

**SCOPE OF WORK RELATED TO THE ESTABLISHMENT
OF WATER SUPPLY ZONES AND THE AUDITING / REINSTATEMENT OF THE PRV
INSTALLATIONS IN EMFULENI LOCAL MUNICIPALITY**

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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 several areas within ELM.

In order to minimise system pressures and system losses, ELM has installed several PRV installations over the years. Water losses in ELM is currently estimated at approximately 60%. There are a range of historical and current initiatives implemented by ELM aimed at understanding and reducing water losses. However, the level of water losses remains unacceptably high. Inevitably, this translates into water and financial losses and poses a threat to the financial viability of both the municipality, as well as to Rand Water.

The municipality requires extended support in establishing and implementing effective water demand and revenue management strategies and procedures in its area of service due to excessively water loss levels currently experienced.

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 to review PRV installations associated with ELM to address the extremely high levels of water losses experienced.

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3. WATER CONSERVATION AND WATER DEMAND MANAGEMENT (WCWDM)

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

1. Reduced operating cost.
2. Improved capital cost efficiency.
3. Improved metering and billing.
4. Reduced health risks.
5. Increased security of supply.
6. Less infrastructural damages.
7. Reduced hydraulic loads on sewers, sewerage pump stations and wastewater treatment works.
8. Improved consumer satisfaction.
9. Publicity and willingness to pay.
10. 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 and in order to understand the sources of the losses as well as the required actions to reduce losses, it will essentially fall within the following categories:

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

One of the areas to be addressed that will assist to reduce water losses is through pressure reducing valves (PRV's).

3.1. PRESSURE REDUCING VALVES (PRV'S)

ELM has of the order of sixty PRV installations, and it is well documented in reports / spreadsheets, while their locations are also known (Coordinates, Google Earth). Annexure A to this document contains information / reports relevant to ELM PRV installations.

PRV installations only operate as intended if:

- The PRV's serves a discrete supply zone. This should be dictated by the Water Master Plan, while the discreteness of the supply zones must be secured and maintained by O&M personnel.
- PRV's are continuously maintained.
- The PRV's settings are correct.
- All actions taken (O&M, etc) are recorded and available.
- Every PRV meter should have a zone meter installed downstream of it.

- System pressures at a PRV, as well as the flow passing through a PRV must be logged and evaluated at frequent intervals to ensure that the system is operating as intended.

Although the use of PRV's in a water network is a useful tool to achieve a specific objective, there are many other measures that still need to be undertaken to fully address WCWDM, such as reducing household losses, metering, the repair / replacement of old / leaking pipes, dealing with illegal connections, etc.

3.2. REFERENCE DOCUMENTS

Reference documents associated with PRV's installed in ELM are attached as **Annexure A**:

Annexure A-1	ELM PRV Information Spreadsheet
Annexure A-2	PRV Database

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	Audit.	D2 – Baseline Study Report
	Task B2	PRV supply zones.	
	Task B3	Complementary Investigations.	
	Task B4	Diagnostic.	
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 Detailed 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. ◦ Consultant responsible for the ELM Water Master Plan. ◦ Rand Water: Planning and Operations. • Obtain and review of the relevant available information. • 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: Preliminary

Study

Purpose	An evaluation of the current situation
Activities:	The following activities are to be performed during the Baseline Study Phase:
B1	<ul style="list-style-type: none"> • An audit of all the existing ELM PRV's on site to capture all the information related to the PRV installations, including details of: <ul style="list-style-type: none"> ◦ Any associated buildings, structures, chambers. ◦ Any associated electrical supply. ◦ Any associated SCADA, control or monitoring infrastructure. ◦ Any associated pipework, valves, control systems, water meters, sump pumps, etc. ◦ All PRV details, inclusive of the make, model, size, upstream and downstream pressures, current settings, etc. ◦ The audit data should be captured on electronic devices (mobile phones, tablets, etc.), and provided to ELM in digital format, in an agreed upon hard copy format, as well as in GIS files compatible with the GIS used by ELM.
B2	<ul style="list-style-type: none"> • Demarcation of the PRV supply zones: <ul style="list-style-type: none"> ◦ Obtaining the PRV supply zones from the consultant doing the ELM Water Plan. ◦ Assessment of the condition and status of the valves in the field to ensure the discreteness of the water supply zones.
B3	<ul style="list-style-type: none"> • Making an allowance for performing complementary investigations in support of the assessment and proposed design of the various PRV installations: <ul style="list-style-type: none"> ◦ Flow logging over 3 days. ◦ Pressure logging over 3 days.
B4	<ul style="list-style-type: none"> • Diagnostic of all the PRV installations / their supply zones, etc.
Output	D2 – Baseline Study Report.

Component C: Detailed Design Stage

Purpose	Detailed Design of the PRV Installation Requirements and Construction Implementation Supervision
Activities	The following activities are to be performed during the Detailed Design Stage:
C1	<ul style="list-style-type: none"> Detailed Design of the following: <ul style="list-style-type: none"> PRV installation refurbishment requirements of the installations that requires refurbishment works. PRV installation requirements related to new / upgraded PRV installations. The required water meters at PRV installations, upstream of the PRV installation. All the meters to be installed should allow logging of the meters. The chambers required associated with housing the PRV installations. The refurbishment / upgrading / provision of required power supply, SCADA requirements, control systems, etc. Every PRV Installation should have, upstream thereof, the following: <ul style="list-style-type: none"> ✓ A meter installation installed between two isolating valves., with their required chambers. ✓ The water meter must allow logging to take place. ✓ If warranted, a dual PRV installation system to facilitate maintenance / repairs without impacting on service delivery.
C2	<ul style="list-style-type: none"> Approval of Design Report by ELM.
C3	<ul style="list-style-type: none"> The Solution Implementation will require the drafting of a tender document related to the implementation of the design / upgrading requirements stipulated and approved by ELM, such as: <ul style="list-style-type: none"> Specifications. Drawings. Detailed BOQ. Construction Cost Estimate Tender Document. Construction Supervision.
C4	<ul style="list-style-type: none"> A Close out Report that provides data on the logging of each of the completed PRV installation zones to assess the flow through the installation, minimum night flows, etc., over a 7-day logging period.
Outputs	D3 – Detailed Design Report, subject to approval by ELM. D4 – Tender Documentation. D5 – Tender Evaluation Report. D6 – Construction Supervision Documentation.

Component D: Capacity Building Stage

Purpose	To initiate and launch the project.
Activities	The following activities are to be performed during the Capacity Building Stage:
D1	<ul style="list-style-type: none"> Diagnostic of the PRV installations and the associated PRV zones: <ul style="list-style-type: none"> Performing a complete assessment of the Operations and Maintenance associated with the PRV installations, the associated infrastructure and components, as well as the zones served by the various PRV installations.
D2	<ul style="list-style-type: none"> Capacity Building and Support to O&M: <ul style="list-style-type: none"> The Capacity Building Report should stipulate all the requirements in terms of the resources, tools, equipment, O&M tasks and activities, monitoring and reporting requirements associated with the operations and maintenance of each of the PRV installations, etc. Operation and Maintenance Manuals covering all the O&M requirements associated with the PRV installations, as well as the zones being served.
Outputs	D7 – Capacity Building Report. D8 – PRV installation & PRV zone O&M manuals.

5. ADDITIONAL INFORMATION REQUIRED / NOTES

The tenderer must 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.
- Where required, Wayleaves must be obtained.

ANNEXURE A

ANNEXURE B

Note: If multiple sheets must be submitted for a single installation, then it must be undertaken.

ELM PRV INSTALLION DETAILS			
PRV Installation Reference			
PRV Installation Reference No:			
Inspection Date:			
Initials and Surname of person Responsible for Inspection:			
Supply Zone Ref:			
Area:			
Physical Address:			
GPS Coordinates Elevation	South (dd.ddddd°)	East (dd.ddddd°)	Elevation (m amsl)

Control Valve Details:	Main	Bypass	Controller Details	Primary	Secondary
PRV Reference No			PMAC ID:		
Make:			Controller High Setting (m):		
Size (mm)			Controller High Time:		
Static Pressure Upstream (m):			Controller Low Setting (m):		
Static Pressure Downstream (m):			Controller Low Time:		

Photographs / Diagrams / Plans / Sketches	
Locality Map	Installation Position in Reticulation Network
PRV Installation Structure / Chamber	PRV Installation Photographs
PRV Installation Photographs	PRV Installation Photographs
PRV Installation Photographs	PRV Installation Photographs

Comments / Recommendations:

ANNEXURE C

The Tenderer must consult the Tender Documentation and Required Scope of Work to ensure that nothing required to undertake the work is omitted in terms of his proposal and the priced BOQ.

Item	Description	Unit	Quantity	Rate	Amount
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1 General Phase

1.1	Company Overhead Costs	Sum	1		
1.2	Project Management	Months			
1.3	Monthly Project Meetings	Months			
1.4	Tools and Loose Gear	Sum	1		
1.5	Signage and Barracding.	Sum	1		
1.6	Supply and maintain facilities on site (portable toilets, etc)	Months			

2 Inception Phase (Component A)

2.1	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	Site visits and auditing of all ELM PRV installations The Contractor to provide a detailed cost for each PRV installation site under a separate cover letter, indicating for each site (refer to Annexure A for list of all PRV installations) the costs associated with it to submit a report sheet as per Annexure B. The rate to include all costs (labour, plant, material, fuel, tools, etc) to conduct the audit	Sum	1		
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3.2	Obtaining and showing on maps / Google Earth PRV supply Zones. Details of the supply Zones are to be provided by ELM or obtained from the Consultant currently doing the ELM water and Sanitation Master Plan.	Sum	1		
3.3	Checking the integrity / status of all isolating valves associated with securing the integrity of a PRV supply zone.	Sum	1		
3.4	Complementary investigations: This may entail aspects such as logging of flows into PRV Zone, etc. The Tenderer to specify any such work he will do under a cover letter, as well as the details thereof	Sum	1		
3.5	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 (Componnet C)

4.1	Undertaking and presenting the Detailed study associated with each PRV installation. The Tenderer to indicate in a separate Table what is anticipated for each Op0PRV installation, to be added to the Tender submission.	Months			
4.2	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		

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 in equal monthly payments to the Tenderer

during the solution implementation period.

5 Capacity Building Phase

5.1	Identification of Needs, Interviews.	Sum	1		
5.2	Obtain the necessary supporting information	Sum	1		
5.3	Submission of Capacity Building Report and Client approval thereof	Sum	1		
5.4	Supply of detailed documents in support of proposed training and skills transfer initiatives	Sum	1		
5.5	Undertaking Capacity Building of ELM staff	Sum	1		
5.6	Documentary proof of training provided, supplying details related to every trainee's attendance and results achieved, issuing of certificates	Per Person	Rate only		

Sub-Total 1

Contingency %

Contingency Amount

Sub-Total 2

VAT at 15%

TOTAL