table 16: Demographic data district level

	Joe Gqabi DC14	O. R. Tambo DC15	Alfred Nzo DC 44
Geographical area	25,663 km^2	12,096 km^2	10,731 km^2
Population	349,768	1,364,943	801,344
Density	14/km^2	110/km^2	75/km^2
	Population group		
Black African	93.8%	99.0%	99.1%
Coloured	3.5%	0.5%	0.4%
Indian/Asian	0.2%	0.2%	0.1%
White	2.4%	0.2%	0.2%
	Language		
Xhosa	70.5%	94.2%	84.6%
Sotho	20.2%	0.27%	8.8%
English	1.4%	2.7%	2.3%
Afrikaans	5.9%	0.17%	0.84%
Zulu	0.25%	0.49%	1.2%
Other	1.8%	3.1%	3.1%

Data source: (Statistics South Africa, 2012)

The difference between the populations and households of the districts as they occurred in 2001 and 2011 are compared **Figure 59.**



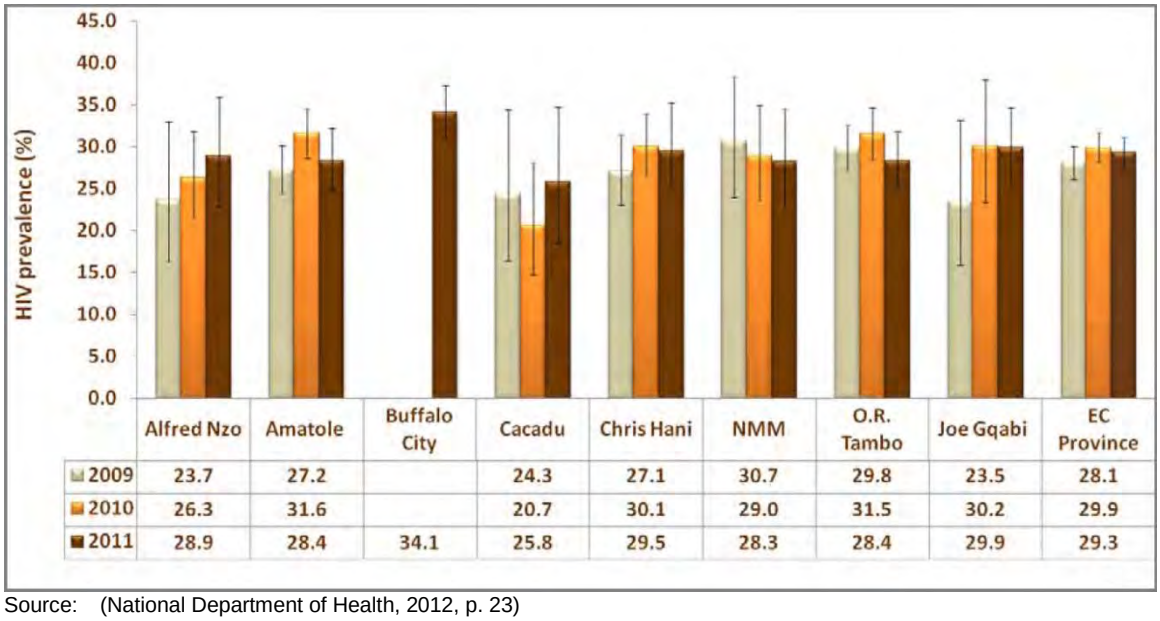
	DC14	DC15	DC44
Population 2001	341,750	1,295,145	773,708
Population 2011	349,768	1,364,943	801,344
Households 2001	84,835	266,709	164,667
Households 2011	97,775	298,229	169,261

Data source: (Statistics South Africa, 2012)

Figure 59: Population and households 2001 and 2011 across districts

6.10.1 Health

Concerning the HIV prevalence rate amongst antenatal women in 2011 as assessed across the affected districts, Joe Gqabi had the highest prevalence rate at 29.3 %. This is followed by the Alfred Nzo District Municipality at 28.9 % and O. R. Tambo at 28.4 %. Across both metropolitan and district municipalities in the Eastern Cape Province, Buffalo City had the highest prevalence rate at 34.1 % while Cacadu had the lowest at 25.8 %. This is illustrated in **Figure 60**.



	Alfred Nzo	Amatole	Buffalo City	Cacadu	Chris Hani	NMM	O.R. Tambo	Joe Gqabi	EC Province
2009	23.7	27.2		24.3	27.1	30.7	29.8	23.5	28.1
2010	26.3	31.6		20.7	30.1	29.0	31.5	30.2	29.9
2011	28.9	28.4	34.1	25.8	29.5	28.3	28.4	29.9	29.3

Source: (National Department of Health, 2012, p. 23)

Figure 60: HIV prevalence trends: Antenatal women by district 2009 – 2011

6.10.2 Local Municipalities

At the local municipal level the project impacts the following 4 local municipalities, Elundini, Mhlontlo, Umzimzubu and Ntabankulu. Of these municipalities Elundini

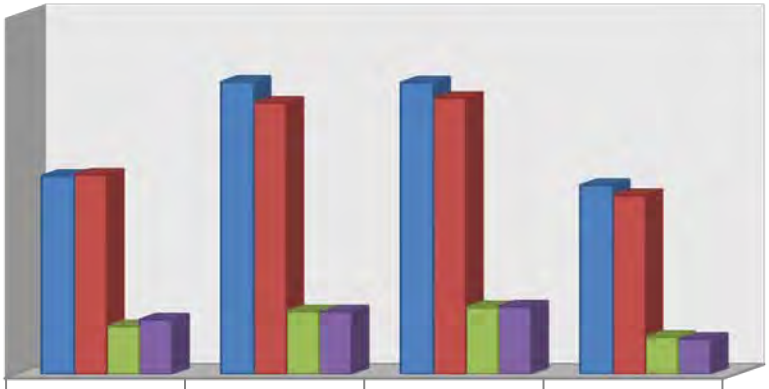
covers the greatest geographical area at 5,065 km^2 and Ntabankulu the smallest area at 1,385 km^2. With a population of 123,976 people Ntabankulu the highest population density at 90 people/km^2. Umzimvubu has the highest population with 191,620 people living within the municipal area. At over 98 % Black African people are the biggest population group across all municipalities and Xhosa is the dominant language spoken. This data is represented in **Table 17**.

Table 17: Demographic data local municipalities

	Elundini EC141	Mhlontlo EC156	Umzimvubu EC442	Ntabankulu EC444
Geographical area	5,065 km^2	2,826 km^2	2,577 km^2	1,385 km^2
Population	138,141	188,226	191,620	123,976
Density	27/km^2	67/km^2	74/km^2	90/km^2
	Population group			
Black African	98.1%	99.4%	99.4%	99.4%
Coloured	1.0%	0.2%	0.3%	0.4%
Indian/Asian	0.1%	0.1%	0.1%	0.1%
White	0.7%	0.2%	0.1%	0.1%
	Language			
Xhosa	70.1%	94.9%	93.1%	95.2%
Sotho	24.8%			
English	1.6%	2.3%	2.6%	1.4%
Afrikaans	1.7%			
Zulu				
Other	1.8%	2.8%	4.3%	3.4%

Data source: (Statistics South Africa, 2012)

The difference between the populations and households of the local municipalities as they occurred in 2001 and 2011 are compared in **Figure 61**.



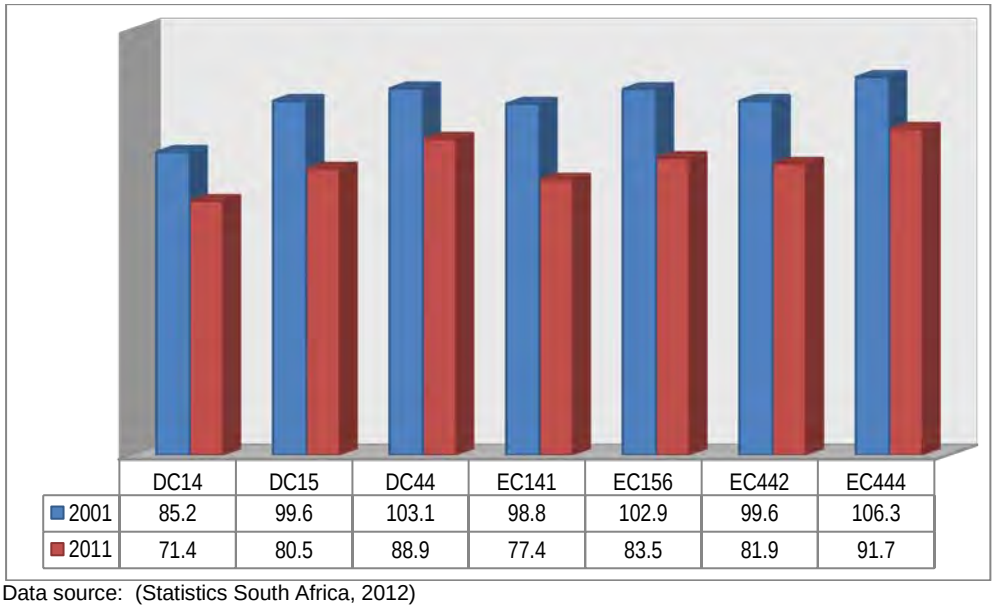
	EC141	EC156	EC442	EC444
Population 2001	137,394	202,933	202,369	130,980
Population 2011	138,141	188,226	191,620	123,976
Households 2001	33,209	43,573	46,460	25,812
Households 2011	37,854	43,414	46,891	24,397

Data source: (Statistics South Africa, 2012)

Figure 61: Population and households 2001 and 2011 across municipalities

6.10.3 Dependency Ratio

The study area is characterised by a high dependency ratio which indicates the burden of supporting children under 15 years and people over 65 years placed on the working population aged 15–64 years. Although there has been some improvement across all areas between 2001 and 2011 the burden still remains heavy with it being greatest in Ntabankulu at 91.7 and lowest being across the Joe Gqabi District Municipality at 71.4. This data is illustrated in **Figure 62**.



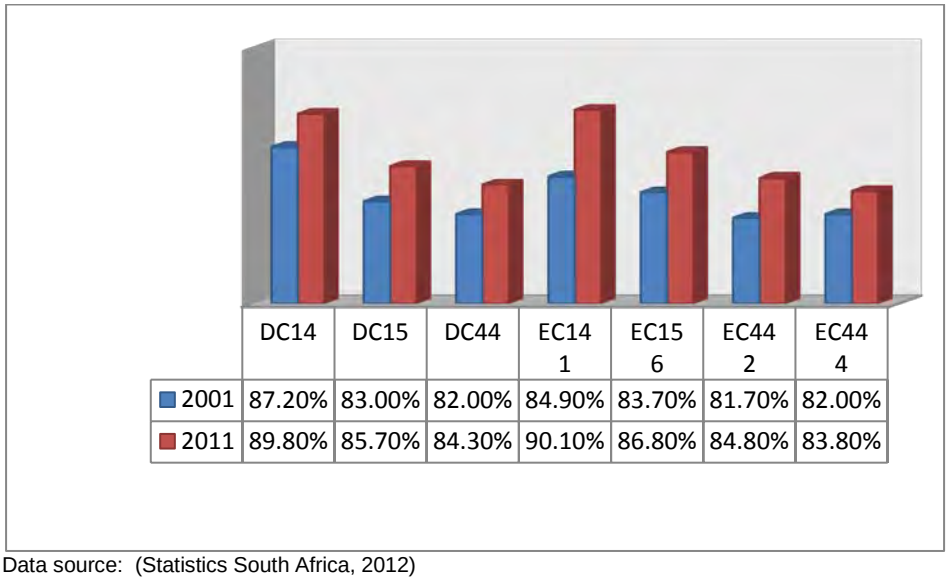
	DC14	DC15	DC44	EC141	EC156	EC442	EC444
2001	85.2	99.6	103.1	98.8	102.9	99.6	106.3
2011	71.4	80.5	88.9	77.4	83.5	81.9	91.7

Data source: (Statistics South Africa, 2012)

Figure 62: Dependence ratio district and local municipalities

6.10.4 Gender

The sex ratio across all areas indicates a higher number of females compared to males with Ntabankulu having the highest proportion of females to males and Elundini the lowest at 90.10 % as illustrated in **Figure 63**.



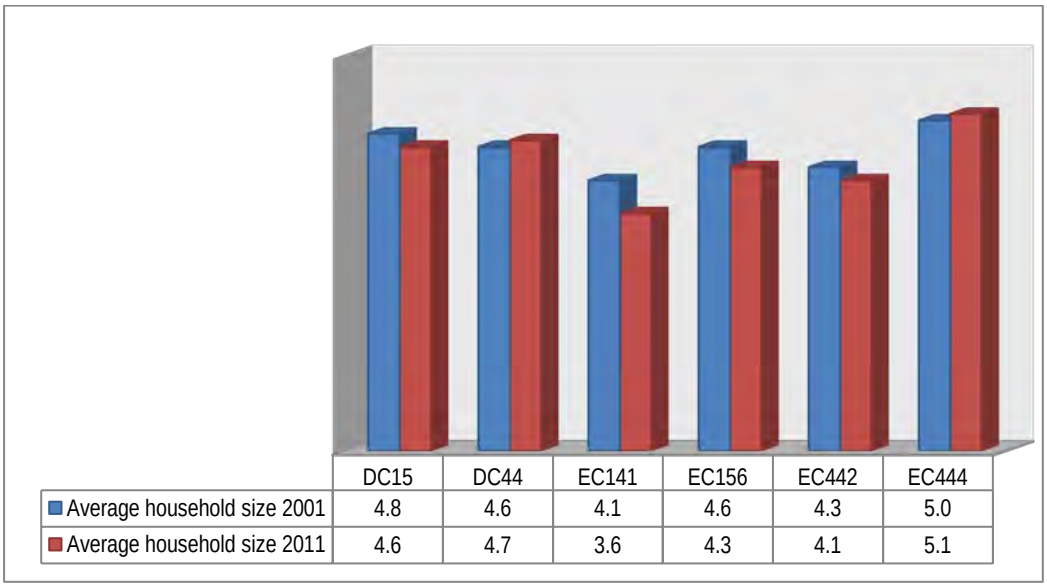
	DC14	DC15	DC44	EC141	EC156	EC442	EC444
2001	87.20%	83.00%	82.00%	84.90%	83.70%	81.70%	82.00%
2011	89.80%	85.70%	84.30%	90.10%	86.80%	84.80%	83.80%

Data source: (Statistics South Africa, 2012)

Figure 63: Sex ratio district and local municipalities

6.10.5 Household size

The average size of households in the area range between 3.6 in Elundini and 5.1 in Ntabankulu and is illustrated in **Figure 64**.



	DC15	DC44	EC141	EC156	EC442	EC444
Average household size 2001	4.8	4.6	4.1	4.6	4.3	5.0
Average household size 2011	4.6	4.7	3.6	4.3	4.1	5.1

Data source: (Statistics South Africa, 2012)

Figure 64: Average household size

6.10.6 Household dynamics

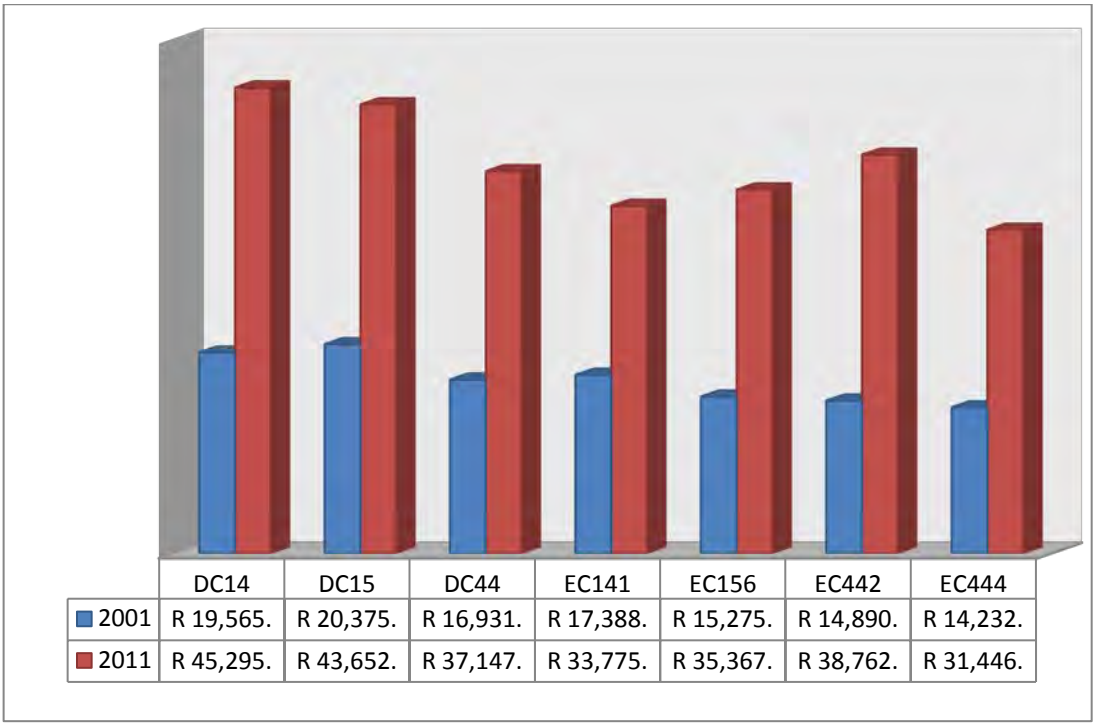
Apart from the Joe Gqabi district, where 49.3 % of the households are female headed, all other areas have a higher percentage of female than male headed households with the greatest percentage of female headed households at 60.4 % being found in Ntabankulu.

When compared on a provincial level with the Eastern Cape Province at 1.0 %, the study area has a relatively high percentage of child headed households. In the O.R. Tambo and Alfred Nzo districts 1.9 % of households are headed by children under 18 years of age while in the Joe Gqabi district the figure is 1.2 %. The percentage of child headed households is marginally lower across the local municipalities, ranging between 1.4 and 1.8 percent,

Regarding household income, with an average household income of R 37 147 per annum Alfred Nzo has the lowest average household income in respect of all district municipalities. Amongst the local municipalities Ntabankulu has an average household income of R 31 446 making it the municipality with the lowest average income overall. The highest average income, at R 45 295, is found in the Joe Gqabi district as illustrated in **Figure 65**.

Most formal dwellings are found in the Joe Gqabi district with the lowest percentage of formal dwellings at 24.3 % being found in Ntabankulu. At 64.4 % the local

municipality of Ntabankulu has the highest percentage of housing being owned or being paid off with the lowest percentage, 53.9 %, being found in Mhlontlo.



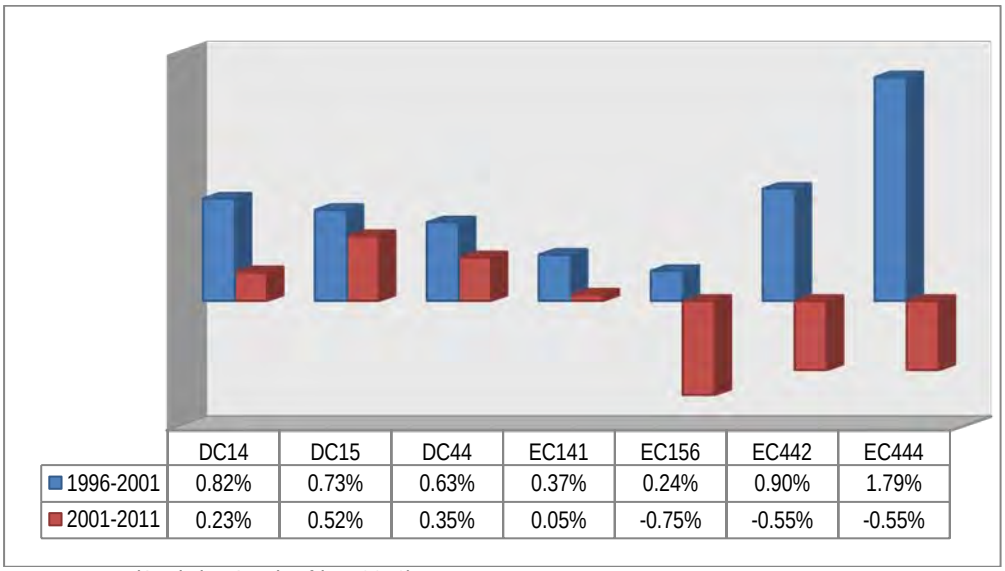
	DC14	DC15	DC44	EC141	EC156	EC442	EC444
2001	R 19,565.	R 20,375.	R 16,931.	R 17,388.	R 15,275.	R 14,890.	R 14,232.
2011	R 45,295.	R 43,652.	R 37,147.	R 33,775.	R 35,367.	R 38,762.	R 31,446.

Data source: (Statistics South Africa, 2012)

Figure 65: Average household income

6.10.7 Population Growth

Between 2001 and 2011 Mhlontlo, Umzimzubu and Ntabankulu all showed a negative population growth with the O. R. Tambo district having the highest population growth at 0.52 %. This is illustrated in below in **Figure 66**.



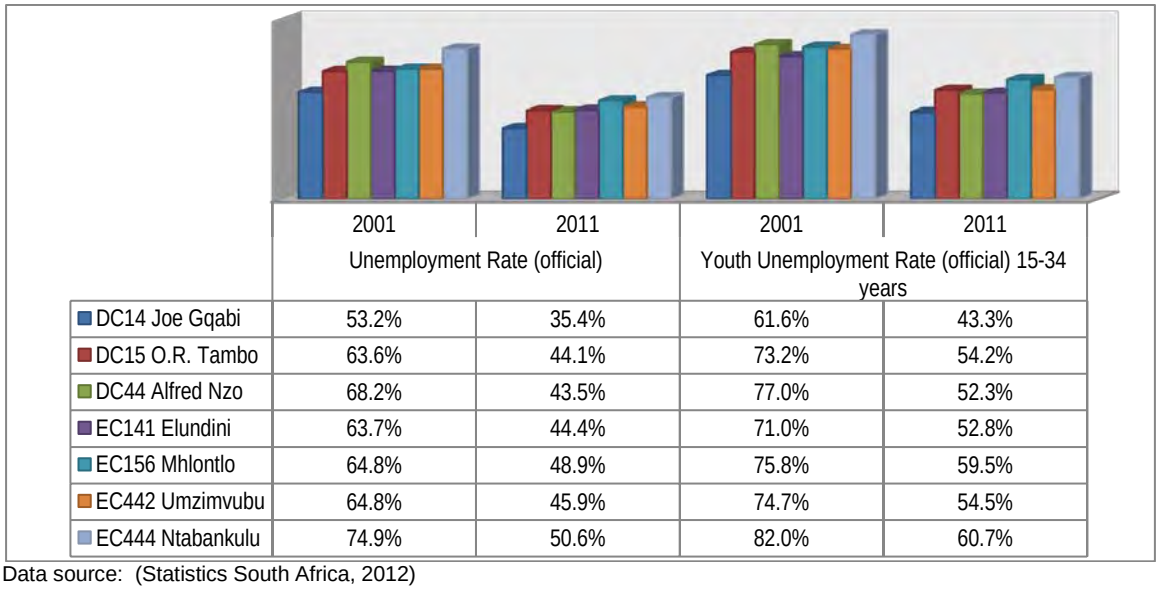
	DC14	DC15	DC44	EC141	EC156	EC442	EC444
1996-2001	0.82%	0.73%	0.63%	0.37%	0.24%	0.90%	1.79%
2001-2011	0.23%	0.52%	0.35%	0.05%	-0.75%	-0.55%	-0.55%

Data source: (Statistics South Africa, 2012)

Figure 66: Population growth % p.a.

6.10.8 Employment

In respect of the labour market, at 50.6 % the highest level of official unemployment is found in Ntabankulu with the lowest level being found in the Joe Gqabi district at 35.4 %. Amongst the youth between 15 and 34 years of age Ntabankulu also has the highest rate of unemployment at 60.7 % with Joe Gqabi again having the lowest at 43.3 % as illustrate below in **Figure 67**.



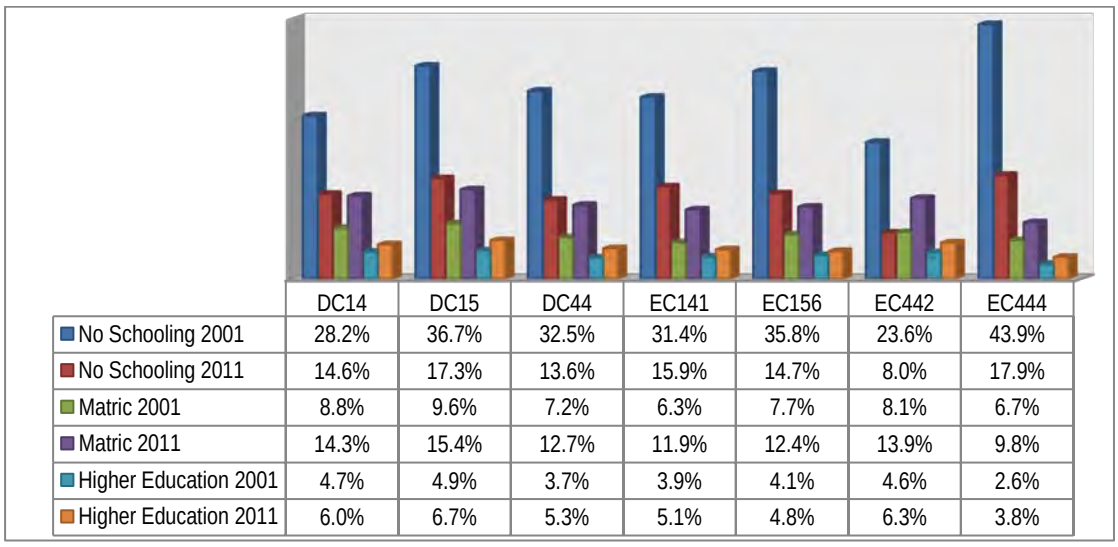
	2001 Unemployment Rate (official)	2011 Unemployment Rate (official)	2001 Youth Unemployment Rate (official) 15-34 years	2011 Youth Unemployment Rate (official) 15-34 years
DC14 Joe Gqabi	53.2%	35.4%	61.6%	43.3%
DC15 O.R. Tambo	63.6%	44.1%	73.2%	54.2%
DC44 Alfred Nzo	68.2%	43.5%	77.0%	52.3%
EC141 Elundini	63.7%	44.4%	71.0%	52.8%
EC156 Mhlontlo	64.8%	48.9%	75.8%	59.5%
EC442 Umzimvubu	64.8%	45.9%	74.7%	54.5%
EC444 Ntabankulu	74.9%	50.6%	82.0%	60.7%

Data source: (Statistics South Africa, 2012)

Figure 67: Official unemployment and youth unemployment rate

6.10.9 Education

The situation regarding schooling in the area improved somewhat between 2001 and 2011. Notwithstanding this, however, there is still a need to improve the situation further with areas such as Ntabankulu and the O. R. Tambo district still having over 17 % of the population over 20 years of age having no schooling. At a provincial level 10.5 % of the population aged over 20 years have no schooling, 19.8 % have a matric and 8.7 % have a higher education. This places all the district and local municipalities below the provincial level of education with only Umzimvubu, at 8 %, having a lower percentage of the population with no education. Education across the area is illustrated in **Figure 68**.



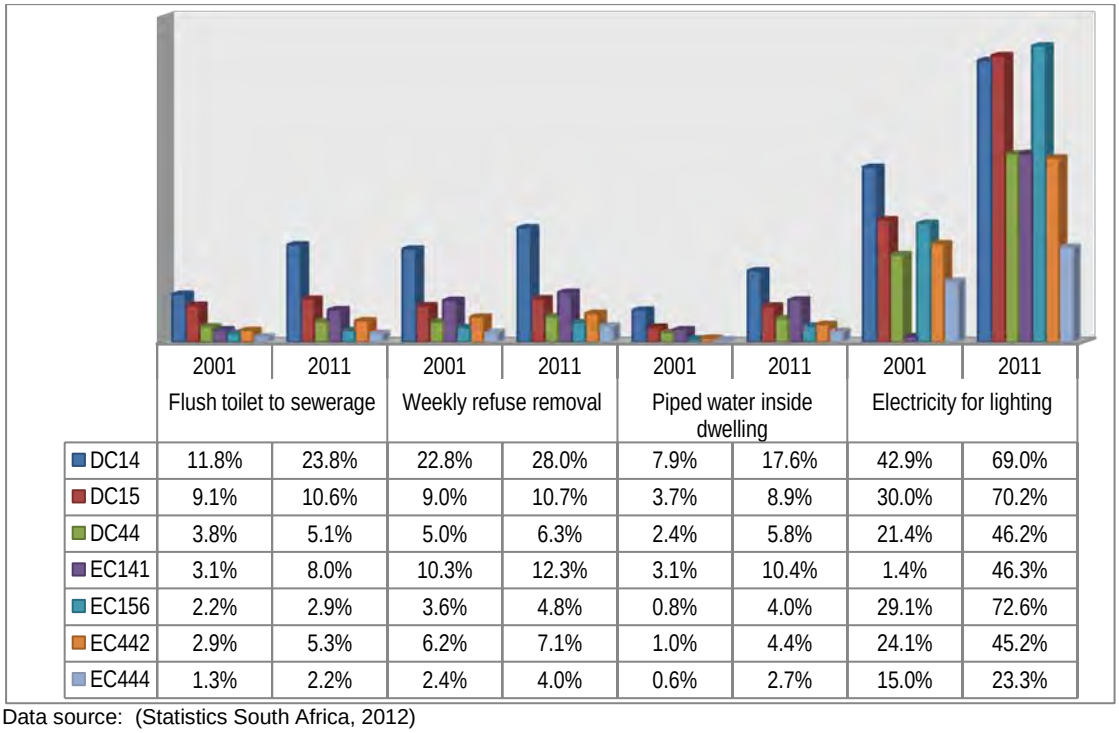
	DC14	DC15	DC44	EC141	EC156	EC442	EC444
No Schooling 2001	28.2%	36.7%	32.5%	31.4%	35.8%	23.6%	43.9%
No Schooling 2011	14.6%	17.3%	13.6%	15.9%	14.7%	8.0%	17.9%
Matric 2001	8.8%	9.6%	7.2%	6.3%	7.7%	8.1%	6.7%
Matric 2011	14.3%	15.4%	12.7%	11.9%	12.4%	13.9%	9.8%
Higher Education 2001	4.7%	4.9%	3.7%	3.9%	4.1%	4.6%	2.6%
Higher Education 2011	6.0%	6.7%	5.3%	5.1%	4.8%	6.3%	3.8%

Data source: (Statistics South Africa, 2012)

Figure 68: Education over 20 years of age

6.10.10 Services

In respect of household services, apart from electricity as a source of lighting, where it is surpassed by both the Mhlontlo local and O. R. Tambo district municipalities, on a general basis the Joe Gqabi District Municipality has the highest level of service delivery. Ntabankulu has the lowest level of service delivery across all indicators. With regard to water delivery specifically, in 2011 17.6% of households had piped water inside their dwelling in the Joe Gqabi DM. This figure was much lower in the O.R. Tambo and Alfred Nzo DMs (8.9% and 5.8% respectively). The indicators of household services are illustrated in **Figure 69.**



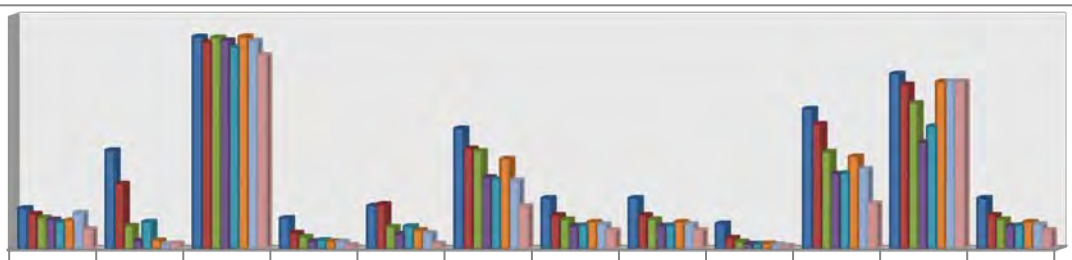
	2001	2011	2001	2011	2001	2011	2001	2011
	Flush toilet to sewerage		Weekly refuse removal		Piped water inside dwelling		Electricity for lighting	
DC14	11.8%	23.8%	22.8%	28.0%	7.9%	17.6%	42.9%	69.0%
DC15	9.1%	10.6%	9.0%	10.7%	3.7%	8.9%	30.0%	70.2%
DC44	3.8%	5.1%	5.0%	6.3%	2.4%	5.8%	21.4%	46.2%
EC141	3.1%	8.0%	10.3%	12.3%	3.1%	10.4%	1.4%	46.3%
EC156	2.2%	2.9%	3.6%	4.8%	0.8%	4.0%	29.1%	72.6%
EC442	2.9%	5.3%	6.2%	7.1%	1.0%	4.4%	24.1%	45.2%
EC444	1.3%	2.2%	2.4%	4.0%	0.6%	2.7%	15.0%	23.3%

Data source: (Statistics South Africa, 2012)

Figure 69: Household services

6.10.11 Household Goods

The proportion of households owning household goods across the area is lower than that of the province. On a general basis, households in the Joe Gqabi municipality own a greater proportion of household goods than those across the other municipalities with households in Ntabankulu owning the lowest proportion of household goods. The distribution of household goods across the study area is illustrated in **Figure 70**.



	Mail PO box	Mail residence	Cellphone	Computer	Satellite tv	DVD	Car	Radio	Landline	Fridge	Stove	Television
EC	16%	38%	82%	12%	17%	46%	20%	20%	10%	54%	67%	20%
DC14	14%	25%	80%	6%	17%	39%	13%	13%	4%	48%	63%	13%
DC15	12%	9%	81%	5%	8%	38%	11%	11%	3%	38%	56%	11%
DC44	11%	3%	80%	3%	6%	28%	9%	9%	2%	29%	41%	9%
EC141	10%	10%	78%	3%	9%	27%	9%	9%	2%	29%	47%	9%
EC156	11%	3%	82%	3%	7%	35%	10%	10%	2%	36%	64%	10%
EC442	14%	2%	80%	3%	6%	26%	10%	10%	2%	31%	65%	10%
EC444	8%	2%	75%	2%	2%	17%	7%	7%	1%	18%	65%	7%

Data source: (Statistics South Africa, 2012)

Figure 70: Distribution of household goods

Although there have been some improvements across the region the area remains one of the poorest parts of the country, characterised by high poverty and out-migration resulting in sex ratio imbalances, a high proportion of female headed households and a low population growth rate. At large the population lacks basic amenities and relies heavily on subsistence farming which is not highly successful.

6.11 LAND USE AND TENURE

The study area is rural, characterised by low densities and generally low levels of economic activity. The main land uses are pastoral stock and subsistence crop farming (**Figure 71**). Land cover in the broader study area is shown in (**Figure 72**).

Figure 71: Typical midrange housing structures and crop planting activities

The proposed project is located on state-owned land which is administered by traditional authorities. The land is therefore currently subject to communal land tenure arrangements. Under this system the State owns the land, but it is managed and allocated to community members by the Traditional Leaders.

Agricultural practices

About 37.7 % of households in the Eastern Cape engaged in agricultural activities over the period June 2011- June 2012. Of these households 24.8 % were involved with poultry production, 20.5 % with livestock production, 19 % with grains and food crops, 19.9 % with fruit and vegetables and only 0.2 % with industrial crops (Statistics South Africa, 2012, pp. 2-3). Of the households in the province involved with different crop planting activities, 23.8% were in backyard gardens, 0.2 % in communal gardens and 0.1 % in school gardens. The percentage of households classified as food access adequate was 72 % while 19.4 % were food access inadequate and 8.8 % food access severely inadequate. Although in this respect there are no statistics specific to the study area, it is unlikely that the situation in the study area will be significantly different.

An aerial inspection of the immediate area shows that much less crop production is currently practised than in the past, it is estimated that about 20 % of the previously contoured lands are currently still cultivated. Before 1994, communal farmer support structures were very active in the region and most of the families produced enough

maize (a staple diet food) for their own consumption. This is not happening currently and the area is a maize import area.

The *Agricultural assessment and irrigation water use* study (AsgiSA EC, 2009) concluded that: “Substantial potential exists in the study area for the development of new agricultural enterprises under rain-fed conditions and for the improvement of existing agricultural practices and productivity. Whilst opportunity exists for small irrigation scheme developments, there are several limiting factors with respect to large irrigation schemes. An initial focus on the upgrading of rain-fed cultivation and livestock farming can bring great gains at moderate investment”.

Commercial irrigation farming is not the traditional farming method in the area and extensive public consultation will be required to obtain buy in from traditional leaders and communities and facilitate the transformation of this sector.

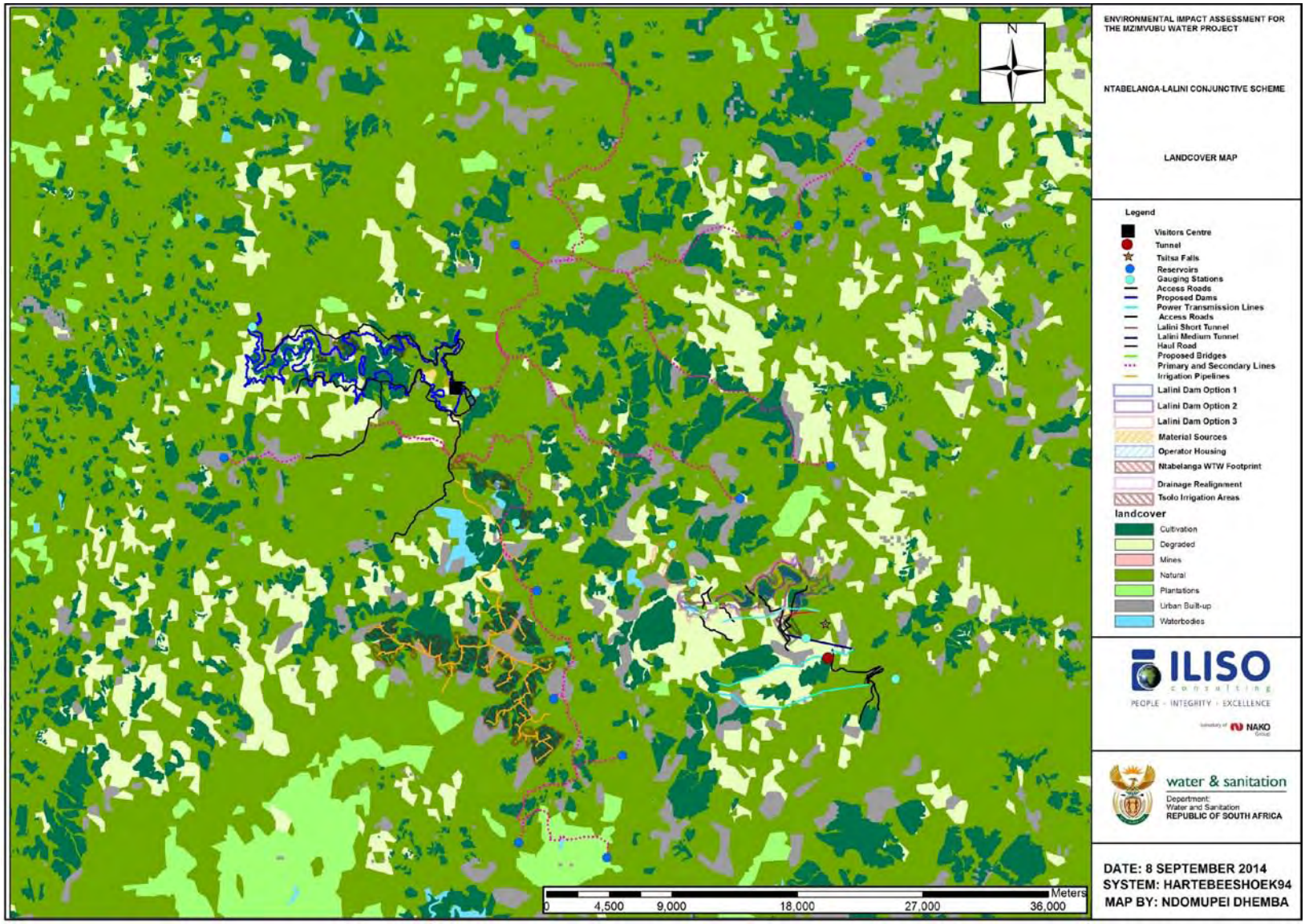


Figure 72: Land cover