

**SCOPE OF WORK RELATED TO TARGETED AREAS IN EMFULENI LOCAL
MUNICIPALITY TO DO LEAK DETECTION AND CONDUCT PIPELINE LEAK REPAIRS
AND PIPE REPLACEMENT PROGRAMMES.**

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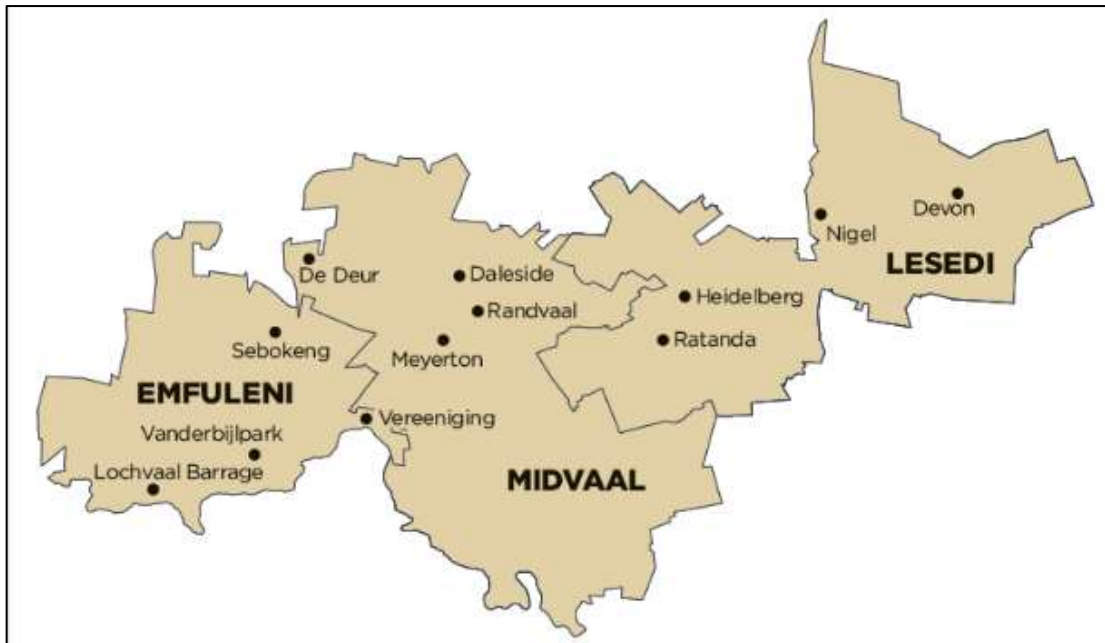
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1. EMFULENI LOCAL MUNICIPALITY

Emfuleni Local Municipality (ELM) is one of three local municipalities that constitute the Sedibeng District Municipality. It is the Western-most Local Municipality of the District, which covers the entire southern area of the Gauteng province and covers an area of 987.45 km².

Emfuleni Local Municipality (ELM) is situated in the south of Gauteng, within the Sedibeng District Municipality. The major centres within Emfuleni are Sebokeng, Vanderbijlpark and Vereeniging.

Metsi-a-Lekoa is the department in Emfuleni Local Municipality responsible for water and sanitation services.



2. WATER SUPPLY

Emfuleni receives the bulk of its water from Rand Water Board. The water from Rand Water is supplied through several pipelines from Vereeniging Pump Station, while water is also supplied under gravity from Rand Water's Langerand reservoir to a number of areas within ELM.

Beyond the Rand Water supply points, Emfuleni has water storage and water distribution networks used to supply water to its end users (consumers). In order to improve revenue collection, ELM will embark on several initiatives related to the installation of new water meters, as well as the replacement of existing water meters.

Rand Water has been directed by the Minister of Water and Sanitation under Section 63 of the Water Services Act to provide, amongst others, support to the ELM municipality to fulfil its mandate as a Water Services Authority.

A tender will thus be issued by Rand Water targeting the repair of pipeline leaks, as well as the replacement of sections of pipelines within areas due to abnormally high maintenance cost being incurred.

3. LEAKS AS PART OF WATER CONSERVATION AND WATER LOSS MANAGEMENT

A WCWDM intervention will normally focus on a range of outcomes and will strive to achieve the following benefits:

- Reduced operating cost.
- Improved capital cost efficiency.
- Improved metering and billing.
- Reduced health risks.
- Increased security of supply.
- Less infrastructural damages.
- Reduced hydraulic loads on sewers, sewerage pump stations and wastewater treatment works.
- Improved consumer satisfaction.
- Publicity and willingness to pay.
- Reduced ecological stress.

ELM uses the DWS Water Loss Spreadsheet on a monthly basis to estimate the water losses. The issues to be addressed are diverse in order to understand the sources of the losses, as well as the required actions to reduce losses, and essentially fall within the following categories:

- System Input Volume (SIV).
- Water Exported (WE).
- Water Supplied (WS).
- Authorised Consumption (AC).
- Water Losses (WL).

Leaking pipes can be a major contributor in as far as water losses are concerned. It therefore warrants that this matter be looked into.

3.1. ELM WATER NETWORK PIPES

Available ELM data indicates the following related to installed water supply pipelines. The two tables presented below highlight the following:

1. The length of the different pipe materials installed in the ELM areas.

| Sum of Water pipe length (km) | Area | | | | |
|--------------------------------------|-------------|----------|------|-------------|--------------------|
| Water pipe material | Evaton | Sebokeng | VDBP | Vereeniging | Grand Total |
| AC | 138 | 158 | 215 | 148 | 659 |
| AC/Steel | 0 | 0 | 0 | 17 | 17 |
| AC/uPVC | 46 | 147 | 3 | 122 | 318 |
| AC/uPVC/Steel | 0 | 0 | 0 | 49 | 49 |
| HDPE | 0 | 0 | 6 | 0 | 6 |
| mPVC | 0 | 0 | 0 | 3 | 3 |
| Standpipes | 0 | 2 | 0 | 0 | 2 |
| Steel | 0 | 0 | 0 | 2 | 2 |
| uPVC | 550 | 348 | 478 | 43 | 1418 |
| uPVC/Steel | 0 | 0 | 0 | 21 | 21 |

2. The average age of different pipe materials installed in the ELM areas.

| Average Date of Pipes Installed | Area | | | |
|---------------------------------|--------|----------|------|-------------|
| Water pipe material | Evaton | Sebokeng | VDBP | Vereeniging |
| AC | 1972 | 1968 | 1967 | 1969 |
| AC/Steel | | | | 1965 |
| AC/uPVC | 1981 | 1984 | 1978 | 1975 |
| AC/uPVC/Steel | | | | 1965 |
| HDPE | | | 1973 | |
| mPVC | | | | 2009 |
| Standpipes | | | | |
| Steel | | | | 1961 |
| uPVC | 1994 | 2003 | 1997 | 1990 |
| uPVC/Steel | | | | 1984 |

Pipes used for water supply and distribution can occasionally be a significant cause of water loss. As a result, it is necessary to evaluate locations with pipes that may be the source of significant water losses. Based on the results of the inspection, steps should then be taken to repair any isolated leaks or replace any affected pipeline sections. Pipes with a Remaining Useful Life of less than ten years must be inspected, and a prioritized replacement program must be started. The Table below gives an indication of the requirement to look into and replace pipelines based on stated priorities.

| PRIORITY | AREA | PIPE SIZE | LENGTH |
|--------------------|--|--|--|
| Vereeniging | | | |
| 1 | Roods Gardens – Boy Louw Roods Gardens – Ken Viljoen | 50mm 50mm | 864m 865m |
| 2 | Unitaspark – Japie Krige | 100mm 150mm | 841m 1498m |
| 3 | Three Rivers - Nile Drive - The Circus - Teviot - Tweed - Cormorant - Palm - Hazel | 150mm 100mm 100mm 100mm 100mm 100mm 75mm 100mm 75mm 100mm 75mm | 263m 129m 575m 317m 421m 603m 271m 314m 1151m 325m 1021m |
| 6 | Peacehaven | 50mm 100mm 150mm | 4938m 3718m 2742m |
| 7 | Three Rivers – Extension 2 | 150mm 100mm 75mm 50mm | 2840m 4655m 12591m 2564m |

| PRIORITY | AREA | PIPE SIZE | LENGTH |
|----------------|--------------------------------|-----------|--------|
| Vanderbijlpark | | | |
| 8 | SW2 – Rossini Bernard Price | 100mm | 1035m |
| | | 100mm | 2770m |
| 9 | SE7 | 100mm | 13997m |
| Sebokeng | | | |
| 10 | Zone 12 | 100mm | 5650m |
| | | 110mm | 6972m |
| | | 150mm | 3288m |
| Evaton | | | |
| 11 | Zone 7 | 75mm | 24508m |
| | | 100mm | 12690m |
| | | 150mm | 6910m |
| 12 | Zone 6x5 | 75mm | 6223m |
| | | 100mm | 195m |
| | | 110mm | 294m |
| 13 | Zone 3 | 75mm | 18467m |
| | | 100mm | 9185m |
| | | 150mm | 877m |

3.2. PROJECT OBJECTIVES

The objectives of this project will comprise of:

1. Obtaining the pipeline asset register.
2. Obtaining the plans indicating the position of the water pipelines.
3. Obtaining data from ELM Planning and ELM Operations and Maintenance to identify areas where leaks on water pipelines have been noted / repaired.
4. To conduct leak detection surveys on selected pipelines.
5. To present the leak detection data in GIS format to ELM. There must also be a hardcopy report highlighting:
 - a. Areas where local repairs must be done.
 - b. Sections where pipelines need to be replaced.
6. To draft a detailed tender report related to the required work in (5) above.
7. Construction supervision of the required work.

3.3. REQUIRED INFORMATION

ELM will supply the successful tenderer with all the required information to execute the project. The information will comprise of data noted in Section 3.2 (1 to 3) above, as well as any other relevant information to be made available by ELM.

4. PROPOSED SCOPE OF WORK

4.1. THE GENERAL WORKING APPROACH

The general working approach should entail the following tasks as outlined in **Table 1** below:

Table 1: General working approach

| Phase | Task | Activity | Output |
|---|---------|---------------------------------------|--|
| Component A: Inception Stage | Task A1 | Inception | D1 Inception Report |
| Component B: Preliminary Study; Evaluation of the situation | Task B1 | Desktop Study | D2 – Baseline Study Report |
| | Task B2 | Site investigations / leak detection | |
| | Task B3 | Baseline Study Report | |
| Component C: Detailed Design Phase; Design of Best Solutions Proposed | Task C1 | Detailed Study. | D3 - Detailed Design Report D4 – Tender Documentation. D5 – Tender Evaluation Report. D6 – Construction Supervision Documentation |
| | Task C2 | Approval of Design Report | |
| | Task C3 | Solution Implementation. | |
| Component D: Capacity Building and Support to Operations | Task D1 | Diagnostic of the O&M. | D7 - Capacity Building Report. D8 – O&M Manuals. |
| | Task D2 | Capacity Building and Support to O&M. | |

4.2. PROPOSED TASKS

An outline of the activities associated with the various Tasks are presented below. It is provided as a guide to the Tenderers. The Tenderers may expand on the activities to provide more detail related to their tender proposal:

Component A: Inception Stage

| Purpose | To initiate and launch the project. |
|------------|--|
| Activities | <p>The following activities are to be performed during the Inception Phase:</p> <ul style="list-style-type: none"> • Mobilisation of the project team. • Kick-off meeting. • Establishment of the project office. • Creation of a Project Steering Committee with the important stakeholders. • Meetings with stakeholders: <ul style="list-style-type: none"> ○ ELM Staff; Metsi-a-Lekoa Management, Planning, Operations and Maintenance. ○ ELM Asset management. ○ ELM Finance Department. ○ Rand Water Team members. • Obtain and review the relevant available information in support of the leak detection / pipeline repair and / or pipeline replacement initiatives. • Discussion of the proposed Project Programme and Workplan. • Review and adaptation of the methodology and the workplan according to the outcome of the Inception Phase. |
| Output | D1 - Inception report with detailed programme and work plan updated |
| Duration | Maximum duration of four (4) weeks |

Component B: Baseline Study

| Purpose | An evaluation of the current situation |
|-------------------|---|
| Activities: B1 | <p>The following activities are to be performed during the Baseline Study Phase:</p> <ul style="list-style-type: none"> • Desktop Study: <ul style="list-style-type: none"> ○ Obtain and assess the ELM pipeline asset register. ○ Obtain the ELM plans / pipeline system layouts. ○ Obtain historical leak incident data, leak repair data. ○ Prioritise areas / pipelines based on criteria such as, but not limited to pipe material, pipe age, pipe diameter, static system pressures, historical defects, soil conditions, etc. • Within the prioritised areas, undertake the following: <ul style="list-style-type: none"> ○ Exposing the pipes at intervals of 100 m to determine the pipe location (GPS) and position relative to the road reserve boundary, diameter, material, condition and depth of cover. ○ Identify and expose the associated isolating valves, record their GPS locations, and exercise the valve to assess its functionality and status (open and/or closed). ○ Undertake leak detection along the identified pipeline routes, and leaks to be categorised in terms of its severity and its GPS location recorded. |
| B2 | |
| B3 | |
| Output | D2 – Baseline Study Report. |

Component C: Detailed Design Stage

| Purpose | Detailed Design of the PRV Installation Requirements and Construction Implementation Supervision |
|-------------------|---|
| Activities: C1 | <p>The following activities are to be performed during the Detailed Design Stage:</p> <p>Detailed Design of the pipelines in the areas where sections of pipelines are to be replaced. The detailed designs should be supported by:</p> <ul style="list-style-type: none"> • Design drawings. • Specifications. • Detailed BOQ. • Construction Cost Estimate. • Tender Document. |
| C2 | |
| C3 | |
| Outputs | <p>D3 – Detailed Design Report, subject to approval by ELM.</p> <p>D4 – Tender Documentation.</p> <p>D5 – Tender Evaluation Report.</p> <p>D6 – Construction Supervision Documentation.</p> <p>D7 – As-built drawings.</p> |

5. ADDITIONAL INFORMATION REQUIRED / NOTES

The tenderer should provide the following documents / schedules in support of their tender proposal:

1. A Project Programme indicating the time allocated to the various work stages and their respective activities, start date, duration, end date, relationships, milestone date for deliverables, etc.
2. A Resource Utilisation Schedule, indicating the allocation of the various resources and their time allocated to the various work stages, activities and deliverables.
3. CV's of the key personnel.
4. Previous experience.
5. The costed proposal must make allowances for travelling, accommodation (if required and to be detailed in terms of estimated costs, etc), printing, etc. Such costs to be verified during execution by proof of payment.

The Tenderer should note that:

- Only ELM personnel are permitted to operate valves.
- All premises to be visited being accompanied by an ELM official.
- All required Health and Safety procedures should be complied with.

6. ANNEXURE A BOQ

| Item | SOW Reference | Description | Unit | Quantity | Rate | Amount |
|----------------|---------------------------------------|--|---------------------|-------------------|------|--------|
| 1 | | General Phase | | | | |
| 1.1 | | Company Overhead Costs | Sum | 1 | | |
| 1.2 | | Project Management | Months | | | |
| 1.3 | | Monthly Project Meetings | Months | | | |
| 2 | | Inception Phase (Component A) | | | | |
| 2.1 | A | Meetings with Stakeholders | Sum | 1 | | |
| 2.2 | | Data Acquisition | Sum | 1 | | |
| 2.4 | | Updating the Project Programme and Workplan | Sum | 1 | | |
| 2.5 | | Other aspects / activities associated with the Inception Stage (Note that details must be provided under a separate cover letter) | Sum | 1 | | |
| 2.6 | | Submission of Inception Report and Client approval thereof | Sum | 1 | | |
| 3 | | Preliminary Study Phase (Component B) | | | | |
| 3.1 | B1 | Desktop Study | Sum | 1 | | |
| 3.2.1 | B2 | Exposing pipes at 100 m intervals, inspection of the pipeline and condition assessment thereof, backfilling, compaction and rehabilitation of the excavated area. | No (Provisional) | 1500 | | |
| 3.2.2 | B2 | Identify, expose, check functionality and condition, and record GPS location | No (Provisional) | 750 | | |
| 3.2.3 | B2 | Leak Detection surveys, include of all labour material, transport, fuel, equipment, etc. | km (Provisional) | 150 | | |
| 3.3 | B3 | Assessment of all the information / data gathered, and presenting it all in the form of a Baseline Study Report, subject to approval by ELM. | Sum | 1 | | |
| 4 | | Detailed Study Phase (Component C) | | | | |
| 4.1 | | Pipeline Repairs | Months | | | |
| 4.1.1 | C1 | Providing full details related to required local pipeline repairs, that can be priced by Contractor. | No (Provisional) | 500 | | |
| 4.1.2 | C1 & Refer to pipeline priority Table | Providing full details related to pipelines required to be replaced, inclusive of drawings, specifications, BOQ, Construction Cost Estimates, Tender Document. Pipes up to 160 mm ND | km (Provisional) | 150 | | |
| 4.1.3 | C3 | Wayleave applications | km (Provisional) | 150 | | |
| 4.2 | C2 | Submission of Detailed Study Report and Client approval thereof, complete with all the relevant design calculations, specifications, drawings, a BOQ for the required work, as well as a Construction cost estimate | Sum | 1 | | |
| 4.3 | | Solution implementation will entail overseeing the required refurbishment or Capital works during implementation / construction | % | See Note 4a below | | |
| 4.4 | | Submission of detailed As-built drawings in ACAD Format | km (Provisional) | 150 | | |
| Note 4a | | The % given will have to cater and be all inclusive in respect of all costs and expenses that will be incurred by the Tenderer during the implementation stage, and will be payable proportionally to the value of the work completed. | | | | |
| | | Sub-Total 1 | | | | |
| | | Contingency % | | | | |
| | | Contingency Amount | | | | |
| | | Sub-Total 2 | | | | |
| | | VAT at 15% | | | | |
| | | TOTAL | | | | |