Utility Regulatory Authority
Male',
Republic of Maldives

ތިމާވެއްޓެ ގަވާއިދުތަކާއި ބެހޭ ބޯޑު
މާލެ،
ދިވެހިރާއްޖެ

Technical Specification & Guidelines: Borehole Drilling

URA 4004:2021

1. Scope

This consists of drilling boreholes and installation of electric pumps for source water extraction for various water supply development projects including reverse osmosis desalination. The work includes drilling boreholes, installation of casings and screens; provision of gravel packing; development of the boreholes; test pumping, water samples; water quality analysis; installation of pumps

2. Drilling Site

Boreholes shall be drilled at the location(s) designated by the client in consultation with Environmental Consultant and Utility Regulatory Authority (URA).

3. Environmental Protection of the Site

Care must be taken in handling and storage of all drilling fluids, oils, greases and fuel on site, to avoid any environmental pollution, damage and degradation. Any toxic materials, drilling fluids and other additives, cuttings and discharged water shall be disposed in a manner that do not cause damage to the environment, public and private property.

4. Equipment and Materials

All machinery, equipment and materials to carry out the drilling work shall be handled, transported and stored in accordance with the manufacturers' recommendations to minimize damage to environment.

5. Drilling Fluids

The volume of drilling fluids, drilling fluid additives, and lubricants used during drilling of a borehole should be recorded

6. Supervision Work

The execution of drilling work shall be supervised by a qualified engineer experienced with drilling work

7. Depth of Borehole

The in-land borehole depth shall not be less than 30m. Continue drilling up to 30m even if the electrical conductivity of discharge water has reached 50-60mS/cm before reaching 30m depth. If

electrical conductivity of discharge water at 30 m depth is measured less than 50-60mS/cm, continue drilling until electrical conductivity reaches to 50-60mS/cm

8. Drilling Method

May use any rotary drilling technique that the client feels applicable to achieve the required depth and diameter, provided that the techniques used are specified in the environmental impact assessment report approved by Environmental Protection Agency (EPA).

9. Borehole Design

The final design of the borehole shall confirm that pumped raw water does not interact with fresh groundwater aquifer zone. For monitoring purpose, boreholes drilled shall provide water sampling tubes at the interval of 5m from top to bottom.

10. Yield Estimates During Drilling

Yield estimates shall be made during the course of drilling applying an appropriate method agreed to make sure that drilled borehole will provide required volume of raw-water.

11. Pumping Test

Pumping test shall be performed to establish the performance and yield of the borehole using a suitable, self-contained, mobile test pumping unit. The method for varying the discharge rate of the pumps will depend on the type of pump used, but the Contractor shall ensure the provision of a suitable means of achieving the range of constant flow rates specified by the Supervisor.

12. Electrical Conductivity /Salinity

Electrical conductivity or salinity of discharge water during the process of drilling and test pumping shall be conducted and recorded.

13. Records and Reporting

During the process of borehole drilling daily activity records as follows shall be recorded and maintained which must be provided to URA upon completion of borehole drilling.

a. Name of the Island
b. Date of drilling
c. Reference number of boreholes
d. GPS co-ordinates of borehole (latitude / longitude)
e. Method of drilling
f. Diameter of borehole and depth
g. Description of strata drilled
h. Vertical water quality profile at 5 m intervals (E.Conductvity/Salinity)
i. Depth at which seawater is reached
j. Records of components and quantities used or added to the drilling fluid or air.
k. Water level at the start of each working day
l. Problems encountered during drilling
m. Details of installations in the borehole (if any)
n. Depth, size and description of well casing
o. Depth, size and description of well screens
p. Aquifer depth after completion of well
q. Borehole design and installation details (as built drawings)

15. Water Sampling and Quality Testing

Water samples shall be collected for testing the physico-chemical and bacteriological quality after completion of borehole. For this purpose, water samples shall be collected in standard sampling bottles including sterilized bottles for bacterial tests. Samples shall be tested at a certified laboratory, and the test results shall be part of the borehole completion report which shall be made available to URA upon request.

16. Parameters to be Tested

Upon completion of the borehole pumped water shall be tested at a certified laboratory for pH, E.Conductivity (µS/cm), TDS (mg/l), Chloride (mg/l), Calcium Hardness (mg/l), Magnesium Hardness (mg/l), Boron (mg/l), Phosphate (mg/l), Sulphate (mg/l), Iron (mg/l), Fluoride (mg/l), Ammonia (mg/l) and Lead (mg/l).

17. Code of Conduct

Drilling work should be conducted in an environmentally and socially sensitive and responsible manner making sure that all workers are aware of the potential impacts of their activities.