

# Infrastructure Development Framework

## 13.1 INTRODUCTION

The development of a framework for the provision of infrastructure is one of the major focal areas of any Local Authority. Any such framework must ensure that that which is developed is sustainable, the framework should be transparent and easily understood by the community and last, but not least, that unreasonable expectations that cannot be fulfilled are not raised in the community. It is with the above in mind that the Infrastructural Development Framework for Buffalo City has been prepared.

The Infrastructural Development Framework has been developed along the following lines based largely on a document prepared by the Amatole District Municipality :

- Classification of existing and proposed settlements into different categories based on the proposed Spatial Development Framework.
- The development of appropriate levels of service for each class of settlement.
- Applying the strategies and objectives to determine the scope and content of a work programme.
- Identifying the extent of future works to comply with legal requirements.
- Identifying any sectoral plans that are being developed for the region.
- Preparing a summary statement on cross-cutting issues including LA 21, HIV/AIDS, Poverty, Gender, Youth, Children and the disabled.

**13.2 CLASSIFICATION OF EXISTING AND PROPOSED SETTLEMENTS INTO DIFFERENT CATEGORIES**

Basic service levels differ according to settlement type. In rural areas, levels of service tends to be lower than those found in urban areas because of the financial implication of providing sparsely-populated settlements with similar levels of service to those that are found in urban areas. Alternative, more viable options to those found in urban areas thus need to be implemented.

Urban areas have been divided into two categories according to densities. Rural areas are divided into higher density areas like villages and lower density areas like scattered settlements and farms. Definitions of different settlement types are given in the table below.

**TABLE 13.1 : Definition of Settlement Types**

URBAN		RURAL		
Zone A	Zone B	Zone C	Zone D	Zone E
Urban core	Dense settlements	Villages	Scattered settlements	Farms
Typically densities of > 15 households per hectare, often higher in the business districts. Relatively large proportion of multi-storey development.	Large settlement size (over 5 000 people). Densities generally above 10 households per hectare. Generally no business district.	Settlement size in range of 5 000 to 500 people. Densities within settlements typically > 2 households per hectare.	Households in small groups. Density below 2 households per hectare; often much less. Little commercial activity.	Low density (below 1 household per hectare). Associated with commercial farming activity.

A definition of a “basic” level of service for the four major Municipal services according to settlement type is given in Section 13.3 below. It should be noted that actual service delivery could be greater than the basic services indicated below depending on affordability linked with community expectations. Short-term minimum levels are also defined where appropriate.

### 13.3 THE DEVELOPMENT OF APPROPRIATE LEVELS OF SERVICE BY SETTLEMENT TYPE

The supply of water and the provision of appropriate sanitation facilities must be seen in context. Buffalo City has a water supply system that will last for the next four years if current growth trends are sustained. Various additional water sources have been identified including the Wesselshoek Dam on the Kwelera River, the Stone Island Dam on the Nahoon River and the Groot Hoek Dam on the Gonubie River. These projects are all relatively expensive and the unit rates for water will be high. It is for this reason that the Demand Management of water is so important and the need to drastically reduce current water losses has become so vital.

For the purposes of the Integrated Development Plan, the standards adopted by the Amatole District Municipality's IDP Framework Committee have been used as the point of departure, and are recommended as the basis on which the sustainable provision of a basic supply of water could be feasible.

The basic minimum levels of service for the provision of water, sanitation and electricity together with the management of solid waste are as set out in Tables 13.2 to Table 13.5.

**TABLE 13.2 : Water**

	<b>BASIC DEFINITION</b>	<b>COMMENT</b>
<b>Urban core</b>	Indoor supply.	Higher than RDP standard provision for urban core.
<b>Dense settlements, Villages</b>	Yard tank or yard tap.	RDP standard service.
<b>Scattered settlements</b>	Communal standpipe within 200 m.	Short-term minimum level lower than RDP standard. These systems can be considered for small remote communities where even basic schemes are costly, where support services are difficult and where affordability is very limited.
<b>Farms</b>	Point source water supply from boreholes, wells and springs.	

**TABLE 13.3 : Sanitation**

	<b>BASIC DEFINITION</b>	<b>COMMENT</b>
<b>Urban Core</b>	Water-borne Systems.	When capacity exists and it is practical.
<b>Other settlement types</b>	Ventilated Improved Pit Latrine (VIP).	A VIP is the minimum standard of sanitation service set by the Minister of Housing.

**TABLE 13.4 : Electricity**

	<b>BASIC DEFINITION</b>	<b>COMMENT</b>
<b>Urban core</b>	20 AMP.	Basic infrastructure supplied by municipality.
<b>Dense settlements</b>	20 AMP.	Basic infrastructure supplied by Eskom.
<b>Villages</b>	20 AMP.	
<b>Scattered settlements</b>	Solar.	Solar systems are used in remote rural areas where off-grid solutions become more favourable in comparison to conventional grid connections.
<b>Farms</b>	20 AMP or Solar.	

**TABLE 13.5 : Solid Waste**

	<b>BASIC DEFINITION</b>	<b>COMMENT</b>
<b>Urban core</b>	Communal skip.	An adequate level of service where consumers transport their own solid-waste to a communal point in their neighbourhood where skips are provided. Skips are generally removed and emptied at the landfill site by the Municipality or a contractor appointed by them.
<b>Dense settlements</b>	Communal dump site.	Consumers transport their own waste to a dumping site outside the settlement area.
<b>Villages</b>	Communal dump site.	

<b>Scattered settlement</b>	On-site disposal.	In scattered rural areas and farms, on-site disposal may be adequate if the composition of the waste is primarily organic and if households are sparsely settled. However if appropriate on-site facilities do not exist both households and farms may require a regular refuse removal system via either communal or individual collection.
<b>Farms</b>		

### 13.4 TYPICAL COSTS

Typical costs for basic levels of service for water, sanitation, electricity and solid waste are as shown in Tables 13.6 – 13.10 below. These tables have been extracted from a similar document prepared by the Amatole District Municipality :

**TABLE 13.6 : Typical Costs for a Basic Level of Service by Settlement Type for Water (per household)**

	<b>URBAN CORE</b>	<b>DENSE SETTLEMENTS</b>	<b>VILLAGES</b>	<b>SCATTERED SETTLEMENTS</b>	<b>FARMS</b>
<b>Service level</b>	Yard tank or yard tap	Communal standpipe within 200 m	Communal standpipe within 200 m	Point source water supply from boreholes, wells and springs	Point source water supply from boreholes, wells and springs
<b>Typical level of consumption (per household per month)</b>	6 kl	2.5 kl	2.5 kl	1-2 kl	1-2 kl
<b>Capital cost</b>	R3 500	R2 700	R3 400	R1 000	R1 000
<b>Monthly operating and maintenance costs</b>	R20	R12	R16	R4	R14
<b>Monthly O &amp; M per kl consumed</b>	R3.33	R4.80	R6.40	R4.00	R14.00

In many areas there is still a great lack of information with regard to consumer profile, current access to services and current consumption rates by those who have services.

**TABLE 13.7 : Typical costs for a Basic Level of Service by Settlement Type for Sanitation (per household)**

	URBAN CORE	DENSE SETTLEMENTS	VILLAGES	SCATTERED SETTLEMENTS	FARMS
<b>Service level</b>	VIP	VIP	VIP	VIP	VIP
<b>Capital cost</b>	R3 200	R3 200	R3 200	R3 200	R3 200
<b>Monthly operating and maintenance costs</b>	R6	R6	R6	R6	R6

Where capacity exists, water-borne systems are provided in urban areas. For comparison, capital and O & M costs for simple water-borne systems are given in the table below:

**TABLE 13.8 : Typical Costs for Simple Waterborne Sanitation in Urban Settlements (per Household)**

	URBAN CORE	DENSE SETTLEMENTS
Capital cost	R7 700	R10 800
Monthly operating and maintenance costs	R56	R74

For urban core settlements, simple waterborne alternatives are R4500 more expensive than VIPs are. In dense settlements, this figure increases to R7600.

**TABLE 13.9 : Typical Costs for a Basic Level of Service by Settlement Type for Electricity (Per Household)**

	URBAN CORE	DENSE SETTLEMENTS	VILLAGES	SCATTERED SETTLEMENTS	FARMS
Service level	20 AMP	20 AMP	20 AMP	Solar	20 AMP
Typical level of consumption (per household per month)	150 kWh	100 kWh	50 kWh	50 kWh	50 kWh
Capital cost	R2 600	R2 600	R3 500	R3 500	R3 500
Monthly operating and maintenance costs	R55	R55	R60	R60	R60
Monthly O & M per 100Wh consumed	R3.67	R5.50	R12.00	R12.00	R12.00

In urban areas, most households have access to a formal level of solid waste removal service. This is not the case in rural areas, particularly in small villages, scattered settlements and farms as they rely on on-site services or no services at all. There is a great deal of variability when it comes to O&M costs of waste collection and disposal.

**TABLE 13.10 : Typical Cost for a Basic Level of Service by Settlement Type for Solid Waste (Per Household)**

	URBAN CORE	DENSE SETTLEMENTS	VILLAGES	SCATTERED SETTLEMENTS	FARMS
Service level	Communal skip	Communal skip	Communal dump site	On-site dumping	On-site dumping
Typical level of consumption (per household per month)	24 kg	16 kg	16 kg	N/A	N/A
Capital cost	R360	R360	-	R0	R0
Monthly operating and	R10	R7	-	R0	R0

<b>maintenance costs</b>					
<b>Monthly O &amp; M per kg consumed</b>	R0.42	R0.44	-	R0.00	R0.00

### **13.5 IMPLICATIONS OF THE DISTRIBUTION OF HOUSING ON THE INFRASTRUCTURAL DEVELOPMENT FRAMEWORK**

Combined with the housing and infrastructure strategies is a land management strategy which will look at managing in-migrants to the urban area before the housing process is started. Clearly any housing programme relies on the availability of bulk services and the housing programme must be fully integrated with any infrastructure programme. Annual targets and programmes are intended to address the current housing backlog. These programmes must be based on sustainability and affordability and should be reviewed annually and highlighted.

Since the provision of housing and infrastructure is inextricably linked the final decisions on infrastructural projects to be implemented can only be taken when a decision has been taken on the distribution of the thousands of dwelling units required to reduce the housing backlog.

### **13.6 INFRASTRUCTURAL PROJECTS AND PROGRAMMES**

#### **13.6.1 ROADS AND STORMWATER**

Roads and the management of stormwater were during the community needs assessment in the Analysis Phase of the IDP process identified as one of the main priority areas. Currently there are a number of processes focusing on the role and responsibilities of local government with regard to transport in general and roads in particular. Strategies have been developed to meet the IDP objectives against this background certain programmes and projects have been identified.

Within the Urban Core there is a relatively well-developed road network of surfaced roads. It will now be necessary to focus resources on the gradual expansion of this network into the rural areas to improve mobility and the public transport system.

Where necessary alternative technologies must be evaluated and utilised to ensure that the most cost-effective strategies are developed. The maintenance of the existing infrastructure is a cause for great concern and many existing roads may not be sustainable.

In order to maintain and upgrade existing road infrastructure as well as prepare for the expansion of the road network within BCM, a major roads plan needs to be prepared, developed and implemented. Apart from that, rehabilitation programmes for the rural roads, tarred roads, sidewalks and bridges of BCM need to also be prepared and implemented.

A number of specific traffic infrastructure projects mainly regarding upgrading of existing road infrastructure have been defined within the IDP process.

### **13.6.2 TRANSPORTATION AND TRAFFIC SAFETY**

The lack of mobility limits access to economic and social activities and will be one of the main obstacles for economic growth in Buffalo City. The development of the Buffalo City area will thus be dependent on the development of sound land use, transportation and economic policies.

The Quality of Life/Needs Assessment Survey undertaken in Buffalo City, proved that transportation is a financial burden on the poorer groups. The average low-income household spends R132 per month on transportation (twice as much as they do on water and electricity) and this makes transportation the fourth largest expense after food, housing and education.

Transportation is one of the fundamental needs of people. After food and housing it is possibly one of the priority needs. It provides the essential link between activities and it is also one of the important factors for promotion of social and economic development. Transportation deals with accessibility and mobility i.e. how to move people between homes and jobs, schools and other activities, in an affordable way, safely and as quickly as possible.

Transportation is based on two pillars – the infrastructure such as roads, railways and other infrastructure facilities and secondly public transport operations. The IDP includes both parts and these parts will form the basis for an integrated transport plan for Buffalo City.

Public transport will play a vital part in increasing the citizens' opportunities to interact in the daily activities that are the base for the economic development. Thus a focus area within the transportation arena will be the public transport system, as an overwhelming majority of the inhabitants do not have alternative means of travel.

A travel survey carried out recently for King William's Town showed that more than 50% of the trips to work are made on foot. The distance travelled on foot can be up to 20km. The other 50% are divided between public transport and private car in a ratio of 2:1.

An efficient public transport system is also an important precondition for sustainability. To achieve this there is a need for integrated transport planning giving guidelines for:

- design of public transport networks;
- organisation and legal framework for public transport operations; and
- investment in infrastructure.

The IDP presents transportation-related projects focused on four areas:

#### **13.6.2.1 Public Transport**

A short-term enhancement of the public transport system by formalizing and improving existing public transport is desirable. This also includes infrastructure investments for taxi facilities and modal interchange facilities at railway stations as well as the development of a long-term plan for a sustainable public transport system for Buffalo City.

#### **13.6.2.2 Traffic Safety**

This area includes improvement of the infrastructure and planning by use of a traffic accident data-base and traffic safety audit methods. The planning proposed will highlight out areas to be prioritised for improvements of road infrastructure. The promotion of non-motorised traffic is also included in the projects and programmes proposed.

#### **13.6.2.3 Integrated Transport Plan**

The long-term development will be based on an Integrated Transport Plan comprising all modes of transport and aspects of transportation. The projects proposed will give a base for coming decisions in strategies and policies to be set up and will be the base for future investments and operations. Infrastructure projects are included as part of the IDP.

#### **13.6.2.4 Institutional Reform and Capacity Building**

To support this process there is also a need to establish an effective and adequate organisation focusing on the priority issues. The IDP projects proposed including projects dealing with institutional reform and capacity building.

Refer to map D11 – Transportation Proposed Projects and Programmes

#### **13.6.3 WATER, SEWERAGE AND SANITATION**

A critical priority issue concerning water is the limited raw water supply. A comprehensive water services analysis as part of the Water Services Development Plan (WSDP) is proposed in order to address this issue. The objective is to identify areas capable of augmenting raw water supplies.

Furthermore it is important to optimise the use of sewage treatment infrastructure. The sewage treatment facilities need to be refurbished and upgraded, in order to meet the demand and minimum level of service. Through implementing customer education programmes on water use, the sustainable usage of sewerage systems and water will be ensured.

To address the issues concerning sanitation the formulation of the following policies are suggested : a sewerage/sanitation implementation and levels of service policy and waste management policies and guidelines.

The provision of basic sanitation service (RDP standards) to informal and rural settlements, as well as the provision of water borne sanitation to new housing developments are examples of important projects to address the identified issues.

Refer to the following maps :

D13 – Water and Sanitation : Economic Enhancement Programmes

D14a & 14b – Water and Sanitation Maintenance and Upgrading Programmes

D15 – Water Prioritised Backlog Programme

D16 – Sanitation Prioritised Backlog Programme

D17 – Key Focus Areas

D18 – Proposed Level of Services

D19 – Water and Sanitation Expansion Programmes

#### **13.6.4 ELECTRICITY**

There is a general need of both ad-hoc and planned maintenance of the city's existing electricity infrastructure, as well as implementation of customer education programmes and projects, to ensure the sustainable use of electricity.

The poor accessibility to electricity in the rural areas as well as the overall unsafe and unstable electricity environment need to be addressed through the

implementation of an electricity maintenance plan and the upgrading of existing electricity infrastructure.

The intent of the necessary work programmes is to rectify the existing shortages are dealt with in chapter 20 and volume 2, Detailed Programmes and Project List.

Refer to map D12 – Electricity Proposed Projects

## **13.7 CONCLUSION**

The extent of future works necessary to ensure that the Infrastructural Development Framework complies with existing legislation will be established once the initial Integrated Development Plan is completed.

The following Sectoral Plans are in the process of being finalised in Buffalo City:

- The Water Services Development Plan
- The Integrated Transportation Plan
- The Solid Waste Management Plan