



AGRICULTURAL RESEARCH COUNCIL
INSTITUTE FOR AGRICULTURAL ENGINEERING

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CLIENT REPORT

RECOMMENDATIONS AND SPECIFICATIONS ARC LOSKOP EXPERIMENTAL FARM: PUMP STATION

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Prepared for: ARC-VIMP

Loskop Experimental Farm

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Contents

1	Scope of work	3
2	Location of site.....	3
3.	Price breakdown	4
4.	Specification of the pumps and electrical motors	4
4.1.	Main pump system	4
4.2.	Back-up pump system.....	5
4.3.	Pipe work and miscellaneous components.....	5
4.4.	Other recommendations	6
5.	Site cleaning and Safety	6
6.	Standards and dimensions	7
7.	Contingency	7
8.	Warranty.....	7
10.	Tender enquiries.....	7

1 Scope of work

- Specification of a pump system to deliver the required water flow at the required pressure to the sprinkler irrigation system and centre pivot.
- Recommendations regarding the switchgear for the electrical motors driving the pumps.
- Specification of a back-up pump system and recommendations for its electrical switchgear.
- Repairs on the leaking suction pipes.

2 Location of site

- ARC -VIMP Loskop experimental farm
- $-25.179111^{\circ} 29.387798^{\circ}$



Figure 1: Location of the pumphouse at ARC – Loskop experimental farm

3. Price breakdown

The ARC has a limited budget and thus the tenderer must give a price breakdown as the example shown in Table 1. The ARC has the right to choose only certain aspects of the quotation as set out in Table 1.

Table 1: Example of price breakdown

Item number	Description	Quoted price (VAT excluded)
1.	Plastic tunnel, complete shade netting and water tap	R
2.	Bins (Quantity 5)	R
3.	Trenches (Quantity 6)	R
4.	Contingency	R10 000
	Grand total (Vat excluded)	R

4. Specification of the pumps and electrical motors

Supply, installation and commissioning of:

4.1. Main pump system

- The required pressure is around 47.8m.
- Pumps:
 - Pump 1: KSB Etanorm 80-200, Impeller diameter = 196mm (or a similar pump from other manufacturer) with best efficiency duty point of 105m³/h @ 47.7m. (at 45m pressure – flow rate is 115m³/h) at 2936rpm.
- Electrical motors:
 - For pump 1: 30kW, 2-pole electrical motor, 400V, IE1, 50Hz.
- Coupling of each pump to the corresponding motor:
 - Relevant Fenner Couplings.
 - Relevant Fenner Tyres.
 - Required Taper lock bushes.
 - Base frames for each pump – electrical motor combination.
 - Installation, commissioning and alignment of the pump – electrical motor combination.
- Electrical motor switchgear:

- It is recommended that a suitable VSD is used in this pumpstation.

4.2. Back-up pump system

- The required pressure is around 47.8m.
- Pumps:
 - Pump 2: KSB Etanorm 65-200, Impeller diameter = 194mm (or a similar pump from other manufacturer) with best efficiency duty point of 71.3m³/h @ 47.8m. (at 45m pressure – flow rate is 77.6m³/h) at 2936 rpm.
- Electrical motors:
 - For pump 2: 22kW, 2-pole electrical motor, 400V, 50Hz, IE1.
- Coupling of each pump to the corresponding motor:
 - Relevant Fenner Couplings.
 - Relevant Fenner Tyres.
 - Required Taper lock bushes.
 - Base frames for each pump – electrical motor combination.
 - Installation, commissioning and alignment of the pump – electrical motor combination.
- Electrical motor switchgear:
 - It is recommended that Star-Delta switchgear is used in the back-up pump system.

4.3. Pipe work and miscellaneous components

- Main pump system: The 2 pumps should be connected in parallel and be operatable separately and/or together. Therefore, valves should be installed to isolate the pumps individually from each other as well as from the total system (suction side as well as delivery side)
- Valves: Butterfly valves of similar diameter as the pipe respective diameters should be used.
- Pressure gauges: Glycerine filled pressure gauges should be installed downstream of every pump.

4.4. Other recommendations

- The existing pumphouse building should be used.
- Suitable provision should be made for drainage of water from the floor of the pumphouse.
- All the pumps should be connected to the existing suction pipe from the reservoir, as well as to the existing main pipeline.
- Installation of the new infrastructure should be performed in such a way that current irrigation operations are not interrupted in a way detrimental to the crops.

5. Site cleaning and Safety

- The contractor will be responsible for safekeeping of all building material and tools until official site handover.
- The contractor is liable for the safety of his workers and work conditions according to the OHS act.
- Remove all construction rubble and clean the site after completion of work before the final payment will be considered.

6. Standards and dimensions

- The installation of the pumps, electrical motors, switchgear and other components should be done according to the SABI Design Norms as well as the SABI Code of practice.
- All building work must comply with the National Building Regulations & Building Standards Act SANS 0400 1990 (or latest). Local Council requirements & all relevant specifications and codes are to be adhered to.
- Indicated dimensions must be taken in preference to scaling. Overall dimensions (external) to take precedence.
- All dimensions, levels and heights to be checked on site and any discrepancies to be reported to the ARC before any work takes place.
- All dimensions on drawings and documents to be checked before commencing of any work and/or compiling of tenders.

7. Contingency

- An amount of R10 000 must be added to the total cost of the quotation for contingency.
- The contingency amount must be clearly stated in the price breakdown.
- The ARC must approve in writing any expenditure of this contingency budget.
- The ARC has the right not to spend this contingency.

8. Warranty

- The Pump station facility must carry a warranty of 3 years from date of final commissioning.

9. Training

- Training on the operation, maintenance and fault finding should be provided to the relevant farm personnel.

10. Tender enquiries:

- All technical enquiries are to be directed to:

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