PARLIAMENT
OF THE REPUBLIC OF SOUTH AFRICA

RESEARCH UNIT
PO Box 15 Cape Town 8000 Republic of South Africa
Tel: 27 (21) 403 8273 Fax: 27 (21) 403 8118
www.parliament.gov.za

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OVERVIEW OF THE KAI !GARIB WATER INFRASTRUCTURE

1. INTRODUCTION

The Kai! Garib Municipality consists of three large towns, i.e. Kakamas, Keimoes and Kenhardt. Kai! Garib is situated along the Orange River and is bordered by //Khara Hais LM in the north-east and Namibia in the north-west. It is characterised by its unique landscape, with the Kalahari Desert on the one side and the Orange River on the other side. It is under ZF Mgcawu District in the Northern Cape[1]. Kai !Garib Municipality is a category B municipality within the ZF Mgcawu District Municipal Area.

2. KAI !GARIB LOCAL MUNICIPALITY

According to the municipality's Spatial Development Framework [SDF], adopted in October 2012, the Municipal area occupies 26 358km², the equivalent of 25.71% of the mentioned District Municipality and 2.16% of the whole of South Africa[2]. The municipal area is divided into 10 wards.

The municipal area of Kai !Garib is situated in the midst of a landscape along the Orange River, characterised by contrasts between semi-desert with sandy plains and wavy hills. The Orange River is the life vain of this Community and on both sides of the river, green cultivated land occurs, forming the largest economic base of this area. The Orange River is further the biggest driving force behind the whole area, causing economic activities in the area over the last two decades to have expanded greatly along the river. The main towns of Kakamas and Keimoes are situated in the midst of an intensive Irrigation Farming Community stretching from Groblershoop in the east up to Blouputs in the west. Farming includes crops like vineyards, pecannut- and citrus plantations.

With 70 500 people (36 800 males and 33 700 females), the Kai !Garib Local Municipality housed 0.1% of South Africa's total population in 2018. Between 2008 and 2018 the population growth averaged 0.87% per annum which is about half than the growth rate of South Africa as a whole (1.57%). Compared to ZF Mgcawu's average annual growth rate (1.53%), the growth rate in Kai !Garib's population at 0.87% was about half than that of the district municipality.

The economy is heavily depended on the Agricultural Sector, both intensive and extensive. However, the major roads (N14, R27 and R359) assist in the growth the municipal area experience. It is important to note that new opportunities have opened up for Kai !Garib municipal area since the need to facilitate the generation of sustainable energy was introduced in South Africa by Eskom and the South African government. According to SDF, Kai !Garib Municipality immediately became a hotspot for Solar Energy developments and numerous

[1] District Development Model. 2021. ZF Sigcawu District
[2] IDP. 2020. Kai Garib

developments are currently in process and the resulting economic spin-offs are eagerly anticipated. Although the Solar Corridor, as identified by the PGDS and NCPSDF, does not include the N14 between Upington and Kakamas, current developments indicate that this area will form the centre of solar development.

Kai Garib contributes 22,8 per cent to the district municipality'; 5.7 per cent to the Northern Cape economy and 0.12 per cent to SA's economy. The main economic sectors of the Municipality is community service, agriculture and finance.

3. Water Services

Kai !Garib Local Municipality had a total number of 8 480 (or 44.46%) households with piped water inside the dwelling, a total of 7 910 (41.49%) households had piped water inside the yard and a total number of 1 460 (7.64%) households had no formal piped water in 2017. This low rate is as a result of the municipality's consistent delivery of bulk and reticulation water purification programme through the MIG. However, a slow increase is experience due to the rapid informality in the area.

Kai !Garib Local Municipality has 3 bulk treatment plants, namely Kakamas, Keimoes and Lennertsville bulk treatment plants and has 10 package plants, with some settlements getting transported purified water. The Kakamas, Keimoes and Lennertsville Treatment Plants run at 100%, 70% and 51% capacity respectively during peak times of the year. Whilst all small package plants run at their optimum (beyond design) capacity. The fact that the treatment plants run at their optimum capacity brings a problem of reduction in the mechanical utilities design life span thus that result in an increase in operational cost, work load, reduction in service delivery and most importantly less service developments not forgetting its treatment efficiency. Adding on the above said, the utilities used are not of latest technology which leads in the scarcity of repair material and increase in repair costs.

The Water Treatment Plant in Kakamas is of such a nature that it may fail at any time and this will have devastating results to the community and the municipality. This particular plant is below the flood line and beyond its life span which pose great challenges. The cost of establishing of a new plant is calculated at +/- R 80 million. The municipality is unable to do this on its own and Municipal infrastructure grant (MIG) allocations are too small to address this emergency situation. The funding for the feasibility studies are been allocated through the Regional Bulk Infrastructure Grant.

Although the plants are running on full capacity as mentioned above, all of the settlements within the municipality still have shortage of clean drinking water, limited or no access to clean drinking water. The Eksteenskuil Islands which is situated in Ward 8 have no access to clean drinking water and areas like Blaauwskop, Bloukamp, Eenduin, Loxtonvale, and Mc Taggers Camp are provided by water through water trucks. The newly developed plant in Vyebos brought relief to some of the communities adjacent to plant due to the restricted service area. Also is a construction process underway to upgrade the water purification plant in Bloemsmond which will extend its supply to McTaggers Camp as well. This plant will also assist with the transport of water to Blaauwskop and the 50hectar (Plangeni) as it is closer to those areas. This phenomenon of transporting water to settlements brings a threat to the

municipality in terms of transport costs and also poor service delivery since we only have no water truck and have to transport water with two Jo-Jo tanks strapped unto a refuse truck.

The municipality has a total of 50 Process Controllers, ageing from 30 to 64 years of age; most do not have grade 12 qualifications but do have the experience. This is a challenge in the sense that it's tougher to change systems and implement the latest technology. Training on the various categories of operation is provided through the TVET College in Upington. All operators attended these two weekly training sessions to upskill/ build their capacity in water maintenance.

4. Maintenance of water infrastructure

The maintenance programme starts at the raw water abstraction points as well as raw water storage dams and continues to the water purification plants (process equipment) and distribution infrastructure (purified water dams/reservoirs/pipelines). The total budget allocated is R300 000 for equipment and wages; a total of 75 temporary jobs have been created.

This project is been initiated by the EPWP as a yearly maintenance effort on Kai !Garib Municipality's water infrastructure to ensure that the water quality complies with Department of Water and Sanitation's drinking water quality limits. Noted that this programme will start as from 1 July 2020.

4.1 The maintenance challenges of the water purification plants

Kai Garib Local Municipality, experienced a number of challenges at the Kakamas Water Treatment plant, Marchand Water Purification Plant, Augrabies, Cille, Vredesvallei, the Lennertsville Water Treatment Plant, as well as in Kenhardt over the festive season/ the peak time. The report provides an overview on the challenges that were faced by the Municipality during the month of November and December 2020.

- **Kakamas Water Treatment Works**

On the 28 November 2020, the community of Langverwag had no water for a period of three days, mainly due to the raw water pump that broke down. In November 2020, there were only 2 raw water pumps and two potable water pumps at the time. No standby pumps were in place. From time to time, other pumps had to be used in order to attend to the other water treatment plants. In total, there are 16 Water treatment plants.

The Municipality had to purchase pumps in order for the community to receive water. Currently the capacity of the water treatment plant cannot meet the daily demand of the Kakamas Community. In general, the condition of the Plant is in a very poor state. The plant cannot supply sufficient water as the plant. The main reasons are that most of the mechanical equipment is in a poor state and most of the equipment has reached their lifetime. The filters are in a very bad condition and therefore the quality of water has not been up to the SANS 241 standard for the past months. The filters have never been serviced for the past years.

The dosing equipment is also in a very poor condition. The chlorine dosing is still done by hand, therefore the water quality for the past months has not been to the required standard. The cleaning of the reservoirs and our network should be priorities yearly in winter to improve our water quality. In general, the condition of the plant is very poor. The only solution is to upgrade the plant.

- **Marchand Water Purification Plant**

The Marchand community lodged a complained in November 2020 to the Premier regarding the shortage of water. The plant was designed to operate with a VSD, when this equipment was struck by the lighting, the VSD did not operate any longer. Currently the plant is operating at 60% capacity. The capacity of the raw water is very low. The purification plant consists of two up flow vessels of which only one vessel in in use. The automatic backwash is not working therefore the filters is partly blocked. The automatic control is also not in use. The Stabillis Development was requested to do an assessment on the plant. A report was then submitted to the Municipality with a proposed solution. The solution is to implement urgent rehabilitation actions by replacing all faulty equipment. The estimated cost to rehabilitate the Marchand Water Purification Plant is **R 776 894.**

- **Augrabies Water Purification Plant –**

For the past 3 to 4 years the plant of Augrabies has been unable to meet the needs of the community. The purification equipment at Augrabies needs rehabilitation due to the growth and wear and tear of the equipment.

- The current purification equipment requires urgent rehabilitation because of normal wear and tear. One of the settling tanks has a crack and is not in use.
- Bulk water meters are not in working condition.
- 400 serviced erven cannot be occupied because of lack of sufficient water supply
- The electricity supply to the plant is not sufficient

In order for the plant to operate the plant will have to be upgraded. The following solution were suggested:

- Supply and install 1800-2 UMFC up flow filtration systems.
- Replace bulk water metres.
- Replace existing raw water pumps
- Replace existing purified water pumps
- Rehabilitation of existing pump house
- Rehabilitation of electricity supply to plant

The estimated project value is **R 7 994 156.00**

- **Lutzburg Water Treatment Plant**

The Lutzburg, Cille and the Augrabies WTW, has common challenges as the designs is the similar. Urgent upgrading must be considered for plants in order for the communities to receive potable water.

- **Lennertsville Water Purification Plant**

The water supply in Lennertsville also supply water to the Kenhardt area. Every Nov and December months challenges are experienced, with water to the area. In September 2020, the one filter at the plant began leaking a lot. Kenhardt could not be supplied with water. The Kenhardt remained without water for a period of three days in December 2020. The following will also have to be refurbished:

- Refurbishment of the telemetry system and control instrumentation on the Kenhardt/ Lennertsville Water Supply system;
- Refurbish/ Replace pumps and motors as needed after evaluation at river abstraction point, within the treatment plant and booster pump station;
- Replace chemical dosing system;
- Sandblast and replace epoxy coating on corroded areas of settling tanks; and
- Funding has been made available through the WSIG programme to refurbish the Lennertsville Water Purification Plant.

- **Vredesvallei Water Purification Plant**

The Vredesvallei purification plant is not a good condition. The infrastructure has not been upgraded for the past years. The current situation of the infrastructure is that the raw water storage is leaking and water is lost. The chlorine dosing is done manually which at this moment is not accurate. The water quality at the plant is not of good standard. Five years ago, the reservoir dam, broke and it was replaced with 3 Jojo tanks. Storage is not sufficient. The only option is that the plant must be upgraded, for the Municipality to deliver potable and safe drinking water to the community. In conclusion, the water quality of the Kai Garib Municipality remains a concern to the Department of Water and Sanitation. Water failures are encountered at some plants. At certain plants, process controllers still dose manually.

References

1. IDP. 2020. Kai !Garib Municipality
2. District Development Model. 2021. ZF Sigcawu District