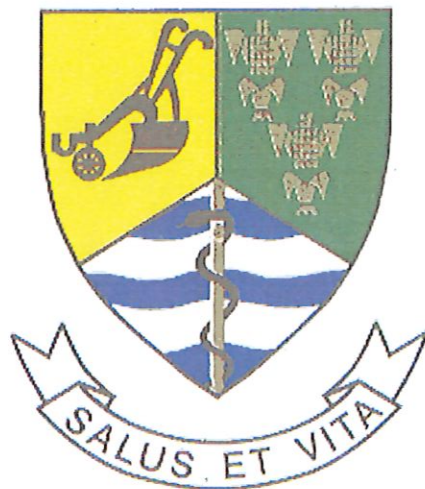


BELA-BELA LOCAL MUNICIPALITY



WATER AND SANITATION ROUTINE MAINTENANCE POLICY

OCTOBER 2022

MC91/10/2022

REPORT ON THE PROPOSED WATER AND SANITATION MAINTENANCE POLICY.

RESOLVED

1. **THAT** the Water and Sanitation Maintenance Policy is approved by Council for implementation.


Cliff TN ZIKHALI
SPEAKER

Council Meeting Date: 28 October 2022.



Bela-Bela Local Municipality

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POLICY NAME	WATER AND SANITATION ROUTINE MAINTENANCE POLICY (WSRMP)	
POLICY NUMBER	TBC	
DATE	OCTOBER 2022	
STATUS	FINAL	
APPROVED BY	MUNICIPAL MANAGER	
	COUNCIL	
DATE APPROVED	OCTOBER 2022	
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TABLE OF CONTENTS

1.	ABBREVIATIONS	1
2.	DEFINITIONS	2
3.	OBJECTIVE	4
4.	POLICY STATEMENT	4
5.	BACKGROUND	5
6.	CURRENT PROBLEM	5
7.	STATUTORY AND REGULATORY FRAMEWORK	6
8.	POLICY ADMINISTRATION.....	7
9.	PREPARATION OF ASSET MAINTENANCE BUDGETS	7
10.	MAINTENANCE PLANNING	7
11.	RISK MANAGEMENT	8
12.	UNSCHEDULED MAINTENANCE – AD-HOC CONSUMER REQUESTS	9
13.	REPORTING MECHANISMS	9
14.	MAINTENANCE & ASSET MANAGEMENT	9
15.	INSPECTION PROGRAMME.....	11
16.	OPTIMISE ON MAINTENANCE ORGANISATIONAL STRUCTURE	11
17.	TRAINING AND WORKPLACE SKILLS DEVELOPMENT PLANNING	12
18.	ENVIRONMENTAL AND QUALITY MANAGEMENT.....	12
19.	POLICY DISPUTE RESOLUTION.....	13
20.	INCEPTION OF THE POLICY.....	13
21.	REVIEW OF THE POLICY	13
22.	ENQUIRIES	13
	ANNEXURE A: FRAMEWORK FOR PROACTIVE MAINTENANCE	14
	ANNEXURE B: MATERIAL UTILISED FOR WATER AND SEWER DISTRIBUTION SYSTEMS.....	19
	ANNEXURE C: ASSET MAINTENANCE CATEGORIZATION	22
	ANNEXURE D: JOB CARD TEMPLATE FOR MAINTENANCE WORK.....	24

1. ABBREVIATIONS

AMP	Asset Management Plan
BBLM	Bela-Bela Local Municipality
COGHSTA	Department of Cooperative Governance, Human Settlements and Traditional Affairs
CSD	Central Supplier Database (National Government)
DTI	Department of Trade and Industry
IIMM	International Infrastructure Management Manual (2006)
KPI	Key Performance Indicator
MFMA	Municipal Finance Management Act, No. 54 of 2000
MSA	Municipal Systems Act, No. 32 of 2000
NIMS	National Infrastructure Maintenance Strategy
O&M	Operation and Maintenance
OEM	Original equipment manufacturer
PPPFA	Preferential Procurement Policy Framework Act No. 5 of 2000
SALGBC	South African Local Government Bargaining Council
SCM	Supply Chain Management
W&S	Water and Sanitation

2. DEFINITIONS

Term	Description
Asset Life Cycle	The cycle of activities that an asset goes through – including planning, design, initial acquisition and/or construction, cycles of operation and maintenance and capital renewal, and finally disposal.
Asset Custodian	A person in any position or level in the organisation entrusted with the safeguarding and use as well as the condition monitoring of a specific asset.
Asset Manager	is any official who has been delegated responsibility and accountability for the control, usage, physical and financial management of the municipality's assets in accordance with the entity's standards, policies, procedures and relevant guidelines.
Availability	The proportion of total time that an asset can perform its intended functions.
Benchmarking	The process of comparing the performance of Bela-Bela Local Municipality with other municipalities, as well as leading practice to identify performance gaps.
Condition based / predictive maintenance	Maintenance performed as a result of the condition of an asset. Condition based maintenance is a type of planned maintenance activity.
Corrective maintenance	Maintenance actions performed because of failure of an asset including the modification or re-design of the asset.
Deferred maintenance	Maintenance activities that were not carried out.
Maintenance	All actions necessary for retaining an asset as near as possible to its original condition, excluding rehabilitation or renewal.
Maintenance plan	Information, policies, and procedures for the optimal maintenance of an asset or group of assets
Maintenance standards	The standards set for the maintenance service, usually contained in preventative maintenance schedules, operation and maintenance manuals, estimating criteria, statutory regulations and mandatory requirements, in accordance with the maintenance outcomes.

Term	Description
Operation	The process of utilising an asset which will consume resources such as manpower, energy, chemicals, and materials.
Planned maintenance	Planned maintenance falls into three categories: 1. Periodic – Activities necessary to ensure the reliability or to sustain the design life of an asset. This includes the regular services required for certain assets. 2. Predictive – Condition monitoring activities used to predict failure 3. Preventative – Maintenance that can be initiated without routine or continuous checking and is not condition-based.
Maintenance/ Refurbishment	Actions that will restore or maintain the originally assessed future economic benefits or service potential that an entity can expect from an asset and is necessary for the planned life to be achieved.
Reliability Centred Maintenance	A structured process to determine the maintenance strategies required for an asset to ensure that it continues to fulfil its intended functions within the current operating context.
Routine / Proactive maintenance	Day-to-day operational activities to keep the asset operating and which form part of the annual operating budget.
Run-to-Failure	A maintenance strategy where no routine maintenance is performed, and the asset is used until it fails.
Service maintenance	Service undertaken seasonally or annually to enable the required level of service to be delivered. Service maintenance is a type of planned maintenance activity.
Unplanned maintenance	Corrective work required in the short-term to restore an asset to a working condition

3. OBJECTIVE

The objectives of the Bela-Bela Local Municipality (BBLM) Water and Sanitation Routine Maintenance Policy are:

- 3.1. To ensure the proper maintenance of the water and sanitation Infrastructure assets of the municipality are captured in the Asset Register of BBLM during O&M Activities.
- 3.2. To benchmark the maintenance management approach of BBLM to the relevant Government guidelines and interactive processes.
- 3.3. To ensure the ongoing maintenance of existing Water and Sanitation (W&S) infrastructure assets, and excludes any capital renewal expenditure.
- 3.4. The policy will be reviewed annually.
- 3.5. To optimize the maintenance of the water and sanitation infrastructure assets for a minimum lifecycle cost.
- 3.6. To ensure existing infrastructure capacity can provide a sustainable delivery of the services to the communities.
- 3.7. To protect the Municipality's investment into capital infrastructure.

4. POLICY STATEMENT

- 4.1. Infrastructure routine maintenance through Operational Management must seek to effectively, efficiently, economically and sustainably utilise the current assets and emerging infrastructure needs to define the required maintenance planning.
- 4.2. Routine Maintenance must take the entire lifecycle of the assets into account, from the identification of an infrastructure need to the final decommissioning or disposal thereof.

5. BACKGROUND

- 5.1. The Asset Management Policy of Bela-Bela Local Municipality describes the procedure for the:
 - a) Proper recording of assets from authorisation to acquisition and to subsequent disposal,
 - b) Providing for safeguarding procedures,
 - c) Setting proper guidelines as to authorised utilisation,
 - d) And prescribing for proper maintenance.
- 5.2. The Senior Manager: Technical Services or delegated authority shall be directly responsible for ensuring that all W&S assets are properly maintained and in a manner which will ensure that such assets attain their useful operating lives.
- 5.3. The policy therefore captures a mandate for the maintenance of the infrastructure assets of the Municipality, there is a need to further articulate this mandate based upon leading practice and applicable Government guidelines.
- 5.4. This maintenance management policy therefore represents the approach to be followed by the Department of Technical Services.
- 5.5. This routine maintenance policy is applicable to the following infrastructure assets:
 - a) Water Infrastructure and related services,
 - b) Sewer Infrastructure and related sanitation services.

6. CURRENT PROBLEM

Bela-Bela Local Municipality currently has no routine maintenance policy in place. The Municipality follows a reactive maintenance procedure whereby the maintenance activity is carried out after a failure has occurred with the aim to restore an assets condition to that which it can perform its intended function, either by repairing or replacing it. This approach is suitable for assets of lower value where consistent monitoring or maintenance may ultimately prove more expensive than reparations or substitutions when malfunctions occur. Experts suggest the implementation of the 80/20 rule, whereby only 20% of maintenance should be preventative and 80% directed to proactive maintenance.

Bela- Bela Local Municipality does not have dedicated stores for spare parts for both sanitation and water systems maintenance, this results in a time extensive procurement process that is followed for the procurement of necessary parts through the Municipal Supply

Chain processes. There exists a major issue in acquisition cycle and management of this function as no store controller human resourcing is fulfilled to maintain this process. No acceptable procedures are developed currently for operational material acquisition in W&S system maintenance, which results in unattended maintenance needs when following SCM processes which take extremely longer. Management challenges also include that of theft and vandalism surrounding available kept spare parts and materials and is attributed access not managed properly.

7. STATUTORY AND REGULATORY FRAMEWORK

- 7.1. In addition to the Statutory and Regulatory Framework contained in the Asset Management Policy, the following documents are relevant, and were used as key inputs for this policy:
 - a) MFMA Local Government Capital Asset Management Guideline published by the National Treasury Department (2008).
 - b) COGTA "Guidelines for Infrastructure Asset Management in Local Government"(2007).
 - c) National Infrastructure Maintenance Strategy (NIMS), developed by Dept. Public Works, CSIR and CIDB. NIMS was approved by the National Cabinet (2006).
 - d) International Infrastructure Management Manual co-authored by Institute of Municipal Engineering of Southern Africa (IMESA, 2006).
- 7.2. The Constitution's prime mandate for Local Government is that services are provided in a sustainable manner (Section 152).
- 7.3. The MSA No. 32 of 2000 in sections 4(2)(d) states that a municipality has the duty to:
 - a) Strive to ensure that municipal services are provided to the local community in a financially and environmentally sustainable manner.

8. POLICY ADMINISTRATION

- 8.1. Municipal Manager as head of the administration is responsible for the administration of this policy in accordance with the MSA Regulations for appointment and conditions of employment for senior managers.
- 8.2. The municipal manager shall, in terms of the provisions of section 55(1) (e) of the Local Government: Municipal Systems Act 2000, appoint staff other than those mentioned in par 3.1 of the said Act, subject to this policy and the provisions of the Employment Equity Act 1998.
- 8.3. Senior Managers have the responsibility to establish a business need for positions that have become or are vacant, to be advertised for the purpose of responsibility fulfilment.

9. PREPARATION OF ASSET MAINTENANCE BUDGETS

- 9.1. The costs associated with the maintenance activities in the maintenance activity plan must be calculated in alignment with the Municipality's W&S Asset Management Planning budgets. Maintenance activities must still adhere to the budget allocation of a minimum of 8% of the asset value for each asset.
- 9.2. The individual maintenance activity costs must be summarised per sub-division and used to inform the required maintenance budgets.
- 9.3. Where available maintenance budgets are inadequate the criticality of the individual activities will be used to prioritise the maintenance actions to be performed.
- 9.4. Maintenance activities that cannot be funded will be classified as deferred maintenance and recorded as such expenditure on maintenance will be recorded against the assets, facilities, and cost centres where the cost is incurred.

10. MAINTENANCE PLANNING

- 10.1. The following supporting documentation shall be established by the department as a framework guidance to development and allow for minimum maintenance planning:
 - a) A set of Safe Operating/Standard Operating Procedures (relating to activities).
 - b) Inspection sheets aligned to the different assets groups or installations.

- c) Maintenance program/Schedule.
 - d) OEM equipment operating and maintenance manuals.
- 10.2. Maintenance plans will be developed to meet the requirements of this policy. The plans will contain details of:
- a) Specific Activity
 - b) Frequency and/ or time-based scheduling,
 - c) Equipment specific data sheets and O&M requirements (where applicable),
 - d) Execution of standard operating procedures for specialised equipment during maintenance activity (where applicable),
 - e) Resourcing breakdown and costing requirements.
- 10.3. Maintenance Plans must be developed by Divisional Managers and Asset Manager for review by the Senior Manager: Technical Services and to be approved by and adopted by Municipal Manager prior to implementation.
- 10.4. The requirement and scope of maintenance, selection of technology, procurement and spares/consumables relevant to any item shall be subject to a life cycle cost analysis and forecast.
- 10.5. Maintenance planning must also detail disposal methods and procedures.

11. RISK MANAGEMENT

- 11.1. Risk is also an important consideration in determining appropriate maintenance policies. Risks associated with the operation of the asset in terms of occupational health and safety standards, as well as consequence of failure, need to be considered.
- 11.2. Risk management shall include:
- a) Risk assessment of operations, equipment, and service loss.
 - b) Risk assessment before, during and on completion of maintenance work.
 - c) Risk assessment and safe procedures in planning and executing maintenance work.
- 11.3. Risk Management shall be implemented to maintain a safe infrastructure (water distribution and sanitation collector systems) for public, operators and maintenance personnel and animal life.

12. UNSCHEDULED MAINTENANCE – AD-HOC CONSUMER REQUESTS

- 12.1. Unscheduled maintenance shall be done in the event of an unplanned failure, to return the equipment or plant to serviceable condition as soon as necessary, but according to either of the following:
- a) **Immediate maintenance** shall be done and the equipment or plant returned to service in accordance with Basic Services Directive.
 - b) **Deferred maintenance** may be done if the plant / equipment can be safely returned to service for later scheduled maintenance. The need for service shall be escalated and tracked for earliest possible corrective action.
- 12.2. The quality of service levels shall be defined by national standards and relevant professional body knowledge.
- 12.3. Service Standards shall be specific to consumer and service level in the area and be subject to constraints identified in the system.

13. REPORTING MECHANISMS

- 13.1. Each asset custodian should report to the Senior Manager: Technical Services; who should report to the Municipal Manager on the execution of their delegated responsibilities, including any issues that will significantly impede the capability of the assets to provide the required level of service or economic benefit. One of these issues will be the adequacy of the maintenance, operation and safeguarding of assigned assets.

14. MAINTENANCE & ASSET MANAGEMENT

- 14.1. Periodic condition assessment for tangible capital assets is like a general medical check-up for people. The regular assessment of the condition and performance of all the tangible capital assets will allow BBLM to determine the ability of tangible capital assets to continue to perform and provide services into the future.
- 14.2. While condition assessments for specialised assets like infrastructure would generally be an engineering function, BBLM can also establish basic performance and benchmarking indicators that will assist in the process. For example:

- a) Keeping historical information on sewer failure could be used to predict when replacements might be needed. This can also be done for motor vehicles and other capital assets.
 - b) Analysing the quality of water treated compared to the quality of water needed can provide a useful indicator of the condition of the treatment plant to provide sufficient treated water.
- 14.3. A condition assessment can be conducted using a top-down approach based upon staff knowledge, maintenance records, customer complaints and performance records. A physical check can also be conducted whenever routine maintenance is done. This will facilitate updated condition information and save time as it will eliminate a second visit. Information collected on the condition should be recorded in the asset register and updated in the strategic plans where necessary.
- 14.4. A rating scale such as the one in the following table could be developed for each class of tangible capital asset:

Condition rating table			
Grade	Description	Detailed Description	Estimated Remaining Life
1	Very Good	New, sound structure or appearance, well maintained. Continue with planned maintenance.	As estimated
2	Good	Performance acceptable with minor deterioration (<5%). Normal planned maintenance continues.	As estimated
3	Fair	Clearly evident deterioration (10- 20%). Significant maintenance required, consider impairment.	Less than estimated
4	Poor	Significant deterioration in structure or appearance. Significant impairment of performance. Significant maintenance required.	Significantly less than estimated

5	Very Poor	Unsound, does not perform. Reconstruction or replacement required (>50% needs replacement).	None or nominal
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- 14.5. Critical infrastructure maintenance schedules must be developed using a risk-based approach by assessing both the probability of failure and the potential impact on the service levels to ensure the critical maintenance plan is established accordingly.
- 14.6. Critical infrastructure and the Critical maintenance plan must be reviewed quarterly basis to monitor performance and resourcing challenges.

15. INSPECTION PROGRAMME

- 15.1. Maintenance Inspection programmes must be established on the following levels by the Asset Manager:
- a) **General IT system inspection** to ensure data quality and system efficiency is maintained and adequate for managing integrated maintenance processes.
 - b) **Physical asset inspections** as guided through operational processes with the integration of asset verification.
 - c) **Vehicle and Trade Inspection Programme** must be conducted bi-annually with HR involvement to ensure operational personnel operating specialised equipment and road vehicles are correctly licensed and certified to undertake the relevant O&M activities of the relevant plant and equipment during maintenance activities.

16. OPTIMISE ON MAINTENANCE ORGANISATIONAL STRUCTURE

- 16.1. All maintenance activity schedules will be used to inform the human resourcing and maintenance organisational structure required to perform the critical routine maintenance work to be executed.
- 16.2. The organisational structure and maintenance activity schedule must guide the planning outcomes to determine the tools and other equipment required to perform the required maintenance.

- 16.3. The outsourcing or use of alternative delivery mechanisms to perform maintenance tasks, or groups of maintenance tasks, must be considered as an alternative for the creation of in-house capacity and is also addressed under Section 19.
- 16.4. Assignment of maintenance responsibilities must be approved between the Asset Manager and Technical Services Manager for maintenance plans to ensure progressive implementation of this policy as envisaged.

17. TRAINING AND WORKPLACE SKILLS DEVELOPMENT PLANNING

- 17.1. To perform the corrective and preventive maintenance tasks, the maintenance personnel must be trained and upgraded to handle these problems.
- 17.2. Maintenance training can be considered to perform two basic functions. First, it can be used as a cure for existing deficiencies. Second, it can be used as a preventive measure to help eliminate potential future problems.
- 17.3. Before initiating a maintenance training program to correct deficiencies in certain maintenance jobs, the specific job should be thoroughly analysed.
- 17.4. Basic and advanced courses could be held on a continuous basis to maintain Operator specific / Trade Certification.
- 17.5. Class sizes be limited to 10 people to give students individual attention to maximise on learning and ensure quality training occurs.
- 17.6. Certificates of completion should be awarded to all individuals who successfully complete the maintenance training program.
- 17.7. Joint responsibility between Asset Manager and Skills Development Facilitator to review training programme in alignment with BBLM Workplace Skills Development Plan to ensure budget is allocated for prioritised maintenance activities.
- 17.8. Skills Development Facilitator can conduct skills audit on bi-annual basis to ensure appropriateness of the elected training programme to enhance impact of maintenance tasks.

18. ENVIRONMENTAL AND QUALITY MANAGEMENT

- 18.1. All maintenance activities to be developed and performed through BBLM quality management system directives.

- 18.2. All maintenance activities will be developed and established in cognisance of environmental impact and risks.
- 18.3. Incidents of environmental damage and degradation shall be reported to the relevant Line Managers, Asset Manager, Senior Manager: Technical to assess situational circumstance and report accordingly to the BBLM Environmental Practitioner for specific response actions.

19. POLICY DISPUTE RESOLUTION

- 19.1. All maintenance activities to be developed and performed through BBLM quality management system directives. In the event, that a grievance arises with regard to the application and interpretation of this policy, it shall be handled in terms of the SALGBC Main Collective Agreements

20. INCEPTION OF THE POLICY

- 20.1. Intended Inception date scheduled for **November 2022**.

21. REVIEW OF THE POLICY

- 21.1. The policy should be reviewed on a minimum period of annually.

22. ENQUIRIES

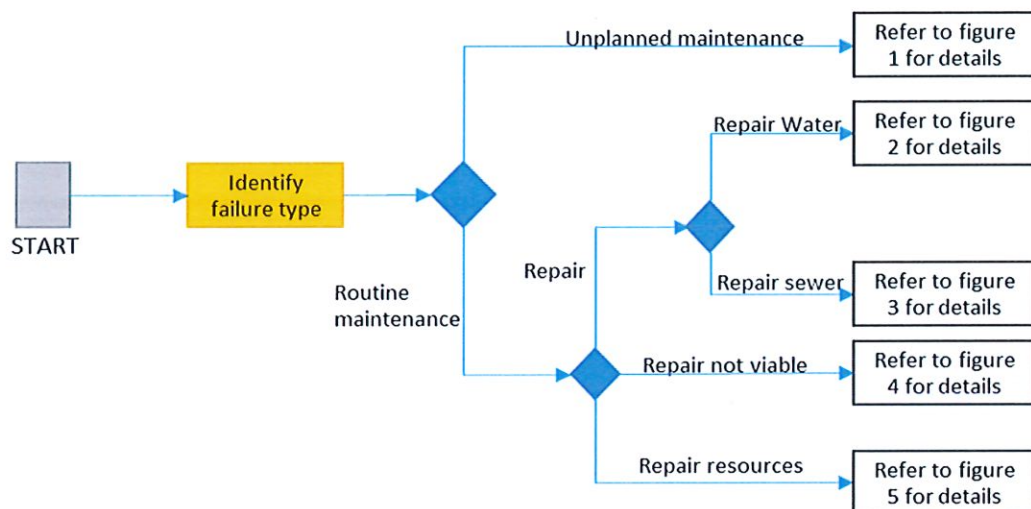
- 22.1. All enquiries related to the content of this policy should be directed to the Senior Manager: Technical Services.

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ANNEXURE A

FRAMEWORK FOR PROACTIVE MAINTENANCE

The proposed framework will assist the municipality to address unplanned and routine maintenance



Step 1: Unplanned Maintenance Procedures

Figure 1: The unplanned failure is the infrequent failure that rarely occurs must be fixed within 1-3 days and documented.

Step 2: Water routine maintenance

Figure 2: The regular water failure is the frequent failure that occurs frequently must be fixed within 1-3 days (in extreme case 7 days) and documented. Be prioritized under long term framework (future works) for replacement or operations/maintenance inspections.

Step 3: Sewer routine maintenance

Figure 3: The regular sewer failure is the frequent failure that occurs frequently must be fixed within 1-3 days (If extreme case 5 days) and documented. Be prioritized under Long term framework (future works) for replacement or operations/maintenance inspections

Step 4: Routine maintenance not viable by Operations

Figure 4: Regular repairs that the operations and maintenance depot departments cannot implement and have lack of personnel staff/skilled staff to deal with the magnitude of the problem. Time to fix this issue varies due to procurement procedures and waiting times for approval.

Step 5: Inadequate resources within Council

Figure 5: Inadequate resources are the steps taken by the Council to expand on employing more service providers and personnel staff to deal with water and sewer failure.

(Routine maintenance: Frequent water failures that can be solved within 1-3 Days or longer depending on severity)

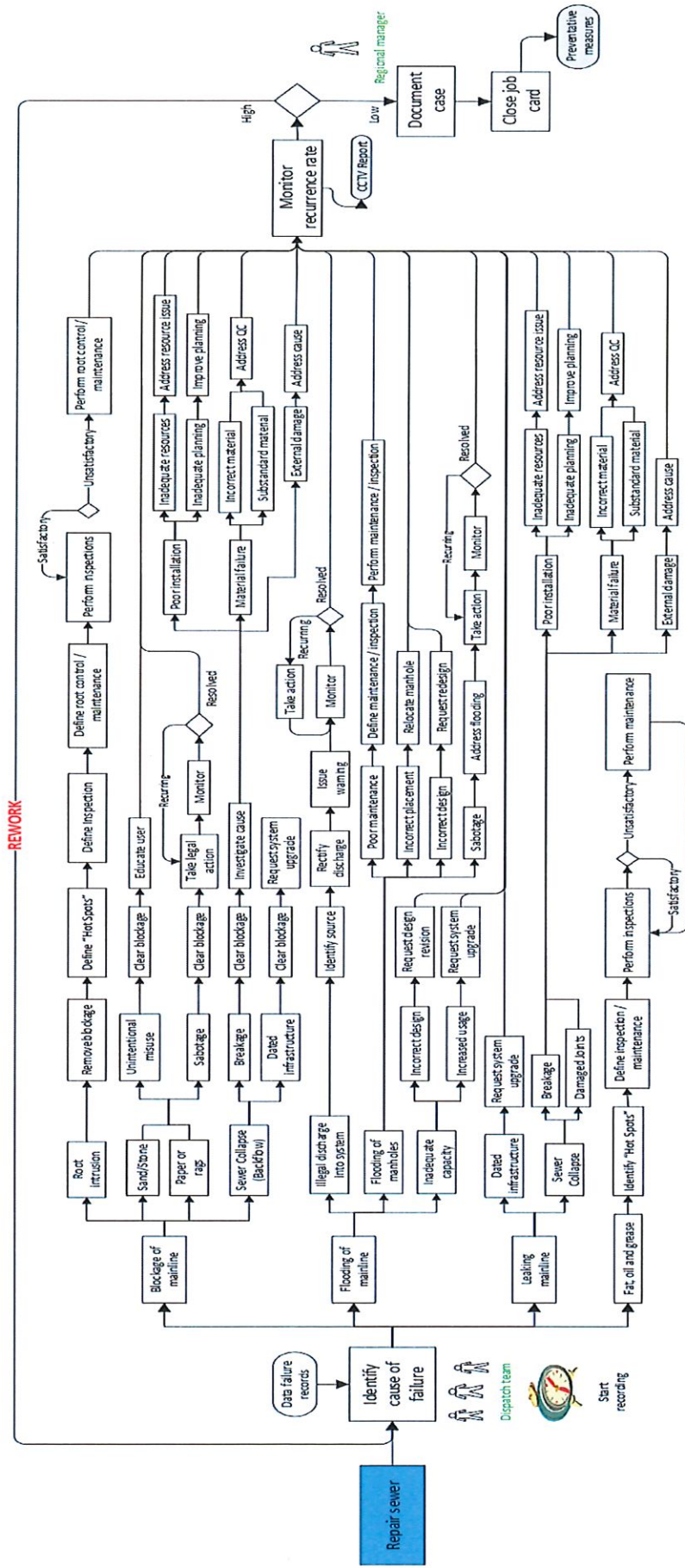


Figure 3: Sewer routine maintenance steps for resolving the problem

(Routine maintenance: Frequent sewer failures that can be solved within 1-3 Days or longer depending on severity)

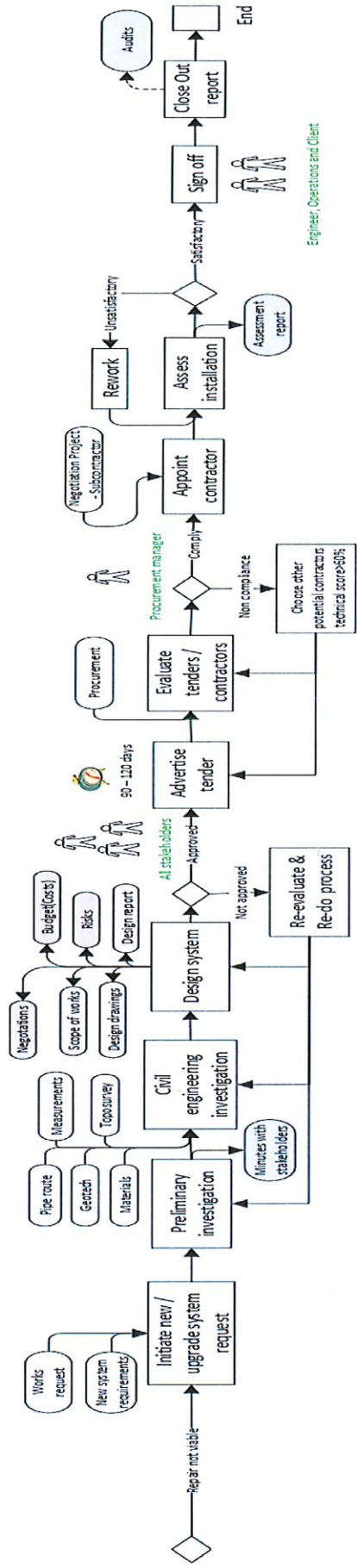


Figure 4: Repairs where routine maintenance is not viable steps for resolving the problem

(Routine maintenance not viable by Operations: A full on project will need to be implemented with consultants, project managers, contractors, etc to solve project).

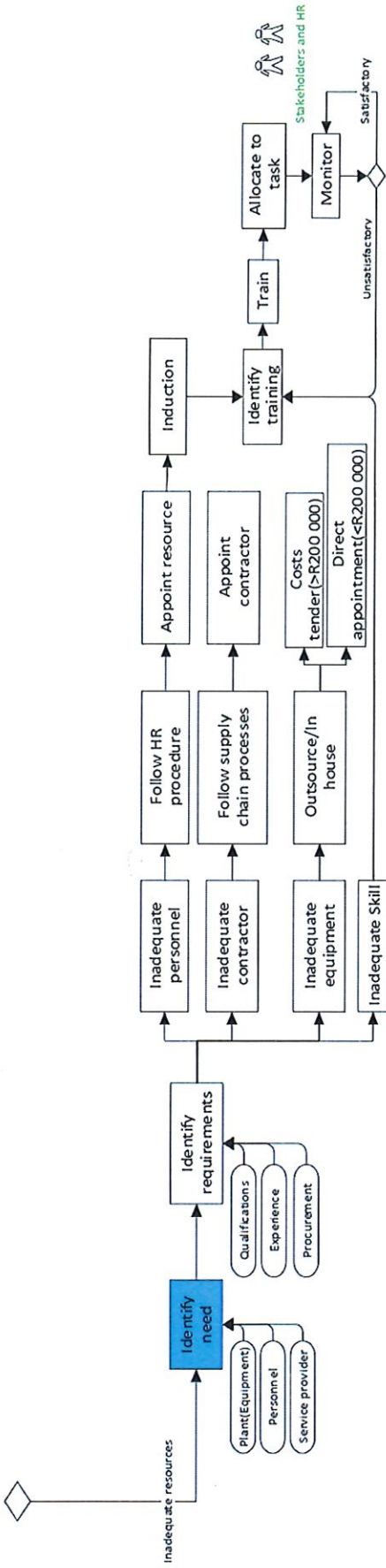


Figure 5: Inadequate resources steps for resolving the problem

(Inadequate resources within metro council: A full on process to expand resources to achieve service delivery goals)

ANNEXURE B

MATERIAL UTILISED FOR WATER AND SEWER DISTRIBUTION SYSTEMS

Selecting the correct material requires detailed understanding of conditions and the strengths and weaknesses of each pipe material especially during design stage so that after construction the service delivered has no or little operational costs. The following are the most used pipe material in water and sewer networks globally:

- Asbestos cement: Cement and fibre glass used for water and sewer, but mostly water
- Bitumen or Epoxy: Petroleum (hydrocarbon substance) used for coating or lining pipe to prevent corrosion
- Cement and concrete: Aggregate or sand bound together by cement used for water and sewer pipes also buildings, foundation, chambers, and anchoring encasement. Manholes –for sewer made mostly of concrete or steel or plastic
- Copper and Brass: Extracted from oxide and sulphide ores and brass alloy of copper and zinc used for water
- Iron and Steel: Carbon and silicon content used for water and sewer
- Polyethylene-Plastic: Thermoplastic polymer consisting of long hydrocarbon chains used for water and sewer
- Polyvinyl chloride (PVC) Plastic: additives such as plasticizers used for water and sewer
- Rubber: Is an elastomer and thermoplastic that originates from trees or produced synthetically and used for water
- Glass Reinforced Plastic: Uses glass fibre in thermosetting resin in combination with other materials for desired properties

The following are the main causes of pipeline leakages/spillages leading to water and sewer:

Pipe bursts and blockages in the system:

- Sabotage of existing infrastructure: Vandalism
- Aged infrastructure: Infrastructure has surpassed its useful life thus will deteriorate and cracks occur
- Exposure to sunlight: Damages certain plastic materials such as PVC and HDPE

- Water pressure: Creating stresses in the walls of pipes and fittings which led to cracks of pipe material
- Changes in momentum: Flow in pipes at bends, junctions, reducers, valves and other fittings which led to pipe accessories failure
- Excessive loads: Loads or forces that exceed the strength of a material can result in failure through cracking or rupture.
- Defective materials: Flaws that were not identified in the manufacturing process
- Design sizing: Inadequate sizing of pipe material, pipe accessories, reservoirs and water towers due to population(densification/urbanisation)
- Cracks: Due to inadequate bedding (geotechnical soil layers- Insufficient soil bedding support) which also leads to excessive deflection leading to pipe to crack
- Tree intrusion: Due to incorrect placement of sewer lines and lack of inspection of the type of trees around the area prior to water/sewer line positioning
- Handling damage (especially small diameters): When delivering to site as well as poor handling on site for storage
- Improper construction or repair: During construction or repairs the system is open to the surrounding environment and thus the physical integrity is compromised especially on the following:
 - Joint misalignment especially spigot and socket joints
 - Welding jointing weakness due to misalignment
- Internal and external corrosion: Leading to material to deteriorate at a high rate which eventually leads to leakage

Common failures that are associated to water and sanitation systems are listed below:

Water:

- AC pipes leaking: aged infrastructure, cracks, design capacity, excessive loads and water pressure
- Leak on valve: aged infrastructure
- Contractor/external party damage water/sewer pipe: Sabotage/Vandalism
- Leaking meter: aged infrastructure and Sabotage/Vandalism
- Hydrant repaired/uncovered: Improper construction or repair
- Stopcock leaking: aged infrastructure and Sabotage/Vandalism

Sewer:

- Fat in the sewer main
- Infiltration: Roots, sand, and stones
- Collapse of pipe sections

- Foreign objects in the sewer main: Paper, rags and other foreign material caused by sabotage/vandalism from end users

ANNEXURE C

ASSET MAINTENANCE CATEGORIZATION

Following asset classification groups for water and sewer assets as per latest compiled Fixed Asset Register:

Water Assets Portfolio consist of:

1. Bulk supply scheme components

- a) General building facility
- b) Boreholes
- c) Raw water dam
- d) Raw water pump station
- e) Pre-chlorination installations
- f) Chemical dosing installations
- g) Inlet towers
- h) Flocculation channels
- i) Settling tanks
- j) Sand filters
- k) Pump stations
- l) Chlorine dosing plants
- m) Filter wash water sumps
- n) Sludge treatment and disposal facilities
- o) Flow meters
- p) Rising mains
- q) Reservoirs
- r) Valves

2. Water reticulation components

- a) Pipe network
- b) Gate valves
- c) Hydrants
- d) Water meters
- e) Valves

Sanitation Assets

1. Sewer reticulation components

- a) Pipe network
- b) Pump stations
- c) Septic tanks and French drains – review asset register (not found in system)
- d) Manholes

2. Sewer treatment works components

- a) General facility
- b) Aeration facilities
- c) Submersible pumps
- d) Centrifugal pumps

- e) Inlet screens
- f) Grit removal systems
- g) Flow measurement systems
- h) Sedimentation systems
- i) Sludge treatment systems
- j) Sludge dewatering systems
- k) Biological treatment systems
- l) Oxidation / maturation ponds
- m) Balancing tanks
- n) Chemical phosphate removal systems
- o) Anaerobic digestion systems

ANNEXURE D

JOB CARD TEMPLATE FOR MAINTENANCE WORK

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