Understanding Soil Resistivity Testing: Methods, Procedure, and Cost

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Introduction:

Soil resistivity testing is a crucial component in various engineering and environmental studies, helping assess the electrical properties of soil. This article will delve into the different methods employed, the procedural aspects, and the associated costs. Whether you are a professional in geotechnical engineering or someone seeking insights into soil resistivity testing, this comprehensive guide aims to provide a thorough understanding.

I. Ground Resistivity Testing: An Overview

Ground resistivity testing is the process of measuring the resistance of the soil to the flow of electrical current. This parameter is crucial in multiple fields, such as the design of grounding systems, corrosion protection, and assessing the suitability of soil for construction.

II. Significance of Soil Resistivity Testing in Groundwater NOC

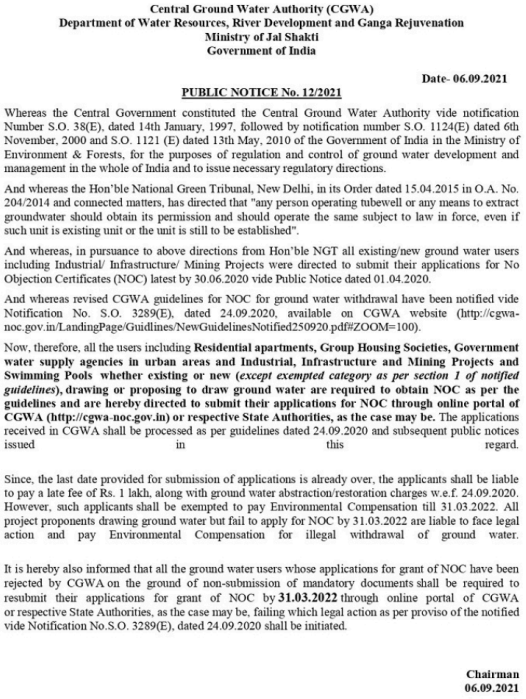
Groundwater NOC (No Objection Certificate) is often required for activities involving groundwater, and soil resistivity testing plays a pivotal role in this process. The

assessment helps determine the potential impact of a project on groundwater resources and ensures compliance with environmental regulations.

(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)
NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION

Project Name:	
Project Address:	
Village:	
District:	**SAMPLE CERTIFICATE FOR NOC FROM CGWA**
Pin Code:	
Communication Address:	
Address of CGWB Regional Office :	

1. **NOC No.:**												
2. Application No.:							3. Category: (GWRE 2020)					
4. Project Status:							5. NOC Type:		New			
6. **Valid from:**							7. **Valid up to:**					
8. Ground Water Abstraction Permitted:												
Fresh Water		Saline Water		Dewatering			Total					
m³/day	m³/year	m³/day	m³/year	m³/day	m³/year		m³/day	m³/year				
9. Details of ground water abstraction /Dewatering structures												
Total Existing No.:3							**Total Proposed No.:0**					
	DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu
Abstraction Structure*	0	0	3	0	0	0	0	0	0	0	0	0
*DW- Dug Well; DCB-Dug-cum-Bore Well; BW-Bore Well; TW-Tube Well; MP-Mine Pit;MPu-Mine Pumps												
10. Ground Water Abstraction/Restoration Charges paid (Rs.):												



Central Ground Water Authority (CGWA)
Department of Water Resources, River Development and Ganga Rejuvenation
Ministry of Jal Shakti
Government of India

Date- 06.09.2021

PUBLIC NOTICE No. 12/2021

Whereas the Central Government constituted the Central Ground Water Authority vide notification Number S.O. 38(E), dated 14th January, 1997, followed by notification number S.O. 1124(E) dated 6th November, 2000 and S.O. 1121 (E) dated 13th May, 2010 of the Government of India in the Ministry of Environment & Forests, for the purposes of regulation and control of ground water development and management in the whole of India and to issue necessary regulatory directions.

And whereas the Hon'ble National Green Tribunal, New Delhi, in its Order dated 15.04.2015 in O.A. No. 204/2014 and connected matters, has directed that "any person operating tubewell or any means to extract groundwater should obtain its permission and should operate the same subject to law in force, even if such unit is existing unit or the unit is still to be established".

And whereas, in pursuance to above directions from Hon'ble NGT all existing/new ground water users including Industrial/ Infrastructure/ Mining Projects were directed to submit their applications for No Objection Certificates (NOC) latest by 30.06.2020 vide Public Notice dated 01.04.2020.

And whereas revised CGWA guidelines for NOC for ground water withdrawal have been notified vide Notification No. S.O. 3289(E), dated 24.09.2020, available on CGWA website (http://cgwa-noc.gov.in/LandingPage/Guidlines/NewGuidelinesNotified250920.pdf#ZOOM=100).

Now, therefore, all the users including **Residential apartments, Group Housing Societies, Government water supply agencies in urban areas and Industrial, Infrastructure and Mining Projects and Swimming Pools whether existing or new (*except exempted category as per section 1 of notified guidelines*), drawing or proposing to draw ground water are required to obtain NOC as per the guidelines and are hereby directed to submit their applications for NOC through online portal of CGWA (http://cgwa-noc.gov.in) or respective State Authorities, as the case may be.** The applications received in CGWA shall be processed as per guidelines dated 24.09.2020 and subsequent public notices issued in this regard.

Since, the last date provided for submission of applications is already over, the applicants shall be liable to pay a late fee of Rs. 1 lakh, along with ground water abstraction/restoration charges w.e.f. 24.09.2020. However, such applicants shall be exempted to pay Environmental Compensation till 31.03.2022. All project proponents drawing ground water but fail to apply for NOC by 31.03.2022 are liable to face legal action and pay Environmental Compensation for illegal withdrawal of ground water.

It is hereby also informed that all the ground water users whose applications for grant of NOC have been rejected by CGWA on the ground of non-submission of mandatory documents shall be required to resubmit their applications for grant of NOC by **31.03.2022** through online portal of CGWA or respective State Authorities, as the case may be, failing which legal action as per proviso of the notified vide Notification No.S.O. 3289(E), dated 24.09.2020 shall be initiated.

Chairman
06.09.2021

III. Soil Resistance Test Methods: Wenner Method

Wenner Method is a widely used technique for soil resistivity testing. This method involves placing four equally spaced electrodes in the ground, forming a square or rectangle. The distance between these electrodes and the depth of insertion are crucial parameters in the accurate measurement of soil resistivity.

IV. Earth Resistivity Test Method: Exploring Variations

Apart from the Wenner method, several other *earth resistivity test methods* exist, each catering to specific scenarios. Some of these include the Schlumberger method, the dipole-dipole method, and the pole-dipole method. The choice of method depends on factors such as the project requirements, the type of soil, and the depth of investigation needed.

V. Soil Electrical Resistivity Test: The Procedure Unveiled

Soil electrical resistivity testing involves a systematic approach. The procedure includes site preparation, electrode placement, current injection, voltage measurement, and subsequent data analysis. The collected data helps in creating a resistivity profile of the soil, offering valuable insights for various applications.

VI. Evaluating the Cost of Soil Resistivity Testing

The *cost of soil resistivity testing* varies based on factors like the chosen method, the size of the area to be tested, and the depth of investigation required. It is essential to consider these factors when planning a project budget. Consulting with experts can provide a more accurate estimate tailored to specific needs.

Conclusion: Unlocking the Potential of Soil Resistivity Testing

In conclusion, soil resistivity testing is a vital component in various industries, ensuring the efficient design and implementation of projects while meeting regulatory requirements. Understanding the methods, procedures, and associated costs empowers professionals and stakeholders to make informed decisions, fostering sustainable development.

How Bhoojal Survey & Recharging Can Help You with Soil Resistivity Test Services In India:

If you are seeking reliable and professional soil resistivity testing services in India, Bhoojal Survey & Recharging is your go-to partner. With a team of experts and state-of-the-art equipment, we offer comprehensive solutions tailored to your specific needs. Contact us for accurate soil resistivity assessments that align with industry standards and regulatory requirements.

FAQs: Frequently Asked Questions

Q1: What is the validity of a groundwater NOC?

The validity of a No Objection Certificate issued by the Central Ground Water Authority (CGWA) varies based on the specific project and conditions. It is crucial to check the expiration date mentioned on the NOC and initiate the revalidation process if needed.

Q2: How often should soil resistivity testing be conducted?

The frequency of soil resistivity testing depends on the nature of the project and any changes in the surrounding environment. Generally, periodic testing is recommended, especially when there are alterations in the land or potential sources of contamination.

Q3: What is soil resistivity testing?

Soil resistivity testing is a geotechnical procedure to measure a soil's resistance to the flow of electrical current. It assesses the soil's electrical properties, providing valuable data for diverse applications, including construction, grounding systems, and environmental impact assessments.

Q4: What are the Methods of measuring soil resistivity?

Various methods are employed, such as the Wenner method, Schlumberger method, dipole-dipole method, and pole-dipole method. The Wenner method, for instance, involves four electrodes placed in the ground to create a square or rectangle, facilitating accurate soil resistivity measurements.

Q5: What is the Method statement for soil resistivity test?

The method statement for a soil resistivity test outlines a systematic procedure. It includes site preparation, proper placement of electrodes, controlled current injection, precise voltage measurement, and comprehensive data analysis. Following these steps ensures accurate results for engineering and environmental assessments.

Q6: What causes soil resistivity?

Soil resistivity is influenced by several factors, including moisture content, mineral composition, temperature, and the presence of contaminants. High moisture and certain minerals enhance conductivity, while dry or contaminated soil can increase resistivity. Understanding these factors is vital for accurate soil resistivity assessments.

Q7: Why is resistivity important?

Resistivity is a critical parameter in various engineering applications. It plays a pivotal role in designing efficient grounding systems to prevent electrical hazards, corrosion protection in structures, and assessing the environmental impact of projects on soil and groundwater. Proper understanding and management of resistivity ensure the safety, compliance, and optimal performance of diverse engineering endeavours.