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Feasibility Study for Augmentation of the Lusikisiki Regional Water Supply Scheme (WP 10317)

REGIONAL ECONOMICS

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* *BKS (Pty) Ltd was acquired by AECOM Technology Corporation on 1 November 2012*

LIST OF STUDY REPORTS

This report forms part of the series of reports, prepared for the Feasibility Study for Augmentation of the Lusikisiki Regional Water Supply Scheme. All reports for the Study are listed below.

Report Name	DWA Report Number
Water Resources Assessment	P WMA 12/T60/00/3711
Assessment of augmentation from Groundwater	P WMA 12/T60/00/3811
Intermediate Reserve Determination	P WMA 12/T60/00/3911
Legal, Institutional and Financial Arrangements	P WMA 12/T60/00/4011
Domestic Water Requirements	P WMA 12/T60/00/4111
Irrigation Potential Assessment	P WMA 12/T60/00/4211
Water Distribution Infrastructure	P WMA 12/T60/00/4311
Materials and Geotechnical Investigations	P WMA 12/T60/00/4411
Zalu Dam Feasibility Design	P WMA 12/T60/00/4511
Regional Economics	***P WMA 12/T60/00/4611***
Environmental Screening	P WMA 12/T60/00/4711
Record of Implementation Decisions	P WMA 12/T60/00/4811
Main Study Report	P WMA 12/T60/00/4911

This report is to be referred to in bibliographies as:

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Executive summary

BACKGROUND AND PURPOSE

*The Department of Water Affairs (DWA) appointed **BKS (Pty) Ltd**[1] in association with four sub-consultants, **Africa Geo-Environmental Services; KARIWA Project Engineers & Associates; Scherman Colloty & Associates and Urban-Econ** with effect from 1 September 2010 to undertake the **Feasibility Study for Augmentation of the Lusikisiki Regional Water Supply Scheme (LRWSS)**. This Regional Economics Report is one of the components of the feasibility study.*

The purpose of this report is to provide a strategic economic assessment of the potential impacts of the proposed augmentation of the Lusikisiki Regional Water Supply Scheme (LRWSS), including major development initiatives and spinoff development on the regional and national economy.

METHODOLOGY

*Socio-economic impact may be defined as the effect produced by a project or programme on the level of economic activity in an area or region. The diagram (**Figure i**) below illustrates the four fundamental steps the economic impact assessment was based on.*

Figure i: Methodology

BASELINE PROFILE

The study area is found in the O.R. Tambo District Municipality and is made up of land from the Ngquza Hill and Port St Johns Local Municipalities. This represents the area that will be affected primarily by the proposed development. The study area as well as components of the baseline

[1] *On 1 November 2012, BKS (Pty) Ltd was acquired by **AECOM Technology Corporation.***

profile referred to in this report were determined in the Domestic Water Requirements report that was compiled as part of this study.

The study area has a high population density (over 110 people per square kilometre) and demographic structure typical to a rural area. The population of the study area is growing and will continue to grow in future. In the absence of additional income, this population growth implies a reduction in standards of living.

Nearly a quarter of the population of the study area has no schooling and a further quarter only has some level of primary education. The region is characterised by residents with a mean of 6.5 years of schooling. This average falls below the provincial and national averages. The unemployment rate is above the national average at 35%, according to Census 2011 data. There is a pressing need for employment opportunities in the region.

The majority of households in the study area do not have access to piped water. This is normal for the area as it is largely rural in nature which significantly limits the scope for provision of piped water. This in turn affects household access to water-borne sanitation services and creates backlogs for the respective local municipal authorities in terms of creating sustainable human settlements. At present 17% of households receive water through a regional or local water scheme operated by their municipality or another water services provider. At present the majority of households acquire water from rivers or streams.

The study area has a relatively low level of social infrastructure, with the majority located near Lusikisiki Town and along transportation route spines. The non-provision or reduction of services has a detrimental impact on the efficiency of a region's economy and the wellbeing of a community. The provision of infrastructural services represents a precondition for improved economic growth, welfare, quality of life and productivity.

Upon examining the income categories it was found that a large portion of the population (40.5%) earns below the poverty line. This indicates that there is a significant portion of the population that is at risk of not being able to afford the water that will be provided through the LRWSS. According to the Human Development Index (HDI), the study area scored 0.4 which indicates low levels of development. A significant investment such as the proposed LRWSS thus has the potential to significantly impact household incomes in the area through direct, indirect and induced channels.

The community and social services sector has the largest contribution (41.7%) to the economy of the study area. Government and the public sector as a whole are represented in the community and social services sector. Construction is also a fairly large contributor to local value addition. This is largely a result of building activity linked to the public sector programmes and projects mentioned above. Formal agricultural output is low, although it must be noted that the official statistics do not reflect subsistence production as is found in the majority of the rural villages of the study area.

National, provincial and local policy prioritises projects such as the proposed LRWSS.

PROJECT PHASES

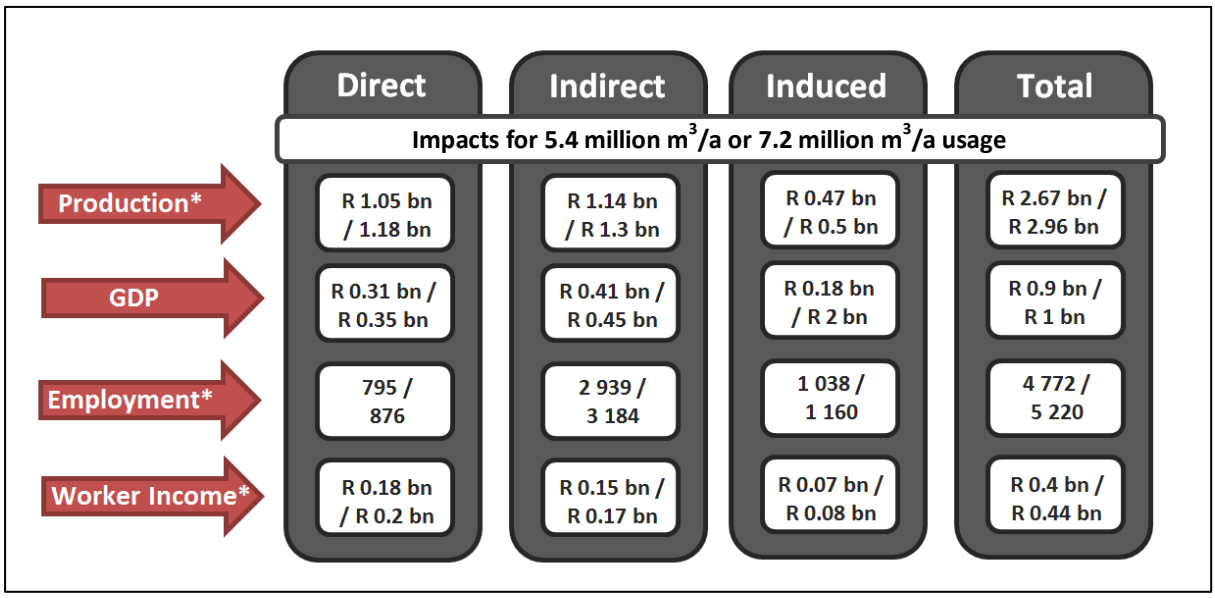
Economic impacts can be viewed in terms of their duration, or the stage of the lifecycle of the project that is being analysed. Generally two phases are subjected to the economic impact assessment, the construction/development phase and the commercialisation/operational phase. The economic impact of the construction phase is of a more temporary nature, and therefore has a temporary effect – with the exception of the potential long term benefit of skills transfer. On the other hand, the operational phase of the project usually takes place over a longer period; hence, the impacts during this stage are of a sustainable nature.

For the development of the LRWSS it is necessary to distinguish between two construction phases. The first is the construction of the Zalu Dam and the second entails the construction of the supporting treatment and distribution infrastructure. In addition to the operational phase of the LRWSS there will also be three refurbishment phases for the supporting pump station, Water Treatment Plant (WTP) and boreholes.

All phases apart from the Zalu Dam construction period were modelled for a system that can supply 5.4 million m^3/a to only domestic users (plus an additional 1.45 million m^3/a irrigation provision), or 7.2 million m^3/a exclusively to domestic users. For the 5.4 million m^3/a supply a 0.6 MAR (8.1 million m^3 storage) dam will be developed whereas the 7.2 million m^3/a supply will be supplied by a 0.6 MAR or 1.5 MAR dam (19.9 million m^3 storage). Expenditure for a 0.6 MAR or 1.5 MAR dam will be the same during the bulk water distribution infrastructure construction phase and various refurbishment phases. During the Zalu Dam construction phase and operational phase expenditure will differ for the different dam sizes. The cost associated with all the phases of the 7.2 million m^3/a system is higher than that of the 5.4 million m^3/a system.

ECONOMIC IMPACT ASSESSMENT

The economic impact assessment showed that the LRWSS will have a significant impact on the regional and local economy during the construction, operational and refurbishment phases. The proposed LRWSS will stimulate job creation and long-term economic development. The following figures provide a summary of the impact results for a 0.6 MAR dam. The impacts associated with the three-year construction phase are provided in the figure below.



Source: Urban-Econ Development Economists calculations (2013)

Figure ii: Macro-economic effect of the three-year construction phase (R-billion, 2012 prices – unless otherwise stated)

*From **Figure ii** it can be concluded that total expenditure during the construction phase of the LRWSS will amount to approximately R 1.05 billion for a 5.4 million m^3/a system (0.6 MAR dam). The direct investment in the domestic manufacturing industry will cause increased productivity in other sectors of the economy. In total, the construction phase will raise the level of production by approximately R 2.67 billion. The total impact on production during the construction of a 7.2 million m^3/a system will be higher with a R 2.96 billion contribution. The construction expenditure of the 5.4 million m^3/a system does not include any cost for the development of irrigation infrastructure.*

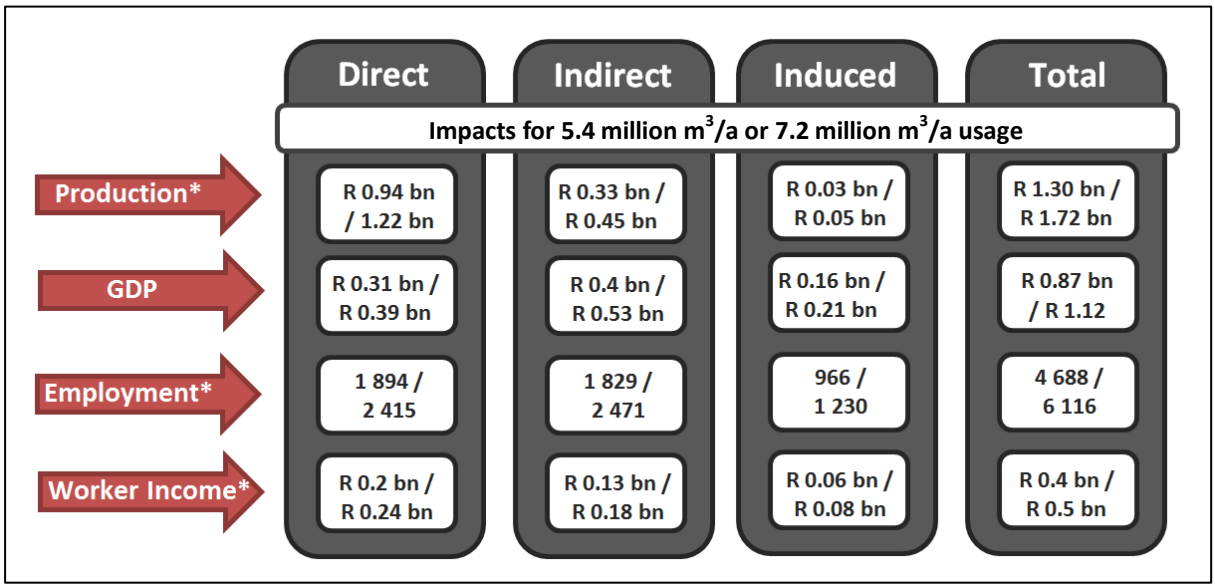
Raised production levels are accompanied by increased GDP. The direct GDP impact of the construction phase is an increase of R 0.31 billion or R 0.35 billion depending on the chosen

system. In total the level of GDP will increase by approximately R 0.9 billion or R 1 billion during the construction phase of a 0.6 MAR dam.

The construction phase of a system with a 5.4 million m^3/a capacity will require the employment of approximately 795 persons for a period of 36 months. Increased production in industries supplying the construction inputs and industries supplying consumer goods and services implies the creation of new employment opportunities in these industries. The (indirect) impact on employment in supplying industries will manifest in the creation of approximately 2 939 employment opportunities, while the impact on industries supplying consumer goods and services (i.e. the induced impact) will be the creation of approximately 1 038 employment opportunities. In total, the construction phase of a 5.4 million m^3/a capacity system will generate approximately 4 772 employment opportunities. The total employment for a 0.6 MAR dam with a 7.2 million m^3/a capacity system will be approximately 5 220 job opportunities per year.

In return for providing a service, employees naturally receive an income. It is estimated that a cumulated income of R 0.4 billion or R 0.44 billion will be generated through the construction phase depending on the chosen system capacity.

*The figure below (**Figure iii**) illustrates the impact of the 46-year (until 2060) operational phase including the three refurbishment phases for a 0.6 MAR dam.*



Source: Urban-Econ Development Economists calculations (2013)

Figure iii: **Macro-economic effect of the 0.6 MAR dam operational phase including the water treatment plant, pump station and borehole refurbishment phases (R-billion, 2012 prices)**

*From **Figure iii** it can be seen that direct expenditure during the operational and refurbishment phases of the LRWSS will amount to approximately R 0.94 million for a 5.4 million m³/a capacity system. The direct investment will cause increased productivity in other sectors of the economy. In total, the operational and refurbishment phases of a 0.6 MAR dam will raise the level of production by approximately R 1.30 billion or R 1.72 billion, depending on the chosen system.*

Raised production levels are accompanied by increased GDP. The direct impact of the operational and refurbishment phases is an increase of R 0.31 billion in GDP for a 5.4 million m³/a capacity system (0.6 MAR dam). In total the level of GDP will increase by approximately R 0.87 billion. The operational and refurbishment phases of a 7.2 million m³/a capacity system (0.6 MAR dam) will contribute R 0.39 billion to the GDP and through indirect and induced impacts it will contribute a total of R 1.12 billion.

Regarding employment, the operational and refurbishment phases of a 5.4 million m³/a capacity system will require the employment of approximately 1 894 persons over a period of 46 years. Increased production in industries supplying the operational inputs and industries supplying consumer goods and services implies the creation of new employment opportunities in these industries. The (indirect) impact on employment in supplying industries will manifest in the creation of approximately 1 829 employment opportunities, while the impact on industries

supplying consumer goods and services (i.e. the induced impact) will be the creation of approximately 966 employment opportunities. In total, the operational and refurbishment phases of a 5.4 million m^3/a capacity system will generate approximately 4 688 employment opportunities. The operational and refurbishment phases of a 7.2 million m^3/a capacity system supplied by a 0.6 MAR dam will create a total of 6 116 new employment opportunities.

In return for providing a service, employees naturally receive an income. It is estimated that a total cumulated income of R 0.4 billion or R 0.5 billion will be generated over a 46-year period through the operational and refurbishment phases depending on the size of system built.

Due to the higher expenditure associated with the construction and operation phases of a 1.5 MAR dam the associated impact will be larger. During the construction phase a 7.2 million m^3/a capacity system supplied by a 1.5 MAR dam will make a total contribution of R 3.218 billion to production, R 1.074 billion towards GDP and 5 449 employment opportunities will be created which will result in worker income of R 0. 463 billion. The operational phase of a 1.5 MAR dam for a 7.2 million m^3/a capacity system will contribute a total R 3.257 billion to production and R 1. 239 billion towards GDP while creating a total of 6 679 million employment opportunities.

The impact during construction is considerable. However, it is not sustainable in the long-term as the construction phase is temporary. On the other hand, the operational phase effects will last much longer and therefore it is regarded as a more sustainable contribution to the domestic economy. The increase will be higher for the construction and operation of a 7.2 million m^3/a capacity system. Both sized systems will result in a positive impact although no irrigation costs or infrastructure was included for the 5.4 million m^3/a capacity system.

CONCLUSION

To conclude, the proposed LRWSS is expected to increase the size of the economy of the local area. It will have significant macro-economic impacts due to the fact that it will increase the level of production, GDP, employment and worker income at a local, provincial and national level, as well as stimulate business and human capital development and assist in raising living standards.

The current economic profile was established as a point of departure to evaluate the anticipated effects. The effect of changes in the economic reality resulting from the proposed development

was studied and concluded to be positive. Through the employment opportunities created it is estimated that a total of 23 860 people will benefit from the construction phase of a 0.6 MAR dam for a 5.4 million m³/a system. A 7.2 million m³/a system will benefit a total of 26 100 or 27 245 people during the construction phase of a 0.6 MAR or 1.5 MAR dam respectively. This is the result of an increase in worker income within each household affected. The operational phase combined with the two refurbishment phases will positively affect between 23 411 and 33 395 people over a 46-year time period (depending on the chosen system and dam size).

Regarding the affordability of water the income profile indicated that there is a significant portion of the population that is at risk of not being able to afford the water that will be provided through the LRWSS. With time, increased economic activity through the LRWSS investments will lead to an increase in worker income and, as a result, more people will be able to afford water. It can therefore be said that to make water available and affordable grant funding will be required.

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List of abbreviations

CPIX	Consumer Price Index
DM	District Municipality
DWA(F)	Department of Water Affairs (and Forestry)
EAP	Economically Active Population
ECR	Earth Core Rockfill
HDI	Human Development Index
IDP	Integrated Development Plan
ISRDP	Integrated Sustainable Rural Development Programme
LED	Local Economic Development
LM	Local Municipality
LRWSS	Lusikisiki Rural Water Supply Scheme
NWRS	National Water Resource Strategy
ORTDM	Oliver Tambo District Municipality
PGDG	Provincial Growth and Development Plan
SDF	Spatial Development Framework
Stats SA	Statistics South Africa
WTP	Water Treatment Plant

List of units

a	annum
ha	hectare
hrs	hours
km	kilometre
km^2	square kilometre
ℓ	litre
ℓ/day	litre per day
ℓ/cap/day	litre per capita per day
m	metre
m^3/s	cubic metre
Mℓ/day	megalitre per day
mm	millimetre
s	second

List of definitions

Household A household is a group of persons who, at least for four nights per week, live together and provide themselves jointly with food and/or other essentials for living, or a single person.

Employment A contract between two parties, one being the employer and the other being the employee certifying the employee with a fixed job; forming part of the working force.

Unemployment A person is unemployed if he or she desires employment but cannot find a job. The unemployment rate is then obtained by expressing the number of unemployed persons as a percentage of the total number of people willing and able to work (the labour force). According to the official definition, the unemployed are those people within the economically active population who: a) did not work during the seven days prior to the interview, b) want to work and are available to start work within a week of the interview, and c) have taken active steps to look for work or to start some form of self-employment in the four weeks prior to the interview.

Potential Economically Active (PEA) Population The potential economically active (PEA) population includes the formally employed, the unemployed and those persons active in the informal/unregistered sector. The terms supply of labour and the labour force are used as synonyms for the potential economically active population. The PEA population falls within the age categories of 15-64 years.

Disposable Income Another measure of a region's welfare, disposable income shows the average amount of income derived during a certain period. Since disposable income includes all income receipts by households and excludes all transfers, such as taxes and social contributions, it reflects the amount of money that the population has at its disposal to spend on consumer products and services.

Growth Rate A growth rate represents a ratio of total change in a specified time reference period to a value at the beginning of the period or at a specified earlier time reference. When changes over a period of more than one calendar year are studied, the annual rate of change is computed.

1 INTRODUCTION

The Department of Water Affairs (DWA) appointed **BKS (Pty) Ltd** in association with four sub-consultants (**Africa Geo-Environmental Services, KARIWA Project Engineers & Associates, Scherman Colloty & Associates and Urban-Econ**) with effect from 1 September 2010 to undertake the **Feasibility Study for Augmentation of the Lusikisiki Regional Water Supply Scheme (LRWSS)**.

On 1 November 2012, BKS (Pty) Ltd was acquired by **AECOM Technology Corporation**. The new entity is a fully-fledged going concern with the same company registration number as that for BKS (Pty) Ltd. As a result of the change in name and ownership of the company during the study period, all the final study reports will be published under the AECOM name.

1.1 PROJECT BACKGROUND

In the 1970s Consultants O'Connell Manthé and Partners and Hill Kaplan Scott recommended that a regional water supply scheme based on a dam on the Xura River and a main bulk supply reservoir close to Lusikisiki Town (located within the then defined "administration area" of the Zalu Dam) would provide potable water supply for the entire region between Lusikisiki and the coast, extending from the Mzimvubu River in the south west to the Msikaba River in the north east. Some areas up to 15 km inland of Lusikisiki would also be supplied. A **White Paper** describing the scheme was tabled by the Transkei Government in 1979. It was envisaged that the scheme would be constructed in phases. Details of the proposed phasing of the scheme are provided in *Lusikisiki Regional Water Supply: Preliminary Report* (Hill Kaplan Scott, 1986).

After the reincorporation of the Transkei Homeland into the Republic of South Africa (RSA) in 1994, the DWA took over responsibility for further development of the scheme. The Directorate: Water Resources Planning commissioned *the Eastern Pondoland Basin Study* (EPBS) in 1999 to further investigate the water supply situation in the area, with a specific focus on future development in the area originally earmarked for the Lusikisiki Regional Water Supply Scheme (LRWSS). This detailed investigation was undertaken for surface and groundwater sources, which re-affirmed that the Zalu Dam was the preferred

source of surface water and recommended further investigation of groundwater sources to augment water supply to the entire area or to sub-areas.

In 2007, SRK Consulting undertook the *Lusikisiki Groundwater Feasibility Study* to investigate groundwater potential and compare the new data with data produced by earlier studies. This study reported that there is a relatively strong possibility of finding high yielding boreholes, and that a combination of surface water (Zalu Dam) and groundwater would be the most feasible solution for the LRWSS.

This Regional Economics report thus forms part of the outcomes of the above described process.

1.2 Objective, Scope and Organisation of the Study

The objective of this study was to complete a comprehensive engineering investigation at feasibility level for the proposed LRWSS, including the possible Zalu Dam in the Xura River, and to define the most attractive composition and size of the water supply components, taking augmentation from groundwater resources into account.

This feasibility study provided for the assessment of all aspects that impact on the viability of utilising a combination of surface water (via the Zalu Dam on the Xura River) and groundwater (via boreholes) for the expansion of the existing water supply scheme to provide all water users in the study area with an appropriate level of service and assurance of water supply. The study is therefore required to:

- Identify all of the technical issues likely to affect implementation, and to define and evaluate all of the actions required to address these issues;
- Provide an estimate of cost with sufficient accuracy and reliability to ensure that management decisions can be made with confidence;
- Investigate irrigation viability; and
- Provide sufficient information to enable design and implementation to proceed without much further investigation.

The required activities for this project have been grouped into 14 modules, as shown in **Table 1.1**.

Table 1.1: Study structure

Modules	Deliverable
1. PROJECT MANAGEMENT 1.1 Study initiation and inception 1.2 Project management and administration	**Inception Report**
2. WATER RESOURCES	**Water Resources Report**
2.1 Hydrology	♦ Hydrology chapter
2.2 Yield analysis	♦ Yield Analysis chapter
2.3 Reservoir sedimentation	♦ Sedimentation chapter
3. GROUNDWATER AUGMENTATION	**Assessment of Augmentation from Groundwater Report**
4. RESERVE - ECOLOGICAL WATER REQUIREMENTS	**Reserve Determination Report** ♦ Reserve Template
5. WATER REQUIREMENTS	
5.1 Domestic water requirements	**Domestic Water Requirements Report**
5.2 Agriculture / Irrigation potential	**Irrigation Development Report**
6. WATER SERVICE INFRASTRUCTURE	**Water Distribution Infrastructure Report**
6.1 Distribution infrastructure	♦ Chapter in Water Distribution Infrastructure Report
6.2 Water quality	♦ Chapter in Water Distribution Infrastructure Report
7. PROPOSED ZALU DAM	
7.1 Site investigations	**Materials & Geotechnical Investigations Report**
7.2 Dam technical details	**Zalu Dam Feasibility Design Report, including design criteria, dam type selection, dam sizing**
8. COST ESTIMATE AND COMPARISON	♦ Included in relevant reports
9. REGIONAL ECONOMICS	**Regional Economics Report**
10. ENVIRONMENTAL SCREENING	**Environmental Screening Report** ♦ Scope of work for EIA
11. PUBLIC PARTICIPATION	♦ Included in Environmental Screening Report
12. LEGAL, INSTITUTIONAL AND FINANCIAL ARRANGEMENTS	**Legal, Institutional and Financial Arrangements Report**
13. RECORD OF IMPLEMENTATION OF DECISIONS	**Record of Implementation Decisions Report**
14. MAIN REPORT AND REVIEWS	**Main Study Report**

1.3 SCOPE OF THIS REPORT

The purpose of this report is to provide a strategic economic assessment of the potential impacts of the proposed augmentation of the LRWSS, including major development initiatives and spin-off development on the regional and national economies.

1.4 METHODOLOGY

Figure 1.1 illustrates the methodological approach taken by Urban-Econ Development Economists in pursuit of the primary study goal of the project.

Figure 1.1: Methodological approach

Step 1: Project Orientation

The project initiated with a site selection and orientation process. This section of the report captures step 1. Project orientation entails developing an in-depth understanding of the project and all that it encompasses. The orientation phase is arguably one of the most important phases of any project, as it ensures a common understanding between the client and service provider. In addition, it enables the project team to develop a

roadmap that will provide direction to the successful completion of the project. For the purpose of this report, the most critical tasks to be completed during this phase include:

- Identifying the study area (site selection);
- Obtaining the required primary and secondary socio-economic data;
- Acquiring project-specific data for the relevant development phases;
- Understanding the details of the proposed LRWSS; and
- Gaining a broad understanding of the potential externalities that may arise as a result of the LRWSS.

Step 2: Baseline Socio-Economic Profile

This step aims to develop a baseline profile of the delineated market area. The aim is to identify and examine the variables that will be influenced by the development of the LRWSS. This information will then be used in later stages to assist in assessing the quantitative impacts of the scheme. The profile will be developed by assessing the following factors:

- Population and household dynamics;
- Economic profile;
- Labour market; and
- Income and expenditure.

The baseline profile will sketch a picture of the current socio-economic dynamics of the receiving environment.

Step 3: Details of the Proposed LRWSS

This step provides details of the various project dynamics for the construction, operational and refurbishment phases of the project. Financial, human capital, as well as physical factors are examined.

Step 4: Socio-Economic Impact Assessment

Step 4 entails the quantification of the following impacts of the LRWSS:

- Direct;
- Indirect;
- Induced; and
- Cumulative/Total.

Impact assessments for the construction, operational and refurbishment phases of the LRWSS will be separately stressed, as is necessitated by the different durations of the impacts associated with each phase. Furthermore, the cumulative impacts of the LRWSS will be assessed.

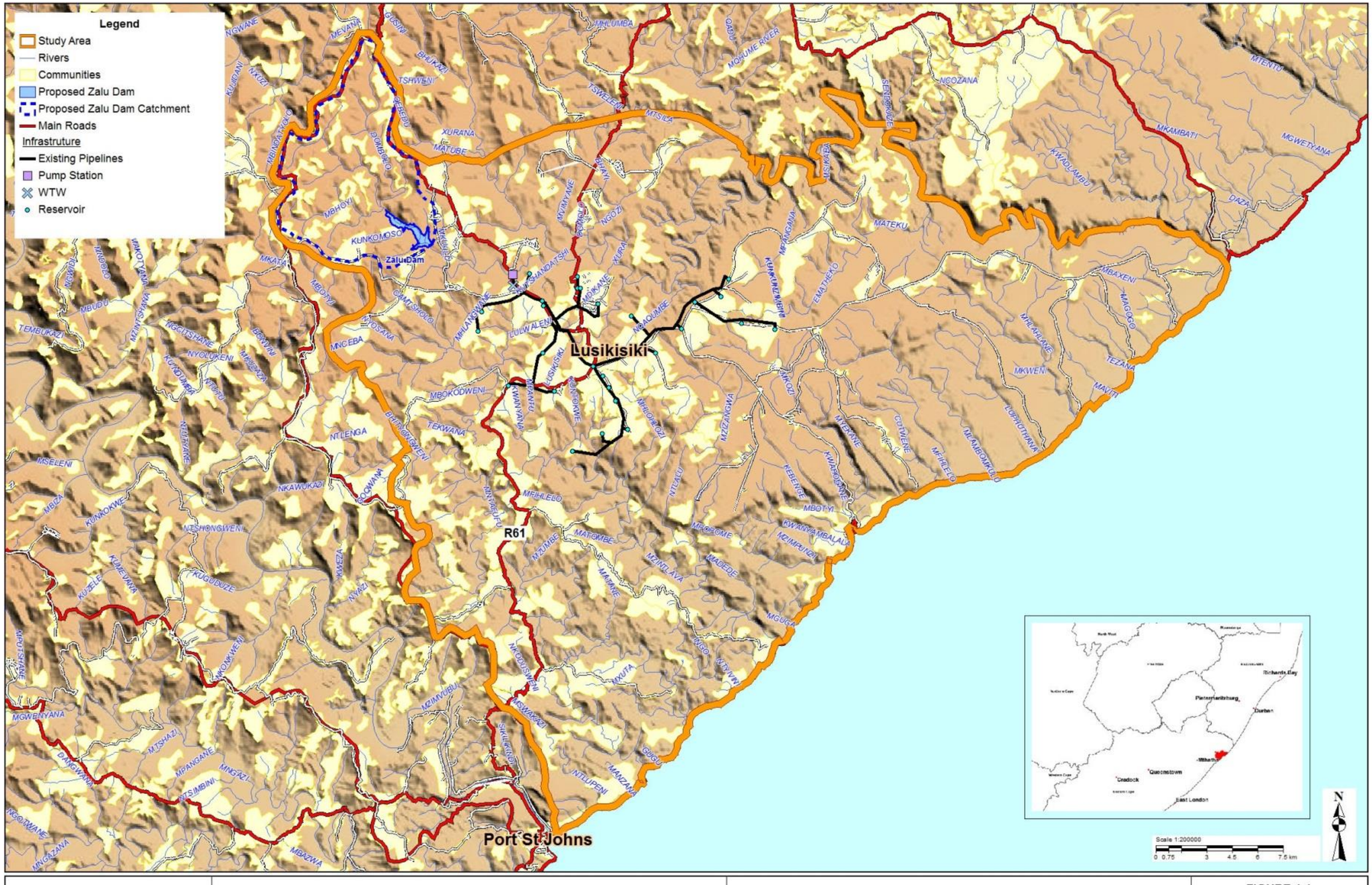
Step 5: Impact Evaluation

Step 5 is based on the baseline profile information to relate the impacts of the project to the economies in which they will be experienced.

Step 6: Conclusions and Recommendations

Step 6 provides a synopsis of the study findings and concludes with suggested mechanisms for minimising negative and maximising positive impacts and externalities that may arise if the proposed LRWSS is pursued.

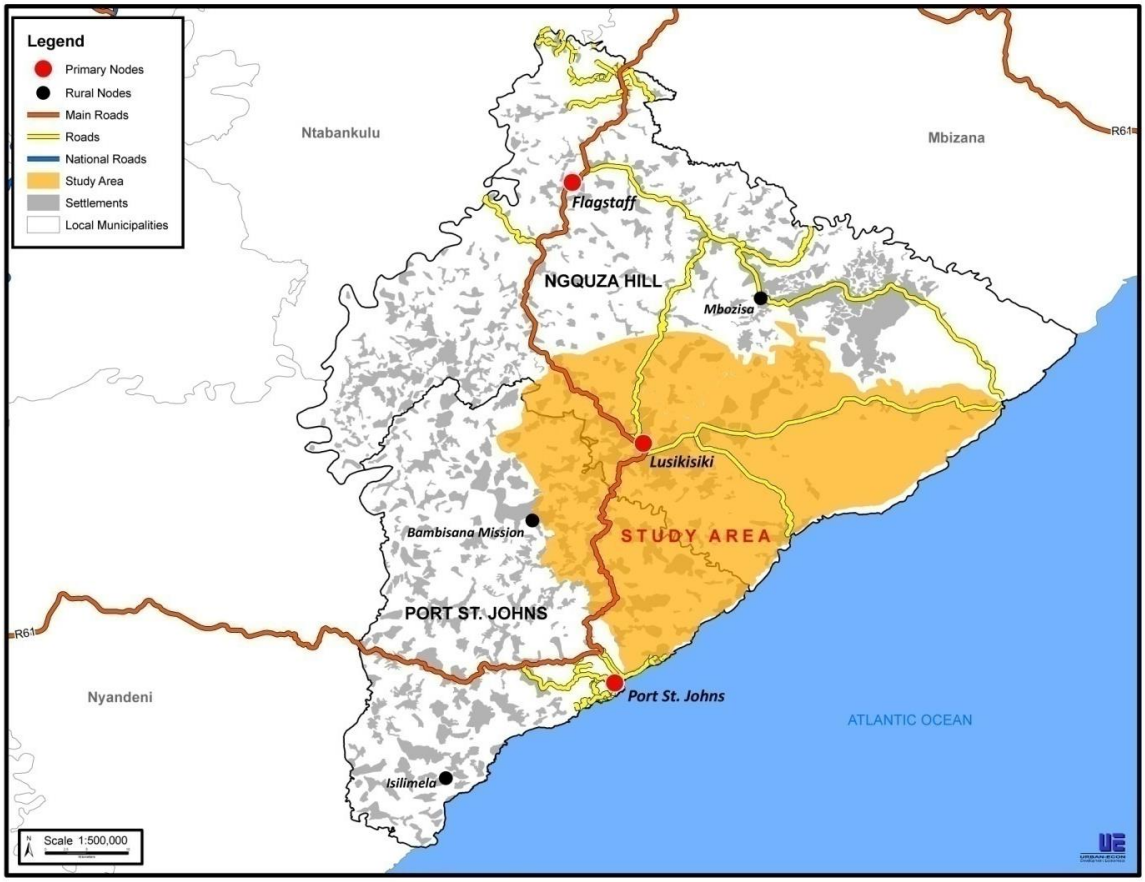
This Regional Economics report pertains to the proposed LRWSS located in the eastern part of the Eastern Cape Province. The study area is found in the O.R. Tambo District Municipality and is made up of areas falling under the Ngquza Hill and Port St Johns Local Municipalities. This study area was determined in the Water Requirements Report that forms part of the broader feasibility study for the proposed LRWSS. The location of the proposed dam is shown in **Map 1.1**.



Map 1.1: Location of proposed Zalu Dam

As seen in **Map 1.2**, the study area has multiple settlements. The majority of these settlements are scattered around Lusikisiki, with their distribution also influenced by the regional road between Port St Johns and Flagstaff (R61 Road), as well as secondary transportation routes of local importance. Proximity to these routes influences access to some public and social goods.

Lusikisiki is the only major urban settlement in the study area and takes the form of a small town that services a vast rural hinterland. There is a higher settlement density inland compared to the coastal region of the study area.



Map 1.2: Study area

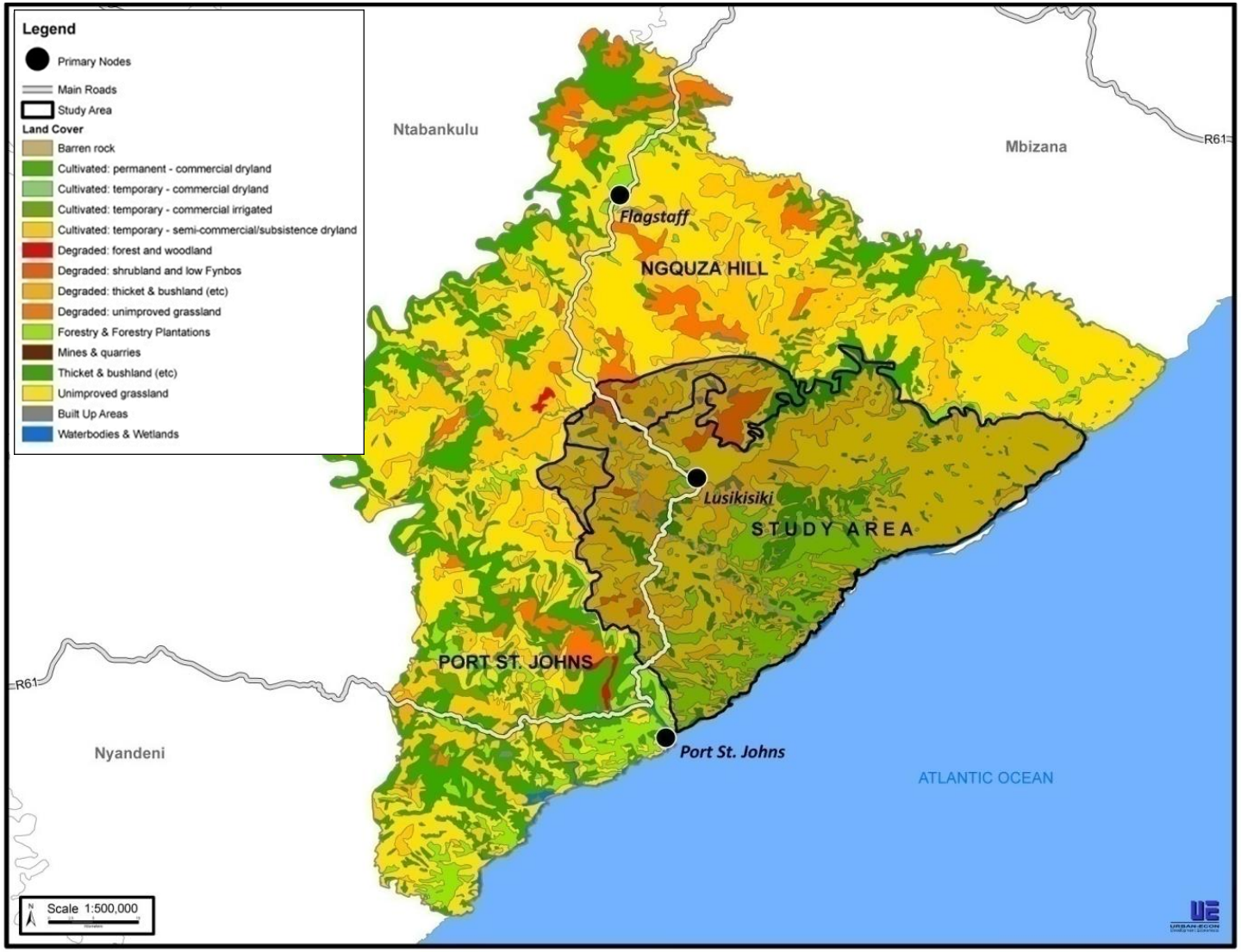
The Ngquza Hill and Port St Johns Local Municipalities will be referred to extensively in this report as the impact of this proposed regional water supply scheme will be primarily experienced in this area. The study area has largely a homogenous land use, which allows the combination of the Port St Johns and Ngquza Hill Local Municipalities together in the basis impact analysis.

Land cover for the study area is displayed in Map 1.3. The study area is comprised of largely rural land (97% of households are situated in rural, tribal or traditional areas) with settlements sparsely located in areas far from roads or the urban node of Lusikisiki. The entire study area consists of land that was previously part of the Transkei Homeland. As such, it is characterised by high levels of endemic poverty and underdevelopment. The implication is that the rural land is largely used for subsistence agriculture.

1.5 Report Outline

The report is structured in chapters:

- The **introductory chapter** provides the background to the study and the project itself.
- The **second chapter** delivers an examination of key economic and socio-economic characteristics of the study area that assist in interpreting and evaluating macro-economic impacts.
- The **third chapter** provides the input data regarding the construction, operational and refurbishment phases of the project, i.e. information used as input into the modelling exercise.
- The **fourth chapter** gives an account of the primary quantified potential macro-economic impacts of the LRWSS.
- The **fifth chapter** presents the results of the regional and local socio-economic impact assessment exercise.
- **Chapter six** summarises the key aspects and outcomes of the study.



Map 1.3: Land cover

2 BASELINE PROFILE AND LEGISLATIVE REVIEW

The purpose of this chapter is to provide an outline of the study area's salient features. This chapter then contextualises the proposed LRWSS within the study area. Furthermore, the section provides a legislative review of the policies pertaining to the development of the LRWSS.

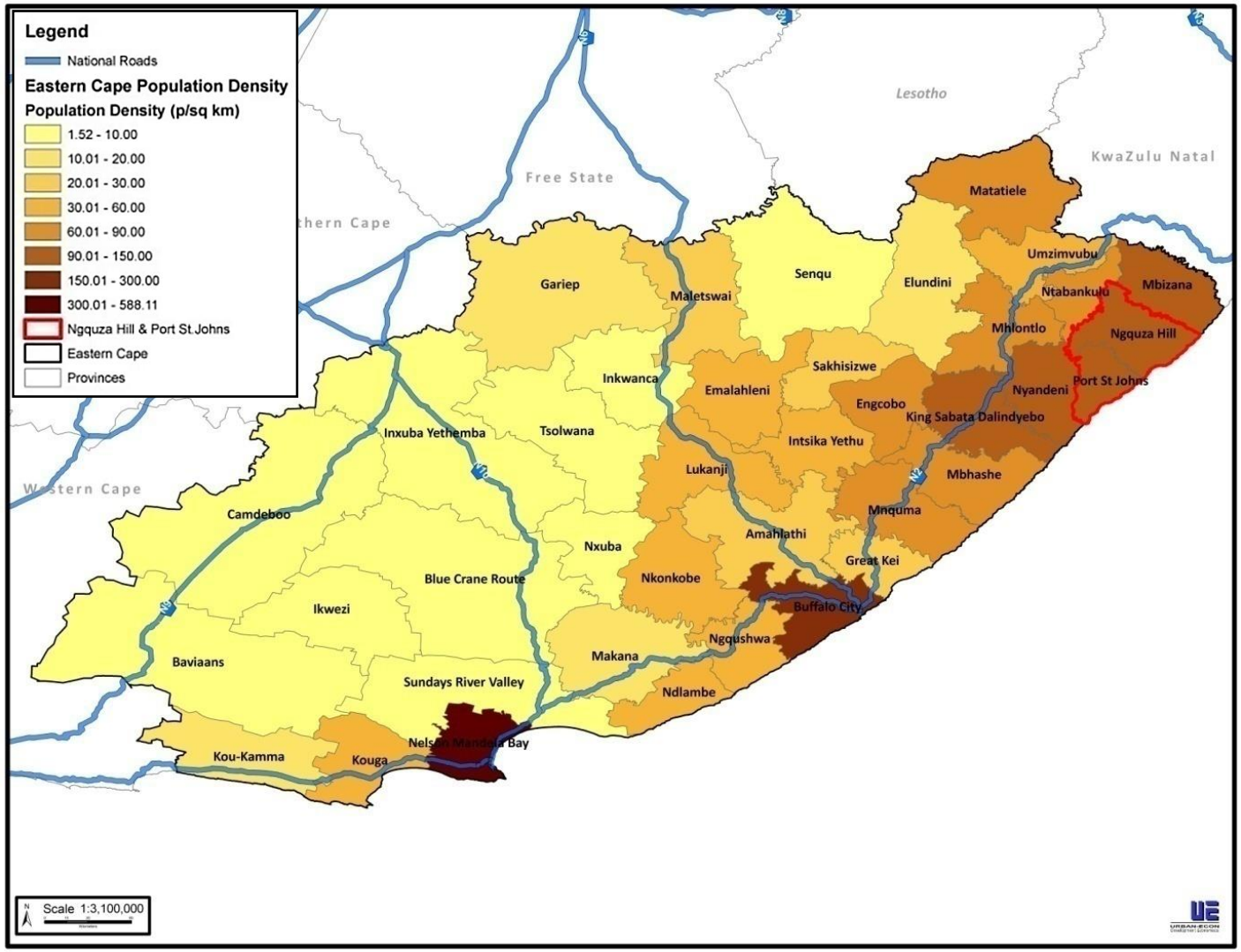
2.1 DEMOGRAPHIC PROFILE OF THE STUDY AREA

The quality of life within the study area can be understood through an analysis of multiple development indicators. This section provides a comprehensive overview of selected indicators in this regard.

2.1.1 Household population and trends

The population of any geographical area is the cornerstone of the development process, as it affects the economic growth through the provision of labour and entrepreneurial skills and determines the demand for the production output. Examining population dynamics is key to understanding the perspective of those likely to be affected by prospective development. Map 2.1 provides an overview of the study area's main population trends.

The study area has a relatively high population density (over 110 people per square kilometre) as shown by **Map 2.1**. This is especially true considering that the area largely constitutes rural settlements. The rural element is reflected in the relatively vast household sizes as shown in **Table 2.1**. The population breakdown per age group conforms to traditional demographic transition models with a large youthful base supported by fewer older residents.



Source: Calculations by Urban-Econ GIS unit based on Census, 2011

Map 2.1: Provincial population density with study area outlined

Table 2.1: Demographic dynamics

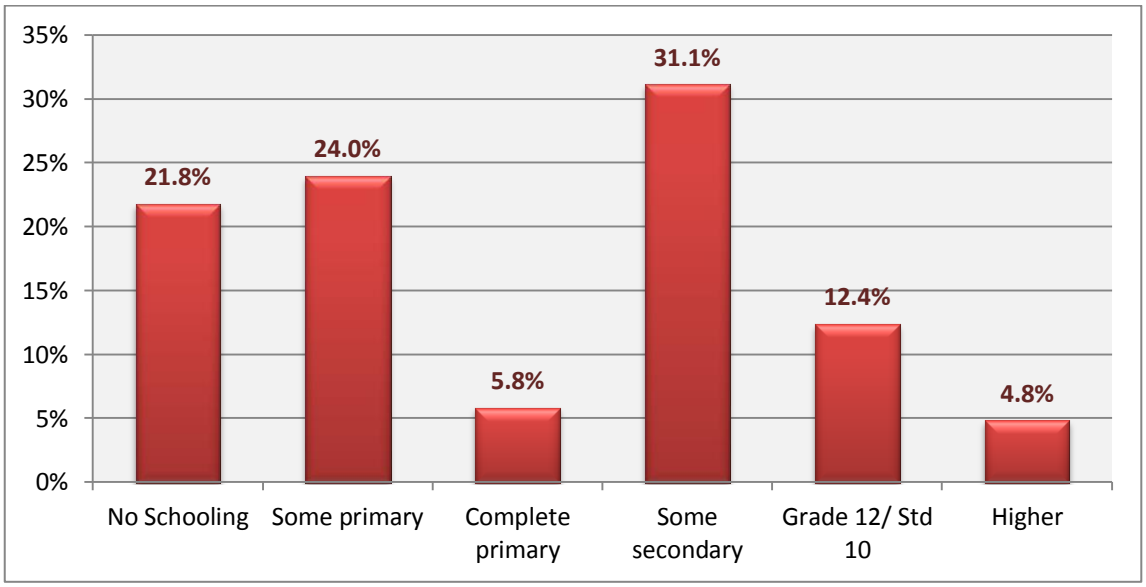
Indicator	Study Area (Ngquza Hill and Port St Johns Local Municipalities)
Population	463 937
Average annual population growth rate (Census 2001 – Census 2011)	0.8%
Population density (people per km^2)	116
Number of households	87 869
Average household size	5
Households per km^2	23
Age breakdown	**0-14:** 42.4% **15-34:** 33.7% **35-64:** 18.2% **65+:** 5.4%
Area	3 768 km^2

Source: Urban-Econ calculations based on Census, 2011

The ***implication*** of the relatively high growing population (almost half a million residents) is that an increase in the size of the population will induce an increase in the water requirements and employment opportunities. To ensure that living standards do not decline, it is imperative that the State and market are able to provide for the needs of the population. In addition, an increase in employment will be accompanied by an increase in individual and household income, which will translate into an increase in the demand for goods and services. This then provides an opportunity for the expansion of business productivity and/or the start-up of new businesses.

2.1.2 Education and employment

In addition to understanding the area through the demographic indicators provided in **Table 2.1**, it is also important to consider aspects of the labour pool that affect the ability of the population to become fully functional members (through literacy) of the society. The region is characterised by residents with a mean of 6.5 years of schooling. This average falls below the provincial and national averages. A detailed breakdown of educational attainment achieved by the adult population is presented in **Figure 2.1**.



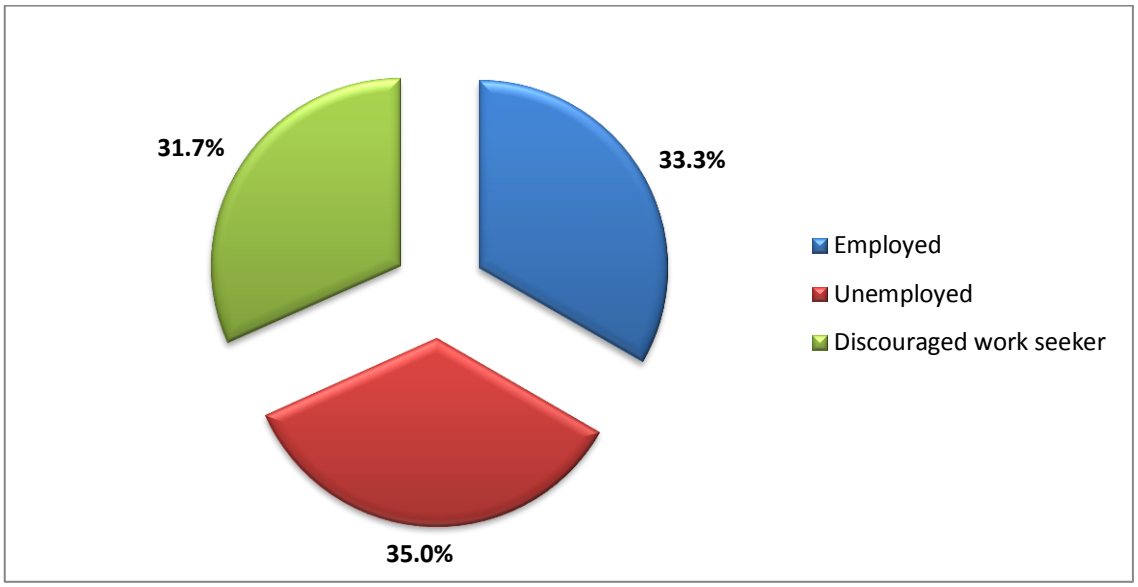
Source: Urban-Econ calculations based on Census, 2011

Figure 2.1: Education profile

Education levels affect the employability of individuals, and this is reflected in **Figure 2.1** which shows the employment status of residents from the study area. It is evident that more individuals in the study area are unemployed than employed. For the purpose of this section, an employment status may be categorised as employed, unemployed and discouraged work seekers. These categories may be defined as:

- ***Employed*** being people who have within the last seven days performed work for pay.
- ***Unemployed*** are those people within the economically active population who: did not work during the seven days prior to the interview; want to work and are available to start work within two weeks of the interview; and have taken active steps to look for work or to start some form of self-employment in the four weeks prior to the interview.
- ***Discouraged work seekers*** i.e. a person who is not working and is not seeking work as a result of a perceived futility in the activity, caused by limited opportunities for gainful employment.

Only 19% of the employed individuals are employed in the informal sector. This is a function of the small urban population and small spatial footprint of the Lusikisiki town (and Port St Johns as well), which limit the scope for activities such as hawking and vending as well as artisanal activity such as backyard automobile mechanics.



Source: Urban-Econ calculations based on Census, 2011

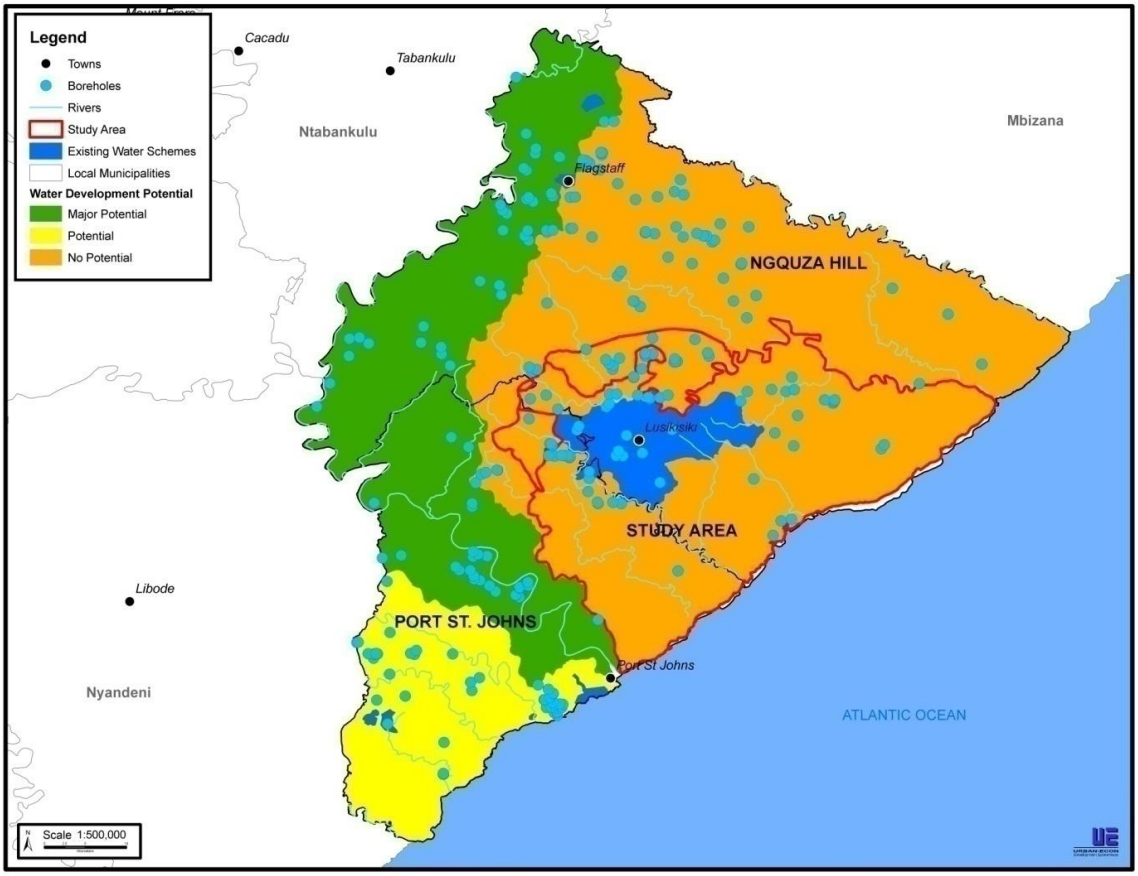
Figure 2.2: Employment profile

The statistics illustrated in **Figure 2.2**, implies that there is a pressing need for employment opportunities in the study area. Employment associated with the development of the LRWSS has the potential for skills development through the provision of on-the-job training that provides transferable competencies for a populace.

2.1.3 Access to basic services

Basic service delivery and shelter are indicators that give an understanding of the standard of living of people residing in the study areas. Comprehension of the extent to which households in the study area have access to water, sanitation and electricity assists in understanding of the communities' plight and their needs. Assessing and understanding a community's access to basic services creates a baseline, against which the potential impact of the proposed project can be assessed.

In accordance with the scope of this report, access to basic services will be discussed under the heading of access to piped water. **Map 2.2** illustrates the current state of water resources and infrastructure within the study area according to the Eastern Cape Spatial Development Plan (2010).

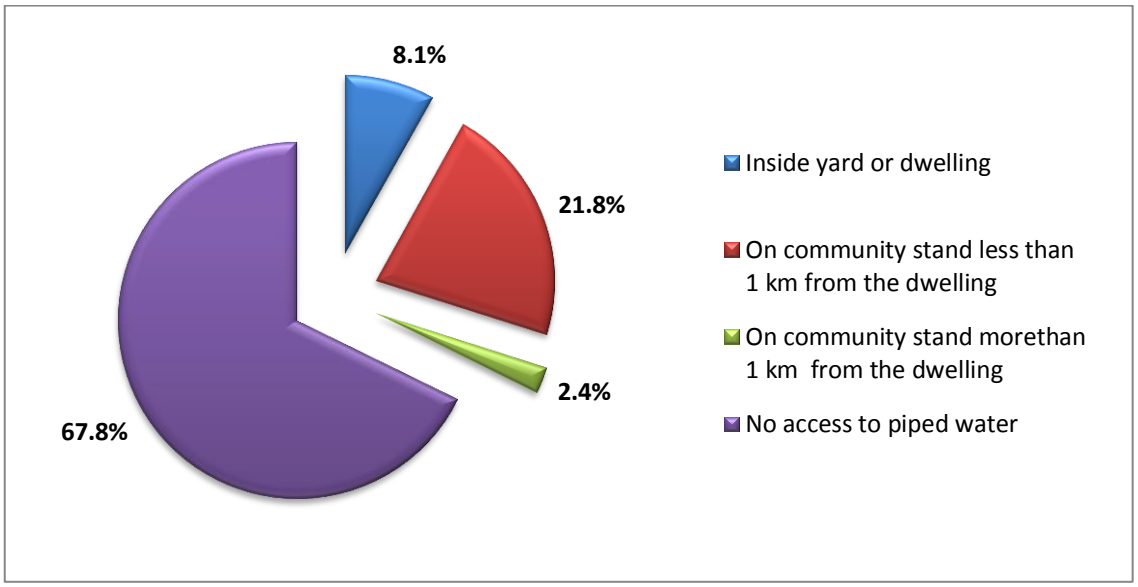


Source: Urban-Econ GIS unit based on the Eastern Cape Spatial Development Plan, 2010

Map 2.2: Current state of water resources and infrastructure within the study area

The South African Constitution (1996) states that all households are entitled to a minimum level of services defined as an electricity connection to each dwelling, clean safe drinking water within 200 m and availability of a ventilated pit toilet.

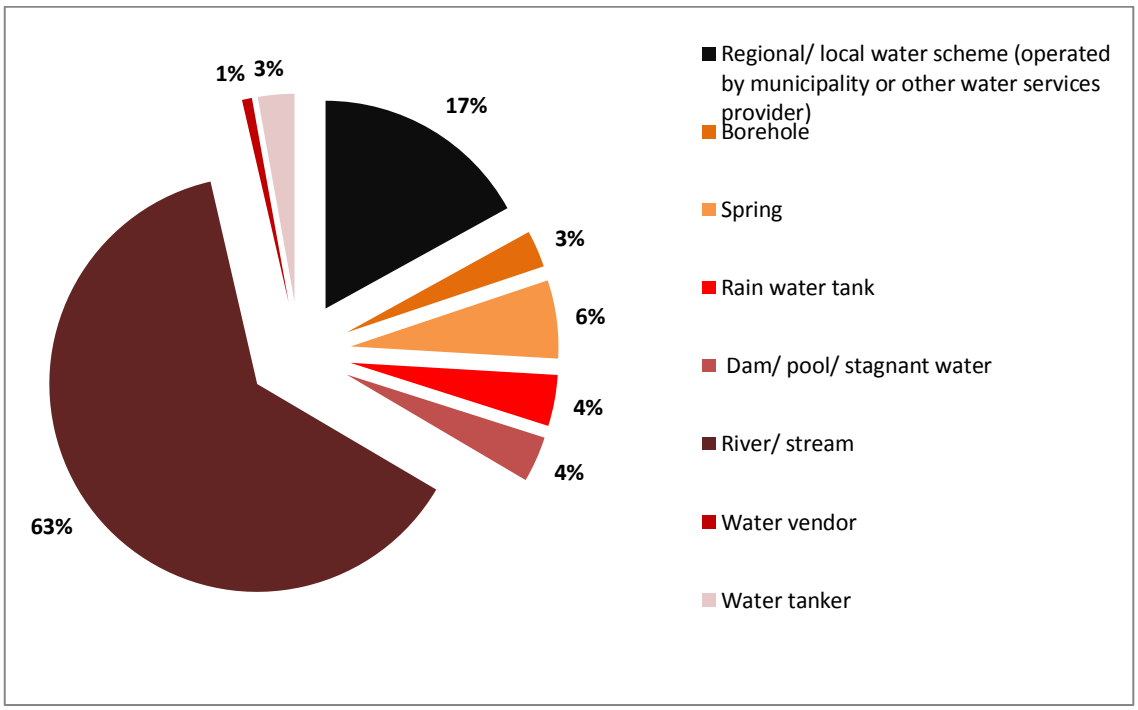
Figure 2.3 illustrates household access to piped water within the study area.



Source: Urban-Econ calculations based on Census, 2011

Figure 2.3: Access to piped water

From **Figure 2.3** it is evident that the majority of households in the study area do not have access to piped water. This is in line with expectations for the area as it is largely rural in nature, which significantly limits the scope for provision of piped water.



Source: Urban-Econ calculations based on Census, 2011

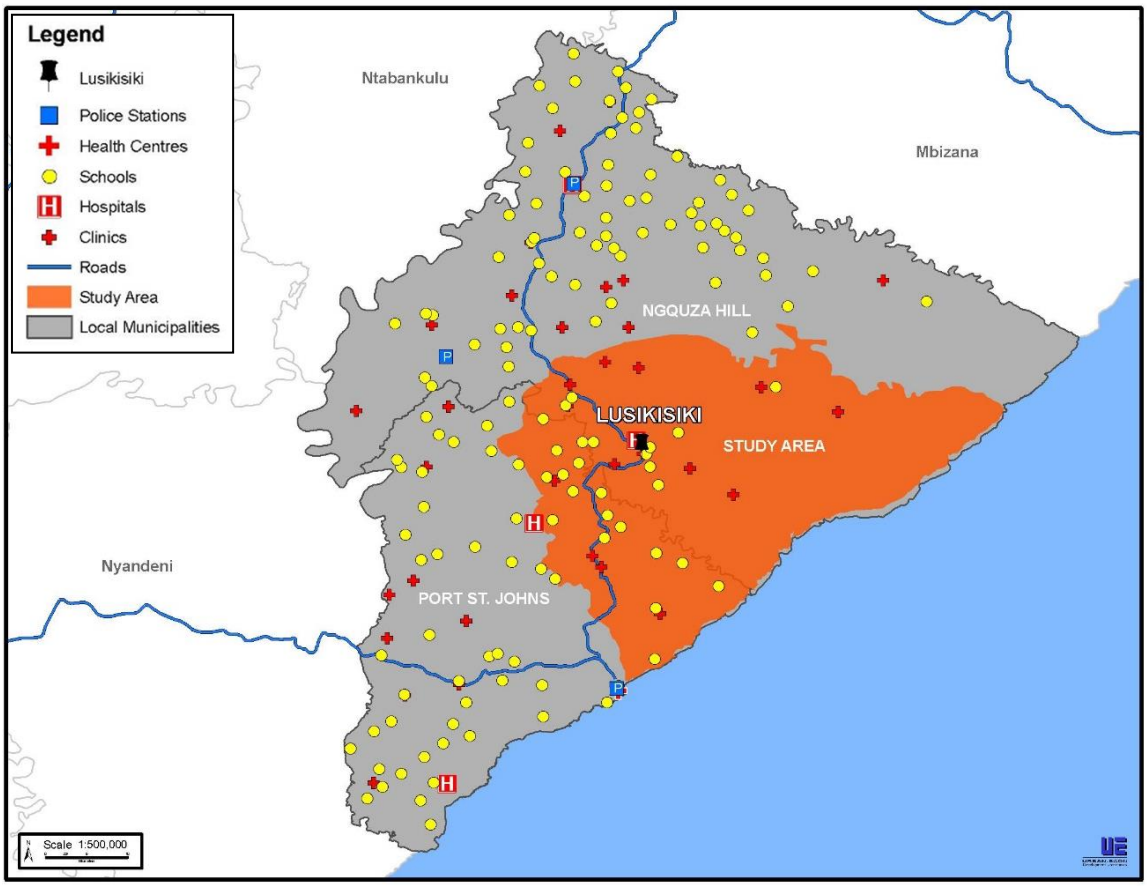
Figure 2.4: Current primary sources of water for households within the study area

Figure 2.4 presents the primary sources of water for households within the study area. At present, 17% of households receive water through a regional or local water scheme operated by their local municipality or another water service provider. Currently, the majority of households acquire water from rivers or streams.

The ***implication*** of the information presented above is that the proposed LRWSS could possibly unlock economic opportunities through facilitating or making the provision of alternate water sources for villages feasible.

Map 2.3 shows the location of selected forms of the social infrastructure namely:

- Schools;
- Clinics;
- Hospitals;
- Health centres; and
- Police stations.



Map 2.3: Social infrastructure

It can be observed that the study area has a relatively low level of provision of the above-mentioned forms of social infrastructure. The majority of social infrastructure is located near Lusikisiki and along transportation route spines.

The ***implication*** of the availability of infrastructure is that the non-provision or reduction of services has a detrimental impact on the efficiency of a region's economy and the well-being of a community. The provision of infrastructural services represents a precondition for improved economic growth, welfare, quality of life and productivity of people. By providing well-planned and managed infrastructure, economic opportunities and social well-being are created. Infrastructure such as the LRWSS thus plays a dual role in the economic system, namely an improvement in economic activity and an improvement in living conditions. The development of the LRWSS will create increased expenditure in the study area and as a result an opportunity to develop the area further.

The provision of infrastructural services can also play an important role in the direct improvement of the welfare of households in a specific region. Criteria in determining

welfare include, among others, access to at least minimal infrastructure services. These services have different effects on improving the quality of life. Access to clean water and sanitation can reduce mortality; access to transport provides access to markets; access to employment opportunities and social services such as health and education can increase living standards and earnings potential; and access to communication networks can result in an improved level of education and literacy rate. By contrast, the non-provision of services can detract from economic quality of life since much time has to be devoted to activities such as collecting fuel, wood or water – time that could otherwise be spent on income-earning activities.

The provision of infrastructural services does not, however, necessarily lead to the eradication of poverty. In designing infrastructure, cognisance must also be taken of the social and environmental effects, as well as the financial capability of the households.

2.1.4 Household income

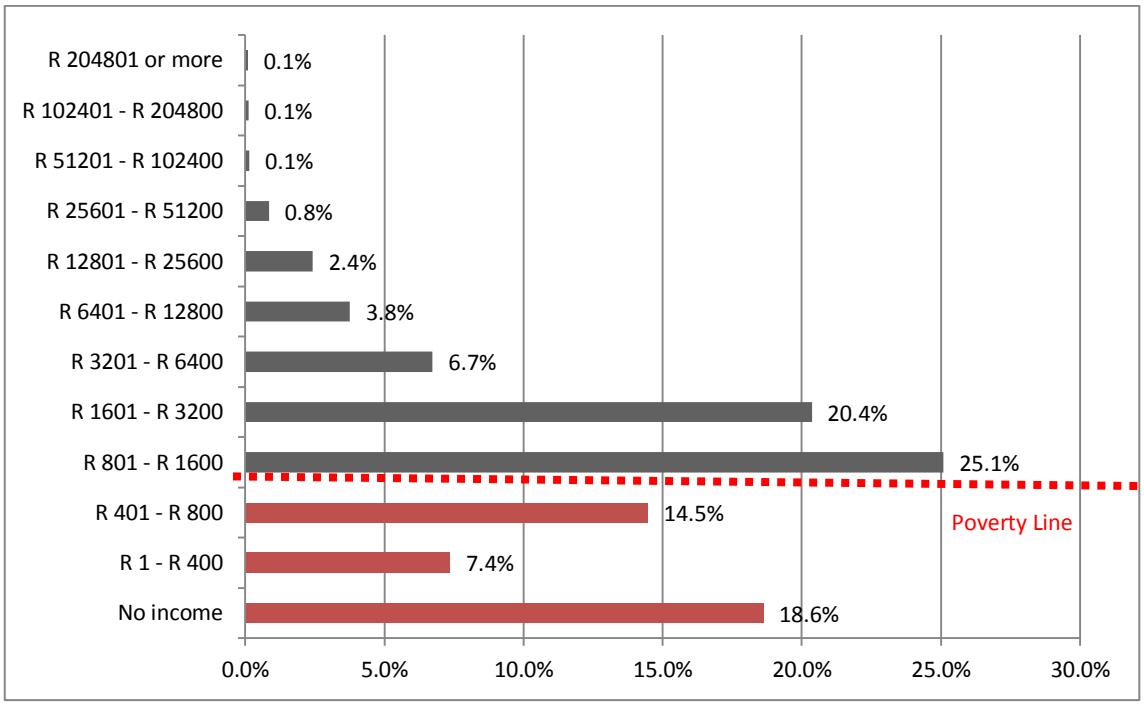
Income distribution is one of the most important indicators of social welfare, as income is a primary means by which people are able to satisfy their basic needs such as food, clothing, shelter, health, services, etc. Household income is also used to determine the affordability of water in the study area.

Change in income will have a positive effect on the standard of living; more specifically a positive change in income can assist individuals, households, communities and countries to improve living standards.

Household income is defined as the combined income of all members of a household, the determination of which includes:

- Labour remuneration;
- Income from property;
- Transfers from government (including pensions);
- Transfers from incorporated businesses; and
- Transfers from other sources.

Figure 2.5 illustrates the proportion of households in each income bracket for the study area.



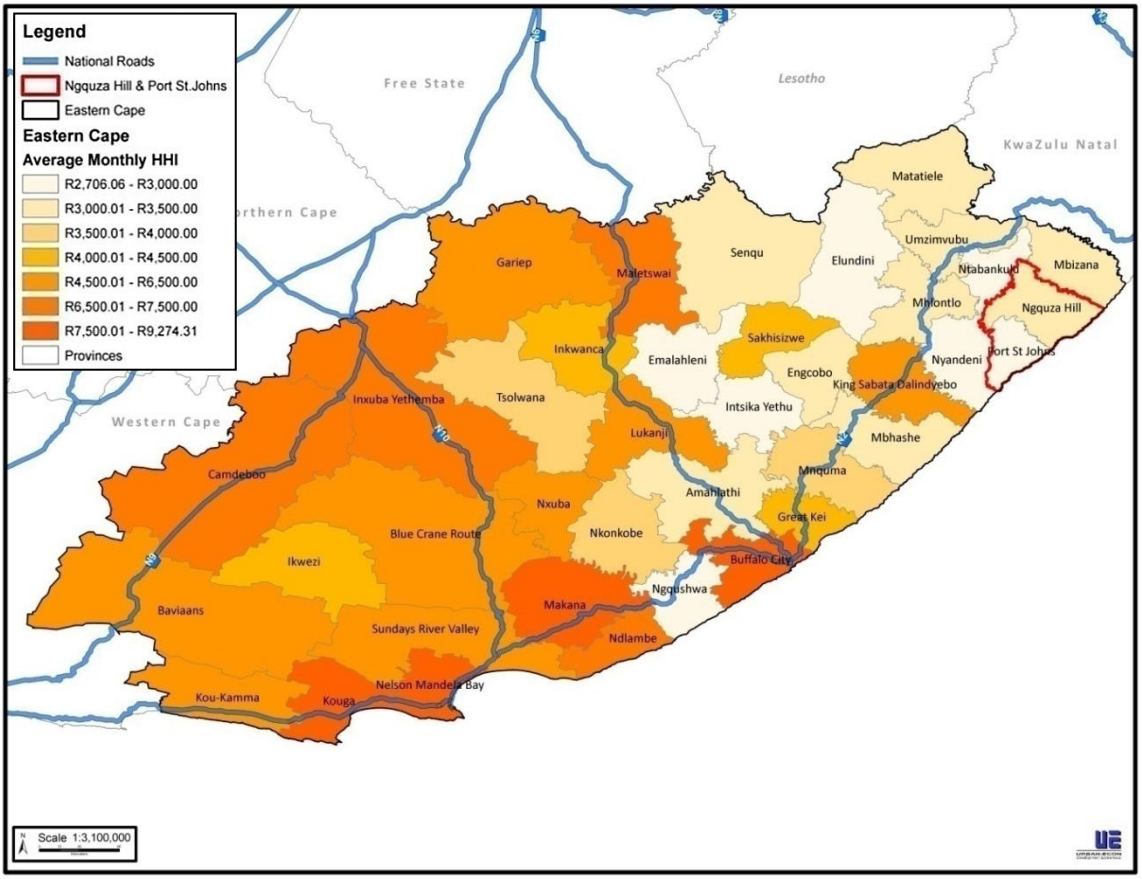
Source: Urban-Econ calculations based on Census, 2011

Figure 2.5: Household income distribution

The distribution of income within the study area is presented in **Figure 2.5** while the weighted average annual household income of local municipalities in the Eastern Cape is presented in **Map 2.4** with the study area outlined.

It is apparent that the study area features amongst the lowest ranking cohorts of household income. In 2011 the study area had a weighted average household income of R 3 003.59 per month. This is partly a result of over 40% of households in the area subsisting on a monthly income below the poverty line of R 802[2]. This results in a Human Development Index, a multi-factor indicator of development, of 0.4. It indicates welfare as measured through access to healthcare services, education and monetary income. The Human Development Index is measured from 0, which indicates an absolute absence of development, to 1, which indicates a comprehensively high level of development. The study area's score is below half, which shows that the area has a low level of development.

[2] *It is acknowledged that multiple alternative income poverty lines are recognized in policy, planning and strategy documents of the South African public sector. It is also acknowledged that income poverty (based on the definition of income used in this report) is one of many methods used to classify household poverty in South Africa.*



Source: Calculations by Urban-Econ GIS unit based on Census, 2011

Map 2.4: Average provincial household income

This has ***implications*** on the levels of income poverty in the area, with household incomes being significantly low compared to other parts of the province. The average household income of R 3 003.59 per month has further implications considering that households in the study area typically consist of several individuals all sharing an income amongst themselves. A significant investment such as the proposed LRWSS thus has the potential to significantly impact household incomes in the area through direct, indirect and induced channels.

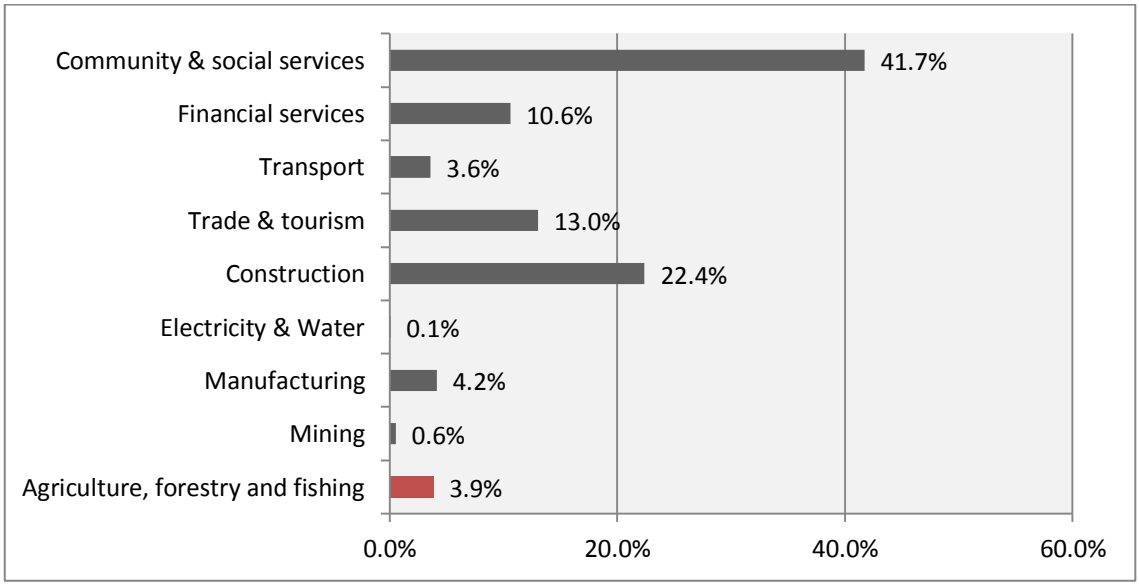
Regarding the ***affordability of water*** the income profile indicates that there is a significant portion of the population that are at risk of not being able to afford the water that will be provided through the LRWSS. The affordability of water was further discussed as part of the impact analysis.

2.2 Economic Profile of the Study Area

The purpose of this section is to profile the local economy of the study area. This is undertaken in order to understand how different productive sectors contribute towards the region's output. Analysis in this section is focused on GDP-R, which comprises the value of all final goods and services produced during one year within the boundaries of a specific region (in this context, the study area). GDP-R is an important indicator of economic activity and is commonly used to measure the level of economic activity in a specific area e.g. local municipality.

2.2.1 Economic structure

The contribution of different economic sectors to the study area's total output is presented in **Figure 2.6**. The community and social services sector represents 41.7% of the economy. Government and the public sector as a whole are represented in the community and social services sector. Construction is a fairly large contributor to local value addition. This is mainly a result of building activity linked to the public sector programmes and projects mentioned above. Formal agricultural output is low, although it must be noted that these official statistics do not reflect subsistence production as is found in the majority of the study area's rural villages.



Source: Urban-Econ calculations based on Quantec Data, 2013

Figure 2.6: Sector contribution to GDP-R

The ***implication*** of high public sector activity is that the nature of economic activity in the study area is highly dependent on government-initiated projects and programmes to stimulate further private sector investment. This is a result of the economy being largely underdeveloped. A project such as the proposed LRWSS could play an important role in catalysing the local economy of the study area.

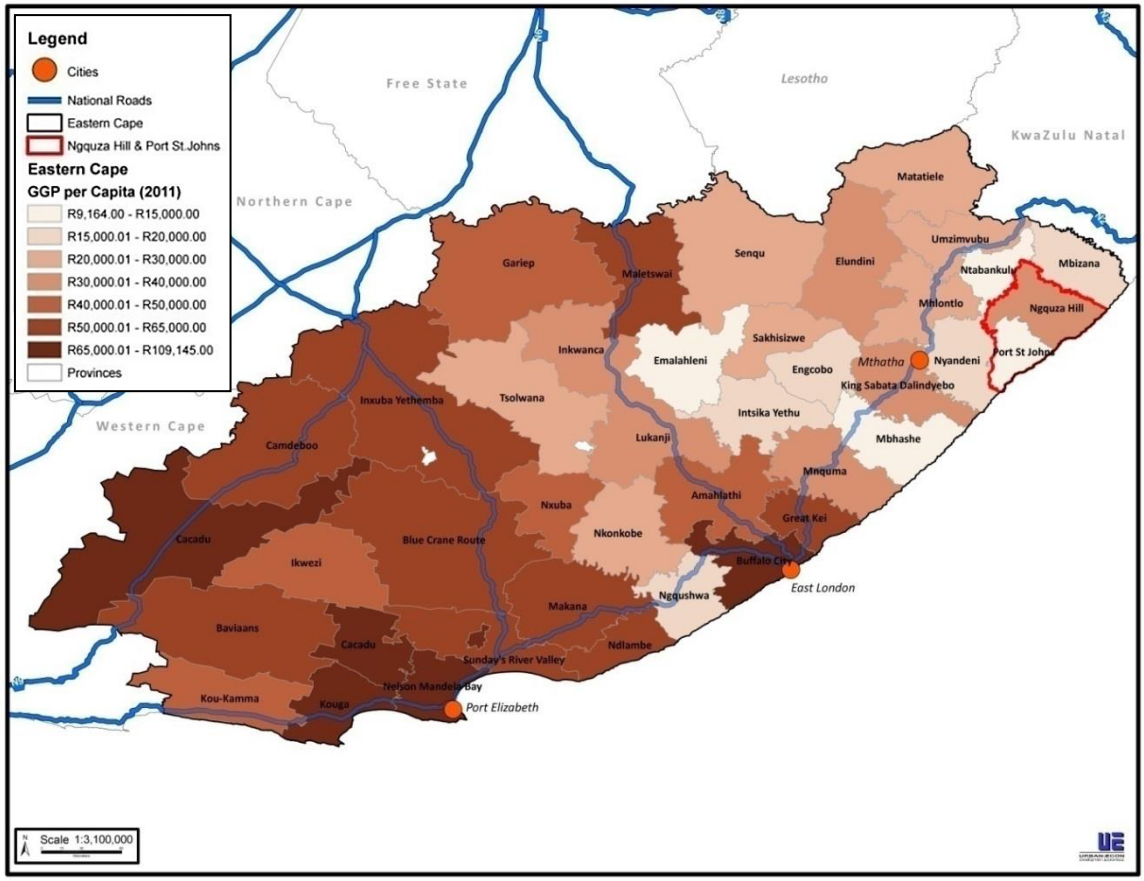
The relatively large construction sector has implications on the nature of economic impacts associated with the proposed water scheme. The large contribution by the sector to the total local economic activity may imply the presence of a relatively high concentration of skilled construction workers residing in the area. Economic expenditure leakages associated with the proposed project would thus possibly be lower compared to if the study area had a smaller construction sector.

The proposed project may also have implications on the nature of agricultural activity found in the area through changes in access to water resources.

2.2.2 Economic trends

The provincial per-capita GDP-R is presented in **Map 2.5**. Per capita statistics are presented in order to show the value of output attributable to each member of the productive workforce. Per-capita GDP-R is not only based on the total quantum of output, but also considers productivity levels per employed individual as well as labour force participation.

It may be observed that the study area has a comparatively low level of output, particularly that which falls under the Port St Johns Local Municipal boundaries. This is a result of the aforementioned historical legacy of apartheid that resulted in underdevelopment in the economies of regions in the former Transkei.



Source: Calculations by Urban-Econ GIS unit based on Quantec, 2013

Map 2.5: Provincial GDP-R per capita

Implication: A low per capita GDP-R (coupled with the previously identified high population density) is related to the economic multipliers associated with investments in the region. Such multipliers will be qualitatively and quantitatively significantly different to areas with comparatively high levels of per capita GDP-R. Another implication is that the area is negatively affected by low levels of economic activity, and thus could stand to benefit from investments such as the proposed LRWSS. Increased economic activity through investments such as the LRWSS could lead to an increase in worker income and as a result more people will be able to afford water.

2.3 LEGISLATIVE REVIEW

The purpose of this section is to provide an outline of some of the pertinent and binding policies, plans and strategies that have a bearing on the proposed LRWSS and its overall economic impact.

2.3.1 National and provincial informants

a) New Growth Path

The New Growth Path is a statement of government's commitment to forging a developmental consensus. It is meant to lead the way by:

- Identifying areas where employment creation is possible on a large scale as a result of substantial changes in South African and global conditions.
- Developing a policy package to facilitate employment creation in these areas, principally through:
  - A comprehensive drive to enhance both social equity and competitiveness.
  - Systemic changes to mobilise domestic investment around activities that can create sustainable employment.
  - Strong social dialogue to direct the focus of all stakeholders to encouraging growth in employment-creating activities.

It contains policies that speak to industry; rural development; competition; education and skills development; enterprise development; BBBEE; labour and technology. These are to be expressed through job drivers in the form of spatial development, social capital, new economies and the main economic sectors.

b) Eastern Cape Provincial Growth and Development Plan (PGDP)

In line with the identification of the district as an Integrated Sustainable Rural Development Programme (ISRDP) node, the Strategy Framework for Growth and Development 2004-2014 (SFGD) and the Provincial Growth and Development Plan 2004-2014, highlights the promotion of rural enterprises based on sustainable utilisation of natural resources as one of the keys to poverty eradication in ISRDP areas. Programmatic implications include support in development of animal husbandry opportunities including processing and marketing with particular emphasis on communal grazing areas; harnessing agricultural potential and linking it to downstream production (agro-processing); and targeting tourism as a key growth sector based on the strength of natural resources and beauty. Related and supporting interventions are infrastructural, institutional and human resource development.

The envisioned growth and development for the Eastern Cape is quantified in the PGDP 2004-2014 by the setting of targets against objectives relating to sustained economic growth, particularly with respect to manufacturing and tourism development, systematic poverty eradication as well as the transformation of the agrarian economy and establishment of food security. Furthermore, the PGDP emphasised the importance of promoting competitiveness, financial sustainability and global integration in Local Economic Development (LED) initiatives and re-iterates that the focus of local government should be on development facilitation, governance and administration, regulation and service delivery.

c) Eastern Cape Provincial Spatial Development Plan

This plan gives guidance on the principles that should underpin the strategic approach to spatial development and management in the province. To this end, a targeted and phased approach to development is recommended based on:

- Settlement hierarchy: focusing investment strategically at three levels of support. The plan promotes identification of nodes and corridors with opportunity and targets development initiatives, which promote consolidation of settlements to facilitate cost effective development.
- Flexible zoning: allowing flexibility for special types of investment.
- Resources sustainability: monitoring the use of resources to ensure sustainability and minimisation of environmental impacts in all land developments.
- Restricted development zone: identifying environmentally sensitive areas and ensuring that developments do not occur for example in or on wetlands; state forests; dune systems; river estuaries; game and nature reserves; and heritage sites etc.
- Spatial integration: promoting of integrated development with maximum spatial benefits, integrating communities and the spatial economy.

d) Eastern Cape Rural Development Strategy

The Eastern Cape Rural Development Strategy is a sustained and long-term programmatic intervention in response to endemic poverty in the province. It is premised on the belief that through self-organisation of communities, government,

the private sector and other role-players in the developmental arena, inroads can be made in the fight against chronic poverty in the province.

The rationale for a rural development strategy that caters for the specific needs of the province can be found in the status of:

- Structural factors that lead to marginalisation of societies and inequality of opportunities.
- The historical political economy, whose legacy in rural hinterlands is experienced through low levels of economic integration.
- Land and agrarian relations, which give rise to a skewed distribution of natural resources.
- Settlement and migration patterns that lead to a divide between rural and urban areas.
- A marked need for improved food security, based on agrarian transformation linked to indigenous ways of life.
- Past initiatives that have mixed fortunes in their ability to deliver a lasting impact on rural development.

National planning documents identify the O.R. Tambo district as a poverty node in which massive investment is to be directed. Provincial planning documents identify projects such as the proposed LRWSS as forming part of a set of critical infrastructure interventions, aimed at unlocking the province's development potential. Based on national and provincial informants, a project such as this is thus seen as having significant positive impacts on the broader region, beyond those experienced solely within the study area's boundaries.

2.3.2 Municipal informants

a) Oliver Tambo District Municipality Integrated Development Plan

An Integrated Development Plan (IDP) is the primary means of service delivery used by municipalities in identifying principal developmental needs and implementing actions to face these needs. The Oliver Tambo District Municipality (ORTDM) IDP encompasses aspirations linked to economic, social, institutional and infrastructural goals within the district. Its overarching goals are to eradicate backlogs in service delivery, meet developmental targets and fight unemployment and poverty in the

district. In line with this, the issues tackled by the document cover social development of human capital, economic stimulation through poverty relief projects and institutional capacity and authority.

The IDP includes plans to tackle gender equity, environmental management and water services development. Through this targeted approach limited resources will be used where they may have the greatest impact on tackling the district's most pressing challenges. Activities with an agricultural, forestry or tourism slant will be promoted, through prioritisation of the following key performance areas:

- Institutional Transformation and Development;
- Service Delivery and Infrastructure;
- Local Economic Development;
- Financial Viability and Management; and
- Good Governance and Public Participation.

This is to be achieved through the establishment of various programmes and targets for the district council. These programmes will seek to remedy the district's poor service delivery statistics, which include:

- A water provision backlog of 51% (171 899 households);
- A sanitation services backlog of 58% (196 991 households);
- Housing backlog of 223 694 units; 95% of which are in rural areas;
- Electricity backlog at a 91% backlog of households; and
- Road network that is in a poor condition.

b) Oliver Tambo District Municipality Spatial Development Framework

The Spatial Development Framework (SDF) of Oliver Tambo District Municipality (ORTDM) recognises the presence of several constraints to the aforementioned development within the district. This includes the lack of basic infrastructure in the district, compounded by the lack of funds to invest in an improvement in service levels.

The main result of the spatial development framework is the district's spatial development plan, which seeks to unlock economic growth by prioritising infrastructure investment. The spatial development plan is a response to the

challenges identified above, highlighting opportunities that exist within different localities. The opportunities are focused on the areas of tourism, mining, agriculture and environmental assets.

c) Ngquza Hill Local Municipality SDF

The Ngquza Hill SDF is largely informed by the IDP, and provides spatial representation of the recommendations set out in the IDP. This involves mapping opportunities and constraints, and matching these to localities within the Local Municipaility (LM).

The spatial development framework conceptually divides up the locality into coastal, urban and rural settlement areas. This is because of the diverse nature of development, and the various needs and requirements found in the coastal, urban and rural areas. This is also undertaken to match the area's potential in agriculture, tourism and forestry with these three areas more closely. In this regard Lusikisiki and Flagstaff are identified as first order nodes and urban settlement areas. Msikaba and Mbotyi are identified as second order nodes.

d) Port St Johns Local Municipality SDF

The spatial development framework is founded on and guided by the following planning principles:

- Efficient and Integrated Land Development;
- Sustainable Development;
- Protection and Enhancement of the Environment;
- Legal Land Use;
- Efficient Public Participation and Capacity Building;
- Facilitating Developer Interaction with the Municipality;
- Speedy Land Development; and
- Security of Tenure.

The above information implies that no single land use is deemed to be more important than any other. This is reflected in the land use management policies and guidelines that are formulated as part of the spatial development framework. This deals with tourism and recreation, agriculture and conservation, and rural land and

urban development - all being based on nodal development. Land development that occurs in a coordinated and responsible manner is encouraged throughout the document.

The SDF incorporates recommendations emanating from the Wild Coast Tourism Development Policy of 2001 and the Wild Coast Spatial Development Initiative, which is based on the Wild Coast Conservation Area as set out in the Transkei Government Coastal Conservation Decree No. 9 of 1992.

The ***implication*** of these district and national informants is to be found in their reflection of local priorities. As such, economic impacts related to the proposed LRWSS will not just be in the form of direct and indirect spending, but also include dimensions such as:

- Nodal spatial development in Lusikisiki;
- Environmental aspects, and the results of these on the local economy; and
- The capacity of local authorities to position the study area so as to maximise potential benefits and minimise potential disbenefits.

2.4 SUMMARY

This section of the report provided a brief overview of the key socio-economic characteristics of the study area consisting of the Ngquza Hill LM and Port St Johns LM. It was found that the study area has a high population density (over 110 people per square kilometre) and demographic structure typical of a rural area. The population of the study area is growing and will continue to grow in future. In the absence of additional income, this population growth implies a reduction in standards of living. Through the provision of employment opportunities and income, the LRWSS will contribute towards maintaining and/or elevating the standard of living of the society which it affects.

Nearly a quarter of the population of the study area has no schooling and a further quarter only has some level of primary education. The region is characterised by residents with a mean of 6.5 years of schooling. This average falls below the provincial and national averages. The local unemployment rate of 35% is above the national average according to Census 2011 data. There is a pressing need for employment opportunities in the region. Employment,

associated with the construction that forms part of the proposed LRWSS, has the potential to develop the skills of the local populations through the provision of on-the-job training.

The majority of households in the study area do not have access to piped water. This is consistent with expectations for the area as it is largely rural in nature which significantly limits the scope for provision of piped water. This in turn affects household access to water-borne sanitation services and creates backlogs for the respective local municipal authorities in terms of creating sustainable human settlements. At present 17% of households receive water through a regional or local water scheme operated by their municipality or another water services provider. At present the majority of households acquire water from rivers or streams.

The study area has a relatively low level of social infrastructure, the majority of which is located near Lusikisiki and along transportation route spines. The non-provision or reduction of services has a detrimental impact on the efficiency of a region's economy and the wellbeing of its community. The provision of infrastructural services represents a precondition for improved economic growth, welfare, quality of life and productivity of people. By providing well-planned and managed infrastructure, economic opportunities and social wellbeing are created. Infrastructure such as the LRWSS thus plays a dual role in the economic system, namely an improvement in economic activity and an improvement in living conditions. The development of the LRWSS will create increased expenditure in the study area and as a result an opportunity to develop the area further.

Upon examining the income categories it was found that a large portion of the population (40.5%) earns below the poverty line. This indicates that there is a significant portion of the population that are at risk of not being able to afford the water that will be provided through the LRWSS. According to the HDI, the study area scored 0.4 which indicates low levels of development. A significant investment such as the proposed LRWSS thus has the potential to significantly impact household incomes in the area

through direct, indirect and induced channels. An increase in household income will make water more affordable to a larger portion of the population.

The community and social services sector has the largest contribution (41.7%) to the economy of the study area. Government and the public sector as a whole are represented in the community and social services sector. Construction is also a fairly large contributor to local value addition. This is to a large part a result of building activity linked to the public sector programmes and projects mentioned above. Formal agricultural output is low, although it must be noted that the official statistics do not reflect subsistence production as is found in the majority of the study area's rural villages. Furthermore, the study area has a comparatively low level of output (particularly that which falls under the Port St Johns Local Municipal boundaries). This is a result of the historical legacy of apartheid that caused underdevelopment in the economies of regions in the former Transkei.

The section further provides a legislative review of the policies pertaining to the development of the LRWSS. It was found that the national, provincial and local legislation policy environment prioritises projects such as the proposed LRWSS.

3 PROJECT DIMENSIONS

The purpose of this section is to provide an overview of the proposed LRWSS. The rationale is that a comprehensive understanding of the project's various elements (activities, phasing, scope, etc.) will allow a theoretically sound and practically robust assessment of economic impacts associated with it. Particular emphasis is placed on planned expenditure and employment, since this data encapsulates the primary input required to conduct a macro-economic impact assessment. The input data given in this chapter are reasonable estimates based on available data received from the technical reports, Zalu Dam Feasibility Design (DWA, 2014b) and Water Distribution Infrastructure (DWA, 2014a).

3.1 PROJECT PHASES

Economic impacts can be viewed in terms of their duration, or the stage of the lifecycle of the project that is being analysed. Generally two phases are subjected to the economic impact assessment - the construction/development phase and the commercialisation/ operational phase. The economic impact of the construction phase is of a more temporary nature, and has therefore a temporary effect. On the other hand, the operational phase of the project usually takes place over a longer period; hence, the impacts during this stage are of a sustainable nature.

For the development of the LRWSS it is necessary to distinguish between two construction phases. The first is the construction of the Zalu Dam and the second entails the bulk water distribution infrastructure. In addition to the operational phase of the LRWSS there will also be three refurbishment phases for the supporting pump station, water treatment plant (WTP) and boreholes. The operational and refurbishment phases will last longer than 2060 but for the purposes of the impact assessment the operational phase was modelled for the time period of 2014 – 2060.

All phases apart from the Zalu Dam construction period were modelled for a system that can supply 5.4 million m^3/a to only domestic users (plus an additional 1.45 million m^3/a irrigation provision), or 7.2 million m^3/a exclusively to domestic users. For the 5.4 million m^3/a supply a 0.6 MAR (8.1 million m^3 storage) dam will be developed whereas the 7.2 million m^3/a supply will be supplied by a 0.6 MAR or 1.5 MAR dam (19.9 million m^3 storage). Expenditure for a 0.6 MAR or 1.5 MAR dam will be the same during the bulk water distribution infrastructure construction phase and various refurbishment phases. During the Zalu Dam construction phase and operational phase expenditure will differ for the different dam sizes.

The operational figures provided in the *Regional Economics Report* will be less than the figures provided in the *Water Distribution Infrastructure Report* (Module 6). The time period used in the Water Distribution Infrastructure Report was a 48-year period from 2012 to 2060. The *Regional Economics Report* is based on an operational phase of 46 years (2014 – 2060) and therefor represents a smaller total impact than associated with a 48-year period.

3.1.1 Zalu Dam construction phase

Expenditure for the construction of the Zalu Dam will be short-term in nature, extended over a three-year period. The expenditure for the construction of the Zalu Dam component is provided in **Table 3.1**.

It can be concluded from **Table 3.1** that during the Zalu Dam construction phase approximately R 487 million will be spent for a 0.6 MAR dam or R 715 million for a 1.5 MAR dam.

During this phase, which is expected to last three years, 300 local people will be employed and 60 core skilled workers will be sourced from outside the study area.

Table 3.1: 0.6 MAR and 1.5 MAR Zalu Dam construction phase expenditure (2012 R-values)

Item	Amount (Rand)	
	0.6 MAR Zalu Dam*	1.5 MAR Zalu Dam #
Civil works (clearing, excavation, embankment, concrete works, etc.)	R 157 862 370	256 045 020
Mechanical Items	R 44 340 000	44 355 000
Landscaping, miscellaneous, etc.	R 40 440 474	60 080 004
Preliminary works	R 4 500 000	4 500 000
Accommodation	R 8 640 000	8 640 000
Planning, design and supervising	R 63 511 197	93 206 166
Contingencies	R 70 567 996	103 562 407
Preliminary and general	R 97 057 138	144 192 010
Total (excl VAT)	**R 486 919 175**	**714 580 607**

Source: AECOM (Pty) Ltd (2013)

** 0.6 MAR Zalu dam has 8.1 million m³ storage at 612 masl FSL*
 # 1.5 MAR Zalu dam has 19.9 million m³ storage at 622.6 masl FSL

3.1.2 Bulk Water Distribution Infrastructure construction phase

Table 3.2 provides the expenditure associated with the phase.

Table 3.2: Bulk Water Distribution Infrastructure construction phase expenditure (2012 R-values)

Item	5.4 million m^3 /a 0.6 MAR Zalu Dam	7.2 million m^3/a 0.6 / 1.5 MAR Zalu Dam
Staffing	R 146 307 600	R 170 241 300
Accommodation	R 16 200 000	R 18 576 000
Transport	R 15 795 000	R 18 111 600
Construction	R 386 968 270	R 485 307 313
Total Expenditure	**R 565 270 870**	**R 692 236 213**
Number of People Locally Employed	360	430
Core Skilled Staff	75	86
Total Number of People Employed	**435**	**516**

Source: AECOM (Pty) Ltd (2013)

It is evident from **Table 3.2** that if a 5.4 million m^3 system should be constructed the cost will be approximetly R 565 million with 435 people employed for three years. The cost for a 7.2 million m^3 system will be in the region of R 692 million with 516 employment

opportunities created. For a 5.4 million m^3 system the cost of irrigation infrastructure was not included.

During the infrastructure construction phase pipes will be manufactured within South Africa, but not necessarily in the study area. Cranes and special equipment will also be sourced in South Africa but not necessarily in the study area. All the other construction materials will be obtained from the local region, provided that the area can supply the required materials, otherwise some materials will have to be sourced from elsewhere in the country.

3.1.3 Operational phase

The operational phase will commence upon completion of the construction phases. Expenditure for the operation of the LRWSS has been provided for a time period of 46 years as shown in **Table 3.3**.

Table 3.3: Operational phase expenditure (2012 R-values)

Item	5.4 million m^3 / a 0.6 MAR Zalu Dam	7.2 million m^3 / a 0.6 MAR Zalu Dam	7.2 million m^3 / a 1.5 MAR Zalu Dam
Staff	R 182 118 600	R 208 058 460	R 294 434 300
Other	R 476 887 487	R 596 957 771	R 616 457 771
Electricity	R 143 008 511	R 156 053 032	R 170 287 409
Total Expenditure	R 802 014 598	R 961 069 263	R 1 081 179 480
Number of People Locally Employed	1 380	1 518	1 668
Core Skilled Staff	276	322	352
Total Number of People Employed	1 656	1 840	2020

Source: AECOM (Pty) Ltd (2013)

Over the 46-year operational period expenditure could range between R 802 million and R 1 081 million depending on the chosen system and dam size.

3.1.4 Pump station refurbishment phase

The pump station refurbishment phase will stretch over the operational time period but in ten-year intervals. The first refurbishment phase will take place ten years after operation of the LRWSS has commenced. After the first refurbishment, a pump station refurbishment will be conducted every ten years until 2060. Each refurbishement phase will last approximetly one year and expenditure is provided accordingly. The exenditure

cost provided in **Table 3.4** represents four pump station refurbishments over a 46-year period.

Table 3.4: Pump station refurbishment phase expenditure (2012 R-values)

Item	5.4 million m^3 /a 0.6 MAR	7.2 million m^3/a 0.6 / 1.5 MAR
Staffing	R 29 033 400	R 31 097 160
Accommodation	R 3 168 000	R 3 456 000
Other	R 36 659 248	R 55 929 638
Total Expenditure	**R 68 860 648**	**R 90 482 798**
Number of People Locally Employed	220	228
Core Skilled Staff	44	48
Total Number of People Employed	**264**	**276**

Source: AECOM (Pty) Ltd (2013)

It can be concluded from **Table 3.4** that the pump station refurbishment associated with a 5.4 million m^3/a system will be approximetly R 69 million with 264 people employed. The cost expected for a 7.2 million m^3/a system will be in the region of R 90 million with 276 employment opportunities created for one year, every ten years, during the pump station refurbishment period.

3.1.5 Water treatment plant refurbishment

The WTP refurbishment phase will be similar to the pump station refurbishment phase but will be implemented in 15-year intervals. The first WTP refurbishment will take place 15 years into the operational phase. Each refurbishement phase will last approximetly one year and expenditure is provided accordingly. The expenditure shown in **Table 3.5** is for three WTP refurbishments over a 46-year operational time period.

It can be concluded from **Table 3.5** that over the 46-year operational period, WTP expenditure could range between R 125 million and R 167 million depending on the chosen system.

Table 3.5: Water treatment plant refurbishment expenditure (2012 R-values)

Item	5.4 million m^3 /a 0.6 MAR	7.2 million m^3/a 0.6 / 1.5 MAR
Staffing	R 23 754 600	R 31 672 800
Accommodation	R 2 592 000	R 3 456 000
Other	R 98 691 609	R 131 673 354
Total Expenditure	**R 125 038 209**	**R 166 802 154**
Number of People Locally Employed	180	240
Core Skilled Staff	36	48
Total Number of People Employed	**216**	**288**

Source: AECOM (Pty) Ltd (2013)

3.1.6 Borehole refurbishment phase

The pump borehole refurbishment phase will stretch over the operational time period but in ten-year intervals. The first refurbishment phase will take place ten years after operation of the LRWSS has commenced. After the first refurbishment, a borehole refurbishment will be conducted every ten years until 2060. Each refurbishement phase will last approximetly one year and expenditure is provided accordingly. The exenditure cost provided in **Table 3.6** represents four borehole refurbishments over a 46-year period.

Table 3.6: Borehole refurbishment phase expenditure (2012 R-values)

Item	5.4 million m^3 /a 0.6 MAR	7.2 million m^3/a 0.6 / 1.5 MAR
Staffing	R 1 188 700	R 1 188 700
Accommodation	R 129 800	R 129 800
Other	R 4 938 458	R 4 938 458
Total Expenditure	**R 6 256 958**	**R 6 256 958**
Number of People Locally Employed	9	9
Core Skilled Staff	2	2
Total Number of People Employed	**11**	**11**

Source: AECOM (Pty) Ltd (2013)

It can be concluded from **Table 3.6** that the borehole refurbishment associated with a 5.4 million m^3/a system or 7.2 million m^3/a system will be approximetly R 6 million with 11 people employed.

3.2 SUMMARY

The LRWSS consists of five phases which formed the basis of the economic impact assessment. It will have two construction phases of which the first is the construction of the Zalu Dam. The second entails the Bulk Water Distribution infrastructure additional to the Zalu Dam. The LRWSS impact assessment is based on an operational phase encompassing a 46-year period. The operational phase will last longer than 46 years but for the purposes of the impact assessment it was modelled for the time period of 2014 – 2060. In addition to the operational phase of the LRWSS, there will also be three refurbishment phases for the supporting pump station, Water Treatment Plant (WTP) and boreholes. These three phases will occur at different time intervals during the operational phase.

All infrastructure, except for the Zalu Dam, consists of infrastructure (and related expenditure) for a system that can supply either 5.4 million m^3/a or 7.2 million m^3/a. The cost associated with all the phases of the 7.2 million m^3/a system is higher than that of the 5.4 million m^3/a system, since no cost for irrigation infrastructure, associated with the 7.2 million m^3/a scenario, was included. For the 5.4 million m^3/a system a 0.6 MAR dam will be developed whereas the 7.2 million m^3/a system will be supplied by a 0.6 MAR or 1.5 MAR dam. Expenditure for a 0.6 MAR or 1.5 MAR dam will be the same during the bulk water distribution infrastructure construction phase and various refurbishment phases. During the Zalu Dam construction phase and operational phase expenditure will differ for the different dam sizes.

During each of the identified phases, on average, 83% of employment will be sourced locally. Only 17% of employment will be towards core skilled people from outside the study area. During the infrastructure construction phase, pipes will be manufactured within South Africa, but not necessarily in the study area. Cranes and special equipment will also be sourced in South Africa but not necessarily in the study area. All the other construction materials will be obtained from the local region, provided that the area can supply the required materials, otherwise some materials will have to be sourced from elsewhere in the country. Local procurement will increase the positive impact associated with the proposed LRWSS.

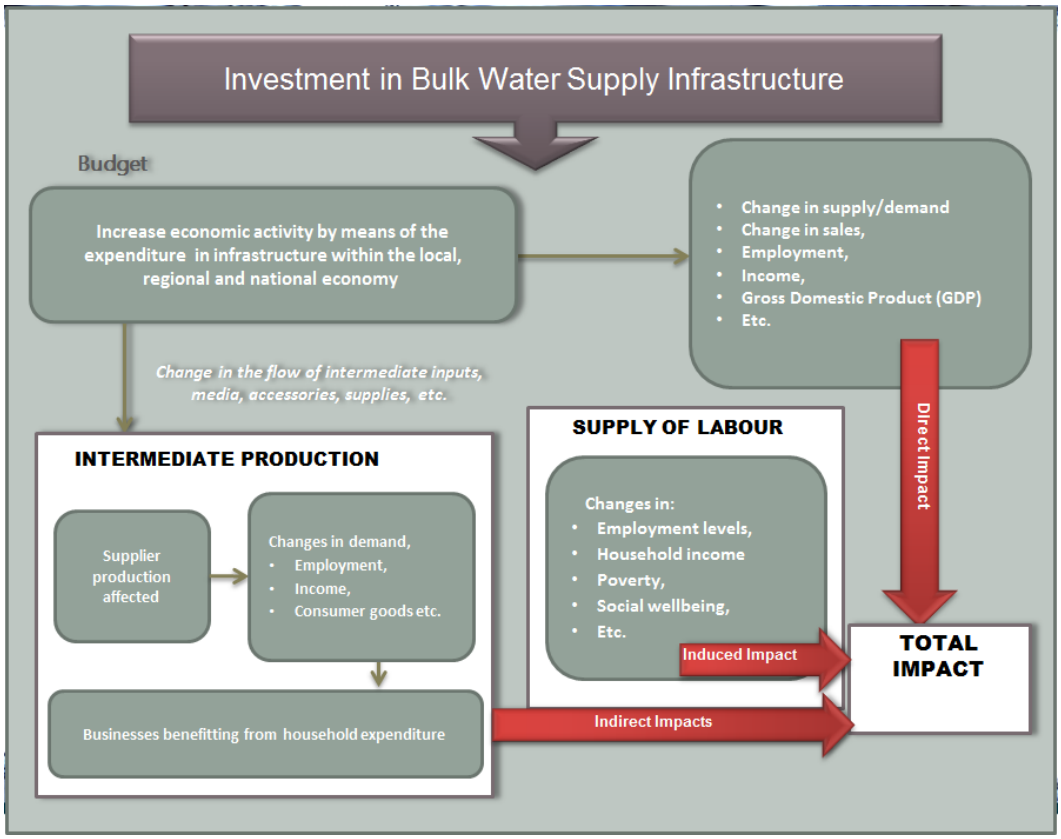
4 ECONOMIC IMPACT ASSESSMENT

4.1 BACKGROUND TO THE ECONOMIC IMPACT ASSESSMENT

The assessment analyses the potential changes in economic production, Gross Domestic Product (GDP), employment creation, and income during project implementation and operation (i.e. commercialisation).

The socio-economic impact assessment examines the effects of a proposed project on the level of economic activity and the welfare of households in the local, regional and national economies. The assessment considers not only the direct impact of the intervention but also the indirect and induced impacts relating to wider economic growth and development.

The relationship between capital and operational expenditure and the direct, indirect and induced impacts of this expenditure is illustrated in **Figure 4.1**.



Source: Urban-Econ Development Economists (2013)

Figure 4.1: Impact of capital investment and expenditure

4.1.1 Measuring economic impacts

The socio-economic assessment considers three different types of economic impact, namely direct, indirect and induced. These levels of impact are defined as follows:

1. ***Direct impact*** occurs when the project creates jobs and procures goods and services resulting in increased employment, production, business sales, and household income.
2. ***Indirect impact*** occurs when the suppliers of goods and services to the proposed project experience larger markets and the potential to expand. Indirect impacts result in an increase in job creation, Gross Domestic Product (GDP) and household income.
3. ***Induced impact*** represents further shifts in spending on food, clothing, shelter and other consumer goods and services due to increased income in the directly and indirectly affected businesses. This leads to further business growth throughout the local economy.

The socio-economic impact of the project is measured according to the following indicators:

1. ***Production:*** Production is defined as the process by which labour and assets are used to transform inputs of goods and services into outputs of other goods and services. The impact assessment will measure the change in production expected to result from the project.
2. ***Gross Domestic Product (GDP):*** Gross Domestic Product refers to the market value of all final goods and services produced within a country in a given period of time. The assessment therefore measures the impact of the proposed project on the South African economy.
3. ***Employment created:*** An employment opportunity is defined as one person employed for one year. Seasonal work is therefore not counted as an individual employment opportunity but instead combined to calculate the number of total jobs created in one year.
4. ***Income generated:*** The income generated by the project refers to the salaries and wages earned by those employed directly in the project and the suppliers of goods and services.

The econometric model for the study was developed using the Eastern Cape Social Accounting Matrix (SAM) updated to 2012 figures. The SAM is a comprehensive, economy-wide database that contains information about the flow of resources between economic agents in the provincial economy.

4.1.2 Assumptions

Based on the input data provided in the previous section, the following assumptions were made:

- All expenditure figures reflect the real situation accurately enough for the purpose of the impact assessment.
- Machinery and equipment as well as imported tooling and equipment were valued at 2012 book values.
- Buildings and infrastructure (i.e. roads, electricity, and water) were valued at 2012 book values.
- Cost of services rendered/goods produced have been re-categorised from commodities to categories of economic sectors to accommodate the modelling process.
- The technical coefficients of the SAM model remain constant for the period over which forecast projection is made, i.e. no structural changes in the economy are experienced.
- Operational capacity will not require new buildings and infrastructure.
- One employment opportunity implies one person employed for one year.
- For the construction and distribution infrastructure phase, expenditure on labour was based on industry standards.

4.2 Quantified Zalu Dam Construction Phase Impact

Table 4.1 indicates the direct, indirect, induced and total production, GDP, employment and income associated with the construction of the Zalu Dam component.

Table 4.1: Macro-economic effect of the 0.6 MAR / 1.5 MAR dam construction phase (R-million, 2012 prices – unless otherwise stated)

Indicator	0.6 MAR Zalu Dam			
	Direct	Indirect	Induced	Total
Production*	R 486.92	R 689.69	R 192.05	R 1 368.66
GDP*	R 145.26	R 245.63	R 72.54	R 463.43
Employment	360	1972	424	2 756
Worker Income*	R 32.39	R 89.84	R 27.56	R 149.78
Indicator	**1.5 MAR Zalu Dam**			
	Direct	Indirect	Induced	Total
Production*	R 714.58	R 691.56	R 218.25	R 1 624.39
GDP*	R 213.18	R 245.64	R 82.39	R 541.21
Employment	528	1 975	482	2 985
Worker Income*	R 47.54	R 90.15	R 31.29	R 168.97

Source: Urban-Econ Development Economists calculations (2013)

From the table above it is apparent that the direct contribution to the total production in the economy of the study area during the construction phase will amount to approximately R 1 369 million for a 0.6 MAR dam or R 1 624 million for a 1.5 MAR dam over a three-year period.

The Zalu Dam component for a 0.6 MAR dam will generate a total of approximately R 463 million in GDP during construction. The total GDP contribution will be as a result of the direct expenditure plus that of industries supplying the project with inputs and industries that supply consumer goods and services. A 1.5 MAR dam will create a GDP contribution of R 541 million during the construction phase.

The construction of the 0.6 MAR Zalu Dam will require approximately 360 new direct employees of which 300 will be local people and 60 core skilled people from outside the region. Higher production in industries supplying inputs will create an additional 1 972 employment opportunities, while approximately 424 new employment opportunities will be generated as a result of an increased demand for consumer goods and services. In total, approximately 2 756 employment opportunities will be created by the construction of the 0.6 MAR Zalu Dam

component. The construction of a 1.5 MAR dam will create a total of 2 985 employment opportunities through the direct, indirect and induced effects.

The development of the proposed facilities, for a 0.6 MAR dam, will result in a total increase of R 150 million in income across the primary, secondary and tertiary study areas.

4.3 QUANTIFIED BULK DISTRIBUTION INFRASTRUCTURE CONSTRUCTION PHASE IMPACT

The table below provides the impact of the supporting infrastructure construction phase for the LRWSS. The impact will be experienced over a three-year period.

Table 4.2: Macro-economic effect of the Bulk Distribution Infrastructure Construction Phase (R-million, 2012 prices – unless otherwise stated)

Indicator	5.4 million m^3 /a 0.6 MAR Zalu Dam				7.2 million m^3/a 0.6 / 1.5 MAR Zalu Dam			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Production*	R 565.3	R 454.3	R 277.5	R 1 297	R 692.2	R 569.4	R 332.6	R 1 594
GDP*	R 168.6	R 160.2	R 104.8	R 434	R 206.5	R 200.8	R 125.7	R 533
Employment	435	967	614	2 016	516	1 212	736	2 464
Worker Income*	R 146.3	R 61.3	R 39.8	R 247	R 170.2	R 76.8	R 47.7	R 295

Source: Urban-Econ Development Economists calculations (2013)

**Impact calculated in millions of Rand (2012 prices)*

From **Table 4.2** it can be concluded that total expenditure during the Bulk Water Distribution Infrastructure construction phase of the LRWSS will amount to approximately R 565 million for a 5.4 million m^3/a system. The direct investment in the domestic manufacturing industry will cause increased productivity in other sectors of the economy. In total, the supporting infrastructure construction phase will raise the level of production by approximately R 1 297 million. For a 5.4 million m^3 system the cost of irrigation infrastructure was not included. The total impact on production during the infrastructure construction of a 7.2 million m^3/a capacity system will be higher with a R 1 594 million contribution. The development of a 7.2 million m^3/a capacity system will include irrigation infrastructure.

Raised production levels are accompanied by increased GDP. The direct GDP impact of the supporting infrastructure construction phase is an increase of R 169 million or

R 207 million depending on the chosen system. In total the level of GDP will increase by approximately R 434 million or R 533 million respectively.

The Bulk Water Distribution Infrastructure construction phase of a system with a 5.4 million m^3/a capacity will require the employment of approximately 435 persons for a period of 36 months. Increased production in industries supplying the construction inputs and industries supplying consumer goods and services implies the creation of new employment opportunities in these industries. The (indirect) impact on employment in supplying industries will manifest in the creation of approximately 967 employment opportunities, while the impact on industries supplying consumer goods and services (i.e. the induced impact) will be the creation of approximately 614 employment opportunities. In total, the supporting infrastructure construction phase of a 5.4 million m^3/a capacity system will generate approximately 2 016 employment opportunities. The total employment for a 7.2 million m^3/a capacity system will be approximately 2 464 opportunities.

In return for providing a service, employees naturally receive an income. It is estimated that a cumulative income of R 247 million or R 295 million will be generated through the supporting infrastructure construction phase depending on the chosen capacity system.

4.4 QUANTIFIED OPERATIONAL PHASE IMPACT

Table 4.3 indicates the direct, indirect, induced and total production, GDP, employment and income associated with the potential operational phases of the LRWSS. The impact is provided as the total impact of 46 operational years and for a 0.6 MAR or 1.5 MAR dam.

Table 4.3: Macro-economic effect of the operational phase (R-million, 2012 prices – unless otherwise stated)

Indicator	5.4 million m^3/a (0.6 MAR Zalu Dam)			
	Direct	Indirect	Induced	Total
Production*	R 802.0	R 255.9	R 3.9	R 1 062
GDP*	R 277.4	R 340.7	R 144.4	R 763
Employment	1 656	1 510	846	4 012
Worker Income*	R 182.1	R 113.0	R 54.9	R 350

Indicator	7.2 million m^3 /a (0.6 MAR Zalu Dam)				7.2 million m^3/a (1.5 MAR Zalu Dam)			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Production*	R 961.1	R 313.9	R 4.6	R 1 280	R 1 081.2	R 1 170.4	R 563.4	R 2 815
GDP*	R 332.5	R 417.9	R 170.8	R 921	R 374.0	R 448.7	R 213.0	R 1 036
Employment	1 840	1 853	1 000	4 693	2 020	1 989	1 247	5 256
Worker Income*	R 208.1	R 138.6	R 64.9	R 412	R 294.4	R 148.8	R 80.9	R 524

Source: Urban-Econ Development Economists calculations (2013)

From **Table 4.3** it can be seen that direct expenditure during the operational phase of the LRWSS will amount to approximately R 802 million for a 5.4 million m^3/a Bulk Water Distribution Infrastructure system (0.6 MAR). The direct investment will cause increased productivity in other sectors of the economy. In total, the operational phase of a 0.6 MAR dam will raise the level of production by approximately R 1 062 million or R 1 280 million, depending on the chosen system. A 1.5 MAR dam could experience an increase in production of up to R 2 815 million.

Raised production levels are accompanied by increased GDP. The direct impact of the operational phase is an increase of R 277 million in GDP for a 5.4 million m^3/a capacity system (0.6 MAR). In total the level of GDP will increase by approximately R 763 million. The operational phase of a 7.2 million m^3/a capacity system through a 0.6 MAR dam will contribute R 333 million to the GDP and through indirect and induced impacts it will contribute a total of R 921 million. A 7.2 million m^3/a capacity system supplied through a 1.5 MAR dam will result in a GDP contribution of approximately R 1 036 million.

Regarding employment, the operational phase of a 5.4 million m^3/a capacity system (0.6 MAR) will require the employment of approximately 1 656 persons over a period of 46 years. Increased production in industries supplying the operational inputs and industries supplying consumer goods and services implies the creation of new employment opportunities in these industries. The (indirect) impact on employment in

supplying industries will manifest in the creation of approximately 1 510 employment opportunities, while the impact on industries supplying consumer goods and services (i.e. the induced impact) will be the creation of approximately 846 employment opportunities. In total, the operational phase of a 5.4 million m^3/a capacity system will generate approximately 4 012 employment opportunities. The operational phase of a 7.2 million m^3/a capacity system will create a total of 4 693 (0.6 MAR) or 5 256 (1.5 MAR) new employment opportunities depending on the chosen dam size.

In return for providing a service, employees naturally receive an income. It is estimated that a total cumulative income of R 350 million, R 412 million or R 524 million will be generated through the operational phase, depending on the chosen system or dam size.

4.5 Quantified Pump Station Refurbishment Phase Impact

The table below provides the impact of the pump station refurbishment phase for the LRWSS. The impact will be experienced in four one-year intervals, every ten years during the operational period.

Table 4.4: Macro-economic effect of the pump station refurbishment phase (R-million, 2012 prices – unless otherwise stated)

Indicator	5.4 million m3 /a 0.6 MAR Zalu Dam				7.2 million m3/a 0.6 / 1.5 MAR Zalu Dam			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Production*	R 68.9	R 34.7	R 10.5	R 114	R 90.5	R 45.7	R 13.9	R 150
GDP*	R 14.9	R 28.1	R 10.2	R 53	R 19.5	R 37.0	R 13.4	R 70
Employment	264	204	75	544	276	214	79	568
Worker Income*	R 9.1	R 10.6	R 3.9	R 24	R 11.9	R 13.9	R 5.1	R 31

Source: Urban-Econ Development Economists calculations (2013)

From **Table 4.4** it can be concluded that total expenditure during the pump station refurbishment phase of the LRWSS will amount to approximately R 68.9 million for a 5.4 million m^3/a system. The direct investment in the domestic manufacturing industry will cause increased productivity in other sectors of the economy. In total, the pump station refurbishment phase will raise the level of production by approximately R 114 million. The total impact on production during the pump station refurbishment phase of a 7.2 million m^3/a capacity system will be higher with a R 150 million contribution.

Raised production levels are accompanied by increased GDP. The direct GDP impact of the pump station refurbishment phase is an increase of R 15 million or R 20 million depending on the chosen system. In total the level of GDP will increase by approximately R 53 million or R 70 million respectively.

The pump station refurbishment phase for a system with a 5.4 million m^3/a capacity will require the employment of approximately 264 persons over the four refurbishment cycles. Increased production in industries supplying the construction inputs and industries supplying consumer goods and services implies the creation of new employment opportunities in these industries. The (indirect) impact on employment in supplying industries will manifest in the creation of approximately 204 employment opportunities, while the impact on industries supplying consumer goods and services (i.e. the induced impact) will be the creation of approximately 75 employment opportunities. In total, the pump station refurbishment phase of a 5.4 million m^3/a capacity system will generate approximately 544 employment opportunities. The total employment for a 7.2 million m^3/a capacity system will be approximately 568 employment opportunities.

In return for providing a service, employees naturally receive an income. It is estimated that a cumulative income of R 24 million or R 31 million will be generated through the pump station refurbishment phase depending on the chosen capacity system.

4.6 Quantified Water Treatment Plant Refurbishment Phase Impact

Table 4.5 indicates the direct, indirect, induced and total production, GDP, employment and income associated with the refurbishment phase of the LRWSS. The impact will be experienced in three one-year intervals, every fifteen years during the operational period.

Table 4.5: Macro-economic effect of the WTP refurbishment phase (R-million, 2012 prices – unless otherwise stated)

Indicator	5.4 million m^3/a 0.6 MAR Zalu Dam				7.2 million m^3/a 0.6 / 1.5 MAR Zalu Dam			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Production*	R 125.0	R 63.1	R 19.2	R 207.3	R 166.8	R 84.2	R 25.6	R 276.5
GDP*	R 27.0	R 51.1	R 18.6	R 96.7	R 36.0	R 68.1	R 24.8	R 129.0
Employment	216	295	109	620	288	394	145	827
Worker Income*	R 16.5	R 19.2	R 7.1	R 42.8	R 22.0	R 25.7	R 9.4	R 57.0

Source: Urban-Econ Development Economists calculations (2013)

Table 4.5 shows that direct expenditure during the WTP refurbishment phase of the LRWSS will amount to approximately R 125 million for a 5.4 million m^3/a capacity system. The direct investment will cause increased productivity in other sectors of the economy. In total, the WTP refurbishment phase will raise the level of production by approximately R 207 million or R 277 million, depending on the chosen system.

Raised production levels are accompanied by increased GDP. The direct impact of the WTP refurbishment phase is an increase of R 27 million in GDP for a 5.4 million m^3/a capacity system. In total the level of GDP will increase by approximately R 97 million. The WTP refurbishment phase of a 7.2 million m^3/a capacity system will contribute R 36 million to the GDP and through the indirect and induced impacts it will contribute a total of R 129 million.

Regarding employment, the WTP refurbishment phase of a 5.4 million m^3/a capacity system, will require the employment of approximately 216 persons over the three refurbishment phases. Increased production in industries supplying the operational inputs and industries supplying consumer goods and services implies the creation of new employment opportunities in these industries. The (indirect) impact on employment in supplying industries will manifest in the creation of approximately 295 employment opportunities, while the impact on industries supplying consumer goods and services (i.e. the induced impact) will be the creation of approximately 109 employment opportunities. In total, the WTP refurbishment phase of a 5.4 million m^3/a capacity system will generate approximately 620 employment opportunities. The WTP refurbishment phase of a 7.2 million m^3/a capacity system will create a total of 827 new employment opportunities.

In return for providing a service, employees naturally receive an income. It is estimated that a total cumulative income of R 43 million or R 57 million will be generated through the WTP refurbishment phase depending on the chosen system.

4.7 QUANTIFIED BOREHOLE REFURBISHMENT PHASE

Expenditure during the borehole refurbishment phases will be the same for a 5.4 million m^3/a and 7.2 million m^3/a capacity system. The impact associated with each system will therefore be identical. **Table 4.6** indicates the direct, indirect, induced and total production, GDP, employment and income associated with the borehole refurbishment phase.

Table 4.6: Macro-economic effect of the borehole refurbishment phase (R-million, 2012 prices – unless otherwise stated)

Indicator	Direct	Indirect	Induced	Total
Production*	R 6.26	R 7.67	R 2.45	R 16
GDP*	R 1.35	R 2.26	R 0.93	R 5
Employment	11	12	5	28
Worker Income*	R 0.82	R 1.05	R 0.35	R 2

Source: Urban-Econ Development Economists calculations (2013)

From the table above it is apparent that the direct contribution to the total production in the economy of the study area during the borehole refurbishment phase will amount to approximately R 6 million.

The borehole refurbishment phase will generate a total of approximately R 5 million in GDP. The total GDP contribution will be as a result of the direct expenditure plus that of industries supplying the project with inputs and industries that supply consumer goods and services.

The borehole refurbishment phase will require approximately 11 new direct employees. Higher production in industries supplying inputs will create an additional 12 employment opportunities, while approximately 5 new employment opportunities will be generated as a result of an increased demand for consumer goods and services. In total, approximately 28 employment opportunities will be created during the borehole refurbishment phase. The development of the proposed facilities will result in a total increase of R 2 million in worker income.

4.8 SUMMARY

The proposed LRWSS will have an impact on the regional and local economies during the construction, operational and refurbishment phases. The impact during construction is considerable, yet it is not sustainable in the long-term as the construction will only last for approximately 36 months. The operational phase, however, will last much longer and therefore it is regarded as a more sustainable contribution to the domestic economy. The dam, pump station, WTP and borehole, etc. refurbishment phases will contribute to the overall impact during the operational phase.

Table 4.7: LRWSS impact assessment summary (R million, 2012 Rand value)

Zalu Dam Construction Phase (0.6 MAR)				
Time Period			3 years	
Total Expenditure			R 487	
Indicator	**Direct**	**Indirect**	**Induced**	**Total**
Production	R 486.92	R 689.69	R 192.05	**R 1 368.66**
GDP	R 145.26	R 245.63	R 72.54	**R 463.43**
Employment	360	1 972	424	**2 756**
Worker Income	R 32.39	R 89.84	R 27.56	**R 149.78**
Zalu Dam Earth Core Rockfill Construction Phase (1.5 MAR)				
Time Period			3 years	
Total Expenditure			R 714.58	
Indicator	**Direct**	**Indirect**	**Induced**	**Total**
Production	R 714.58	R 691.56	R 218.25	**R 1 624.39**
GDP	R 213.18	R 245.64	R 82.39	**R 541.21**
Employment	528	1 975	482	**2 985**
Worker Income	R 47.54	R 90.15	R 31.29	**R 168.97**

Supporting Infrastructure Construction Phase (0.6 / 1.5 MAR Zalu Dam)								
Time Period				3 years				
Total Expenditure (5.4 million m³/a)				R 565.28				
Total Expenditure (7.2 million m³/a)				R 692.20				
Indicator	**5.4 million m³/a**				**7.2 million m³/a**			
	Direct	**Indirect**	**Induced**	**Total**	**Direct**	**Indirect**	**Induced**	**Total**
Production	R 565.3	R 454.3	R 277.5	**R 1 297**	R 692.2	R 569.4	R 332.6	**R 1 594**
GDP	R 168.6	R 160.2	R 104.8	**R 434**	R 206.5	R 200.8	R 125.7	**R 533**
Employment	435	967	614	**2 016**	516	1 212	736	**2 464**
Worker Income	R 146.3	R 61.3	R 39.8	**R 247**	R 170.2	R 76.8	R 47.7	**R 295**

Operational Phase				
Time Period			46 years (2014 – 2060)*	
Total Expenditure (5.4 million m3/a)			R 802	
Total Expenditure (7.2 million m3/a) – 0.6 MAR			R 961	
Total Expenditure (7.2 million m3/a) – 1.5 MAR			R 1 081	
Indicator	**5.4 million m³/a (0.6 MAR)**			
	Direct	**Indirect**	**Induced**	**Total**
Production	R 802.0	R 255.9	R 3.9	**R 1 062**

GDP	R 277.4	R 340.7	R 144.4	**R 763**
Employment	1 656	1 510	846	**4 012**
Worker Income	R 182.1	R 113.0	R 54.9	**R 350**

Indicator	**7.2 million m^3/a (0.6 MAR)**				**7.2 million m^3/a (1.5 MAR)**			
	Direct	**Indirect**	**Induced**	**Total**	**Direct**	**Indirect**	**Induced**	**Total**
Production	R 961.1	R 313.9	R 4.6	**R 1 280**	R 1 081.2	R1,170.4	R 563.4	**R 2 814.9**
GDP	R 332.5	R 417.9	R 170.8	**R 921**	R 374.0	R 448.7	R 213.0	**R 1 035.6**
Employment	1 840	1 853	1 000	**4 693**	2,020	1,989	1,247	**5 256**
Worker Income	R 208.1	R 138.6	R 64.9	**R 412**	R 294.4	R 148.8	R 80.9	**R 524.1**

Pump Station Refurbishment Phase (0.6 / 1.5 MAR Zalu Dam)

Time Period	Stretched over 46 years (2014 – 2060)* as four one year cycles every ten years during operation
Total Expenditure (5.4 million m^3/a)	R 68.9
Total Expenditure (7.2 million m^3/a)	R 90.5

Indicator	**5.4 million m^3/a**				**7.2 million m^3/a**			
	Direct	**Indirect**	**Induced**	**Total**	**Direct**	**Indirect**	**Induced**	**Total**
Production	R 68.9	R 34.7	R 10.5	**R 114**	R 90.5	R 45.7	R 13.9	**R 150**
GDP	R 14.9	R 28.1	R 10.2	**R 53**	R 19.5	R 37.0	R 13.4	**R 70**
Employment	264	204	75	**544**	276	214	79	**568**
Worker Income	R 9.1	R 10.6	R 3.9	**R 24**	R 11.9	R 13.9	R 5.1	**R 31**

Water Treatment Plant Refurbishment Phase (0.6 / 1.5 MAR)

Time Period	Stretched over 46 years (2014 – 2060)* as three one year cycles every fifteen years during operation
Total Expenditure (5.4 million m^3/a)	R 125.04
Total Expenditure (7.2 million m^3/a)	R 166.8

Indicator	**5.4 million m^3/a**				**7.2 million m^3/a**			
	Direct	**Indirect**	**Induced**	**Total**	**Direct**	**Indirect**	**Induced**	**Total**
Production	R 125.0	R 63.1	R 19.2	**R 207.3**	R 166.8	R 84.2	R 25.6	**R 276.5**
GDP	R 27.0	R 51.1	R 18.6	**R 96.7**	R 36.0	R 68.1	R 24.8	**R 129.0**
Employment	216	295	109	**620**	288	394	145	**827**
Worker Income	R 16.5	R 19.2	R 7.1	**R 42.8**	R 22.0	R 25.7	R 9.4	**R 57.0**

Borehole Refurbishment Phase (0.6 / 1.5 MAR Zalu Dam)

Time Period	Stretched over 46 years (2014 – 2060)* as four one-year cycles every ten years during operation
Total Expenditure (5.4 or 7.2 million m^3/a)	R 6.26

Indicator	**Direct**	**Indirect**	**Induced**	**Total**
Production	R 6.26	R 7.67	R 2.45	**R 16**
GDP	R 1.35	R 2.26	R 0.93	**R 5**
Employment	11	12	5	**28**
Worker Income	R 0.82	R 1.05	R 0.35	**R 2**

Source: Urban-Econ Development Economists calculations (2013)

** The operational and refurbishment phases will last longer than 2060 but for the purposes of the impact assessment the operational phase was modelled for the time period of 2014 – 2060*

Table 4.7 provides a summary of the various impact assessments associated with the proposed development.

To summarise, it is important to note that the development of the LRWSS is expected to increase the size of the economy of the local area. The increase will be higher for the construction of a 7.2 million m^3/a capacity system but both systems will result in a positive impact.

5 IMPACT ANALYSIS

It is evident from the previous section that the construction, operation and refurbishment phases of the LRWSS will have a positive effect on the economies of the Ngquza Hill LM and Port St Johns LM, as well as the broader environment. All phases apart from the Dam Construction Phase consist of expenditure for a system that can supply 5.4 million m^3/a or 7.2 million m^3/a. The current economic profile (**Section 2**) was established as a point of departure to evaluate the anticipated effects. The effect of changes in the economic profile of the study area as a result of the proposed development is discussed in this section of the report.

5.1 IMPACT EVALUATION WITHIN THE SOCIO-ECONOMIC ENVIRONMENT

5.1.1 Population

The study area has experienced positive population growth over the last decade. The proposed investments will provide employment opportunities and income for a portion of the growing population, which will ensure that living standards do not decline. It is imperative that the State and market are able to provide for the needs of the population through interventions such as the LRWSS.

5.1.2 Employment, skills development and worker income

In terms of the labour market, there exists a definite need for employment opportunities. The LRWSS investments will create employment opportunities and assist in decreasing the current unemployment rate. *During each of the identified phases, on average, 83% of the direct employment will be sourced locally. Local procurement will increase the positive impact associated with the proposed LRWSS.* Local employment will further create skills development opportunities through on-the-job training. Skills development will assist employees in future employment and contribute to the development of the study area. Employment of a temporary nature (construction phase) is often viewed as less sustainable than long-term employment (operational phase). One important

exception however, pertains to skills developed and experience accumulated during the time of employment. In this respect, for example, a construction project engenders a positive impact that is lasting in nature.

The leverage effect that will be created through the employment and training of unskilled people is immense and will have a lasting effect throughout the study area, affecting not only the lives of the employees but their entire households. Through the employment opportunities created it is estimated that a total of 23 860 people will benefit from the construction phase of a 0.6 MAR dam for a 5.4 million m^3/a system. A 7.2 million m^3/a system will benefit a total of 26 100 or 27 245 people during the construction phase of a 0.6 MAR or 1.5 MAR dam respectively. This is the result of an increase in worker income within each household affected. The operational phase combined with the two refurbishment phases will positively affect between 23 411 and 33 395 people over a 46-year time period (depending on the chosen system).

In addition, an increase in employment will be accompanied by an increase in individual and household income, which will translate into an increase in the demand for goods and services. This then provides an opportunity for the expansion of business productivity and/or the start-up of new businesses. There is a significant portion of the population that is at risk of not being able to afford the water that will be provided through the LRWSS. Increased economic activity through investments such as the LRWSS will lead to an increase in worker income and as a result more people will be able to afford water.

5.1.3 Services and infrastructure development

The proposed project will reduce the costs (both fixed and variable) associated with providing households with access to water significantly. Apart from cost-savings on behalf of the applicable water service authority, improved access to water in the region will have multiple and significant impacts on the quality of life experienced by households. The proposed LRWSS will also unlock economic opportunities through facilitating or making feasible the provision of alternate water sources for villages.

Population densification may result in adverse effects on public infrastructure and services, such as roads and public transport. In addition to the benefit of clean and sufficient water, the LRWSS will generate revenue for the government in the form of taxes, which may assist the government by providing (a portion of) funds to maintain and/or upgrade infrastructure and services that come under pressure as a result of demographic trends. It would also further assist government in providing much needed facilities such as schools, social amenities and health facilities throughout the study area.

The non-provision or reduction of services in an area has a detrimental impact on the efficiency of the economy and the wellbeing of a community. The provision of infrastructural services represents a precondition for improved economic growth, welfare, quality of life and productivity of people. By providing well-planned and managed infrastructure, economic opportunities and social wellbeing are created. Infrastructure such as the LRWSS thus plays a dual role in the economic system, namely an improvement in economic activity and an improvement in living conditions.

The provision of infrastructural services will also play an important role in the direct improvement of the welfare of households in a specific region. Criteria in determining welfare include, among others, access to at least minimal infrastructure services. These services have different effects on improving the quality of life. Access to clean water and sanitation can reduce mortality; access to transport provides access to markets; access to employment opportunities and social services such as health and education; increases in earnings potential and socio-economic aspirations; access to communication networks can result in an improved level of education and literacy rate. By contrast, the non-provision of services can detract from economic quality of life since much time has to be devoted to activities such as collecting fuel, wood or water – time that could otherwise be spent on income-earning activities.

5.1.4 Economic profile

The proposed developments will contribute to the provincial GDP through much needed investments. The high public sector activity in the study area is highly dependent on government initiated projects and programmes to stimulate further private sector investment. This is a result of the economy being largely underdeveloped. A project such as the LRWSS would play an important role in catalysing the local economy.

The relatively large construction sector has implications on the nature of the economic impacts associated with the proposed water scheme. The large contribution by the sector to total local economic activity may imply the presence of a relatively high concentration of skilled construction workers residing in the area. Economic expenditure leakages associated with the proposed project would thus possibly be lower compared to if the study area had a smaller construction sector. The proposed project may also have implications on the nature of agricultural activity in the area through changes in access to water resources.

The impact assessment showed that the construction, operation and refurbishment phases of the LRWSS will result in numerous positive leverage effects in the study area. The sectors in which these leverage effects will be experienced the most are as follows:

- During the construction phase:
  - building and construction
  - manufacturing
  - real estate and business services
- During the operational phase:
  - water
  - manufacturing
  - transport and storage
- During the refurbishment phases:
  - manufacturing
  - trade and accommodation
  - real estate and business services.

It can be concluded that the proposed investments will be a positive injection into sectors other than the dominating community and social services (government services). This will assist in the diversification of the local economy. A diverse economy ensures better sustainability through economic activities in all the sectors of the economy.

5.2 THE AFFORDABILITY OF WATER

Water affordability is a central element to water access. Water affordability is typically measured by the annual cost of water bills as a percentage of median household income. Households paying an amount for water that exceeds an affordability threshold are considered to be paying a cost that is unaffordable and a "high burden". Affordability of services and housing is also directly linked to what people are willing to pay for the services they receive. Willingness to pay depends largely on the value each household attaches to a particular service. This is highly dependent on local conditions and there are not universally applicable figures to measure willingness to pay. Ideally willingness to pay studies should be carried out before a service is provided.

Various studies have found that households are generally willing to pay between 5% and 10% of their income for services including water (*City of Cape Town, 2001 & Walsh, 2008*). The challenge in the study area is that more than 40% of the households in the study area earn less that R 801 per month. These households would be able to pay no more than R 80.10 per month for their total package of services. Most of these households (18.6%) however report no income at all and would not be able to afford any level of service.

On the other hand, at present only 17% of households receive water through a regional or local water scheme operated by their local municipality or another water service provider. The majority of households acquire water from rivers or streams. The South African Constitution (1996) states that all households are entitled to a minimum level of services defined as an electricity connection to each dwelling; clean safe drinking water within 200 m; and availability of a ventilated pit toilet. It can therefore be said that to make water available and affordable grant funding will be required.

With time, increased economic activity through the LRWSS investment will lead to an increase in worker income and, as a result, more people will be able to afford water. The study has shown that in addition to the availability of potable water, the LRWSS development will lead to numerous positive effects which will create various leverage effects throughout the study area and increase the overall wellbeing of citizens.

5.3 SUMMARY: THE INVESTMENT SCENARIO

The investment scenario represents the effect of the establishment and operation of the LRWSS on the local, provincial and national economies.

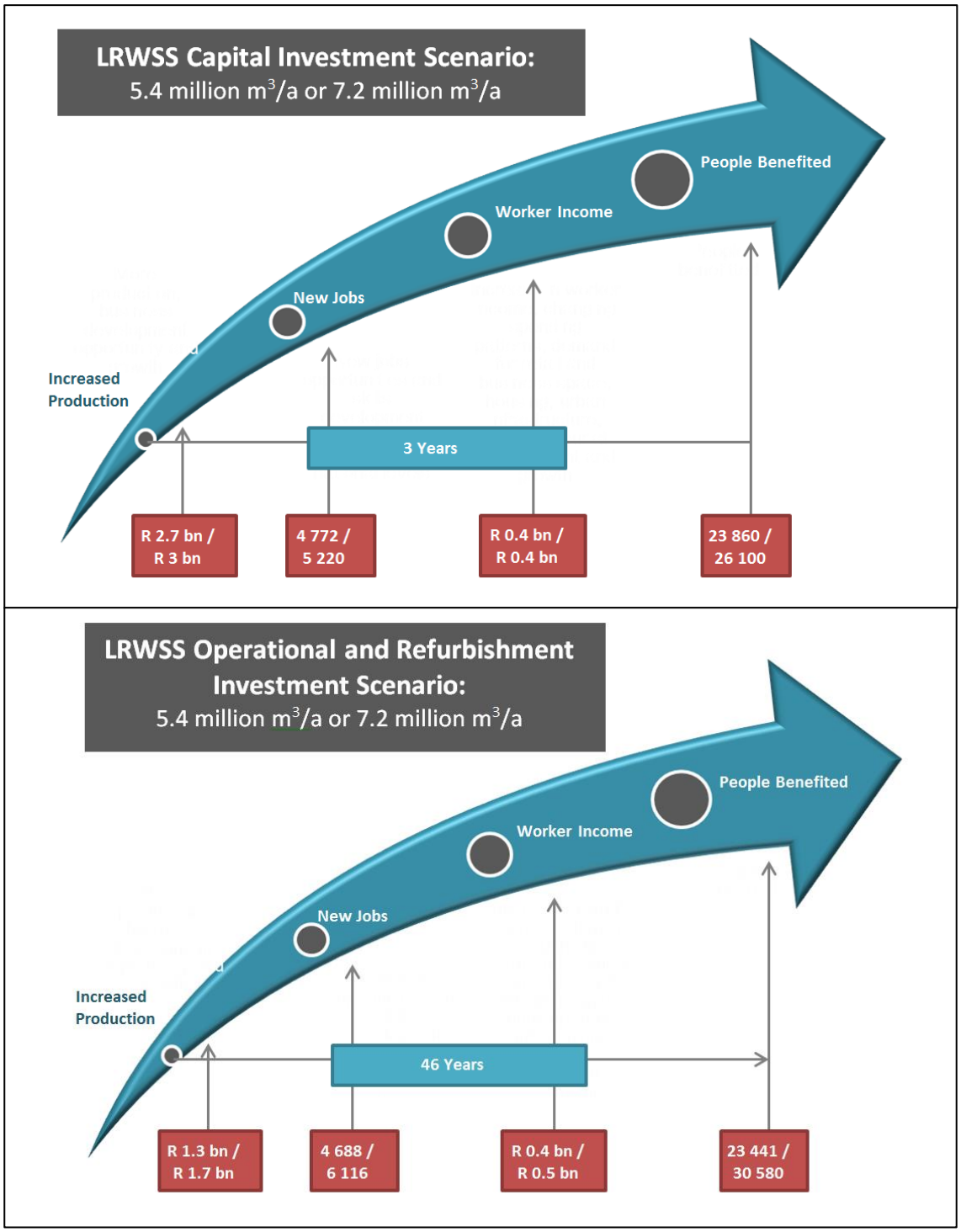
The outcome of the investment scenario based on a 0.6 MAR dam is summarised in **Figure 5.1**.

It can be concluded from **Figure 5.1** that the LRWSS investment will lead to numerous positive leverage effects in the economy of the study area as well as the broader environment. The key impacts of the LRWSS Investment Scenario are the following:

- More production, business development opportunity and growth.
- New job opportunities and skills development potential on local, regional and national levels.
- Increase in worker income, changing spending patterns, demand for retail and business space, housing, urban infrastructure, entrepreneurial development and growth.
- People benefited as a result of increased income on local, regional and national level, which results in poverty alleviation and a better quality of life.

If the LRWSS should not be developed, the two key effects will entail the following:

- The most obvious implication of not developing the LRWSS is the loss of the positive economic impacts (the topic of this report) associated with the construction, operation and refurbishment expenditures and employment.
- Water provision in the study area will remain the same and the benefits associated with adequate and reliant potable water provision will be lost.



Source: Urban-Econ Development Economists calculations (2013)

Figure 5.1: LRWSS investment scenarios for a 5.4 million m³/a or 7.2 million m³/a system (0.6 MAR dam Zalu Dam)

6 FINAL CONCLUSION

The analysis has shown that the LRWSS development in the Ngquza Hill LM and Port St Johns LM has the potential to generate high levels of production, employment creation as well as household income. This will stimulate business and human capital development and assist in raising living standards.

The LRWSS will either be developed for a 5.4 million m^3/ a or 7.2 million m^3/a system. The 5.4 million m^3/a system will be supplied through a 0.6 MAR dam whereas a 7.2 million m^3/a system will rely on either a 0.6 MAR or 1.5 MAR dam. The macro-economic impact assessment has revealed that both systems have the potential to create positive leverage effects into the study area. The 7.2 million m^3/a system based on a 1.5 MAR dam will result in the largest positive economic impact.

The current economic profile (**Section 2**) was established as a point of departure to evaluate the anticipated effects. The effect of changes in the economic reality resulting from the proposed development was discussed and concluded to be positive. Through the employment opportunities created it is estimated that a total of 23 860 people will benefit from the construction phase of a 0.6 MAR dam for a 5.4 million m^3/a system. A 7.2 million m^3/a system will benefit a total of 26 100 or 27 245 people during the construction phase of a 0.6 MAR or 1.5 MAR dam respectively. This is the result of an increase in worker income within each household affected. The operational phase combined with the refurbishment phases will positively affect between 23 411 and 33 395 people over a 46-year time period (depending on the chosen system).

Regarding the affordability of water, the income profile indicated that there is a significant portion of the population that is at risk of not being able to afford the water that will be provided through the LRWSS. With time, increased economic activity through LRWSS investments will lead to an increase in worker income and as a result more people will be able to afford water. It can therefore be said that to make water available and affordable grant funding will be required.

During each of the identified phases, on average, 83% of the direct employment will be sourced locally. Only 17% of all employment will be towards core skilled personnel from outside the study area. During the infrastructure construction phase, pipes will be

manufactured within South Africa, but not necessarily in the study area. Cranes and special equipment will also be sourced in South Africa but not necessarily in the study area. All the other construction materials will be obtained from the local region, provided that the area can supply the required quantities, otherwise some materials will have to be sourced from elsewhere in the country. Local procurement will increase the positive impact associated with the proposed LRWSS and the following is recommended to maximise the positive economic impacts of the project:

- Use local labour and inputs as far as possible.
- Stipulate that companies that bid for tenders within the development (especially the construction phases), have a skills development plan in order, which will result in impacts of a long-lasting nature.

In addition to the economic impacts associated with the capital, operation and refurbishment expenditures of the proposed LRWSS, the development is important from a national strategic perspective. The national, provincial and local policy environment prioritises projects such as the proposed LRWSS.

The developments are sizable ones, which will result in numerous positive leverage effects into the receiving economies. It is recommended that the developments be supported to realise the positive socio-economic effects illustrated in the investment scenario.

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