

CO/DND/WTS/0454165
27th February, 2025

John Makau

Dear Sir/Madam,

PROPOSAL FOR SUPPLY AND INSTALLATION OF WATER TREATMENT PLANT

Following the inquiry regarding the above, Davis and Shirtliff wish to present a proposal, terms, and conditions for a solution to treat the client's borehole water for domestic drinking and use in the laboratory.

1 CUSTOMER REQUIREMENTS

Based on the requirement Davis and Shirtliff have provided a water treatment system that can treat **250 litres/hr** for domestic use.

1.1 SITE CONDITIONS

The water analysis report from Davis & Shirtliff Laboratory (Lab Sample ID: **10/24/RO/2376**, dated 10th October, 2024) indicates that all tested parameters were within acceptable limits.

Parameter	Unit	Results	WHO Standards
pH		6.13	6.5-8.5
Total Suspended Solids	Mg/l	15	NIL
Turbidity	Mg/l	5.1	<5
Manganese	Mg/L	0.73	<0.1
Total Hardness	Mg/l	403	<300
Bicarbonates	Mg/l	321	<255

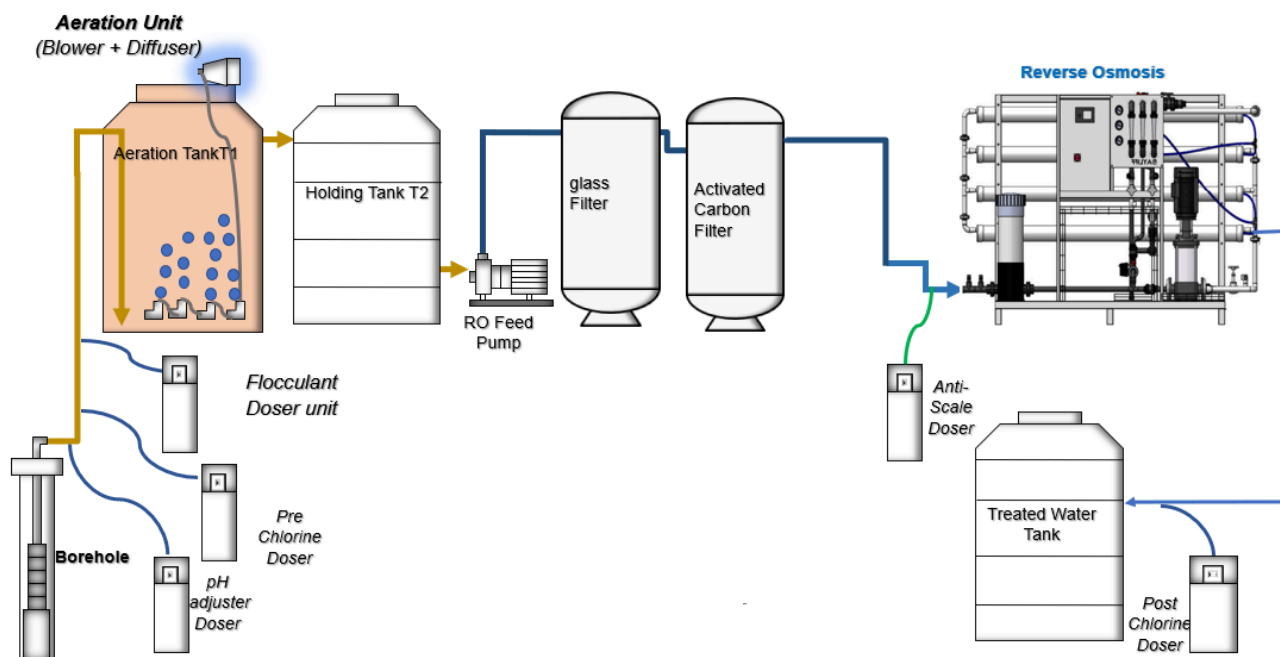
2 PROPOSED SOLUTION

Davis & Shirtliff proposes a treatment plant designed to provide a net flow rate of **0.25 m³/hr** as requested by the client.

Below are the unit treatment processes involved.

- **Chlorination and oxidation**
- **Filtration** - Removal of suspended matter, turbidity, and colour
- **Reverse Osmosis** - Removal of Dissolved salts
- **Post disinfection**- Chlorination

Proposed Treatment Layout



Proposed Treatment Process

- The incoming water from the borehole shall be dosed with ph plus to adjust the pH to the acceptable levels and chlorine to oxidize and precipitate any dissolved iron and manganese as it goes into an aeration tank (**Client's Scope**).
- In the aeration tank, dissolved iron and manganese are further oxidized through the injection of air into the water through the air distribution system.
- From the aeration tank, the water overflows into a clarifier tank (**Client's Scope**) to allow sedimentation of any suspended particle in the water including the precipitated iron and manganese.
- The water will then be filtered through **PXD Media filter** charged with glass to remove the suspended particles and reduce the turbidity to the acceptable before it goes through the **Activated Carbon filter** to remove any residual chlorine that may damage the RO membranes.
- To prevent scaling of the RO membranes, it will be important to dose an antiscalant into the water before the water goes into the RO. Genesys antiscalant will, therefore, be continuously added to the system before the RO.
- The treated water will be dosed with a chlorine for disinfection before storage (**Client's scope**).

3 EQUIPMENT

For the above scope, the treatment system will include the supply of the following treatment stages.

- a. **Dayliff Filters** – **Dayliff PXD Industrial media filters** are specifically designed for filtration applications where higher levels of operating pressure and reliability are demanded. The filter will be charged with glass media of different grades for sediment removal.



b. Airmac DBMX single-phase air

The [Airmac DBMX Single-phase air blower](#) shall be used to pump air from the atmosphere and through the pipes, diffuser, and into the water for aeration.

Equipped with built-in protection devices, safety switches, and thermostats, to protect pumps from any unpredictable diaphragm breaks.



c. Disc Diffusers

The disc diffuser bubbles air into the water. They have multiple air-release orifices resulting in improved oxygen transfer efficiency

d. Reverse Osmosis Unit – [Reverse Osmosis \(DRO4\)](#) is a process in which purified water (permeate) is produced from the feed water via the rejection of all organic and inorganic constituents by a semi-permeable membrane system. The RO system separates the incoming feed stream into two effluent streams:

The permeate (treated water) passes through Reverse Osmosis membranes and thus contains greatly reduced quantities of dissolved mineral salts and organics for use (typically $\geq 96\%$ rejection ratio). A ratio of permeate to feed water gives the system recovery. The designed recovery of the RO machine is estimated at 45- 50% depending on raw water feed parameters.

The concentrate (reject water) is the stream that passes tangentially across the membrane surface and thus retains the impurities separated from the permeate stream. A certain minimum flow of 'concentrate' is necessary to keep the RO membranes from 'fouling' due to the removed mineral salts and organic contents.



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What is NEW?

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- ✓ BRANCHES AND STOCKISTS FINDER
- ✓ INTEGRATION TO IDAYLIFE, POOL TOOL and DAYLIPA HABA
- ✓ EXTRANET

4 INSTALLATION


Davis & Shirliff Ltd Scope

The Client Scope

- Fabrication and assembly of equipment.
- The positioning of the plant and components as specified in a plant room (prepared by the client).
- Electrical connections of the plant to a PowerPoint within the plant room area.
- Testing and commissioning of the plant.
- Training of the plant operators both at the site and at the supplier's workshops.
- Provide a well-ventilated plant room to accommodate all the equipment to be installed for protection against weather adverse conditions.
- Provide a power supply to the plant room.
- Provide three tanks for aeration, clarifier & clean water tank
- Plumbing from the raw water tank to the plant room. The raw water tank should preferably be close to the plant room (approximately **5m** max).
- Provision of a backwash water and wash-out drainage and disposal.
- To make available an operator for the equipment. The operator will be required to carry out regular plant monitoring and maintenance duties, including refilling chemical tanks with the correct weights of chemical cleaning out storage tanks if required, backwashing filters, simple water quality tests, and basic troubleshooting.

5 PRICING

DESCRIPTION	QTY	RATE	TOTAL
SUPPLY & INSTALLATION OF A WATER TREATMENT PLANT -250 LIT/HR	1	1,532,550	1,532,550
SUB-TOTAL			1,532,550
VAT (16%)			245,208
TOTAL PRICE INCLUDING VAT			1,777,758
CURRENCY			KES

KES BANK ACCOUNT DETAILS	USD BANK ACCOUNT DETAILS	
Account Name: Davis & Shirtliff Ltd	Account Name: Davis & Shirtliff Ltd	 Paybill No. 600900 Acc No. XXXXXXXXX
Bank Name: Standard Chartered	Bank Name: NCBA Bank Kenya	
Bank Branch: Chiromo	Bank Branch: Upperhill	For More Payment Options CLICK HERE
Currency: KES	Currency: USD	
Account No. 0104033637700	Account No. 6621600042	
Bank Code: 02084	Bank Code: 07000	
Swift Code: SCBLKENXXXX	Swift Code: CBAFKENXXXX	

THIS IS NOT A TAX INVOICE. TAX INVOICE WILL BE ISSUED ONCE THE GOODS ARE SUPPLIED.



6 i-DAYLIFF REMOTE MONITORING



i-DAYLIFF is a high specification internet-based communication system for remote monitoring and control of all Dayliff and other Davis & Shirliff-supplied equipment and installations. It provides users with various information regarding the systems' operation and can also enable remote control options. i-DAYLIFF has now been upgraded to use the latest IoT (Internet of Things) infrastructure that gives improved reliability, speed, and accuracy of information and is scalable, flexible, robust, and customer-centric.

7 CONDITION

Please note the following:

- a. **Offer Price:** Prices quoted are in Kenya Shillings and are inclusive of VAT. Where further site assessment is required to verify the details, a conclusive quotation will have to be provided and confirmed by the client before the commencement of work.
- b. **Delivery and Offloading:** The proposed plant will be delivered using a crane truck. The process involves moving the truck across a lawn or loose ground, there could be damage caused to the ground owing to the weight of the truck. It will be the responsibility of others to make good any such damage.
- c. **Drilling and Welding:** The nature of the work may further involve drilling on walls to mount the changeover panel. This may require the D&S team to access the client's main supply.
- d. **System Design:** The water treatment system is designed to perform optimally based on best design practices and computer simulations performed on the results of a water analysis report which has been provided. While in most cases, the equipment performance matches the output

of the design and simulations, the Purchaser accepts that environmental factors may result in water quality change leading to a difference between the actual plant output and that predicted during design. Long-term performance can therefore only be accurately determined during plant operation on the ground. Predicted water quality results before installation can only be used as an indicator of expected plant performance and the Seller, therefore, reserves the right to recommend further design changes and additional works as necessary if the water quality changes after installation or is discovered to be different during installation, cost of which shall be borne by the Purchaser.

- e. **Consumables**- Cartridges/bag filters, membranes, and required chemicals are consumables and shall require periodic replacement and replenishment depending on water quality.
- f. **Permeate Output**: The consistency of this output is based on proper operation, maintenance, and keeping of logs of the plant, and consistency in the quality of the incoming (feed) water. Should the incoming water degrade further, the output of the plant may decline, and a new design would be needed whose costs would be shared with the Purchaser.

8 DELIVERY

Please allow for **3-4** weeks for fabrication and assembly. The delivery period above is subject to **prior sale** and **the stock availability of components**.

9 TAXES

The above notwithstanding, please note that should the statutory tax rates (e.g. VAT/ Import duty) change from the current rate at the time of order confirmation, receipt of goods, or invoicing, the supplier reserves the right to adjust the prices by the new ruling rate at that time.

10 PAYMENT

Davis & Shirtliff proposes a 100% payment on the order confirmation. However, the supplier is open to discussions to reach mutually agreeable terms.

Note; Customer financing options are also available upon request.

11 WARRANTY

The equipment offered is covered by the manufacturer's standard terms of warranty. Please see our attached standard [Terms of Warranty](#) document for more details.

12 FORCE MAJEURE

This proposal is for all intents and purposes executable subject to "*Force Majeure*" events which cannot reasonably be avoided by the supplier's diligent observation under circumstances, which are beyond reasonable control and which make the performance of the supplier's responsibilities stated herein impossible or so impractical as reasonably to be considered impossible in the circumstances. Such events include but are not limited to viral epidemics, war, riots, civil disorder, earthquake, storm, flood or adverse weather conditions, strikes, lockouts or other industrial action, terrorist acts, acts of piracy, confiscation, or any other action by government agencies.



Yours sincerely,
for **Davis & Shirtliff Ltd.**

Christine Ombui
Engineer Group WT