



Terms of Reference

Chirundu

Joint Cross-Border Water Supply and Sanitation Project (Zambia/Zimbabwe)

Consultancy Services to carry out

Pre-feasibility and Feasibility Studies

Terms of Reference Appendix I

Description of the Project Area

August 2018

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Abbreviations

CRIDF	Resilience Infrastructure Development Facility
CLB	Chirundu Local Board (Zimbabwe)
CTC	Chirundu Town Council (Zambia)
Eng.	Engineer
GIZ	Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH
ICPs	International Cooperating Partners
IWRM	Integrated Water Resources Management
KAPB	knowledge, attitudes, behaviour and practices
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LWSC	Lusaka Water and Sewerage Company
MLGPW & NH	Ministry of Local Government, Public Works and National Housing (Zim)
MoU	Memorandum of Understanding
MWDSEP	Ministry of Water Development, Sanitation and Environmental Protection
NRW	non-revenue water
NWASCO	National Water Supply and Sanitation Council (Zambia)
O&M	Operation and maintenance
OSBP	One Stop Border Post
PCP	Public Consultation Process
PR	poverty reduction
RI	regional integration
RIDMP	Regional Infrastructure Development Master Plan
RSAP	Regional Strategic Action Plan
SADC	Southern African Development Community
ToR	Terms of Reference
TWMP	Transboundary Water Management Project
VIPs	Ventilated pit latrines
WASH	Water, Sanitation & Hygiene.
WSPs	waste stabilisation ponds
WTPs	Water treatment plants
ZIMRA	Zimbabwe Revenue Authority
ZINWA	Zimbabwe National Water Authority
ZRA	Zambia Revenue Authority

1 Background to the project area

1.1 Introduction

Chirundu is a settlement on the Zambezi River between Zambia and Zimbabwe. The settlement is an important international border for the North-South Corridor linking eastern and southern Africa. The transport corridor is the busiest regional transit transport link in eastern and southern Africa, carrying 5.8 million tons of cross-border traffic extending over three regional and economic groups, COMESA, SADC and SACU. The Beira-Lobito Corridor also passes through Chirundu making the settlement a trade route node and convergence of all corridors in the sub-region including the Kalahari.

The Chirundu border crossing is the site of two of the five major road and rail bridges across the Zambezi River. It is the only place on the Zambezi where two bridges cross the river. The Chirundu settlement consists of two towns, a larger part in Zambia and a smaller one in Zimbabwe. In Zambia the town has a population of approximately 15,000 whilst in Zimbabwe the resident population is estimated at just below 4,000 people giving a combined urban population of just under 20 000. Chirundu Zambia serves also as the capital for Chirundu district and is growing at a fast pace. It is estimated that the actual population including informal settlements and immediate surroundings stands at 62,000 with 4.5 % annual growth rate which is the highest in the country. Chirundu is the busiest port of entry in Zambia. Both settlements have a predominantly young and growing population, which is under-served in terms of basic services. About 25% of the population live in informal settlements.

Formal employment is mainly in public institutions operating at the Border Complexes of either country, notably revenue authority, Department of Immigration, the police, health and defence. Private sector employers include clearing agents, transporters and those operating beer-halls, restaurants, butcheries and grocery shops. A greater percentage of the population in Chirundu engages in informal trading (e.g., vending and other such activities).

Chirundu is surrounded by wildlife/safari areas in both countries, and it is also a popular destination for fishing with a high potential for tourism related developments. The settlements have a high potential for agriculture and trading. To date a new and modern shopping centre is already under construction in Chirundu Zambia.

1.2 Development challenges and socio-economic characteristics

Like most urban settlements in the developing world, Chirundu faces the challenge of a rapidly increasing population that, coupled with poor physical planning, which puts a severe strain on existing public health services and other amenities. The high volume of traffic through the border has brought commercial opportunities to Chirundu but has also placed the existing services under further pressure. The pressure on services has in turn increased the risk of waterborne diseases in each town as well as cross border infection. The situation is exacerbated by the high HIV infection rate that is experienced in Chirundu, partially due to the high transient cross-border population that spends time in Chirundu while completing the cross border formalities. Child pregnancies are also reported to be high. Chirundu is also fast becoming a commercial hub for the nearby rural areas in both countries.

Town planning is poor for both towns in Chirundu. As the populations increase and more people settle in the towns, the towns will run out of economic servitudes for service supply lines. It is therefore necessary that the water supply and sanitation system is adequately planned before the settlement densities reach a critical level beyond which creating servitudes will be impossible without property demolitions.

Lastly, despite the existence of a physical barrier in the form of the Zambezi River, the border remains highly porous and the movement of resident and surrounding populations is not restricted by national boundaries. For example, ordinary shoppers have been observed to visit Chirundu-Zambia from as far as Makuti, Karoi, Kariba and rural Hurungwe in Zimbabwe. In the past the situation was the reverse. Furthermore, Chirundu Zimbabwe is isolated from other urban centres in Zimbabwe with the nearest urban centre, Karoi, being 150 km away. The town is therefore highly dependent on services from across the border. Thus, developments in the two towns cannot be decoupled as disease outbreaks in one town will inevitably affect the other and the surrounding areas in both countries as well as the transit populations.

1.3 Water supply and sanitation system

WASH services in the two towns are under the control of national institutions and are operated separately from each other. In Chirundu Zambia water supply is the responsibility of the Lusaka Water and Sewerage Company (LWSC), a commercial utility headquartered in Lusaka. In Chirundu Zimbabwe water supply is the responsibility of the Zimbabwe National Water Authority (ZINWA) Manyame Catchment Council headquartered in Harare. In both towns sanitation services fall under the local political administrative authorities, i.e., Chirundu Town Council (CTC) in Zambia and the Chirundu Local Board (CLB) in Zimbabwe. All the institutions responsible for services have capacity limitations and are not able to cope effectively with the challenges posed by the demands for service provision in a fast growing settlement.

Water for both domestic and commercial purposes is drawn from the Zambezi River for both towns. The flows on the Zambezi River downstream of the Kariba Dam are mainly outflows from the dam and are therefore regulated and the water quality is generally good. Due to generally the hydro-geological condition of the area, the groundwater potential around Chirundu is rated moderate to low, between 1-2 l/s. The existence of alluvial aquifers along the main river with occasionally high yields, above 40l/s, has not resulted in the development of groundwater sources for public water supply. Consequently, there are no known boreholes and deep wells in Chirundu.

Institutions and formal settlements have individual service connections but the informal settlements rely on communal taps. Water service delivery is generally poor in Chirundu partly because of water pipe bursts often caused by elephants which deliberately damage water pipes to access drinking water. Intermittent water cuts resulting from power outages are also experienced.

Household and institutional/commercial premises are either connected to a septic tank or a reticulated sewage disposal system whilst most public places such as bus termini and market places have Blair Toilets. Residents from informal settlements use basic individual pit latrines and public toilets while a sizeable number resort to open defecation.

Sewage treatment is by waste stabilisation ponds but in both towns. The design capacity for the original treatment facilities has long been exceeded leaving partially treated sewage flowing into the Zambezi River. Recent initiatives such as the new sewage ponds in Chirundu-Zimbabwe commissioned in 2013 with support from Welthungerhilfe (better known as German Agro Action, which is a German NGO) have been limited to critical areas, in this case the new immigration facilities. Also the total installed wastewater treatment capacity is underutilised due to the missing link between the old wastewater network and the recently constructed stabilisation ponds. Consequently areas of the town have largely remained unserved because of funding limitations. Furthermore, in the case of Chirundu-Zimbabwe the old sewer ponds discharge just upstream of the raw water abstraction points for both towns posing a pollution risk in case of washout by river tides.

Access to reliable and safe water supply and sanitation facilities at the two towns in Chirundu is thus a challenge that requires action to both prevent and control the proliferation of disease.

1.4 Current water and sanitation initiatives

Out of its commitment to transboundary water management in Southern Africa, DFID funds the Climate Resilience Infrastructure Development Facility (CRIDF). In 2016 CRIDF carried out a feasibility study for a water supply and sanitation project in Chirundu-Zambia. The project proposes to upgrade the treatment plant, pumping system, pumps and pumping mains, bulk main pipelines, introduce bulk meter, increase water storage as well as construct new and refurbish existing ablution facilities. The Chirundu Zambia feasibility study findings and recommendations need to be integrated within the joint study for both sides of the border.

In Chirundu-Zimbabwe, national government agencies, ZINWA and ZIMRA have embarked on WSS infrastructure projects to augment water supply and improve wastewater treatment through construction of a new water-works complete with a water storage tank and new waste stabilisation ponds. The developments remain largely uncompleted and/or unconnected to the larger settlement.

The two projects on either side of the Zambezi River are not integrated and the benefits of economies of scale, value for money and cost-effectiveness to be gained through a joint scheme remain unexplored and may actually be missed.

Meanwhile, the one stop border post (OSBP) at Chirundu has been completed and has been judged by key stakeholders to have greatly improved movement across the border. Considering this, free movement will only result on a strain on the planned WASH facilities on Chirundu-Zambia, if no corresponding measures are implemented on the Zimbabwe side. Thus, SADC considers it imperative that a feasibility study be undertaken for a joint project for the entire Chirundu settlement.

Despite the national efforts sector development in general, and services in the border towns in particular, have been constrained by inadequate funding.

2 Town specific issues

Available documentation shows that the two towns have embarked on separate initiatives pertaining to the delivery of water supply, sanitation and health services. They also have divergent outlooks about their developmental trajectories as these are mostly shaped by national political imperatives and policy frameworks. Yet in these differences there are opportunities for synergies, which if exploited, may result in a win-win for both towns. Currently though, there is no formal cross border collaboration between the two towns. However, personal relations among key stakeholders from either side of the river are reported to be cordial and the stakeholders feel more formal collaboration will be beneficial to either party in the long run. They also seem to acknowledge that national policies currently limit the scope for effective collaboration even where such would make both economic development and service delivery sense.

2.1 Chirundu Zambia

As stated above, CRIDF carried out a feasibility study for a water supply and sanitation project in Chirundu-Zambia focussing on the installation of new infrastructure. Thus, for Chirundu Zambia the focus in WSS development is to augment and modernise services to meet both growing demand and previously unserved populations. The district administration also has plans to expand the urban boundaries, which would result in an increased service area.

Physical planning: The town size is currently stated as 600 hectares from just 94 ha before it was declared the district capital. However, traditional chiefs control the land and there are encroachments from the rural area. As such there is need to incorporate current residents in the new urban boundaries. Jurisdiction over land is also an issue. So far it has been reported that two chiefs, Chipopo and Chifembe, are clashing over land rights. This makes it difficult for the urban local authority to decide who to negotiate with regarding land for urban expansion.

Water resources: Chirundu Zambia has historically depended on the Zambezi River for its source of water supply from two abstraction points which are located upstream (southeast of the town) and downstream (northeast of the town). Each of these intake points pumps water to separate water treatment plants. About 2,000 m³ /d of water is supplied from the two water treatment plants to the town.

Water Supply: The Lusaka Water and Sewerage Company (LWSC) supplies reticulated water to the Chirundu border area and the entire urban area through two main water supply systems, namely (1) piped house and yard connections and (2) communal water points. However, some institutions and individual households have developed their own private water systems. Communal water points are in the form of water kiosks managed by water licensed water vendors. A total of 928 house and 60 commercial connections are reported. Willingness to pay for services was reported to be high even though services were often erratic.

LWSC indicates that they are currently supplying approximately 2,000 m³/d to Chirundu consumers (1,400 m³/d from Chirundu Main Plant . although only half of this volume is treated and 600 m³/d from the ex-ZRA system, therefore total treated volume of water that can be supplied to Chirundu is estimated as 1,300 m³/d). The water losses in the system are esti-

mated at 50%. The LWSC is not able to meet the current water supply demand due to inadequate water production capacity. It is reported that facilities for water abstraction, treatment, transmission and storage all have inadequate capacity and the distribution network is not servicing the full customer base. Latest service figures suggest that LWSC produces 3,800m³/day against a demand of 10,400m³/d. Hours of supply is 21 to connected consumers only.

To address the water supply challenges, the recently concluded technical assessment proposes to develop a ring main network, comprising a ring main allowing for improved coverage of supply to the town. Water kiosks would be constructed to cover all the residential areas, although the number and location would be determined and finalised after consultation with stakeholders at the detailed design stage.

Sanitation: The council owns and manages public ablution blocks with a water borne sewer system at the main bus station and main local market. Ventilated pit latrines (VIPs) are mainly utilised by institutions and a few households whilst ordinary unlined pit latrines are prevalent both in commercial and residential areas. Because of the terrain and poor soil conditions in the town a sizeable number of pit latrines are reported to collapse during the rainy season posing a health threat to both residents and travellers.

The technical assessment proposes the construction of public ablution facilities for use by travellers crossing the border and at high foot traffic areas like the local market. The ablution block would consist of toilets, shower and laundry facilities, which will be separate for males and females. Sewage treatment would be by means of a septic tank, designed to be emptied every 3 years. The sludge would be discharged into sewage ponds located at the nearest town with sewage treatment facilities. In future, these facilities could be connected to the existing sewer network system, which would need to be refurbished to possibly include a faecal sludge handling facility.

The low to medium income residents would be encouraged to use on-site treatment solutions, while construction of VIP latrines for the low income communities would be considered on condition of affordability.

The existing non-functional sewerage treatment plant would in future be redeveloped to full operation to receive and treat wastewater from the operations of a conventional sewerage system conveying sewerage from the border post and surrounding commercial area. A small bore sewerage system from other high volume water consumers (lodges, hotels, businesses, homeowners) can be incorporated into the existing system. All the wastewater would then be conveyed to the refurbished oxidation ponds.

Solid waste management: The mandate of waste collection and disposal lies with the local authority within their planning jurisdiction. In this light Chirundu council is expected to establish a sustainable solid waste management system. It is envisaged that the current waste disposal practice of using pits and burning will be banned as it is environmentally unfriendly and undesirable for an area that is frequented by tourists and other travellers.

System augmentation plans: The current feasibility study for Chirundu Zambia plans to expand and improve the WSS system as follows:

- Rehabilitate raw water pipeline from abstraction pontoon to a capacity of 936 m³/hr

- Upgrade the treatment capacity (to 6 ML/day)
- Increase storage capacity to 2 ML which guarantee at least 12-hour storage
- Increase booster pump capacity (pumps and pipes)
- Upgrade bulk pipeline capacity to 630 m³/hr peak hour flow
- Introduce bulk metering
- Increase distribution network
- Refurbish the sewer system and connect high consumption water users

2.2 Chirundu Zimbabwe

There is currently little formal documentation on the status of WSS in Chirundu Zimbabwe. However, a reconnaissance visit to the town provided preliminary insights into the WSS situation in Chirundu Zimbabwe as of May 2017. From the field observations and discussions with the Local Board it appears the WSS challenge for the town is two-fold (1) how to connect the entire town to existing infrastructure which infrastructure seems to have excess capacity in relation to current demands, and (2) how to complete and operationalise installed infrastructure which has not yet been commissioned.

It should also be noted that several players are involved in the delivery of services. This situation arose from the difficult economic environment prevailing in the country in the past two decades during which a firefighting approach was adopted regarding service delivery. Some players like the Zimbabwe Revenue Authority (ZIMRA), by virtue of them having funds, ended up playing a significant role in WASH service infrastructure development to save the situation, even though they do not have such a mandate.

Water supply: There is an old and a new WTPs. The old plant is in good working order but has one raw water pump. The old water treatment plant has a capacity of 70m³/h on average producing 1,100m³/day against a peak demand of 1,375m³/day. Water storage capacity stands at 2,000m³ whilst distribution losses in the system are estimated around 33%. The capacity of the new treatment plant is 180m³/h delivering 2880m³/day. Storage is in the form of a 2000m³ ground reservoir. The new plant is state of the art but is yet to be completed and commissioned due to contractual issues. A new storage reservoir has been completed but only serves the border complex as it is not connected to the town reticulation.

Wastewater: There are new and old waste stabilisation ponds. The Old WSPs discharge into Zambezi River and have been decommissioned but still receive sewage from some parts of the town. The ponds need minor rehabilitation works if they are to continue in use. The Ministry of Local Government, Public Works and National Housing (MLGPW-NH) wishes them decommissioned but the Local Board believes they still can be used to serve areas that cannot drain by gravity to the new WSPs. The new ponds are well designed and are reported to have sufficient capacity to serve the entire settlement but currently only serve the border complex and may not command the whole town without some pumping of sewage. The design capacity of the two works is also not documented.

Solid waste management: The Local Board currently uses an unprotected and undersigned old quarry site as a dumpsite. Currently, wildlife access to the dumpsite is unrestricted. The Local Board has plans to construct a sanitary landfill and has identified a possible site close to the river downstream of the town area.

Institutional issues: Several players are involved in WSS service delivery for the town. Water is the responsibility of ZINWA. The Local Board manages wastewater and solid waste. ZIM-RA has funded all developments serving the border complex with the of local government ministry supervising all works. The Local Board want water to be moved from ZINWA but acknowledges that they have no capacity yet to run the full WSS services. The Local Board is run by 4 commissioners appointed by the local government minister. The Local Board Secretariat has 6 permanent staff including an engineering intern. Monthly revenue ranges between USD18,000 and USD20,000 with USD10,000 covering staff costs. Meanwhile the water revenue for ZINWA is estimated at an average of USD13,000 per month.

Town planning: The town has set aside close to 100 ha of land along the highway for the purposes of developing a new central business district. However, the town is planned from the provincial headquarters in Chinhoyi about 240km away. The Local Board feels such planning does not address the real challenges in the town and often creates problems, e.g., locating houses in flood plains. There is no physical planning master plan to guide the location of new developments. Lateral expansion of the town is also restricted by the Zambezi River and national parks areas, making proper planning critical.

Town Board priorities: The order of priorities for the Town Board is stated as: (1) Town Master Plan (2) Sewage conveyance (3) Water distribution and (4) Health facilities. The Town Board welcomes the SADC initiative and believes it dovetails with their priorities.