

BOREHOLE DRILLING PROGRESS REPORT



Submitted By: Villages in Partnership

Donor: Rotary Club of Downers Grove

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1. Introduction

This Borehole Progress Drilling Report presents a comprehensive update of the borehole drilling project underway in Traditional Authority Nkagula, Zomba District. The project is funded by the Rotary Club of Downers Grove and implemented by Villages in Partnership (VIP).

The report covers geophysical surveys, borehole drilling, test pumping and civil works (headworks) construction. It specifically provides detailed progress on civil works for all five successful wells: Maliwata, Mwala, Manduwasa, Makuluni and Nsenda villages.

The objective is to provide safe and sustainable groundwater for domestic and community use in line with Government of Malawi (GoM) Ministry of Water and Sanitation standards.

2. Background and Site Selection

Initial drilling at Maulana (dry hole) and Makuluni (low yield) required replacement and redrill sites. Geophysical surveys using Vertical Electrical Sounding (VES) were conducted on 2nd August 2026 using a Geotron Resistivity Meter (Model G41) in Schlumberger configuration.

- **Nsenda Village:** Selected as a replacement for Maulana Village after dry hole. VES indicated promising weathered-fractured basement aquifer potential with U-shaped curves, moderate overburden and deep saprock fracture zones.
- **Makuluni Village:** Redrill within same community after first site yielded insufficient water. Low resistivity (10-21 $\Omega \cdot m$) indicated thick Quaternary clay/alluvium over saturated saprolite near Lake Chilwa margin. Mud Rotary recommended.
- **Maliwata, Mwala and Manduwasa Villages:** Identified earlier in the programme as successful sites from previous drilling phases and now included for completion of headworks.

3. Geophysical Survey Results

Two retained sites surveyed:

Village / Site	Drill Point	Coordinates (Lat/Long)	Elevation (m) / Date
Makuluni	DP1	-15.3569133, 35.50008833	649.32 m – 02/08/2026
Nsenda	DP1	-15.3572095, 35.46889034	703.15 m – 02/08/2026

- **Makuluni Village:** Drilling Recommendation targeted depth at 45 m, using Mud Rotary due to collapse-prone overburden with expected 1st strike at 13-20 m, 2nd strike 30-35 m and main supply zone 40-45 m.

- **Nsenda Village:** Drilling Recommendation targeted depth at 50 m, using Air Rotary with expected 1st strike at 16-25 m, 2nd strike 30-35 m and main supply zone 40-50m.

4. Drilling Results and Construction

Overall programme had 7 sites drilled with 5 successful wet boreholes, 1 dry (Maulana) and 1 low yield (initial Makuluni). Total wet meters drilled were 313.0 m with success rate for final targeted sites at 100% (5 of 5).

Village	Depth (m)	Method	SWL (m)	Yield (LPS)	Status
Maliwata	45	Air/Mud Rotary	4.5	0.45*	Successful
Mwala	42	Air Rotary	5.1	0.38*	Successful
Manduwasa	44	Air Rotary	4.2	0.52*	Successful
Makuluni (Redrill)	43	Mud Rotary	3.74	0.81	Successful
Nsenda (Replacement)	47	Air Rotary	5.64	0.30	Successful

**Yields for Maliwata, Mwala, Manduwasa based on test pumping from earlier phase reports. All exceed GoM minimum 0.25 LPS for Afridev hand pump.*

4.1. Summary Comparison of Drilled Boreholes

Parameter	Nsenda	Makuluni	Comment
Date Completed	22/08/2026	22/08/2026	
Borehole Depth	47.0 m	43.0 m	Within target range
Gravel Pack	0.98 m ³	0.98 m ³	
Static Water Level	5.64 m	3.74 m	Shallow – good recharge
Dynamic Water Level	28.90 m	6.74 m	Low drawdown at Makuluni
Drawdown	23.26 m	3.00 m	Excellent recovery at Makuluni
Yield	0.30 LPS	0.81 LPS	Both > 0.25 LPS minimum
Test Duration	4 hours	4 hours	



Pictorial presentation: Left-Community members praying before commencing drilling of a borehole on the second site of drilling in Makuluni Village and Right-Borehole development in progress in Makuluni Village after a successful drilling

5. Progress on Civil Works for all 5 Successful Boreholes

Following successful drilling and test pumping, civil works (headworks) construction was carried out on all five successful boreholes: Maliwata, Mwala, Manduwasa, Makuluni and Nsenda. Works were completed in accordance with the Government of Malawi Technical Manual for Water Wells and Groundwater Monitoring Systems (MoAIWD, 2nd Edition, Feb 2019) – Chapter 4.2 Civil Works (Headworks) Construction for Afridev Handpump.



Pictorial presentation: Left- Civil works progress in Nsenda village and Right-Completed borehole in Maliwata Village.

5.1. Type of Civil Works Installed

Civil works for the water points were constructed in full compliance with Government of Malawi (GoM) standards for Afridev Hand Pump installations. All

headworks components were constructed to ensure durability, hygiene, ease of operation, and inclusive access.

The following civil works were installed at each site:

a) Afridev Hand Pump Assembly

A standard GoM-approved Village Level Operation and Maintenance (VLOM) Afridev hand pump was installed. The assembly consists of a stainless steel / hot-dip galvanized pump head complete with handle, fulcrum, and discharge spout. The pump was centrally aligned over the apron to ensure all spillage is contained within the slab area. The installation allows for easy removal and maintenance by community-based mechanics using standard VLOM tools.

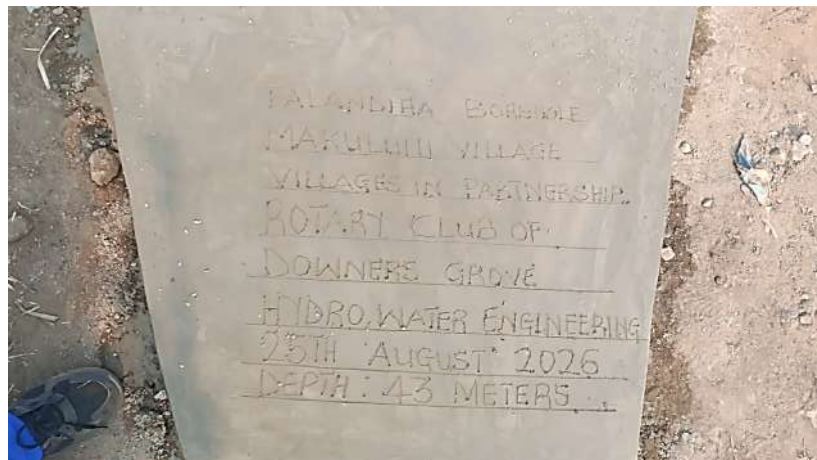
b) Reinforced Concrete Pedestal

A reinforced concrete pedestal was constructed to support and secure the pump head. The pedestal was formed around the 113 mm uPVC rising main casing, with the pedestal legs set in cement grout and fully submerged in the base concrete to provide stability. The pedestal was structurally keyed into the apron foundation to prevent lateral movement, rotation, or uplift during pumping.

c) Concrete Apron Slab

A reinforced concrete apron slab of approximately 2.5 m x 2.5 m diameter was constructed with a thickness of between 75mm and 100mm based on the location. The concrete mix ratio used was 1:2:4 (cement: sand: gravel) as specified for water-retaining

structures. The slab was reinforced with mesh and provided with raised edges of 50 - 75 mm to contain splash water and spillage. The surface was finished with a wood float and laid to a fall of 1:50 to 2% towards the central drainage channel to facilitate rapid drainage and prevent ponding.



d) U-Shaped Drainage Channel and Spout Channel

A central U-shaped drainage channel was cast integrally with the apron slab. The channel collects spillage from the pump spout and wash water from the laundry wings and conveys it to the extended drain. The pump spout was precisely aligned to the centerline of the apron and directly over this channel.

e) Extended Drain / Wastewater Channel

A 3.0 m long concrete-lined wastewater channel was constructed to convey water away from the apron foundation to the soakaway pit. The channel was constructed on a compacted foundation of hard-core stones / broken bricks and finished in concrete to prevent scouring and undercutting of the headworks edges. The gradient was set to ensure positive flow away from the apron under all conditions.

f) Soakaway Pit

A soakaway pit was constructed at the terminus of the extended drain, located to suit the natural drainage of the site. The pit was filled with large stones at the bottom and smaller gravel on top to facilitate infiltration and prevent clogging. The top was protected with a heap of excavated earth to prevent ingress of surface runoff while allowing soakage of wastewater from the apron.

g) Wash Area / Laundry Platform (Triangular Wings)

Triangular wing platforms were constructed on the left and right sides of the apron, as shown in the site photographs. These wings provide space for placing jerrycans during filling and for laundry and other domestic uses. The wings were sloped inward towards the central U-channel to ensure all wastewater is collected and drained away.

h) Accessibility Ramp with Anti-Slip Grooves

An inclusive access ramp, 1.0 m wide with a gentle gradient, was provided at the front of the apron in compliance with inclusive WASH guidance. The ramp surface was provided with transverse anti-slip grooves, as visible in the photographs, to provide safe access for wheelchair users, elderly users, and users with carts and bicycles.

i) Sanitary Seal and Curing

For the pedestal foundation, an excavation 20 cm deep by 70 cm diameter was made around the borehole casing. A base concrete of mix ratio 1:2:6 was placed to provide a sanitary seal and stable foundation. Upon completion of all concrete works, the entire structure was cured for 7 days by continuous flooding with water before the final pump installation, in accordance with the standard installation manual, to achieve full strength and durability.

5.2. Status per Village

Village	Apron Completed	Afridev Installed	Drain + Soakaway	Remarks
Maliwata	Yes	Yes	Yes	Water quality testing and training of WPCs remaining
Mwala	Yes	Yes	Yes	Water quality testing and training of WPCs remaining

Manduwasa	Yes	Yes	Yes	Water quality testing and training of WPCs remaining
Makuluni (Redrill)	Yes	Yes	Yes	Water quality testing and training of WPCs remaining
Nsenda (Replacement)	Yes	Yes	Yes	Water quality testing and training of WPCs remaining

Conclusions and Next steps

The drilling programme in TA Nkagula successfully delivered five productive boreholes out of seven attempts. The final five include Maliwata, Mwala, Manduwasa, Makuluni and Nsenda. All boreholes exceed the GoM minimum yield of 0.25 LPS for Afridev hand pumps.

Civil works for all five boreholes have been completed to Government of Malawi standard specification.

Next steps

The following are remaining to be done:

- To conduct water quality testing (physico-chemical and bacteriological) per Malawi Bureau of Standards before full community handover.
- To train Water Point Committees for the 5 borehole wells
- Elect a project visibility signage targeting all drilled boreholes.
- Handover of the boreholes to the community

End