Test set-up for stability of embankments reinforced with geotextiles

Name of Equipment/ Assembly	Test set-up for stability of embankments reinforced with geotextiles
Related Standards to be accorded	
Features/Capabilities /Specifications	The assembly shall consist of the following: • **Test Box Dimensions:** 5 meters (Length) x 2 meters (Width) x 0.6 meters (Height), with tilting capability up to 10 degrees. • **Automatic Tilting System:** Automatic integrated system for tilting the test section using hydraulic mechanism. • **Water Pump (2 Qty) Requirement:** Pump with suitable capacity for simulating various rain and river conditions with controlled flow by VFD • **Water Storage Capacity:** 2500 litres water storage tank **(2 Qty)** • **Soil Handling Facilities:** Basic Equipment/system for soil filling and discharge. • **Rain Simulation:** The test box features two independently controllable sections for comprehensive rain simulation with fully automatic selection from control panel. • **Nozzle Variety:** Multiple nozzle sets supplied with system for diverse rain simulation scenarios. **(2 Set)** • **Rain Flow Control:** Pump equipped with a Variable Frequency Drive (VFD) to adjust rain flow and river inlet flow. The flow shall up to 6 litre/minute (i.e. 1 mm/min rainfall) Regulator for control of rainfall intensity. Minimum 0.1 mm/min & Maximum 5mm/min. • **Rain Intensity Measurement**: A digital sensor/meter shall measure rain intensity, with flexibility for relocating the sensor within the test section. • **Erosion and Scouring Measurement (2 Qty):** Ultrasonic or laser system for precise measurement. • **Flow Measurement device (10 Qty):** Digital flow meters compatible with HMI-PLC control system. • **Current Meter (2 Qty):** Measure the velocity of flow. • **Pressure Measurement:** Piezoelectric sensors (minimum 06) for accurate pressure readings at different location. • **Flow Control:** Adjustable inlet and outlet gates for managing river flow. • **Wave Simulation system:** An ocean wave simulator designed to replicate various wave conditions. The system should include compatible motors and other necessary components and fixtures to accurately simulate different sea states. • **Environmental Monitoring:** Humidity and temperature sensors integrated with HMI-PLC control system. for environmental tracking. • **Filtration:** A filtration system is installed for the water at the outlet storage tank. • **Control Panel:** HMI-PLC based control panel for comprehensive system management. • **Data logging:** A fully automatic data recording system that saves data at specified time intervals onto a USB drive. Additionally, the system offers the capability to view and log data through an IoT interface. • **System Operation:** The system is fully automatic and controlled via a touchscreen-based HMI. It can also be operated remotely using Ethernet and Wi-Fi on devices such as PCs, tablets, and mobile phones. • The system includes accessories required for simulating rain flow and river falls, along with obstacles and other required components. • The complete system, including the test section, is divided into several parts for easier handling and installation in the lab • **Computer system along with the following** o Desktop/laptop computer with Intel i7 or equivalent processor, 2 TB SSD, 16 GB RAM, compatible motherboard. With a monitor, keyboard and mouse. With a 2-year warranty.

	○ Compatible software for analysis ○ Configurable controlling unit system for DAQ ○ Printing kiosk • **Power Supply** requirements shall be mentioned clearly. • Demonstration for the assembly of the system and training for software shall be provided at our place. • UPS (Uninterrupted Power Supply) system with 4-hour continuous power backup capacity to run the electronic & electrical system of the equipment.
Experimental and Research Capabilities	The Setup shall possess capabilities as follows • **Experiment Possibilities for River flow and rainfall** 1. **Flow Dynamics and Hydraulics** ○ Measurement of flow velocity and discharge ○ Analysis of flow patterns and turbulence 2. **Erosion and Sediment Transport** ○ Investigation of erosion rates under varying conditions ○ Study of sediment transport and deposition patterns **3. Rainfall-Runoff Relationships** ○ Analysis of runoff generation based on rainfall intensity and duration ○ Hydrograph analysis for timing and volume of runoff **4. Water Quality and Contaminant Transport** ○ Measurement of dissolved and suspended solids ○ Study of contaminant dispersion and dilution **5. Effect of Vegetation and Obstacles** ○ Assessment of vegetative buffers on flow resistance and erosion control ○ Impact analysis of obstacles on flow diversion and sediment deposition **6. Channel Morphology and Dynamics** ○ Observation of channel formation and evolution ○ Identification of scour and deposition zones **7. Hydraulic Structures and Control Measures** ○ Testing of weirs, dams, and check dams for flow control ○ Evaluation of silt traps for sediment management **8. Flood Simulation and Management** ○ Simulation of flood scenarios and floodplain analysis 9. **Assessment of flood mitigation strategies** 10. **Scale Model Testing** ○ Verification of scaling laws and model accuracy ○ Study of upstream and downstream effects **11. Educational and Demonstrational Purposes** ○ Visualization of hydrological processes for educational purposes ○ Hands-on experiments for public and student engagement • **Experiment Possibilities of ocean wave simulator** ○ **Wave Dynamics**: Study wave formation and characteristics. ○ **Coastal Erosion**: Investigate coastal erosion and sediment transport. ○ **Wave Behaviour**: Study wave reflection, refraction, and diffraction.
Make	• Clear mention Make in the bid
Electrical Supply Requirement	• Electricity supply requirements (voltage and phase) shall be clearly mentioned
Size and weight	• **Detachable/ Assemblable Units:** The equipment shall be dismantlable as placed in the available infrastructure, The maximum dimensions of the door are given below. • The dimension of any unit/ part of the apparatus shall not exceed 2.7 meters (L) x 1.5 meters (W) x 1.9 meters (H). • Mention area required for positioning of equipment. • Mention total weight of the equipment. • Mention specific requirement of foundation/pedestal for resting the equipment, if any. • Mentioned need of vibration isolated, if needed

Water and air supply requirements	• Mention the requirement to supply of compressed air, if any. • Mention the requirement and arrangement of water supply, if any.
Compatibility of parts	• In case of accessories from make differing to the make of equipment, compatibility shall be checked and certified by the bidder.
Calibration Certificates, technical manual and SOP	• The calibration certificates shall be provided with equipment and accessories. • Validity of calibration certificate for all devises shall not be less than one year. • Technical manual and Standard Operating Procedure document shall be provided.