REPORT

of the

Auditor–General

on the

MANAGEMENT OF SEWERAGE SYSTEM BY URBAN LOCAL AUTHORITIES UNDER THE MINISTRY OF LOCAL GOVERNMENT, PUBLIC WORKS AND NATIONAL HOUSING

Presented to Parliament of Zimbabwe

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Office of the Auditor- General
48 George Silundika Avenue
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Harare,Zimbabwe

The Hon. J. Moyo
Minister of Local Government, Public Works and National Housing
Makombe Building
Corner Leopold Takawira & Herbert Chitepo Avenue
Harare

Dear Sir

I hereby submit my Value for Money Audit Report on the Management of Sewerage System by Urban Local Authorities under the Ministry of Local Government, Public Works and National Housing in terms of Section 11 of the Audit Office Act [*Chapter 22:18*].

Yours faithfully,

M. Chiri (Mrs)
AUDITOR-GENERAL
Harare
October 30, 2019

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Office of the Auditor-General

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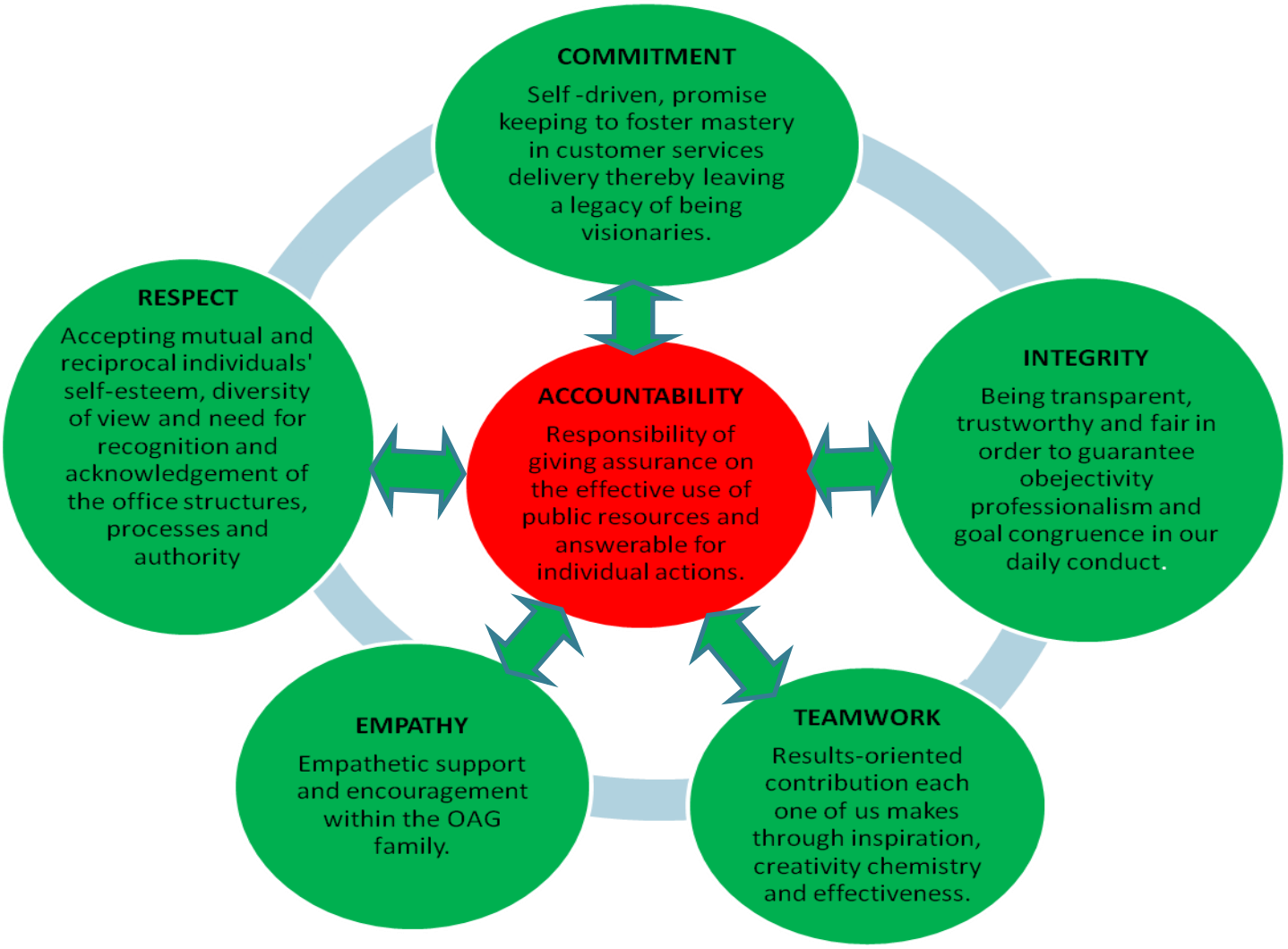

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ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
BNR	Biological Nutrient Removal
BOQ	Bill of Quantity
EMA	Environmental Management Agency
GIS	Geographic Information System
GRP	Glass fiber Reinforced Plastic
IfDB	Infrastructure Development Bank
ISSAIs	International Standards of Supreme Audit Institutions
PPP	Public Private Partnership
SPB	State Procurement Board
SLB	Service Level Benchmarking
STPs	Sewerage Treatment Plants
UCAZ	Urban Councils Association of Zimbabwe
ULAs	Urban Local Authorities
WSPs	Waste Stabilisation Ponds
ZACC	Zimbabwe Anti-Corruption Commission
ZINWA	Zimbabwe National Water Authority

GLOSSARY OF TERMS

Blue Band	in respect of a disposal which is considered to be environmentally safe.
Chokes	obstruction in the sewerage system pipes.
Effluent	liquid waste or sewage discharged into a river or the sea.
Green Band	in respect of disposal that is considered to present a low environmental hazard.
Gross Domestic Product	is the sum of the market values, or prices, of all final goods and services produced in an economy during a period of time
Pathogens	a bacterium, virus or other microorganism that can cause disease.
Red Band	in respect of a disposal that is considered to present a high environmental hazard.
Rehabilitation	to restore to original condition.
Reticulation	refers to the system of pipes, sewers and drains that are used to convey sewage from a property to a sewage treatment plant.
Sewage	is a type of wastewater that is produced from a community of people. It is characterized by volume or rate of flow, physical condition, chemical and toxic constituents, and its bacteriologic status (which organisms it contains and in what quantities). It consists mostly of greywater (from sinks, tubs, showers, dishwashers, and clothes washers), blackwater (the water used to flush toilets, combined with the human waste that it flushes away); soaps and detergents; and toilet paper.
Sewerage	is the infrastructure that conveys sewage or surface runoff (stormwater, meltwater, rainwater) using sewers. It encompasses components such as receiving drains, manholes, pumping stations, storm overflows, and screening chambers of the combined sewer or sanitary

	sewer. Sewerage ends at the entry to a sewage treatment plant or at the point of discharge into the environment. It is the system of pipes, chambers, manholes, etc. that conveys the sewage or storm water.
Unserved inhabitant	not attended to or catered for.
Waste Stabilisation Ponds	are ponds built for wastewater treatment where biological processes occur which reduce the organic content and kill pathogens in the wastewater.
Waste water	is any water that has been affected by human use. **Wastewater** is "used **water** from any combination of domestic, industrial, commercial or agricultural activities, surface runoff or stormwater, and any sewer inflow or sewer infiltration".
Yellow Band	in respect of a disposal which is considered to present a medium environmental hazard.

EXECUTIVE SUMMARY

The audit of management of the sewerage system by urban local authorities under the Ministry of Local Government, Public Works and National Housing in Zimbabwe was carried out in order to make an independent assessment of how the sewer reticulation system was being managed and also to proffer audit recommendations for improvement, where necessary.

Management of sewage and sewerage system is an important aspect of good hygiene and sanitation of any community and has an influence in the provision of portable water in urban localities. Failure to properly manage sewage and sewerage systems has deadly repercussion. For instance in Zimbabwe over 560 people died from water-borne diseases while 590 753 others contracted the diseases during the period 2013. In addition, poor sanitation is costing Government approximately US$194 million per year, or the equivalent of 1.3% of Zimbabwe's annual Gross Domestic Product (GDP). This translates to an average US$16.4 per capita annually, or US$31.9 per unserved inhabitant. These figures reflect the adverse health effects associated with poor sanitation and water supply such as medical costs of treating Cholera and Typhoid and loss of productivity that results when individuals are sick and others have to care for them.[1]

Most Urban Local Authorities recharge their surface water sources with treated sewage effluents, thus wastewater effluents are a critical component of the water supply system. The major concern is that most of the sewage effluents can only achieve the yellow band on the Environmental Management Agency (blue, green, yellow and red band) with most of them falling in the red band. Thus, the risk on environment remains very high due to sewage effluents.

Management of sewage and sewerage system in Zimbabwe is the mandate of Urban Local Authorities (ULAs) as prescribed in the Urban Councils Act (Chapter 29:15). It involves the collection, conveyance, treatment and disposal of sewage or stormwater.[2]

Urban Local Authorities are under the Ministry of Local Government, Public Works and National Housing. They are responsible for the overall planning, designing, construction, sustainable operation, maintenance and management of sewer systems.

A sample of six (6) out of thirty two (32) Urban Local Authorities namely Bulawayo City Council, Harare City Council, Masvingo City Council, Mutare City Council, Chitungwiza Municipality, and Marondera Municipality were selected for audit covering the period January 2013 to June 2017.

The areas are a representative of city councils and municipalities based on the following criteria:

- Harare, Chitungwiza and Marondera have high cases of sewer blockages and outbreak of water borne diseases,

[1] Zimbabwe Economic Impact on Water and Sanitation Report 2016

[2] Section 168 of the Urban Councils Act (Chapter 29:15)

- Bulawayo, Masvingo and Mutare have better sewer systems in place than the other councils,
- Harare, Bulawayo, Mutare and Masvingo as well as Marondera and Chitungwiza have high population.

The audit was conducted in accordance with International Standards of Supreme Audit Institutions (ISSAIs) with interviews, documentary reviews and inspections being used as data collection methods.

Findings

The assessment of the six (6) Urban Local Authorities revealed that there were systems in place for the management of sewer system although they were not being adhered to. This was evidenced by challenges in repairs of systems, completion, planning, scoping, inspection, maintenance, monitoring and evaluation of sewer projects. These challenges were contributing to the sewer blockages and were a concern for the public.

I noted through documentary reviews of sewer blockages registers for the six (6) Urban Local Authorities that the figures for cases of sewer blockages were high depending on the size of the population in the city or town. From the table below, since Harare has the largest population it was experiencing more sewerage blockages followed by Bulawayo, Chitungwiza, Mutare, Masvingo and Marondera. The table below also shows the summary of the sewer blockages reported in the Urban Local Authorities that were visited.

Schedule of Sewer Blockages Reported

Year	**Name of Council**					
	Harare	**Bulawayo**	**Chitungwiza**	**Mutare**	**Masvingo**	**Marondera**
Yearly Average	26 709	21 700	7 256	3 740	2 812	1 452
Pop.[3]	1 542 813	699 385	340 360	184 205	76 290	57 802
Ranking	***1***	***2***	***3***	***4***	***5***	***6***

Source: Sewer Blockages registers and monthly reports

Below are the highlights of the audit findings on the management of sewerage system for the Urban Local Authorities visited. The detailed findings are in Chapter 3 of this report.

Repairs to the sewer chokes/blockages

1 Urban Local Authorities were taking a long time to attend to sewer blockages and in most cases 2-3 days after getting the reports made by affected ratepayers. This was caused by

[3] Population of cities in Zimbabwe 2018

non-availability of vehicles and delays in procurement of materials. This resulted in raw sewage flowing in residential areas, leading to water borne diseases such as cholera and typhoid.

Supervision of projects

2 Urban Local Authorities visited failed to complete their projects on time. The projects were on sewer infrastructure rehabilitation. There were cases of commissioning of uncompleted projects and launching of projects without proper scoping of work. This was caused by lack of supervision by Urban Local Authority project engineers and lack of enforcement of contract agreements such as durations of the work and termination in case of non-performance by parties involved.

Urban Local Authority engineers were not doing due diligence in costing of projects which resulted in tender variations and disagreements. These resulted in delays of payments of certificates which had ripple effects on the completion of projects.

The delay in completion of projects increased pressure on temporary connections resulting in more blockages putting the residents at risk of water borne diseases.

Rehabilitation the sewer network

3 Urban Local Authorities delayed or failed to carry out rehabilitation of sewer reticulation lines with asbestos cement pipes. Most of the sewer system rehabilitations being done were financed by African Development Bank instead of government. According to interviews held with various Engineers, Asbestos cement pipes have a lifespan of forty (40) years. Sewer lines in most old residential suburbs in Harare, Bulawayo, Mutare, Masvingo, Marondera and Chitungwiza are of asbestos cement pipes. This led to numerous sewer blockages resulting in raw sewage spilling into the environment before reaching treatment plants.

Inspection and maintenance of the reticulation system

4 There was no evidence that Urban Local Authorities were carrying out regular inspections and maintenance of the sewer reticulation systems. According to interviews with Engineers, they cited that they were doing more of reactive maintenance as and when there is a problem basing on sewer reports rather than planning maintenance. Urban Local authorities did not have online machines and equipment required to do inspections.

Failure to do routine and scheduled inspections resulted in the engineer's inability to identify weaker parts of the sewer reticulation system. This caused accumulation of solid objects and grit in the reticulations system leading to sewer chokes and blockages.

Revenue Collection

5 Urban Local Authorities were collecting less revenue than anticipated. Through documentary review of (5) five Urban Local Authorities (Harare, Chitungwiza, Masvingo, Mutare and Marondera), I noted that on average the Local authorities were collecting 46.4% of the anticipated revenue. According to a survey undertaken, consumers/ratepayers were not paying rates willingly because of poor service delivery by Urban Local Authorities. This adversely affected the operations of the sewer units.

As a result of low collection of revenue, resources available for allocation between several service areas will be limited resulting in service delivery being compromised.

Recommendations

It is hoped that the audit recommendations proffered will result in improvements on the management of sewer systems by the Urban Local Authorities. The issues raised were very material in that they sought to ensure sound management of sewer systems, reduction in water borne diseases and sewer blockages. In addition, effective management of sewer systems would improve the basic living standards of the populace at large.

1. Urban Local Authorities should provide vehicles, as well as shorten the procurement process of materials so as to ensure that repairs will be done within 24 hours from the reporting time. This would also reduce health hazards.

Urban Local Authorities should have a mechanism that avails materials when they are being needed so as to minimize work disruption.

2 Urban Local Authorities should enforce the provisions of contract agreements signed with contractors such as duration of the contract and payment of stage certificates. Any breach of contract should result in contract termination. Penalties and charging of interest should be enforced on contractors who fail to complete works on time. Where applicable legal action should be taken so that a party that breaches the contract would be held accountable.

Urban Local Authorities should ensure that they pay contractors on time for all work certified complete so that operations are not affected.

Project engineers should supervise the work done by contractors. There should be a budget for supervision of projects to allow them to constantly monitor the works done by the contractors. This would also allow them to timeously make decisions.

Council engineers should ensure that proper scoping and planning of projects is done before commencing the projects to avoid stoppages. This will result in target dates of the projects being met.

3 Urban Local Authorities should ensure that rehabilitation of sewer system is done timeously. Adherence to routine inspection and maintenance schedules of sewer system infrastructure would preserve the system life span as well as reduce health hazards. In addition, this may also reduce the number of sewer blockages and ensure that all sewage waste is treated before it is pumped into rivers where portable water is drawn from. Consequently waterborne diseases such as cholera and typhoid would be reduced.

4 Urban Local Authorities should ensure that they procure online machines and equipment for inspections and maintenance of the sewer reticulation system so as to reduce the number of sewer blockages and waterborne diseases such as cholera and typhoid.

5 Urban Local Authorities should come up with awareness campaigns and promotions that encourage consumers to pay their bills. In addition, an improvement in Urban Local Authorities' service delivery may motivate consumers to pay since some indicated that they were not paying because of poor service delivery.

There is need for Central Government to be involved in the financing and ensuring that ongoing rehabilitations of sewer system are done properly to further improve sewerage management.

CHAPTER 1

INTRODUCTION

The audit of management of the sewerage system by urban local authorities under the Ministry of Local Government, Public Works and National Housing in Zimbabwe was carried out in order to make an independent assessment of how the sewer reticulation system was being managed and also to proffer audit recommendations for improvement, where necessary.

1.1 Background

Urban Local Authorities are under the Ministry of Local Government, Public Works and National Housing. They are responsible for the overall planning, designing, construction, sustainable operation, maintenance and management of sewer systems. Over the years there has been a public outcry on the condition of hygiene and sanitation in Zimbabwe to the extent that this has become a public concern and a cause of various health problems such as typhoid and cholera which are being experienced in most urban areas. So to provide good hygiene and sanitation to citizens there has to be effective and efficient measures to properly manage sewage in urban areas. The Constitution of Zimbabwe section 73 (1) states that every person has the right to an environment that is not harmful to their health or well-being; and to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation[4]. Even the country's economic blueprint (TSP) Transitional Stabilisation Programme (Part V) places water and sanitation rehabilitation projects as one of the priority areas. The economic blue print also states that, by 2024 all sewer should be treated before being discharged to the environment.

1.2 Organisational Structure

Urban Local Authorities are responsible for the management of the sewage systems. Within each Urban Local Authority there is a Wastewater Division that deals with all wastewater related issues. The Wastewater Division structures are similar in Urban Local Authorities but may differ in terms of the number of employees and size of the Urban Local Authority according to the set up of the department. Every Urban Local Authority is headed by the Town Clerk, to whom Director of Engineering (Waste water Division) reports. Below the Director there is a Deputy Director of engineering and other personnel such as the technicians, superintendants, and plant operators. **Refer to Annexure A** for a detailed organizational structure.

[4] Section 73 of the Constitution of Zimbabwe

1.3 Funding

Funding for the Urban Local Authorities varies per Urban Local Authority, though the main source of funding is from bills raised for services rendered. The actual revenue collected for a sample of five (5) Urban Local Authorities below was $98 586 513 from billings of $182 954 459. This shows that the Urban Local Authorities managed to collect on average 46.4% of the total amount billed.

Table 1-Amount Billed and Collected for the period 2013-2016

Council	Total Billed ($)	Total Collected ($)	Collection in Percentages (%)
Harare	107 347 642	46 860 065	44
Mutare	11 368 974	6 480 600	57
Masvingo	9 603 958	4 344 167	45
Marondera	2 312 982	767 423	33
Chitungwiza	12 718 488	6 721 865	53
Total	**$143 352 044**	**$65 174 120**	**46.4**

Urban Local Authorities also receive funding from the donor community such as African Development Bank (AfDB) and can access loan facilities from local banks. Table 2 below reflects total funding for the concerned Urban Local Authorities for the period under review.

Table 2-Total funding during the years 2013-2017

Urban Local Authority	Revenue Collected $	AfDB Funding $	Loans $	Total Funding $
Harare	46 860 065	27 169 948*	0	74 030 013
Mutare	6 480 600	0	0	6 480 600
Masvingo	4 344 167	0	1 700 000	6 044 167
Chitungwiza	6 721 865		0	6 721 865
Marondera	767 423	0	0	767 423
Total	**$ 65 174 120**	**$ 27 169 948**	**$ 1 700 000**	**$ 94 044 068**
Percentage of total funding	**46.4%**	**36%**	**8%**	

Source: Financial Reports

*African Development Bank gave Harare and Chitungwiza councils all in all $27 169 948 between the year 2012 to 2017. However, from the information given by the Project Contractor it was difficult to apportion the figure among each respective local authority.

1.4 Audit Motivation

The audit was necessitated by the outcry of the Zimbabwean people that sewer system in towns and cities had collapsed as blockages had been prevalent. Below are some of the issues that were raised by the public and other institutions.

Poor sanitation in Zimbabwe approximately costs the country US$194 million per year, or the equivalent of 1.3% of annual Gross Domestic Product (GDP). This translates to an average of US$16.4 per capita annually, or US$31.9 per unserved resident. These figures reflect the adverse health effects associated with poor sanitation and water supply such as medical costs of treating waterborne diseases such as Cholera and Typhoid and loss of productivity that results when individuals are sick and others have to care for them.[5]

In urban areas 250 450m^3/day of waste water is generated. However, collection and treatment of this sewerage remains a challenge because the existing treatment plants cannot meet the demand and that the sewerage infrastructure has aged.[6]

There were 944 cases of typhoid that were reported and 55 cases of these were confirmed and a total of 5 typhoid related deaths were reported as at March 31, 2016.[7]Between 2015 and 2017 there were 28 confirmed cases of cholera but no deaths were recorded.[8]

Water quality across Southern Africa had deteriorated, but worryingly, the United Nations Environment Programme Report of 2013 ranked Lake Chivero, Harare's main water source, as one of the ten most polluted lakes in the world. Zimbabwe's water bodies are polluted mainly through industrial and mining waste and raw sewage. Harare alone discharges 3 885 mega litres or 19 million (200-litre) drums of raw or partially-treated sewage daily into water systems around the capital city. That's 299 times more than that released by Bulawayo.[9] It is upon this background that the Auditor- General carried out the audit.

[5] Zimbabwe Economic Impact on Water and Sanitation Report 2016
[6] The ZIMSTATS Environmental Report 2016
[7] Zimbabwe Humanitarian Situation Report No 3, of March 31, 2016
[8] Zimbabwe Cholera Outbreak report Number 1 published on 13/09/2018
[9] UN Environment Programme Report 2013

1.5 Audit Objective and Scope

The overall objective of the audit was to assess whether there is adequate management of sewer systems by Urban Local Authorities. The audit covered the period January 2013 to December 2017.

1.6 Audit questions

In order to meet the audit objective the following audit questions were formulated.

1.6.1. What actions are taken by the council wastewater division to ensure timely repairs as per stipulated time?

1.6.2. To what extent does the wastewater division timely procure equipment and materials?

1.6.3. How does the wastewater division ensure that sewerage and drainage reticulation rehabilitation is done and completed timeously?

1.6.4. To what extent are inspections done to the sewer system to ensure better performance?

1.6.5. Is there adequate number of qualified staff for management of the sewer system?

1.6.6. What measures are being put in place to enhance revenue collection?

1.7 Audit methodology

I conducted the audit in accordance with International Standards of Supreme Audit Institutions (ISSAIs). Interviews, documentary reviews, inspections and questionnaires were used as data collection methods.

Interviews were done with various officers in order to obtain information on the management of sewer system, the challenges faced as well as confirmation of the data that was obtained from the documents reviewed.

Documentary review was done to gather information on the functions, procedures, policies and operations of Urban Local Authorities. This included review of various project files to corroborate information from interviews and physical inspections.

Physical inspections of six (6) treatment plants were also carried out to assess how sewerage treatment plants were being managed. The condition and status of the infrastructure were also assessed. Questionnaires were issued to residents, to get comments and opinions concerning the sewer system in their areas. **Annexure B** shows the treatment plants that were visited, documents reviewed and interviews done.

1.8 Sampling

Samples of four (4) out of seven (7) city local authorities (Harare, Bulawayo, Mutare and Masvingo) as well as two (2) out of nine (9) municipalities (Chitungwiza and Marondera) were audited.

The samples are a representative of city councils and municipalities basing on the following reasons:

- Harare, Chitungwiza and Marondera have high cases of sewer blockages and outbreak of water borne diseases,
- Bulawayo, Masvingo and Mutare have better sewer systems in place than the other councils,
- Harare, Bulawayo, Mutare and Masvingo as well as Marondera and Chitungwiza have high population.

1.9 Limitation of scope

Harare City Council did not avail contracts for rehabilitation projects for examination by the audit team. The documents were said to be with the Zimbabwe Anti-Corruption Commission. In addition, documents relating to the distance of the sewer reticulation network that had been rehabilitated were not availed. The documents and/or information would have helped the team to gain a deeper understanding of how the contracts were processed and also to evaluate the percentage of the reticulation system that had been rehabilitated.

CHAPTER 2

DESCRIPTION OF THE AUDITED AREA

This chapter describes in detail the roles of key stakeholders and in particular how the management of sewerage system is supposed to be done.

2.1 Roles and responsibilities of key players

Ministry of Local Government, Public Works and National Housing

The Ministry of Local Government, Public Works and National Housing is accountable to Parliament for the operations of all Urban Local Authorities in Zimbabwe. It has the responsibility of:

- monitoring through review and approval of budgets, financial statements, and management reports.
- attending council meetings, analysing minutes and performing institutionalised system audits.
- providing training and advisory services.
- mobilising resources and checking whether Urban Local Authorities are complying with the regulations.
- Participating in Service Level Benchmarking review exercises.

Wastewater Division in Urban Local Authorities

The Wastewater Division's main goal is to ensure that they provide quality services to the residents by meeting all the needs of the residents in time.

The functions of the Wastewater division are as follows:

- Open trenches to repair burst pipe and collapsed sewer;
- Backfill trenches after repairs;
- Open trenches for new pipe laying within the reticulation network;
- Unblock sewer blockages;
- Construct, moulds and cast concrete blocks;

- Laying of water and sewer pipes;
- Plan, develop and fabricate water and sewer specials for large diameter pipes;
- Construction and maintenance of water and sewerage distribution valve boxes, manholes and chamber shafts from water and sewer treatment plants, truck mains and reticulation.

Urban Local Authorities Treasury Department.

The Local Authority Treasury Department`s main goal is to provide timely and accurate financial management information to management.

It is also responsible for:

- Providing and managing funds of the wastewater division in accordance with their approved departmental budgets for administrative and operational issues.
- Collecting and making follow-ups on revenue generated from provision of wastewater services to the residents.

2.2 PROCESS DESCRIPTION FOR MANAGEMENT OF SEWER SYSTEM

The Operational procedures for the Wastewater Division in an urban council are similar regardless of size.There are numerous processes that are done by Urban Local Authorities.

2.2.1 OPERATIONAL PROCESSES

There are four main stages in the operation of the sewerage system which comprise reticulation, primary treament, secondary treament and final treatment. Maintenance starts from the underground sewer pipes from residential and industrial areas upto the sewer treatment plant and ponds.The four processes are explained below:

Reticulation

Reticulation refers to the system of pipes, sewers and drains that are used to convey sewage from a property to a sewage treatment plant. Wastewater is a by product of domestic, industrial, commercial or agricultural activities. In other words, wastewater is used water from any combination of domestic, industrial, commercial/ agricultural activities, surface runoff or stormwater and any sewer inflow or sewer infiltration.

Waste water from city centre and residential areas is collected through out the city from toilets, bathrooms, kitchens and industries usually using gravity power to the sewer mains. Where gravitation power is not possible pumps are used. There are manholes which are designed to ease maintenance of the system. The sewer mains flow into progressively larger pipes until they reach the wastewater treatment plant. In order to help gravity do its

job, the wastewater treatment plant is usually located in a low-lying area, and sewer mains will often flow to the plant.

Primary Treatment

The second stage, known as primary treatment, allows the solids to settle out of the water and the scum to rise. The system then collects the solids for disposal (either in a landfill or an incinerator). It involves a screen followed by a set of pools or ponds that let the water sit so that the solids can settle out in Primary Settling Tanks (PSTs). Primary treatment removes half of the solids, organic materials and bacteria from the water.

Secondary Treatment

The third stage, known as secondary treatment, removes organic materials and nutrients. This is done with the help of bacteria. The water flows to large, aerated tanks where bacteria consume everything they can. The wastewater then flows to settling tanks where the bacteria settle out. Secondary treatment might remove 90 percent of all solids and organic materials from the wastewater.

There are two different types of treatment that are used in the secondary stage which are, the Biological Nutrient Removal system (BNR) and Biological Filters system.

In the Biological Filter System the water moves from the Bio filters after treatment to the Humus tanks and then into the settlement ponds before being pumped to the farms for disposal to be used as manure by farmers. The standard of treated wastewater from this system can not be pumped directly to the river.

In the Bilogical Nutrient Removal system the water passes through clarifiers from the BNR plant and it is pumped to the river.The standard of treated pumped water can be pumped direct to water bodies.

Final Treatment

Wastewater treated through Biological Filters system is then sent to a settlement tank. Here, more sludge is formed at the bottom of the tank from the settling of the bacterial action. Again, the sludge is scraped and collected for treatment. The water at this stage is almost free from harmful substances and chemicals. The water is allowed to flow over a wall where it is filtered through a bed of sand to remove any additional particles. The filtered water is then released into the river. Effluent to be released into the river should be in blue, green or yellow category and not red category. The four categories are:

- **Blue** – in respect of a disposal which is considered to be environmentally safe.
- **Green** - in respect of disposal that is considered to present a low environmental hazard

- **Yellow** - in respect of a disposal which is considered to present a medium environmental hazard.
- **Red -** in respect of a disposal that is considered to present a high environmental hazard.[10]

Statutory Instrument 6 of 2007 provides the water quality standards in which the effluent should be discharged into the environment.

2.2.2 INSPECTION, MAINTENANCE AND REPAIRING

All Urban Local Authorities are responsible for the maintenance of sewer reticulation system and sewer treatment plants. The Council Engineers should do inspections of the sewer pipes and repairs can be done on an adhoc basis. Maintenance includes all activities that lead to the effective and continuous use of equipment and processes. Repairs consist of what has to be done to unblock a sewer blockage to working order. According to the manufacturer's specifications the lifespan of the sewer pipes are tabled below after which they must be replaced.

Table 3: Schedule of Rehabilitation Periods

Item	**Rehabilitation Period**
Mild Steel	15 years
Asbestos Cement	40 years
PVC pipes	80 years
Reinforced Concrete	70-100 years
Clay Pipes	100 years
Glass Reinforced Plastic	50 years/more

Source: Interview with Engineers

Furthermore, all Urban Local Authorities sewer blockages must be attended and repaired within 24 hours.[11] The Wastewater Division is responsible for repairing the sewer reticulation system, unblocking sewer blockage and inspecting new sewer connections. In addition, residence can come to Council office to report on sewer blockages which when received are recorded and directed to the council plumber to attend to. Once the sewer blockage has been attended to, plumbers record in the same register to indicate that the job was attended to.

[10] Enviromental Management Agency Statutory Instrument 6 of 2007.
[11] Service Level Benchmarking Reports 2016 for all Urban Local Authorities.

Monitoring, Evaluation and Certification

Under the Procurement Regulations Statutory Instrument 171 of 2002, all Urban Local Authorities may sub-contract sewer construction projects and they are required to supervise, monitor and evaluate the works through project and/or council engineers. Project and/or council engineers evaluate each stage completed by the contractors and are required to certify the works so that the contractor can be paid for the work done.

2.3 ADMINISTRATIVE PROCESSES

2.3.1 BILLING SYSTEM

The billing system for sewerage rates emanates when the billing section of Urban Local Authorities sends bill statements to consumers on a monthly basis. As consumers receive the bill statements they are obliged to pay before or on the 15th of every month. The rates charged vary per local authority and per location of the property. Sewerage fees are paid for in arrears, that is billing is done soon after use.

2.3.2 RECRUITMENT OF PERSONNEL AND TRAINING

Recruitment of personnel in Urban Local Authorities is done internally through promotion or externally when there are no qualified personnel to fill the vacancy. External recruitment requires approval from Minister of Local Government, Public works and National Housing. An advert is placed in the newspaper. Potential candidates are then selected and interviewed. Successful candidates go through induction training and on the job training. Where there are training needs, training programs such as continuous development, supervisory management skills, service excellency, specialised equipment training, standard operating procedures and bi-annual health and safety programs are conducted by the human resources division for its employees to reinforce good behaviour and enhance motivation.

Bulawayo City Council has a different way of recruiting employees. The head of unit in need of manpower requests for additional staff by completing a requisition form. After completing the form it is submitted to the work study section in the Human Resource Department. The work study section reviews the requisition and if they are in agreement the Human Resource Department authorises the requisition thereby allowing the head of the requesting unit to proceed in filling the position. A job description containing the qualification and responsibilities of the position to be filled are made and advertised. Interviews are held and the interview outcomes are submitted to the General Purpose Committee which reviews and then recommends to the council to recruit the successful

candidate. After the council approves the recruitment the successful candidate is offered the position.

2.3.3. PROCUREMENT OF MATERIALS

The procurement process is initiated by a user division requesting for the materials required before stocks reach re-order level. The request is authorised by the Director of works, and submitted to the buying department for the purchasing process. This involves seeking quotations or going for tender whichever is appropriate. The administration department will then order and receive the goods and distribute to the user departments. The supplier will send and invoice for payment to the finance department and payment of goods is made. [12]

According to the Procurement Regulatory Authority of Zimbabwe Circular Number 01 of 2018, all procuring entities including urban local authorities are responsible for their own procurement and can dispense procurement below the following thresholds:[13]

i. Below $200 000 in case of construction,
ii. Below $100 000 in case of goods,
iii. Below $50 000 in case of services.

All Urban Local Authorities have separate accounts and each unit has a specific budget for procurement although the funds are authorised and/or released from respective council's Treasury Department.

[12] Procurement Regulations Statutory Instrument 171 of 2002

[13] Procurement Regulatory Authority of Zimbabwe Circular Number 01 of 2018

CHAPTER 3

FINDINGS

This Chapter details my findings relating to management of sewerage systems in Urban Local Authorities.

Management of Sewerage System

The assessment of the six (6) Urban Local Authorities revealed that there were systems in place for the management of sewer system although they were not being adhered to. This was evidenced by challenges in repairs of systems, completion, planning, scoping, inspection, maintenance, monitoring and evaluation on sewer projects. These challenges were contributing to the sewer blockages and were a concern for the public.

I noted through documentary reviews of sewer blockages registers for the six (6) Urban Local Authorities that the figures for sewer blockages were high depending on the size of the population in the city or town. From the table below, Harare having the largest population, it was experiencing more sewerage blockages followed by Bulawayo, Chitungwiza, Mutare, Masvingo and Marondera. Table 4 below also shows the summary of the sewer blockages reported in the Urban Local Authorities that were visited.

Table 4: Schedule of Sewer Blockages Reported

Year	**Name of Council**					
	Harare	**Bulawayo**	**Chitungwiza**	**Mutare**	**Masvingo**	**Marondera**
2013	22 584	21 870	6 036	2 520	2 936	1 620
2014	24 203	23 155	7 548	720	2 725	1 657
2015	28 426	21 518	7 548	4 800	2 460	1 214
2016	29 111	21 127	7 944	4 560	2 707	1 377
2017	29 220	20 832	7 203	6 102	3 231	1 392
Total	133 544	108 502	36 279	18 702	14 059	7 260
Yearly Average	**26 709**	**21 700**	**7 256**	**3 740**	**2 812**	**1 452**
Pop.[14]	**1 542 813**	**699 385**	**340 360**	**184 205**	**76 290**	**57 802**
Ranking	*1*	*2*	*3*	*4*	*5*	*6*

Source: Sewer Blockages registers and monthly reports

[14] Population of cities in Zimbabwe 2018

The assessment of the Urban Local Authorities' management of sewerage system revealed a number of weaknesses which contributed to the increase in the number of sewer blockage complaints from consumers. From table 4 above, there is an increase in the blockages from 2015 to 2017 for most Urban Local Authorities. Below are the challenges on the Management of Sewerage System in Urban Local Authorities.:

3.1 Repair of sewer chokes/blockages

According to the Urban Local Authorities' Service Level Benchmarking standards the maximum time that it must take to attend to a sewer blockage and repairing it is between 8-24 hours after a report has been made.

I however noted that from the Service Level Benchmarking reports for the Urban Local Authorities sampled it took more than 24 hours to attend to and resolve sewer blockages. For example Bulawayo city council in 2013 the rate of repair within 24 hours was 94.1% but by 2017 it had dropped to 30.9%. **Annexure C (for more details)** and table 5 below refers:

Table 5: Schedule showing rate of repair of sewer blockages within 24 hours

Year	Redressal of complaints within 24 hours (in Percentages)			
	Bulawayo	**Mutare**	**Marondera**	**Chitungwiza**
2013	94.1	44.9	72	91.8
2014	67.5	75.9	83.3	62.5
2015	14.9	92.2	84.2	62.5
2016	33.3	88.6	53.6	63.4
2017	30.9	79.9	98.3	69.8

Source: Service Level Benchmarking Reports and registers

From the questionnaire response in table 6 below Marondera and Bulawayo were the least Urban Local Authorities not attending to sewer blockages within 24 hours. They were at 17% and 16% respectively. It was taking more than a day to attend to sewer blockages.

Table 6: Questionnaire response on when council attended to sewer blockages

Council	Total number of Questionnaires administered	Within 24 hours (%)	Within a week (%)	Within a month (%)	Not Applicable (%)
Bulawayo	110	16	24	46	14
Mutare	60	30	62	5	3
Marondera	41	17	69	7	7

Source: Survey conducted

Due to the failure by the Urban Local Authorities to attend to blockages within the stipulated 8-24 hrs, raw sewage is lost into the environment before reaching the treatment plants thereby contaminating water bodies. The raw sewage flowing on the ground will mix with portable water thereby resulting in waterborne diseases.

Furthermore delays in repair of sewer blockage/chokes will result in backflow of sewage increasing pressure on inlet pipes and joints or weaker points will give in to pressure thereby causing further blockages.

The Urban Local Authorities attributed the delays in repairs of the sewer blockages to:

3.1.1 Vehicles to attend to sewer blockages

All Urban Local Authorities are supposed to ensure that adequate material and equipment is available to repair and attend to sewer blockages. However, I noted for the years under audit (2013-2017), that there were inadequate vehicles to attend to sewer blockages for Mutare and Marondera, whilst the other four (4) councils were well equipped with vehicles. Mutare City Council was using vehicles from other departments such as roads, housing and so on in attending to sewer blockages. Table 7 refers.

Table 7: Schedule of Vehicles for Waste Water Department

Council	Number of Vehicles	Number of Runners	Number of non-Runners	Area Covered	Average coverage for each vehicle
Mutare	4	0	4	36km^2	0km^2
Marondera	2	1	1	50km^2	50km^2
Masvingo	5	3	2	35km^2	11.7km^2
Bulawayo	12	10	2	993.5km^2	99.35km^2
Harare	18	18	0	960km^2	53.3km^2
Chitungwiza	8	6	2	45km^2	7.5km^2

Source: Vehicle Registers as at February 2018

From table 5, Bulawayo City Council was not attending to sewer blockages within 24 hours at 30.9%. According to table 7, it may have been due to the fact that one vehicle covered a wider area of 99.35km^2 as compared to other councils. Chitungwiza had the least area covered by each vehicle of 7.5km^2, therefore it was able to cover on average 70% of sewer blockages reported.

Shortage of vehicles resulted in councils failing to attend to sewer blockages within the standard time of 24 hours.

3.1.2 Procurement of equipment and materials

Materials are supposed to be procured and used as and when required. From documentary review, I noted that Bulawayo and Mutare City Councils as well as Chitungwiza Municipality were taking time to procure materials. The delay ranged from 2 to 347 days. Failure to procure materials on time results in the Urban Local Authority failing to repair and maintain the sewer infrastructure within 24 hours as evidenced on table 5. An Urban Local Authority that procures its equipment and material on time can respond quickly to sewer blockages. **Annexure D showing the time taken to deliver materials refers**.

However, for Municipality of Marondera I could not make an analysis of the delay in procurement of materials. This was because the council did not maintain registers indicating date of requisitions, quantity requested, requisition number, order number, quantity procured and date the materials were procured.

Management Responses

Masvingo City Council

Repair of sewer blockages is sometimes taking more than 24 hours mainly as a result of manpower and vehicle shortages. Currently the City is being manned by one (1) Sewer Rodding Team. City of Masvingo is however in the process of acquiring more vehicles for this section after which more manpower will be recruited to constitute a second Sewer Rodding Team.

Procurement of equipment and materials for operation and maintenance is taking long therefore leading to backlogs in maintenance. We expect to register improvements in this area after setting up the Procurement Management Unit (PMU) in Council and adherence to the new procurement regulations.

Harare City Council

The number of vehicles mentioned by the audit report as available for sewer maintenance is on the higher side. The figure includes all vehicles in the Harare Water Department of which some may not be directly for sewer. Furthermore, the vehicles are all beyond their economic lifespan and are constantly on breakdown. Thus, on average 25% of the 65 vehicles recorded by the audit i.e 18 vehicles are generally available for sewer maintenance per given time. If on the ground survey could have been carried out, the audit could have revealed that in most cases one vehicle will service two suburbs e.g Glen View and Budiriro, which means the vehicle

will be available in the morning or afternoon only in each suburb. However, the Department is making frantic efforts to address the situation through various avenues e.g there is a provision of 48 vehicles still outstanding from the China Eximbank US$144million facility.

The assessment and ranking of cities and municipalities requires revision, your audit report considered numbers of reported blockages but did not carry out a scientific assessment e.g. blockages per km. The SLB target of 24 hours attendance to blockages was qualified, thus there is need to also consider that collapsed sewer lines and deliberate blockages by residents for peri-urban agricultural irrigation is complex and cannot be attended within 24 hour period. Most of sewer blockages are now caused by abuse of the infrastructure such as dumping of kitchen utensils, stolen property e.g. motor bike, engine parts, clothing including mattresses and these tend to take long to unblock. In this regard, the 24 hour target is a bilateral target without residents' full cooperation it becomes a dream target. The Department does not autonomously run awareness programs and residents engagement is only through budgetary consultations and ward meetings. The greatest challenge is on peri-urban agriculture where residents deliberately block sewer lines to irrigate their crops especially when rains are delayed and crops start wilting.

Chitungwiza Municipality

We can safely respond to sewer blockages at a rate of 70%, the remainder will be resolved after 24 hours.

We have an old fleet that has gone past its useful life hence it is no longer efficient. The turnaround time is too much such that we face many price changes in our procurement cycles. This is being caused by low revenue collections.

Mutare City Council

There were no increases on sewer blockages but there was an increase in number of blockages attended between the years 2015 to 2017.
Council is working towards resolving sewer blockages within standard turnaround time (i.e. within 24 hours) by 31 December 2019. Plans are in place to procure 1 vehicle in the 2019 budget to address the turnaround time.
The audit observation of 0km2 per vehicle is not correct. In the month of February 2018 we had on average, one (1) runner at any time out of four (4) vehicles in the section. Council is working towards improving operational efficiency at the Mechanical Workshop to keep the aged fleet on the road whilst we procure new vehicles for the department.

The audit observations have been noted. Council has budgeted for the Procurement Manager's post and other staff have been transferred to the Buying section to complement the shortage.

Bulawayo City Council

Efficiency was largely affected by the improved awareness created by Call Centre system. The number of calls increased dramatically with some complaints sometimes being recorded more than once affecting redressal efficiency. Also the number of Plumbers on the Ground did not change since 2013 to date.

Marondera Municipality

Delays in attending blockages is attributed to unavailability of efficient and reliable service vehicles. Of the two vehicles in operation, one is constantly immobile. Whilst the Municipality has a vacuum truck and a towed high-pressure jetting machine for aiding the efficiency of wastewater reticulation blockages, both machines are broken down to date and for the period under review.

However, the Municipality of Marondera carried out a tender for delivery of service vehicles in November 2017, which were delivered on January 19th 2019. This will aid in addressing the mobility challenges.

Marondera Municipality purchases all materials required to attend to sewer reports in bulk. These materials are requested through the Stores sections where they are bought and stored awaiting use by the sections. Most of the materials that we have in stock were purchased back in the days and it is these stocks that are being used to attend to blockages. In the event of sewer blockages, the section raises an internal requisition which they will present to the stores section for the items required to be released to them.

However most of our sewer reports are to do with blockages and these usually do not require any materials but rather manpower to unblock the sewer systems. Fuel requisitions for the sewer vehicles are always funded in time and at the stores section as and when required.

The Municipality procured wastewater reticulation materials worth $24,924.87 of sewer pipes meant for addressing key identified problem points in April-May 2015. The bulk of the materials were used in various projects done by the Municipality.

Evaluation of Management Response

Mutare City Council

Management responses for Mutare City Council were referring to February 2018 which was not the period under review. For the years under review 2013-2017, Mutare City Council's wastewater division had 4 non-runner vehicles.

3.2 Supervision of projects

Urban Local Authorities are responsible for supervising, monitoring, assessing and certifying contractors' work through the project engineers and/or technicians. This will ensure that contractors deliver as per contract agreement with the respective Urban Local Authority. I noted that Urban Local Authorities were not adequately supervising projects contracted out as there were delays averaging 2 years in completion of projects. This resulted in Urban Local Authorities failing to fulfil their mandate in offering sound sanitation services to the consumers and this also led to an increase in waterborne diseases.
Annexure E refers.

The delays for the completion of projects were due to:

3.2.1 Scoping and planning for the job/project

Proper planning and scoping must be done by the council engineer and the project consultant before the project is put to tender. I noted, for instance, that this had not been the case for Bulawayo City Council resulting in the delay in completion of project COB/ESD/C5F/2015 for the rehabilitation of the Deep Tunnel Main Outfall Sewer. The project according to the contract was supposed to take a year and seven months, that is from March 31, 2016 to November 30, 2017.According to documentary review the following were the reasons for the delay in completion:

- On September 2017 the council wrote to Gwayi Catchment seeking authority to excavate across the ZINWA water line supplying water to the J.M.N International Airport. However, from May 2017 up to the time of audit January 28, 2018 the issue had not been addressed by the Local Authority.
- A main house and a cottage was supposed to be demolished so that the contractor could construct a pipe line section. It took more than a year to address the issue from November 2016 to January 2018 when it was addressed.

- Constricted excavation through private properties, hence necessitating the use of dump trucks to move spoils from excavation. However, from May 2017 up to the time of audit January 28, 2018 the issue had not been addressed.
- The hard pickable material (ground material difficult to drill) that was not taken into consideration at the time of tender. However, at the time of audit January 28, 2018 the issue had not been addressed, hence delaying the completion of the project. No proper scoping and planning for projects resulted in issuing of contracts to contractors without adequate equipment to excavate hard pickable materials.

For the Deep Tunnel Main Outfall Sewer project as detailed above, most of the problems were due to improper scoping and planning before the start of the project resulting in delaying the completion of the project.

In the meantime, the sewage was being diverted into the river which is about 14.59 km cutting across the town. Therefore, the continued delay in completing the project would mean that sewerage will continue to flow into the river, thereby becoming a health hazard causing outbreak of disease and attracting penalties from EMA for causing pollution. Continued discharge of raw sewage into water bodies will also result in increased costs of treating portable water since more chemicals will be required for it to be safe for human consumption.

3.2.2 Costing of projects

According to documentary review done for the Mucheke Trunk Sewer Project for Masvingo City Council, costing of the project by the Consultant, that is, CNM-YBJ Consulting Engineers also contributed to the delay in completion of the project of 4 years 3 months. The initial contract amount was $2 143 110 but an additional $900 000 was added for the completion of the project which was 42% of the initial amount. At that time the $2 143 110 had not been exhausted but was not sufficient to complete the works as more other interim payment certificates were being raised. The additional $900 000 was not sufficient again to complete the project. Most of the excavation works and blasting works were grossly understated in the Bill of Quantities. Failure by Masvingo City Council to adequately assess and evaluate the Bill of Quantities at the contract awarding stage resulted in them approving a project that was grossly understated. At the time of audit on February 5, 2018 an additional $1 700 000 was required to complete all outstanding work. This prompted Masvingo City Council to seek a loan from National Social Security Authority (NSSA) to complete the project.

3.2.3 Payment for stage of work done

For every stage of work completed, contractors issue a certificate that is assessed and verified by Urban Local Authority engineers authenticating work done. Once, the certificates are assessed and verified they are sent to the finance department for payment.

Contrary to the terms of the contracts which stipulates that payment of certificates to contractors are supposed to be done within 30 days from the date certified. Masvingo City Council, Chitungwiza and Marondera Municipalities failed to honor contractors' payments on time. For instance, Masvingo City Council had two (2) certificates for Mutual Construction to the value of $490 472.81 which remained outstanding as at the time of audit February 7, 2018. The certificates were assessed and certified by the City Engineers. According to documentary review, the main reason for the outstanding payment was that the city engineers were seeking to recover some money from the two (2) certificates for work that was previously over certified and paid for, while the contractor argued that there was no over certification. Delay in resolving the disagreement resulted in delay in construction. Table 8 below refers:

Table 8: Schedule of outstanding payments of certificates to contractors

Name of Contractor	**Certificate Number**	**Amount ($)**	**Date Assessed and certified**	**Date Paid**	**Time Taken**
Mutual Construction	9	233 378.46	05/01/2015	Not Paid	3 years one (1) month
	10	257 094.35	17/02/2015	Not Paid	2 years 11 months
Total		**$490 472.81**			

Source: Project files and payment documents

Bulawayo City Council on the other hand, for the period under review had been able to pay its contractors within the contractual deadline that is within 30 days from the date a certificate was submitted. **Annexure F refers.** This was because of the financing agreement that they had with CBZ bank and BancABC.

Mutare City Council was using its sewer staff in the repair and maintenance of river crossing sewer pipelines hence the projects were being completed on time.

Management Responses

Masvingo City Council

There are delays in completion of Mucheke Trunk Sewer mainly as a result of funding constraints. The project was being funded using a loan from National Social Security Authority (NSSA). However, the current NSSA Management and Board seem not to be prioritizing this project hence Council is now looking for alternative funding for completing this project.
The mix up and the overpayments to the Contractor were mainly caused by the Consulting Engineers (CNM-YBJ Consulting Engineers) who had been contracted by Council to manage the Mucheke Trunk Sewer Project. However, the contract between Council and the Consulting Engineers has since been terminated and Council Engineers are now managing the project.

The Consulting Engineers on Mucheke Trunk Sewer Project had grossly underestimated the project cost. For future projects, Council Engineers will thoroughly review the project costs before implementation to avoid cost overruns.

Chitungwiza Municipality

We are excited by the level of assistance we are getting from ZIMFUND but of late we have a project running out of time due to delays by the contractor. The contractor is not performing well despite pressure coming from all quarters.

Payments to contractors are done through AfDB, and to date no complaints were received from the participating contractors.
We do our own costing, if there is any need we hire consultants to assist in costing.

Bulawayo City Council

Hard pickable is specified in the Tender document as well as in the (BOQ) Bill of quantities. A variation order was approved in October 2017, which covered Hard pickable, the variation on demolishing of Properties. Designs and BOQs were done prior to the tender, which also catered for demolishing of properties and their compensations through Provisional Sums in the (P&Gs) Preliminary and General within the tender. Roads crossings and the Airport water line were delayed due to unavailability of pipes from ZINWA to replace the line, since the Airport line falls within their purview. The Pipe was then supplied by BCC to avoid further delays. The Project excavation quantities still fell within the design BOQ with variations being found on the type of soil /material excavated.
Contractor was given extension of times due to a number of challenges which were being faced by the Contractor, and some of the major ones were as follows:

1. **Delays in securing forex from the Reserve Bank to procure Glass fiber Reinforced Plastic (GRP) pipes from South Africa, where they are manufactured. Council, had to lend the Contractor some of its own stocks to avoid further delays.**
2. **The sewer line is deep lying, in some instances as deep as 14m. Such deep areas were being affected by continuous flow of ground water, this hampered progress, especially in pipe bedding and laying.**
3. **Large hauling distances due to nature of the excavations and huge quantities of material being stockpiled.**

Marondera Municipality

Marondera Municipality received a loan of $1.9 million from IDBZ instead of $2.9 million requested for the rehabilitation of wastewater reticulation between 2012-2013. To date the project is still to be fully funded. As a result of this, the project could not be completed and most of the sewer from residential areas is not reaching the intended destinations.

Payment of certificates were raised for the work done and they were funded with the $1.9 million availed. We however encountered problems in paying off some of the contractors such as Mutual Construction and Johnsons Design and Installations (JDI) since we did not receive the full amount of funds as per request. This has resulted in Council being sued and court orders issued to pay these amounts. As of now we are paying monthly instalments of $7 994.55 to Mushoriwa-Pasi, the lawyers of (JDI). The last instalment will be paid off in March 2019 from a total debt of $105,934.55.

Currently the Municipality uses its staff to attend to sewer issues.

For the period under review, Municipality of Marondera has been doing in-house to undertake wastewater reticulation requirements. Costing for internal works is done in-house. Lack of funding and low revenue inflows inhibit the implementation of capital intensive projects.

Project plans are generated from the Works' Department for each project before inception, done by sectional heads in consultation with the Director of Works for inception into the Annual budgets. Records for annual maintenance budgets are available on request.

Harare City Council

The documents for the Contracts involving Sidal Engineering (Pvt) Ltd for Firle and Crowborough rehabilitation and ERAC digester rehabilitations are available for scrutiny. Although the Contracts were awarded before the date of your audit period (2013 to 2017), works are still in progress and documents for audit scrutiny are available.

Agreeable that ZACC has issues with the projects, but the Department has documents available for your audit purpose. The ERAC digester rehabilitation is in the process of being terminated due to the board room fights of the consortium

directors which was affecting work progress. The Sidal Engineering projects stand above 90% complete with Firle Unit 4 operating in the EMA green band, Unit 5A and 5B completed but still to be handed over to City of Harare, Unit 5C and 5D the outstanding work is on transformer and clarifiers, Unit 3 very little has been completed, Crowborough Unit 3 is more than 90% complete and the Department is preparing for its commissioning and handover. AfDB ZimFund Project completed and commissioned Firle Unit 1 and 2 and Crowborough Unit 1 and 2. In total the two treatment plants are treating 128ml/day. Thus from the 219 ml/day of sewage received, only 128ml/day is being treated properly. It should be noted that Crowborough currently receives approximately 110ml/day but has a treatment capacity of 54ml/day only, hence the 56ml/day is discharged as raw sewage into the environment. The Department has engaged private players such as Sinohydro to construct additional treatment plant with capacity of 60ml/day in form of new Crowborough Sewage Works. Another new treatment plant will be constructed in Mabvuku /Tafara with design capacity of 60ml/day to cater for the City's Eastern expansion.

Evaluation of Management Response

Harare City Council

The documents with ZACC were not availed for audit inspection during the audit.

Bulawayo City Council

According to a correspondence letter from Tzircalle Bros. (Pvt) Ltd, the contract dated August 01, 2017 clearly disclosed that hard pickable material was not taken into consideration at the time of tender. In addition point 2 and 3 from the local authority's management response shows that proper planning was not done. The local authority through scoping should have realised that the existing sewer line was deep and this was going to affect pipe bedding and laying.

Masvingo City Council

The engineers were involved, however, it seems they did not give due attention to project costing.

3.3 Inspection and maintenance of the reticulation system

Urban Councils Act [*Chapter 29:15*] section 168 mandates all councils to take such measures and construct such works as it considers necessary for the collection, conveyance, treatment and disposal of sewage. In other words, it gives all Urban Local Authorities the mandate to do inspections on the reticulation system to determine and report on the areas that need repairs and maintenance. All Urban Local Authorities did not

have structured inspections scheduled as all did not have sophisticated equipment required for monitoring efficiency of the system, for example, line cameras, fully ventilated protective gear, Geographic Information System (GIS) gadgets, laser (optic) leak detectors and so on.

Whilst on repairs and maintenance, the engineers interviewed indicated that they were being done as and when need arises and they used the reports made by complainants to visit the various points. Failure to do routine and scheduled inspections resulted in the engineer's inability to identify weaker parts of the sewer reticulation system resulting in accumulation of solid objects and grit in the reticulations system causing sewer chokes and blockages. If routine inspection is done, they will help in early identification of parts of the reticulation system that needs replacement and corrective action at early stages.

The causes of failure to perform routine inspection and maintenance are as follows:

3.3.1 Technical staff

I noted from interviews and documentary reviews that one of the causes for failure to do inspections in Urban Local Authorities was the issue of essential skilled labour which was not available hence affecting service delivery. For example, Chitungwiza, Mutare, Masvingo, Harare and Bulawayo lacked critical staff such as Deputy Director of Engineering, Engineer Sewage Works, Deputy Sewage Works Superintendent, Sewer Reticulation Engineer, Civil Engineer Technicians, Foreman and Assistant Foremen. **Annexure G refers.**

Furthermore, according to the interviews held with the human resources personnel of the Urban Local Authorities, most of the staff under the wastewater divisions especially the plumbers, technician and operators did not have the requisite qualifications but only had many years of experience in the job. This is the manpower mainly used to attend to the blockages, repairs and maintenance. The quality of workmanship can thus be affected if work is not done under the supervision of qualified personnel.

3.3.2 Equipment for Works

According to the interviews held with engineers the other concern was equipment such as pipes, pumps and generators that were difficult to source both within and outside the country. **Refer to Annexure D**. For instance, the rehabilitation of Charlotte Crescent Sewer Trunk Main and the Deep Tunnel Outfall Sewer to Aiselby farm was delayed as Bulawayo City Council contractors could not procure materials for construction works due to foreign currency shortages.

Management Responses

Masvingo City Council

Council does not have structured or scheduled inspections at the moment and has been highly dependent on complaints and reports from residents to attend to problem areas.
From 2019 onwards, the Sewage Section has drawn up an inspection schedule for all major/ trunk lines in order to detect problems before blockages. Also swabbing of these main lines is now an annual activity which seeks to remove grit that would have accumulated in the lines.

Council at the moment has vacancies in the following positions;
-Engineer (Water and Wastewater)
-Deputy Sewage Works Superintendent
-2 Supervisors and
-2 Plumbers
Council will recruit the above critical staff once the resources permit.

Chitungwiza Municipality

There are regular inspections for pumps and associated infrastructure but recommendations from such inspections may not get support due to a number of reasons such as;

- **Lack of funding**
- **Lack of priority**
- **Sewage Works Superintendent, Charge Hands not in post**
- **Equipment such as pipes, pumps and generators that were difficult to procure both within and outside the country this can cause delays in project implementation.**

Mutare City Council

While the observation made might be pertinent it is important to note that as City of Mutare we have all the necessary quality control inspection tools in place i.e. job cards, inspection forms filled weekly and monthly. However, there might be need to intensify the inspections around our infrastructure by December 31, 2018.

Council has put in place plans to fill critical positions with qualified personnel to resolve the issue of limited capacity raised above by December 2019.
Council has already procured 2 mobile dewatering pumps and 2 vacuum tankers.

Council has not been engaging contractors on execution of its projects. However, it has been noted that delivery of equipment and materials should be in line with the programme of works.
Council will intensify the inspections and enforce quality control measures to ensure that maintenance work is done to required standards and is an ongoing process.
Council has already commenced the implementation of maintenance schedules on our service infrastructure to preserve and prolong its useful life from July 2018 and is anticipated to be fully operational by December 2019.

Bulawayo City Council

No management response.

Marondera Municipality

Whilst the Municipality has been conducting reactive maintenance on the sewage reticulation system, constant inspection remains a challenge owing to sophisticated equipment required for monitoring efficiency of the system eg. Line cameras, fully ventilated protective gear, Geographic Information System (GIS) gadgets, laser (optic) leak detectors, high pressure jetting machines etc. which are not available and expensive. With adequate funding this initiative can be addressed effectively.
While the Municipality has enough plumbers, there is shortage of critical staff dedicated to the wastewater services alone. A wastewater engineer, technician, and plumbing assistants are required for the section to ensure 100% dedication to water and sewer problems.
As reiterated above, there is shortage of resource equipment for maintenance of the wastewater conveyance systems. The Municipality currently employs labour intensive methods of repair and maintenance and borrows heavy equipment such as the backhoe loader and tipper from other sections which in turn affect the overall functionality of the Municipality.

3.4 Rehabilitating the sewer network

I noted from documentary reviews, physical inspections and interviews that the councils delayed or failed to carry out rehabilitation of the sewer network infrastructure in time. This was contrary to the manufacturer's specifications and council engineers' stipulation of the lifespan of the sewer pipes as shown in **Table 3** after which they must be replaced. The delays in rehabilitation/changing of pipes resulted in some pipes remaining in use for a period more than double its lifespan. Pipes will develop weaker spots and cracks through which raw sewer escapes into the environment before reaching treatment plants.

From analysis on table 9 and 10 below, it showed that all 6 councils visited had done very little in rehabilitation of the sewer reticulation network.

Table 9: Schedule for rehabilitation of pipes

Council	**Type of pipes**	**Recommended life span of pipe**	**Age to date**	**Delay in rehabilitation (Year)**
Chitungwiza	Asbestos Cement Pipes	40 Years	77 Years	37 Years
Masvingo	Asbestos Cement Pipes	40 Years	120 Years	80 Years
Bulawayo	Asbestos Cement Pipes	40 Years	120 Years	80 Years
Marondera	Asbestos Cement Pipes	40 Years	77 Years	37 Years
Harare	Asbestos Cement Pipes	40 Years	120 Years	80 Years
Mutare	Asbestos Cement Pipes	40 Years	117 Years	77 Years

Source: Interview with Engineers and Plant Superintendent

All Urban Local Authorities visited revealed that high density suburbs that were established long ago were the ones using asbestos cement pipes. These pipes required rehabilitation after forty (40) years. At the time of audit on February 2018 they were overdue for replacement ranging from thirty-seven (37) to eighty (80) years as shown in table 9 above. These areas were the ones with frequent blockages. However, the other types of pipes such as reinforced concrete, clay, glass reinforced plastic and Polyvinyl Chloride for all the Urban Local Authorities visited were not yet due for rehabilitation.

Due to the delayed and/or failure to rehabilitate the asbestos cement pipes, the pipes were eroding underground thereby causing increase in sewer blockages resulting in sewage flowing on streets to rivers and/or streams without being treated.

Table 10: Schedule of rehabilitation done and yet to be done

Council	Total Sewer reticulation system (km)	Rehabilitated (km)	Requiring Rehabilitation (km)	Percentage rehabilitated (%)
Chitungwiza	650	17.6	632.4	2.7
Masvingo	280	0.28	279.72	0.1
Bulawayo	1 600	10.7	1 589.3	0.67
Marondera	150	0	150	0
Mutare	400	0.1	399.9	0.025

Source: Interview with Engineers and Superintendents

From the table 10 above, Urban Local Authorities had not been able to rehabilitate the sewer reticulation network as the percentage of the reticulation rehabilitated was well below 50% of the total sewer reticulation for all the Urban Local Authorities visited.

According to the interviews held with Urban Local Authorities' engineers the failure to rehabilitate was due to lack of financial resources. However, this was having an effect on;

3.4.1 Volume of sewage collected and treated

Urban Local Authorities are responsible for the collection, conveyance, treatment and disposal of sewage. Sewage from residential and commercial areas should be collected and conveyed to sewage treatment plants (STPs) where it is treated and then released to rivers.

I noted through documentary review that Bulawayo City Council and Marondera Municipality were not being efficient in terms of ensuring that total wastewater generated reached the sewage treatment plants and that the total volume of sewage was treated at the plants. This was based on Local Authorities above 50% in efficiency. The other four (4) Urban Local Authorities Chitungwiza, Masvingo, Mutare and Harare were efficient. Details are on **Annexure H** and table 11 is the summary:

Table 11: Percentages of sewage collection and treatment per day (%)

Council	Years				
	2013	**2014**	**2015**	**2016**	**2017**
Bulawayo	17	34	37	38	27
Marondera	0	0	0	0	0

Source: Service level benchmarking reports

The effects of not collecting and treating sewage was that the five (5) councils, that is, Bulawayo, Harare, Mutare, Marondera and Chitungwiza were being penalized by Environmental Management Agency (EMA) as most of sewage was finding its way into the rivers untreated. For the period under review the Urban Local Authorities were penalized as follows: Mutare $22 658; Harare $286 313; Chitungwiza $9 723. Bulawayo and Marondera councils did not avail the amounts they were penalized by EMA. There is also a risk of water borne diseases such as typhoid being prevalent. In addition, the cost of purifying portable water for drinking will increase as more chemicals will be needed for the treatment of portable water.

Management Responses

Masvingo City Council

The greatest part of the sewer reticulation in the old suburbs amounting to almost 280km now requires rehabilitation. This exercise is however being delayed by financial constraints since the works are capital-intensive. Lack of long term loans in the financial markets has made it almost impossible to do the rehabilitation works. Development partners have also not done much in this regard. Council continues to budget for the rehabilitation works.

Chitungwiza Municipality

There is need for rehabilitation as the network has more than 40 years and we are experiencing breakdowns of pipes and spillages. A deficit of funding is hampering the rehabilitation projects.

The volume of sewage collected and treated is low due to the following reasons;

1. **Availability of water from Harare Water**
2. **The infrastructure that is supposed to convey the sewage to treatment works is collapsing thereby posing an environmental hazard.**
3. **Volume varies as there are other sources of water that are not controlled by the Municipality.**

Mutare City Council

Council had no capacity to do the rehabilitation of the aged infrastructure due to financial constraints. However, Council had advertised and are waiting for investment partners to resolve the raised matters by December 2019.

Non-Revenue water (the difference between the amount of treated water put into the distribution system and the amount of water billed to consumers) is also contributing to increased wastewater flows to the treatment plant. Measures are in place to reduce the high non-revenue water from 68% to 40% by December 2019.
Council have put in place provisions in the 2019 budget to address the above concerns of increasing demand on services.
Council system is fully functional. Council has resolved 90% of the leaking sewer mains and the remaining 10% will be rectified by December 2019.

Bulawayo City Council

Management is still to respond.

Marondera Municipality

The sewer network is now very old and needs replacement in areas where blockages are prevalent with upgrading in instances where design capacities have been exceeded. With the Integrated Urban Water Masterplan (IUWM) project underway, this will address the challenges being faced by Marondera Municipality.

There is inception of the Integrated Urban Water Masterplan (IUWM) project for Marondera Municipality, launched in November 2013. The project value as of December 2017 is 2,340,450 Euros, funding proponent being the Africa Development Bank and Government of Zimbabwe through the Global Water Partnership Initiative. As of December 2017 the selection of the project engineer was done, with the selection and appointment of project consultant done in March 2018. Currently the project is under-way.

With the IDBZ project of 2012-3 which was left incomplete, virtually no treatment is being done for effluent by the Municipality. The effluent is being discharged into the environment due to breaches in the sewer reticulation pipelines, vandalism, theft of pumps and electrical transformers at pumping stations.

Harare City Council

The City of Harare is affected by several sewage pump stations that have been on breakdown over a long period of time. The pump stations required substantial

capital injection hence AfDB had to fill in the capital requirements and all treatment plants are almost complete. The Budiriro Pump station was rehabilitated through PPP with CABS housing development assisting but never handed over to the City after precommissioning test run. The Borrowdale Brooke Pump Station was budgeted in the US$144 Million China Exim Bank facility, and in addition a PPP arrangement with Borrowdale Brooke residents expects to yield an onsite treatment plant.

The outbreak of waterborne diseases should be addressed in the context of Integrated Harare Water Supply System, where shortage of water triggers sewer blockages and high sewer blockages pollute raw water sources resulting in costly potable water production.

Harare Water currently uses highly mechanical equipment, such as the high pressure sewer jet and bucket system, to deal with unusual sewer blockages as mentioned above. The cost of using this equipment affects the Department's liquidity.

3.5 Revenue Collection

All Urban Local Authorities have a tariff they set for sewerage billing. Consumers are classified into four (4) categories which are residential, commercial, industrial and institutional. I noted through documentary review that Bulawayo City Council had the highest bill collection rate. The other five (5) Urban Local Authorities visited had a low bill collection rate as consumers were not paying their bills including sewerage. As a result of low collection of revenue, resources available for allocation between several service areas will be limited resulting in service delivery being compromised.Table 12 below and **Annexure I refers:**

Table 12: Schedule of amount billed and amount collected

Council	Total Billed ($)	Total Collected ($)	Difference ($)	Variance as a percentage (%)
Harare	107 347 642	46 860 065	60 487 577	44
Mutare	11 368 974	6 480 600	4 888 374	57
Masvingo	9 603 958	4 344 167	5 259 791	45
Marondera	2 312 982	767 423	1 545 559	33
Chitungwiza	12 718 488	6 721 865	5 996 623	53
Total	**$143 352 044**	**$ 65 174 120**	**$ 78 177 924**	**46.4**

Source: Financial Reports and SLB Reports

From **Annexure I**, for all the councils the collection of revenue was fluctuating for the period under review with only Bulawayo City Council receiving around 84% of the amount billed from sewerage fees, hence it has been more efficient in collecting rates. Mutare and Chitungwiza were also efficient in collecting as they were above 50% from the amount billed whilst the other three (3) were collecting below 50%.

Table 13: Average tariff charged between 2013-2017

	Flat Rate Tariff ($)					
Council	Harare	Bulawayo	Mutare	Masvingo	Marondera	Chitungwiza
Description						
Residential-Low Density	11.00	1.02	5.74	3.36	3.85	3.92
Residential-Medium Density	11.00	1.02	5.74	3.36	3.85	3.92
Residential-High Density	5.00	0.51	5.05	3.36	3.85	3.92
Institutional	13.40	10.16	12.62	93.10	5.32	10.00
Commercial	13.40	10.50	17.75	9.92	5.32	10.00
Industrial	13.40	10.50	16.62	9.92	5.32	10.00

Source: Tariff schedules and Service Level Benchmarking Questionnaire

I noted through the analysis above and the reports reviewed that Urban Local Authorities were charging different tariffs. As a result, this may be the reason why Bulawayo City Council had been able to collect 84% of the revenue billed as opposed to Harare, and Mutare City Councils which were charging higher tariffs when compared to Bulawayo City Council. Differences in tariffs and affordability by consumers had a bearing on the collection of revenue. Analysis on table 13 revealed that the lower the tariffs being charged the more the revenue collected as consumers will be willing and able to pay. **Annexure J refers.**

According to interviews with Finance Directors and accountants, all the six (6) Urban Local Authorities visited had introduced different methods to improve payment of bills by residents. For instance, Marondera Municipality offered 50% discount on all outstanding amounts. Other methods to increase collections that were being employed by the councils were to establish debt collection units as well as involve councilors to encourage residents in their wards to pay their bills.

The main reasons for low revenue collection according to the residents were that councils were taking long in attending to sewer blockages as revealed on **Table 6** coupled with the economic hardships. There is also lack of awareness being done by councils to inform and encourage consumers to pay their bills on time.

Local authorities prioritize provision of water above all other services. Therefore, the little funds/revenue collected is channeled towards provision of water leaving very little or no funds available for sewer system reticulation maintenance. Also payment of salaries is prioritized over sewage system.

Loans taken by local authorities have costs in the form of interest that has to be paid by the councils of which the payments are usually from the revenue collected.

Donors such as AfDB have specific areas of interest they fund leaving other areas for council to rehabilitate.

Failure by the local authorities to set aside sewerage fees collected for the maintenance of sewerage system will cause delay/non procurement of material/equipment required thereby resulting in sewer blockages and eventually outbreak of waterborne diseases.

Table 14: Questionnaire responses (sewerage awareness programmes) by Urban Local Authorities

Council	**Total number of Questionnaire administered**	**Yes, the (ULA) did perform awareness programs (%)**	**No, the (ULA) did not perform awareness programs (%)**
Bulawayo	110	15	85
Mutare	60	0	100
Masvingo	60	3	97
Marondera	41	7	93

Source: Survey conducted

From the survey results on table 14 above, it revealed that all the councils visited were not conducting any sewerage awareness programmes to encourage residents to pay their bills. Survey results above revealed that 90% of the residents interviewed in all councils indicated that the councils were not doing any awareness programmes to encourage residents to pay their bills.

Management Responses

Masvingo City Council

The revenue being collected is low therefore maintenance suffers. Residents are failing to pay for the services because of the harsh economic conditions generally prevailing in the country. This poor revenue collection translates to deterioration in the quality of the services offered by Council. Council is however continuously

engaging the residents to settle their bills. Council has set up an internal debt collection unit.

Chitungwiza Municipality

Revenue collection is below 50% as many residents are not paying.

Mutare City Council

Council is not charging exorbitant rates but the tariffs are charged on a cost recovery basis. However, we have put in place mechanisms to intensify revenue collection from 50% to 60% by December 2019.Council is in dire need of the government loans and grants to rehabilitate the aging infrastructure.

Bulawayo City Council

Management is still to respond.

Marondera Municipality

The budgets for Marondera Municipality are crafted on a cost recovery basis and for critical services such as sewer, water and refuse there is a provision for the upgrade and maintenance of equipment and infrastructure. As a result of the unfinished Biological Nutrient Removal (BNR) sewer project, a provision was set on the sewer tariff to raise funds for the completion and continuous upgrade and maintenance of the sewer system. However, collection of the bills remained a challenge despite several measures implemented. Poor collection is mainly as a result of the poor service delivery on the sewer aspect and this is what most of the residents cited as the reason for non-payment. The other major reason for poor collection is the low disposable income of the ratepayers due to the prevailing economic conditions.

From 2019 going forward the council is expecting an increase in revenues after the grant from Africa Development Bank part of which will be used to repair and maintain some of the sewer infrastructure. These quick wins will improve on service delivery which will also improve on our collections.

The 50% discount promotion offered improved collections from around 33% to around 50%. After these promotions council plans to implement several measures such as door to door follow ups, legal actions and ward development committees to improve on collections.

The recommendation from the Audit report to intensify sewerage awareness programs has been noted and Marondera Municipality will channel more resources to this as this has a direct impact on sanity of the town and revenue collections.

CHAPTER 4

CONCLUSIONS

4.0 Urban Local Authorities did not effectively manage sewer systems resulting in increased sewer blockages and hampering service delivery to consumers.

Although the Urban Local Authorities have undertaken some interventions to rehabilitate the sewer reticulation network through donor funds especially from African Development Bank, there is still need for more strategies to further improve the sewer reticulation network. From the six (6) Urban Local Authorities visited with a total of 3 080km sewer reticulation network only 0.93% of the total had been rehabilitated meaning that Urban Local Authorities will continue to be penalised by Environmental Management Agency as they will not meet the standard required for effluent discharged to the environment. Waterborne disease outbreaks will continue to rise with possible increases in deaths. Maintenance and inspections of the sewer reticulation system is still inadequate and this affects the effectiveness of the flowing, collection and treatment of wastewater, with the probable collapse of the whole system which is evidence that Urban Local Authorities do not have the capacity to resuscitate.

Furthermore, the over reliance on donor funding in the rehabilitation of the sewer reticulation system and the treatment plants has severe consequences if the donors pull out. The donor pull out would have a negative effect on the lives and well-being of the citizens.

If Bulawayo, Mutare and Chitungwiza councils, which are collecting revenues above 50% of the amount billed continue to delay in attending to complaints raised, residents are likely to develop a negative attitude towards payment of bills and might stop paying bills.

CHAPTER 5

RECOMMENDATIONS

5.0 This chapter presents recommendations that are aimed at addressing problems being faced by Urban Local Authorities on the management of sewerage systems. It is hoped that the recommendations proffered will result in improvements on the management of the same. The issues raised and recommendations made seek to ensure that there will be reduction in the amount of chemicals being used to treat portable water for drinking, reduction in water borne diseases that may cause deaths and reduction in medical costs to residents.

5.1 Urban Local Authorities should provide vehicles as well as shorten the procurement process of materials so as to ensure that repairs will be done within 24 hours from the reporting time. This would also reduce health hazards.

Urban Local Authorities should have a mechanism that avails materials when they are needed so as to minimise work disruption.

5.2 Urban Local Authorities should enforce the provisions of contract agreements signed with contractors such as duration of the contract and payment of stage certificates. Any breach of contract should result in contract termination. Penalties and charging of interest should be enforced on contractors who fail to complete works on time. Where applicable legal action should be taken so that a party that breaches the contract would be held accountable.

Urban Local Authorities should ensure that they pay contractors on time for all work certified complete so that operations are not affected.

Project engineers should supervise the work done by contractors. There should be a budget for supervision of projects to allow them to constantly monitor the works done by the contractors. This would also allow them to timeously make decisions.

Council engineers should ensure that proper scoping and planning of projects is done before commencing the projects to avoid stoppages. This will result in target dates of the projects being met.

5.3 Urban Local Authorities should ensure that rehabilitation of sewer system is done timeously. Adherence to routine inspection and maintenance schedules of sewer system infrastructure would preserve the system life span as well as reduce health hazards. In addition, this may also reduce the number of sewer blockages and ensure that all sewage

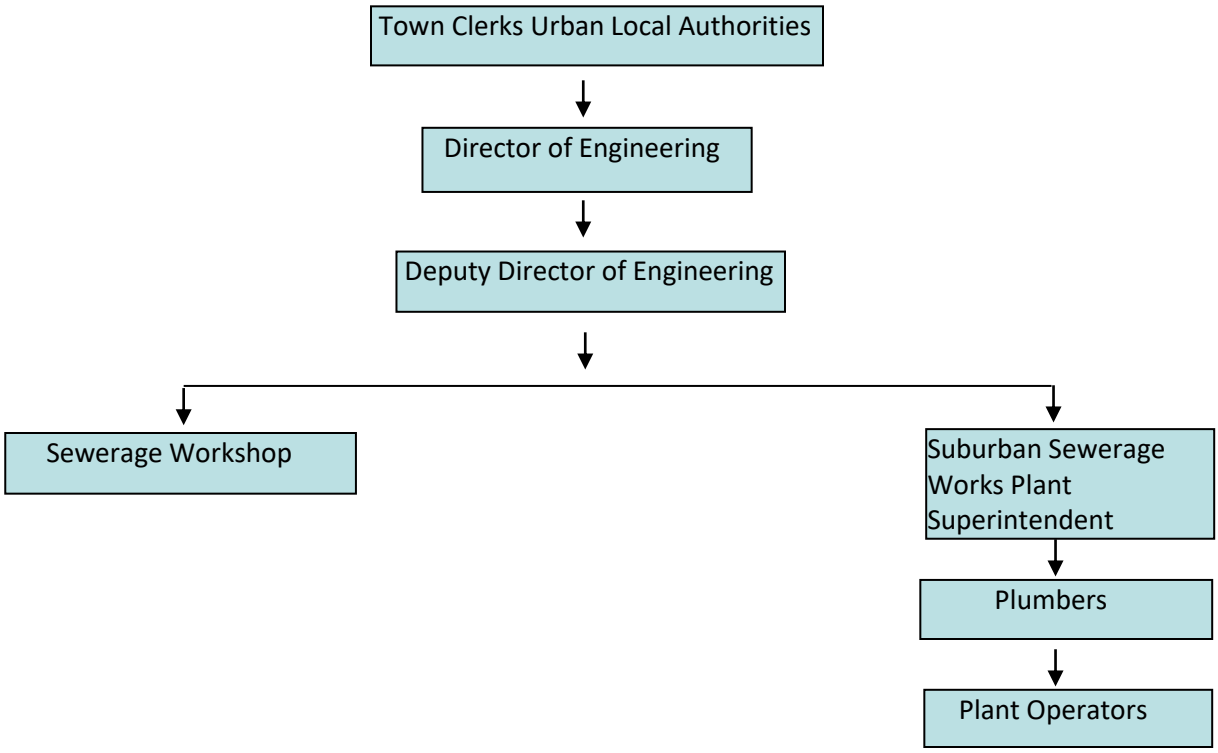
waste is treated before it is pumped into rivers where portable water is drawn from. Consequently waterborne diseases such as cholera and typhoid would be reduced.

5.4 Urban Local Authorities should ensure that they procure online machines and equipment for inspections and maintenance of the sewer reticulation system so as to reduce the number of sewer blockages and waterborne diseases such as cholera and typhoid.

5.5 Urban Local Authorities should come up with awareness campaigns, promotions that encourage consumers to pay their bills. In addition, an improvement of Urban Local Authorities' service delivery may motivate consumers to pay since some indicated that they were not paying because of poor service delivery.

There is need for Central Government to be involved in the financing and ensuring that ongoing rehabilitation of sewer system are done properly to further improve sewerage management.

ANNEXURE A: Organisational Structure



ANNEXURE B: Audit Methodology

Documents Reviewed

Document Reviewed
Urban Councils Act (Chapter 29:15)
Environmental Management Act (Chapter 20:27)
Water Act (Chapter 20:24)
Policies and Operational Manuals
Council and Departmental organizational charts
Departmental Annual Reports
Staff Establishment and Monthly Vacancy Returns
Departmental Financial Budgets and Actual Financial Statements for the period 2013-2016
Sewer chokes/blockages Reported Cases (Attended and unattended) for 2013-2017
Service Level Benchmarking Reports
Project files

Key personnel interviewed

Designation/Post	**Work station**
Engineers –six	Harare, Bulawayo, Mutare, Masvingo, Marondera and Chitungwiza
Finance Manager-six	Harare, Bulawayo, Mutare, Masvingo, Marondera and Chitungwiza
Plant Superintendent-six	Harare, Bulawayo, Mutare, Masvingo, Marondera and Chitungwiza
Director Human Capital-six	Harare, Bulawayo, Mutare, Masvingo, Marondera and Chitungwiza
Senior Operators-Two	Harare and Chitungwiza
Residents- Bulawayo 100 Mutare 60 Masvingo 60 Marondera 40	Bulawayo, Mutare, Masvingo, and Marondera

Sites Visited

Council	**Site**
Bulawayo, Harare, Marondera, Masvingo, Mutare, Chitungwiza	Sewerage treatment plants
Sewerage ponds in Marondera, Mutare, Bulawayo and Harare	Elmwood in Marondera Cowdray Park in Bulawayo
BNR in Marondera, Bulawayo, Harare, Masvingo. Mutare	
Bulawayo	Aiselby 1,2 and 3
	Cowdray Park
	Charlotte Deep Main Outfall Sewer
Masvingo	Mucheke Trunk Main Sewer
Mutare	Hobhouse Sewer Line

ANNEXURE C-Schedule howing efficiency on attending to sewer blockages within 24 hours using monthly averages

Council		**Years**				
		2013	**2014**	**2015**	**2016**	**2017**
Bulawayo	Total number of complaints reported per month	1 929	2 857	1 836	1 761	1 767
	Blocks attended within 24 hours	1 815	1 929	273	587	546
	Efficiency in redressal of complaints within 24 hours (in %)	**94.1**	**67.5**	**14.9**	**33.3**	**30.9**
Masvingo	Total number of complaints reported per month	248	220	218	230	273
	Blockages attended within 24 hours	182	200	210	218	260
	Efficiency in redressal of complaints within 24 hours (in %)	**73.4**	**90.9**	**96.3**	**94.8**	**95.2**
Mutare	Total number of complaints reported per month	468	79	434	429	487
	Blockages attended within 24 hours	210	60	400	380	389
	Efficiency in redressal of complaints within 24 hours (in %)	**44.9**	**75.9**	**92.2**	**88.6**	**79.9**
Marondera	Total number of complaints reported per month	125	138	101	112	116
	Blockages attended within 24 hours	90	115	85	60	114
	Efficiency in redressal of complaints within 24 hours (in %)	**72**	**83.3**	**84.2**	**53.6**	**98.3**
Harare	Total number of complaints reported per month	1 725	1 725	2 253	2 369	2 435
	Blockages attended within 24 hours	1 720	1 720	2 000	2 215	2 310
	Efficiency in redressal of complaints within 24 hours (in %)	**99.7**	**99.7**	**88.8**	**93.5**	**94.9**
Chitungwiza	Total number of complaints reported per month	503	629	629	662	601
	Blockages attended within 24 hours	462	393	393	420	420
	Efficiency in redressal of complaints within 24 hours (in %)	**91.8**	**62.5**	**62.5**	**63.4**	**69.8**

ANNEXURE D- Delays in Procuring equipment and material

BULAWAYO CITY COUNCIL

Procurement of stores items as per the goods ordered and received book

Date Ordered	Description	Requisition No.	Quantity Ordered	Quantity Received	Date Received	Variance in Days
2013						
15/01/13	8mm sewer rods	D39462	500	150	25/03/13	70
15/01/13	100mm plungers	D39462	50	0		
15/01/13	rod pullers	D39462	10	0		
1/2/2013	chloride of lime	D39469	300	270	6/6/2013	150
11/4/2013	8mm sewer rods	D39489	300	0		
3/12/2013	8mm sewer rods	D39517	600	0		
2014						
3/1/2014	100mm rubber plungers	D39530	50	25	12/6/2014	180
3/1/2014	150mm rubber plungers	D39530	50	25	12/6/2014	180
3/1/2014	concrete manhole covers	D39535	500	0		
3/1/2014	900*600 manhole rings	D39536	25	0		
3/1/2014	900*300 manhole rings	D39536	25	0		
3/1/2014	900*150 manhole rings	D39536	50	0		
18/03/14	25kg chloride of lime	D39554	20	20	29/04/2014	41
26/03/14	700mm*12 GRP	D39556	100	0		
8/5/2014	25kg chloride of lime	D39564	50	50	7/7/2014	60
5/6/2014	110mm*6m PVC pipes	D39570	50	50	27/8/2014	82
5/6/2014	110mm PVC adaptors	D39570	50	50	27/8/2014	82
5/6/2014	110mm*1/8 PVC bend	D39570	50	50	27/8/2014	82
5/6/2014	110mm *1/16PVC	D39570	50	50	27/8/2014	82
5/6/2014	200mm*12m GRP	D39571	25	0		
13/10/14	25kg chloride of lime	D39591	50	25	5/12/2014	53
16/10/14	Manhole covers concrete	D39592	225	0		
16/10/14	Manhole covers concrete	D39593	225	0		
2015						
14/01/15	25 chloride of lime	D43309	50	5	20/02/15	37
14/01/15	Manhole covers	D43312	225	0		

	concrete					
14/01/15	Manhole covers concrete	D43313	225	0		
14/01/15	PVC pipes 110mm*6m	D43318	20	20	6/3/2015	51
11/2/2015	PVC pipes 110mm*6m	D43327	50	50	29/04/15	76
13/05/15	25 chloride of lime	D43342	50	20	4/9/2015	113
2/11/2015	25 chloride of lime	D43358	50	0		
2016						
7/1/2016	25 chloride of lime	D43363	50	52	19/04/16	101
22/01/16	Manhole concrete covers	D43375	250	0		
28/01/16	8mm*2m sewer rods steel	D43376	400	0		
28/01/16	Manhole concrete covers	D43378	250	0	12/8/2016	195
28/01/16	8mm*2m sewer rods steel	D43379	400	400	12/8/2016	195
1/9/2016	25kg chloride of lime	D43398	100	0		
2017						
9/1/2017	25kg chloride of lime	D56158	20	20	17/03/2017	66
9/1/2017	8mm*2m sewer rods steel	D56159	200	140	4/5/2017	114
				60	22/06/17	163
23/05/17	25kg chloride of lime	D56171	20	20	27/07/17	64
28/07/17	25kg chloride of lime	D56177	20	0		
3/8/2017	8mm*2m sewer rods steel	D56178	200	100	25/10/17	82
3/8/2017	8mm*2m sewer rods steel	D56179	200	0		
20/09/17	25kg chloride of lime	D56185	20	20	1/12/2017	

MUTARE CITY COUNCIL

Order Number	Quantity	Details	Date Ordered	Date Received	Variance in days
197127	20	25kg Chloride of Lime	26/11/2015	03/02/2016	67
19466	10	Manhole Slab Covers	18/02/2016	16/03/2016	28
19393	5	Yard Broom	10/02/2016	14/03/2016	34
19790	24	Safety Shoes	05/04/2016	19/05/2016	44
20356	20	25kg Chloride of Lime	30/06/2016	11/08/2016	41
21287	500	25kg Chloride of Lime	15/11/2016	14/12/2016	29
22858	100	150mm Rubber O rings	06/06/2017	27/07/2017	51
12650	5	150mm Ac Pipes	19/03/2013	21/03/2013	2
12649	10	75mm Ac Pipes	19/03/2013	04/04/2013	15
13155	5	150mm Ac Pipes	13/05/2013	15/05/2013	2
12872	10	75mm Ac Pipes	11/03/2013	04/04/2013	23
12939	5	150mm Ac Pipes	23/04/2013	23/05/2013	30
20854	2	Drainage Rod Sets	09/09/2016	27/09/2016	18
20854	2	Drainage Rod Sets	09/09/2016	17/11/2016	68
20319	20	25kg Chloride of Lime	29/06/2016	16/12/2016	168
10974	10	100mm Ac Pipes	28/09/2012	10/09/2013	347
10975	10	100mm Ac Pipes	28/09/2012	10/09/2013	347
10979	20	75mm Collars	28/09/2012	10/09/2013	347
14661	10	75mm Pipes	27/11/2013	12/12/2013	15
9965	5	25kg Chloride of Lime	19/06/2012	18/07/2013	29
9962	5	25kg Chloride of Lime	19/06/2012	18/07/2013	29
14879	5	150mm Ac Pipes	31/12/2013	13/01/2014	14
14877	9	75mm Ac Pipes	31/12/2013	13/01/2014	14
14659	5	150mm Ac Pipes	27/11/2013	13/01/2014	47
14900	10	75mm AC Pipes	06/01/2014	20/01/2014	14
14898	10	75mm AC Pipes	06/01/2014	20/01/2014	14
15121	10	75mm AC Pipes	17/01/2014	19/08/2014	212
16013	5	150mm Ac Pipes	09/07/2014	08/09/2014	59
15659	10	100mm Ac Pipes	25/03/2014	18/11/2014	233
15658	10	75mm Ac Pipes	25/03/2014	24/11/2014	233
15653	10	75mm Ac Pipes	24/03/2014	24/11/2014	233
15651	10	100mm Ac Pipes	24/03/2014	31/12/2014	307
16531	20	25kg Chloride of Lime	10/10/2014	20/10/2014	10

16976	7	25kg Chloride of Lime	19/12/2014	06/01/2015	17
16957	7	25kg Chloride of Lime	18/19/2014	06/01/2015	16
18057	10	25kg Chloride of Lime	12/06/2015	10/07/2015	28
18058	10	25kg Chloride of Lime	12/06/2015	10/07/2015	28

CHITUNGWIZA TOWN COUNCIL

	DATE REQUESTED	**ITEMS**	**DATE RECEIVED**	**Variance in days**	**COMMENTS**
1	29/09/2014	20 x 300 mm A/C pressure pipes class 16 100 x 300 mm sewer pipes all complete with collars and rubbers	-		Not yet received
2	12/01/2016	Assorted hand tools…spades ,shovels, picks etc.	-		Not yet delivered
3	16/01/2016	Assorted hand tools spades ,shovels, Picks etc. for Sewage works	-		Not yet delivered
4	16/01/2016	50 kg s/steel welding rods 25kg multipurpose grease	-		Not yet delivered
5	16/01/2016	Baffle plates for St Mary's 1 pump station Baffle plates for St Mary's 2 pump station	-		Were not paid for in that year
6	14/09/2016	1 x Flygt Raw sewage pump for repairs 1 x Flygt dewatering pump for repairs	-		Not yet paid for
7	10/11/2016	Repair Flygt submersible pump model 5153 for pump station 2	-		Not paid for

8	16/01/2017	Assorted hand tools	-		Not yet procured
9	13/01/ 2017	Lathe machine tools	17/05/2017		Paid for part of requirements delivered
10	10/04/2017	Submersible Raw Sewage pump	13/06/2017		Paid for ;Delivered
11	19/05/2017	Baffle plates for StMary's 1 pump station Baffle plates for StMary's 3 pump station	-		Not yet Bought

ANNEXURE E- Delays in completion of works

Council	Project Name	Contract Start Date	Agreed Contract End Date	Date Completed	Period of Delay /to date (in years)
Bulawayo	Rehabilitation of Cowdray Park Waste stabilisation Ponds	21/03/2015	07/08/2015	November 2017	2 years 3 months
	Rehabilitation of Marvel/Mahatshula Outfall Sewer	30/10/2015	16/05/2016	November 2017	1 year 6 months
	Rehabilitation of Pumula South Phase 3 overhead collapse, Pumula riser mains between pump 7-pump 6 underground collapse and Luveve Outfall sewer	01/12/2015	30/04/2016	27/11/2017	1 year 7 months
	Rehabilitation of Sauerstown Deep Section and Charlotte Crescent Outfall Sewers	11/03/2016	31/11/2016	Not yet completed by the time of audit on 02/02/2018	I year 2 months
	Rehabilitation of plant at Aiselby 1 and 2 Wastewater Treatment Works	26/10/2016	26/06/2017	30% complete as at 31/01/2018	7 months
Harare	Rehabilitation of Firle and Crowborough Plants	24/06/2010	24/03/2011	Still running as at 28/02/2018	6 years 11 months
	Gas Joint Venture Plant	14/11/2012	14/11/2029	Not yet started due to disagreeme	

				nts	
Masvingo	Mucheke Trunk Main Sewer	04/03/2013	04/11/2013	Still running however no progress as at 08/02/2018	4 years 3 months
Marondera	BNR construction project	Early 2001	-	60% complete as at the time of audit 15/02/2018. **Annexure K refers**	Over 15 years

ANNEXURE F-Schedule of project certificates that were paid within 30 days

BULAWAYO CITY COUNCIL

Contractor	Cert. No.	Date certified	Date paid	Amount ($)	On time in days
Natwecraft Investments	1	20/2/17	14/3/17	77 576.10	21
	2	26/5/17	29/5/17	35 421.29	3
	3	19/7/17	21/7/17	144 525.75	2
	4	27/7/17	03/8/17	162 745.93	6
	5	16/8/17	22/08/17	144 425.13	5
	6	14/9/17	15/09/17	251 935.94	1
	7	21/9/17	25/10/17	213 084.10	4
Tzircalle Brothers (Pvt) Ltd Contract number: COB/ESD/C5B/2015	1	27/05/16	30/05/16		3
	2	12/05/16	26/05/16		14
	3	19/06/16	24/06/16		5
	4	26/07/16	02/08/16		6
	5	14/10/16	15/11/16		29
	6	10/11/16	18/11/16		8
	7	31/01/17	01/02/17		1
	8	03/08/17	21/09/17		48
Tzircalle Brothers (Pvt) Ltd Contract number: COB/ESD/C5F/2015	8	20/07/2017	26/07/2017	146 088	5
	7	24/03/2017	28/03/2017	215 899	4
	6	1/02/2017	15/02/2017	253 284	14
	5	14/11/2016	25/11/2016	63 131	11
	4	07/09/2016	19/09/2016	147 019	12

ANNEXURE G-Vacant Critical Staff

Position	Salary Grade	Approved Establishment	In Post	Vacant
Chitungwiza				
Director of works	15	1	0	1
Foreman	10	1	0	1
Assistant Foreman	9	4	0	4
Harare				
Sewer Reticulation Engineer	5	1	0	1
Civil Engineering Technician	9	2	0	2
Bulawayo				
Attendants	2	113	68	45
Works Supervisor/Drain Layer	6	16	4	12
Mutare				
Deputy Director of Engineering Services	14	1	0	1
Sewerage Engineer	12	1	0	1
Masvingo				
Engineer Sewage works	14	1	0	1
Deputy Sewage Works Superintendent	12	1	0	1
Labour Supervisor	8	1	0	1
BNR Operator	8	10	3	7
Marondera				
Due to the retrenchments and changes to the organizational structure being done by the Marondera Municipality I was not able to compare staff establishment with the in-post.				

ANNEXURE H-Schedule of comparison of wastewater generated against volume collected and treated (m^3/day)

Council	Description	Years				
		2013	**2014**	**2015**	**2016**	**2017**
Bulawayo	Total volume of sewage collected and treated at the plants per day	9 539	19 946	22 436	22 436	14 582
	Total wastewater Generated per day	57 454	57 938	59 881	58 280	53769
	Efficiency in sewage collection and treatment per day (%)	**17**	**34**	**37**	**38**	**27**
	Sewage not being collected and treated (%)	**83**	**66**	**63**	**62**	**73**
Masvingo	Total volume of sewage collected and treated at the plants per day	3 874	3 980	10 522	14 345	15 036
	Total wastewater Generated per day	11 948	10 011	11 481	15 829	11 959
	Efficiency in sewage collection and treatment per day (%)	**32**	**40**	**92**	**91**	**126**
	Sewage not being collected and treated (%)	**68**	**60**	**8**	**9**	**0**
Mutare	Total volume of sewage collected and treated at the plants per day	28 027	30 474	31 008	32 707	7 863
	Total wastewater Generated per	32 956	22 268	22 577	25 326	22 477

	day					
	Efficiency in sewage collection and treatment per day (%)	**85**	**136**	**137**	**129**	**35**
	Sewage not being collected and treated (%)	**15**	**0**	**0**	**0**	**65**
Marondera	Total volume of sewage collected and treated at the plants per day	0	0	0	0	0
	Total wastewater Generated per day	3 479	3 282	2 610	2 346	2 604
	Efficiency in sewage collection and treatment per day (%)	**0**	**0**	**0**	**0**	**0**
	Sewage not being collected and treated (%)	**100**	**100**	**100**	**100**	**100**
Harare	Total volume of sewage collected and treated at the plants per day	62 000	207 482	216 332	220 000	193 796
	Total wastewater Generated per day	135 817	123 441	135 177	172 424	119294
	Efficiency in sewage collection and treatment per day (%)	46	168	160	128	162
	Sewage not being collected and treated (%)	54	0	0	0	0
Chitungwiza	Total volume of	5 487	5 496	5 550	5 844	10 572

	sewage collected and treated at the plants per day					
	Total wastewater Generated per day	29 918	6 862	6 862	8 949	6 926
	Efficiency in sewage collection and treatment per day (%)	**18**	**80**	**81**	**65**	**153**
	Sewage not being collected and treated (%)	**82**	**20**	**19**	**35**	**0**

ANNEXURE I- Schedule of amount billed and amount collected

Chitungwiza Municipal Council

Year	Amount Billed ($)	Amount Collected ($)	%
2013	3 770 520.52	1 423 027.22	37.74
2014	3 875 161.19	1 798 824.46	46.42
2015	3 719 545.98	1 860 044.40	50
2016	4 746 259.82	1 639 969.14	34.55
Total	**12 718 487.51**	**6 721 865.22**	**52.85**

Harare City Council

Year	Amount Billed ($)	Amount Collected ($)	%
2013	28 593 678.85	11 876 836.66	41.54
2014	29 141 760.00	13 529 535.83	46.43
2015	24 984 857.30	12 807 874.83	51.26
2016	24 627 346.25	8 645 817.67	35.11
Total	**107 347 642.40**	**46 860 064.99**	**43.65**

Masvingo City Council

Year	Amount Billed ($)	Amount Collected ($)	%
2013	2 458 931.04	1 019 045.02	41.4
2014	2 326 713.06	1 114 165.86	47.9
2015	2 449 992.09	1 133 997.89	46.3
2016	2 368 321.35	1 076 957.88	45.5
Total	**9 603 957.54**	**4 344 166.65**	**45.23**

Bulawayo City Council

Year	Amount Billed ($)	Amount Collected ($)	%
2013	9 507 083	7 662 706	80.6
2014	10 023 801	8 539 495	85.2
2015	10 658 557	9 971 857	93.6
2016	9 412 974	7 238 335	76.9
Total	**39 602 415**	**33 412 393**	**84.37**

Mutare City Council

Year	Amount Billed ($)	Amount Collected ($)	%
2013	2 775 589	1 331 533	48
2014	2 835 405	1 735 349	61.2
2015	2 878 317	1 933 742	67.2
2016	2 879 663	1 479 976	51.4
Total	**11 368 974**	**6 480 600**	**57**

Marondera Municipal Council

Year	Amount Billed ($)	Amount Collected ($)	%
2013	558 303	250 182	44.8
2014	581 708	243 123	41.8
2015	559 655	106 693	19.1
2016	613 316	167 425	27
Total	**2 312 982**	**767 423**	**33.18**

ANNEXURE J- Schedule of tariffs charged

Council	Description	Year					Average Tariff
		2013	2014	2015	2016	2017	
Harare	**Flat Rate Tariff**	**($)**	**($)**	**($)**	**($)**	**($)**	**($)**
	Residential- Low Density	11.00	11.00	11.00	11.00	11.00	**11**
	Residential- Medium Density	11.00	11.00	11.00	11.00	11.00	**11**
	Residential- High Density	5.00	5.00	5.00	5.00	5.00	**5**
	Institutional	11.00	11.00	15.00	15.00	15.00	**13.4**
	Commercial	11.00	11.00	15.00	15.00	15.00	**13.4**
	Industrial	11.00	11.00	15.00	15.00	15.00	**13.4**
Bulawayo	**Flat Rate Tariff**						
	Residential- Low Density	1.00	1.00	1.04	1.04	1.04	**1.02**
	Residential- Medium Density	1.00	1.00	1.04	1.04	1.04	**1.02**
	Residential- High Density	0.50	0.50	0.52	0.52	0.52	**0.51**
	Institutional	9.42	9.42	10.66	10.66	10.66	**10.16**
	Commercial	10.25	10.25	10.66	10.66	10.66	**10.50**
	Industrial	10.25	10.25	10.66	10.66	10.66	**10.50**
Mutare	**Flat Rate Tariff**						
	Residential- Low Density	6.90	4.00	4.00	6.90	6.90	**5.74**
	Residential- Medium Density	6.90	4.00	4.00	6.90	6.90	**5.74**
	Residential- High Density	5.75	4.00	4.00	5.75	5.75	**5.05**
	Institutional	14.37	10.00	10.00	14.37	14.37	**12.62**
	Commercial	20.00	20.00	20.00	14.37	14.37	**17.75**
	Industrial	14.37	20.00	20.00	14.37	14.37	**16.62**
Masvingo	**Flat Rate Tariff**						
	Residential- Low Density	3.45	3.45	3.45	3.45	3.00	**3.36**
	Residential- Medium Density	3.45	3.45	3.45	3.45	3.00	**3.36**
	Residential- High Density	3.45	3.45	3.45	3.45	3.00	**3.36**
	Institutional	10.47	113.76	113.76	113.76	113.76	**93.10**
	Commercial	10.47	10.47	10.47	9.10	9.10	**9.92**

	Industrial	10.47	10.47	10.47	9.10	9.10	**9.92**
Marondera	**Flat Rate Tariff**						
	Residential- Low Density	3.50	3.50	3.62	3.62	5.00	**3.85**
	Residential- Medium Density	3.50	3.50	3.62	3.62	5.00	**3.85**
	Residential- High Density	3.50	3.50	3.62	3.62	5.00	**3.85**
	Institutional	5.30	5.30	5.50	5.50	5.00	**5.32**
	Commercial	5.30	5.30	5.50	5.50	5.00	**5.32**
	Industrial	5.30	5.30	5.50	5.50	5.00	**5.32**
Chitungwiza	**Flat Rate Tariff**						
	Residential- Low Density	3.92	3.92	3.92	3.92	3.92	**3.92**
	Residential- Medium Density	3.92	3.92	3.92	3.92	3.92	**3.92**
	Residential- High Density	3.92	3.92	3.92	3.92	3.92	**3.92**
	Institutional	10.00	10.00	10.00	10.00	10.00	**10**
	Commercial	10.00	10.00	10.00	10.00	10.00	**10**
	Industrial	10.00	10.00	10.00	10.00	10.00	**10**

ANNEXURE K-Photographs

Marondera Municipal Council

Photo 1- BNR equipment not being maintained

Photo 2- Monitoring offices for the BNR and the BNR not being maintained properly and have not yet been completed

Photo 3- Intake works point not being manned, maintained and the roof falling

Photo 4- Stabilisation ponds in dire state as they are not being maintained at all

Bulawayo City Council

Photo 1- Charlotte Crescent sewer trunk main and the deep tunnel outfall sewer to Aiselby farm not yet completed

Photo 2-Nketa and Pumula manhole blockages

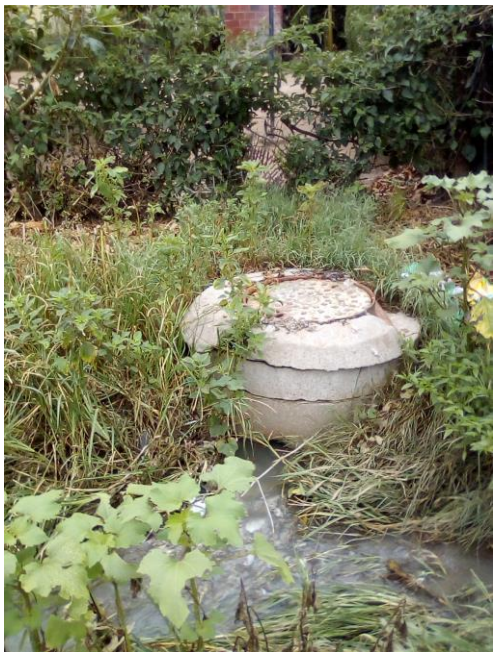


Photo 3- Aiselby 1 and 2 Sewage treatment plant not yet completed

Masvingo City Council

Photo 1- Mucheke Trunk Main Sewer Project still under construction. Beneath the water there are sewer pipes and the area is not being maintained.

Mutare City Council

Photo 1- Hobhouse project under repair. Mutare City Council were not using contractors all its project were being done by council.