

Kerala Development and Innovation Strategic Council (K-DISC)

Tender Document

**Tender For Borehole Drilling And Soil Testing As Part Of Implementing
Landslide Early Warning System At Madasseri Mala, Kanichar Grama
Panchayath, Kannur District, Kerala**

Tender No.: 8/2021/KDISC/P-899/01

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1. Introduction

Kerala Development and Innovation Strategic Council (K-DISC) is implementing a project named the 'Landslide Early Warning System (LEWS)' at Madasseri Mala, Kanichar Panchayath, Kannur District as its pilot location in coordination with and Kerala State Disaster Management Authority (KSDMA). The project focusses on developing an early prediction of landslide occurrence using AI and nowcasting at pilot location in a multi-institutional collaborative approach.

Indian Institute of Technology, Roorkee (IIT –Roorkee) in collaboration with Council for Scientific and Industrial Research – Central Building Research Institute, Roorkee (CSIR-CBRI) will install indigenously developed sensors to gather necessary input parameters from the ground and also develop an Artificial Intelligent / Machine Language (AI/ML) model for the landslide early warning system. A technology partner identified through Kerala Startup Mission will supply the hyper-local rainfall forecast data based on Global Navigation System of Satellites (GNSS) tomography-based sensors to be used as one of the inputs to build the AI/ML model and to provide early warnings.

To install the indigenously developed sensors developed by IIT-Roorkee, the borehole needs to be drilled and soil need to be tested as specified by CSIR-CBRI. This tender document is therefore issued by K-DISC to invite bids from qualified vendors/agencies for the borehole drilling and soil testing to install sensors as part of implementing landslide early warning system at Madasserimala, Kanichar grama panchayath, Kannur district, Kerala.

2. Objectives

1. The objective of this assignment is to engage a qualified agency for drilling boreholes and conducting detailed geotechnical investigations required for the installation of in-situ sensors.
2. A minimum of seven (07) boreholes shall be drilled at the project site (Approximate location: 11°51'46.8"N, 75°47'09.6"E) along with borehole logging, sampling, laboratory testing, and reporting activities. All activities shall be carried out under the technical supervision of qualified Geotechnical Engineers and Geologists from CSIR-CBRI.

3. Scope of the work

1. Site reconnaissance for collecting data about site nature, topography of the site, geological features and other properties concerning the project site.
2. Mobilization of necessary plant, equipment(s) and personnel to the project site, setting up the equipment, shifting of the equipment from one test location to another location, carrying out the field investigations on land and demobilization on completion of work.
3. The geotechnical investigation includes drilling of boreholes, borehole logging, performing standard penetration tests (SPTs), undisturbed and disturbed sampling, and relevant laboratory tests.
4. Borehole is to be made at a minimum seven (07) locations. Locations will be provided on the site map separately. Drilling is to be carried out as per IS 1892: 2021 through 100 mm/125 mm nominal diameter boreholes. ABS casing is to be provided throughout the depth of the drilled hole.

5. Maximum borehole depth to be drilled is 210 m with varying depth from the existing ground level and up to a depth of 2m into the bedrock (unweathered bedrock). Number of boreholes may vary based on achieving the required depth. A percussion or rotary core drilling method is to be used for borehole excavation. The boring includes the drilling in overburden material. However, if bedrock is encountered, the drilling is to be carried out further 2 m into the unweathered bedrock.
6. ABS casing pipe diameter 70 mm, Casing pipes should be along the complete drill length of the borehole having precision-machined threaded ends (V-threads or trapezoidal threads) or quick-joint (QJ) flush couplings, ensuring a watertight, self-aligning connection without the need for solvent cement.
7. Top ABS caps (at least 10 nos.) to fit 70 mm OD & Bottom ABS casing caps (at least 10 nos.) to fit 70 mm OD.
8. Joints may be sealed using Mastic tape. Size 50 mm/100 mm width along with BOPP Waterproofing ceiling tape, having size 50 mm/100 mm width.
9. A slotted ABS casing/pipe is to be provided at the bottom of the target depth. Geosynthetic wrapping is to be provided, and the side wall is to be filled with clean, washed sand filter (0.5–2 mm size) around the slotted portion, with a thickness of 300–600 mm above and below the screen. Bentonite pellets or bentonite-cement grout plug is to be provided above the sand filter, having a thickness of 300–500 mm. Backfilling is to be done for the rest of the borehole with grout/bentonite.
10. After the installation of the casing, the sensors are to be installed at the prescribed depths by the vendor under the technical supervision of CSIR-CBRI. The sensors will be provided by CSIR-CBRI.
11. 210 m long guiding rod of Aluminium having a diameter of 25 mm for the fixity of various sensors
12. Once the hard stratum (rock) is met with (hard stratum is confirmed by geologist/site in-charge), further drilling is to be carried out by HX core drilling with TC/Diamond bits as per IS 6926: 1996 (RA 2020) by using double core/triple core barrel up to 2 m into the bedrock. Each run of the core drilling is to be properly recorded with core logging. At the end of each run, the drill rod string with the core barrel is to be extracted and the core is to be recovered. The cores are to be carefully transferred to the core boxes and properly preserved, numbered, labelled, and photographed for reporting purposes. The rock core recovery (C.R.) percentage and Rock Quality Designation (RQD) are to be recorded. Some of the cores are to be sent to the laboratory for determining density and specific gravity of rock (IS 13030: 1991, RA 2021), uniaxial compressive strength (UCS) of rock samples of NX size (IS 9143: 1979, RA 2021), determination of shear strength of rock materials in triaxial compression as per IS 13047: 1991(Reaffirmed Year: 2021).
13. To conduct standard penetration tests (SPTs) as per IS 2131: 1981(RA 2021) in the boreholes and to collect disturbed soil samples from boreholes at 1.5 m interval in depth or when there is a change in strata, whichever is earlier.
14. From the boreholes, undisturbed samples are to be collected using a Shelby tube of 75 mm diameter and 450 mm long, and disturbed samples to be collected using an SPT sampler at a vertical interval of 1.5 m or from depth at which change in stratum occurred earlier. Collecting

undisturbed soil samples at regular intervals and at every identifiable change of strata to supplement the boring records.

15. Recording the depth of the groundwater table in all the bore holes, if observed up to the depth of exploration during boring work. Groundwater accumulation in boreholes is to be monitored during and after completion of drilling activities.
16. Determination of field moisture equivalent as per the IS 2720: Part 18: 1992(Reaffirmed Year: 2021).
17. Conducting the following laboratory tests on selected disturbed / undisturbed soil samples collected from various bore holes / test locations: bulk and dry density, specific gravity (IS 2720 : Part 3 : Sec 1& 2 : 1980 Reaffirmed Year: 2021), water or moisture content (IS 2720: Part 2: 1973Reaffirmed Year : 2020), grain size analysis including hydrometer analysis (as per IS 2720 : Part 4 : 1985Reaffirmed Year : 2020) and, determination of liquid limit and plastic limit (IS 2720: Part 5: 1985Reaffirmed Year : 2020), laboratory determination of permeability of soil (IS 2720: Part 17:1986Reaffirmed Year: 2021) or granular soils (IS 2720: Part 36: 1987Reaffirmed Year:2021), classification and identification of soils for general engineering purposes(IS 1498: 1970Reaffirmed Year: 2021), tri-axial shear tests in unconsolidated undrained condition (IS 2720: Part 11: 1993Reaffirmed Year: 2021), direct shear tests (IS 2720: Part 13: 1986 Reaffirmed Year : 2021 or IS 2720 : Part 39: Sec 1: 1977Reaffirmed Year: 2021), consolidation test (IS 2720: Part 15: 1965 Reaffirmed Year: 2021). All these tests to be conducted as per the IS code guidelines.
18. To submit a preliminary site report along with each bore-log profile, SPT profile results once the borehole SPT tests have been concluded at the site.
19. To demarcate clearly (with GPS co-ordinates) the locations of boreholes at site on a contour map or site plan and submit it along with the preliminary geotechnical investigations report.
20. Applying engineering analysis and evaluation of field findings and laboratory results to develop conclusions and recommendations, if any.
21. Preparation and submission of a detailed soil investigation report of the proposed site in three copies including all the above information, along with tables and graphs of field and lab test results and site and laboratory photographs while performing the tests.

4. Eligibility of Agency

1. The bidder shall be a registered company / Research Institution / partnership firm / LLP / proprietorship registered in India.
2. The bidder shall possess valid GST registration and other statutory registrations as applicable.
3. The bidder shall have a minimum of 4 years of experience in providing material testing, geotechnical investigation, and laboratory testing services.
4. The bidder should have successfully executed similar works for Government / Semi-Government / PSU / reputed private organisations during the last 5 years.

5. The bidder shall have qualified and experienced technical personnel, including Geo-technical Engineers.

5. Score Calculation

The Score will be calculated based on the Quality Cost Based System (QCBS).

Weightage for the quality (Q) is 70% and weightage for the price bid (PB) is 30%

The technical bid score and the financial bid score for each vendor shall be normalised and combined evaluation score as indicated below

$$\text{Normalised Technical Bid Score (NTB)} = \frac{\text{Marks obtained in technical bid} \times 100}{\text{Highest marks of technical bid}}$$

$$\text{Normalised Financial Bid Score (NFB)} = \frac{\text{Lowest Quoted Price} \times 100}{\text{Price Quoted by the bidder}}$$

$$\text{Combined Evaluation Score} = 0.3 \times \text{NFB} + 0.7 \times \text{NTB}$$

The vendors could be ranked based on the combined evaluation score in descending order and the vendor who secures the highest combined evaluation score would be selected.

The parameters for technical Bid Score is given below. Requesting vendor to note down values/comments on these parameters

SI No	Parameter	Criteria	Score
1	Experience in material testing / geotechnical investigation / lab testing	4 – 10 years	20
		Above 10 years	30
2	Successful execution of similar works	10 – 20 Nos	15
		Above 20 Nos	20
3	Number of qualified and experienced technical personnel	5-10 No.s	15
		Above 10 No.s	20

6. Location of Borehole drilling

The Kerala Development and Innovation Strategic Council (K-DISC) is implementing the pilot project “Land Slide Early Warning System (LEWS) at Madasseri Mala, Kanichar Grama Panchayath, Kannur District (11°51'46.8"N 75°47'09.6"E) in coordination with Kerala State Disaster Management Authority (KSDMA).

The **tentative location for borehole drilling is as follows:

Borehole Location	Latitude	Longitude
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BH-1	11°51'47.00"N	75°47'9.00"E
BH-2	11°51'48.00"N	75°47'7.00"E
BH-3	11°51'46.00"N	75°47'8.00"E
BH-4	11°51'44.37"N	75°47'5.50"E
BH-5	11°51'40.74"N	75°47'3.34"E
BH-6	11°51'41.00"N	75°47'2.00"E
BH-7	11°51'38.21"N	75°47'2.02"E
BH-8	11°51'36.81"N	75°47'0.36"E

** Number of Borehole and their locations may vary.

7. General Terms and Conditions

1	Tender Reference Number	8/2021/KDISC/P-899/01
2	Tender ID	2026_KDIC_841629_1
3	Tender Type	Open Tender
4	Currency	Indian Rupees
Critical Date Sheet		
5	Date of Tender Publishing	27/02/2026, 5.00 pm
6	Pre Bid meeting	06/03/2026, 12:00 PM
5	Bid Submission Start Date	07/03/2026, 2.00 pm
6	Bid Submission End Date	18/03/2026, 3.00 pm
7	Bid Opening Date	19/03/2026, 03.00 PM
8	Designation and Contact Details of Tender Inviting Authority	The Senior Procurement Manager, Kerala Development and Innovation Strategic Council (K-DISC), India Heights Building, Govt Women's College Road, Vazhuthacadu, Thycadu P O Thiruvananthapuram, Kerala For more details: 918714619203, 9447041550 https://kdisc.kerala.gov.in/en/ <u>Email ID:</u> pmupe13@kdisc.kerala.gov.in with cc to pmuspe14@kdisc.kerala.gov.in

1. Bids shall be submitted online only at Kerala E-tender Website <https://etenders.kerala.gov.in> using valid Digital Signature Certificate. Tenderer are advised to follow the instructions "Instructions to Bidder for Online Bid Submission" provided in the Annexure for online submission of bids available at Kerala E-tender website: <https://etenders.kerala.gov.in>.
2. Intending tenderers are advised to visit KDISC website i.e. www.kdisc.kerala.gov.in and Kerala E-tender website: <https://etenders.kerala.gov.in> regularly till closing date of submission of tender for any 'Corrigendum, Addendum, Amendment'.

3. The agency shall comply with all applicable IS codes and safety regulations.
4. All activities mentioned in the scope of work are mandatory.
5. The agency should consider equipment transportation including the clearance for borehole drilling.
6. The agency should consider backfilling the excavated pit if it is deemed unsuitable for the purpose
7. The agency shall consider levelling, grading and compacting the excavated area.
8. The contractor shall comply with all labour laws, environmental norms, safety rules, and statutory permissions required for execution, transport, disposal, and drilling operations.
9. Any damage to roads, utilities, private properties, or public infrastructure during execution shall be restored by the contractor at their own cost to the satisfaction of the Engineer-in-Charge.
10. The quoted price shall be inclusive of all costs (mobilisation, testing, reporting, clearance, etc.).
11. The contractor must provide required number of qualified and experienced technical personnel, including Supervisors, Geo-technical Engineers etc.

8. Documents To Be Submitted by Agency

1. Company / Research Institution / Partnership firm / LLP / Proprietorship registration document.
2. Experience certificates of qualified technical personnel.
3. Document proof of experience of the institution in providing material testing, geotechnical investigation, and laboratory testing services.
4. End User certificate of project completion.
5. Bank Details.
6. Copy of PAN and GST Registration No. and Income tax return certificate of the last three years.
7. Scan and upload signed e-Tender Document

9. Force Majeure

Neither party shall be liable for failure or delay in the performance of its obligations under this tender, if such failure or delay is due to events beyond reasonable control, including but not limited to acts of God, natural disasters, floods, fire, earthquakes, epidemics, pandemics, war, riots, civil disturbances, acts of Government, changes in law, strikes, lockouts, or failure of utilities or communication systems (“Force Majeure Events”).

The affected party shall promptly notify the other party in writing of the occurrence of such event and take all reasonable steps to resume performance as soon as practicable. The timelines for performance shall be extended proportionately for the duration of the Force Majeure Event.

10. Jurisdiction

This tender document, the bidding process, and any contract awarded pursuant to this tender shall be governed by and construed in accordance with the laws of India.

Any disputes arising out of or in connection with this tender or the resultant contract shall be subject to the exclusive jurisdiction of the competent courts at Thiruvananthapuram, Kerala.

11. Annexures

(To be printed on the Letterhead of the Bidder, signed and stamped by Authorized Signatory)

Annexure I: PARTICULARS TO BE FILLED BY THE BIDDER

SI No.	Item	Particulars	Remarks
1.	Communication details of the bidder to whom all references shall be made regarding this tender enquiry. [NOTE: Any changes after submission of Tender documents kindly update KDISC]		
	a.) Full Name :		
	b.) Complete Postal Address:		
	c.) Telephone No.:		
	d.) Mobile No.:		
	e.) E-mail:		
	f.) Website URL:		
	g.) PAN No.		
	h.) GST Registration No.		
	i.) IGST		
2	Details of Bank		
	Name of the Bank		
	Address of the bank		
	Account No.		
	IFSC:		
	any other relevant information:		

*Insert additional rows to accommodate any other relevant information:

Authorized Signature and Stamp of Bidder

Annexure 2: PRE-QUALIFICATION – GENERAL PART A

SI No	PQ Criteria	Yes/No	Supporting Documents to be attached as annexures (1.....n)
1.	Have you paid Tender Fee & EMD?		Payment slip has to be furnished as Annexure 1
2.	Have you submitted a Valid NSIC or MSME Certificate(s) for EMD exemption		Provide the copies of the certificates as Annexure 2
3.	Original/Endorsed documents scanned and submitted as indicated in the tender document		Authorised signatory to sign all copies of all the pages of the tender document and attach as Annexure 3
4.	a) Name of the bidder (As per Registration Certificate), Correspondence address, telephone number and fax number/E-mail id of the bidder.		Company registration Certification has to be furnished as attached as Annexure 4
5.	b) Legal status: Tenderer must be a Private or Public Registered Company/Partnership firm/Educational Institution/Proprietorship Firm/Cooperative Society		Proof of legal status of the entity has to be submitted as Annexure 5
6.	Copy of PAN and GST Registration No. and Income tax return certificate of the last three years (For Indigenous bid) should be attached		Scanned copy of PAN card and GST Registration Certificate has to be furnished as Annexure 6
7.	Whether your company ever have been blacklisted for indulging in corrupt practice, fraudulent practice, coercive practice, undesirable practice, breach of contract or restrictive practice by any Central/ State Government/PSU/Semi-Government bodies as on bid submission date.?		The self-declaration certificate in respect to the above has to be scanned and submitted as Annexure 7
8.	Have you submitted tender acceptance letter?		TENDER ACCEPTANCE LETTER has to be furnished as Annexure 8
9.	Whether Bank details have been submitted?		Front page of bank passbook copy with account number and IFSC Code to be attached as Annexure 9
10.	Whether the Bidder has completed, installed and commissioned one similar work of value not less than 80% of the estimated cost put to tender during the last four years as prime Contractor ending the previous day of the last date of submission of tenders? The installed work shall be in satisfactory operation for the past one year.		Copies of Purchase orders/ satisfactory completion certificate for the work done/ certificate from the client showing that the installation has been satisfactorily working for the past year shall be submitted in English language. Details of current contracts in hand and other commitments as supportive evidence. All these should be attached as annexures 10.

11.	Whether the tenderer has the power of attorney authorizing the signatory to sign the tender.(if applicable)		Power of attorney has to be furnished as Annexure 11
12.	General Conditions of the Tender compliance		Self Certification for complying General Conditions of the Tender must be furnished as Annexure 12