महाराष्ट्र वन विभाग

दूरध्वनी क्र.022-69309286
Email Id:dfommcu@gmail.com

महाराष्ट्र शासन
वन विभाग
विभागीय वन अधिकारी, कांदळवन विभाग- उत्तर कोकण
यांचे कार्यालय
अभिमान-२, ५ वा मजला, तीन हात नाका, नौपाडा, ठाणे पश्चिम.

पत्र/ईमेलद्वारे: कक्ष-०२/योजना/ 3086 / सन २०२६-२७. **दिनांक:** 28/१०/२०२६.

प्रति,

१. मा. मुख्य वनसंरक्षक,
कांदळवन कक्ष, मुंबई.

२. माहिती व प्रसिद्धी अधिकारी (वने),
मा. प्रधान मुख्य वनसंरक्षक यांचे कार्यालय, नागपूर.
Email: - mahaforestpublicity@gmail.com

विषय: कांदळवन कक्षांतर्गत विविध पुनर्स्थापना (Restoration) कामांसाठी प्रस्तावित Hi-Tech Mangrove Nursery (अद्ययावन कांदळवन रोपवाटिका) चे सविस्तर प्रकल्प अहवाल (DPR) तयार करण्याकरिता सार्वजनिक बांधकाम विभागाच्या अनुसूची दरपत्रकात (State Schedule of Rates - SSR) समाविष्ट नसलेल्या Lab equipment Supply and Installation या अनुसूचीबाह्य (non-Schedule) बाबींसाठी दरपत्रके मागविण्याबाबत.

कांदळवन परिसंस्थेमध्ये राबविण्यात येणाऱ्या विविध विकासकामांमध्ये विविध शासकीय/निम शासकीय विभाग तसेच खाजगी संस्थांकडून कांदळवन पुन: स्थापन योजनेकरीता संबंधितांकडून वसूल करण्यात आलेल्या रक्कमेतून कांदळवन पुन:स्थापन योजनेचे अनुषंगाने राबविण्याच्या विविध उपक्रमांच्या अंमलबजावणीकरीता कांदळवन कक्ष / कांदळवन प्रतिष्ठान यांना तांत्रिक सहाय्य सेवा उपलब्ध करुन घेणेकामी सल्लागार नेमणूक करण्याचे दृष्टीने या कार्यालयामार्फ़त ई निविदा प्रसिद्ध करणेत आलेली होती.

सदर निविदा प्रक्रियेद्वारे मे. टंडन अर्बन सोल्यूशन प्रा. लि, मुंबई यांना सल्लागार म्हणून नियुक्त करणेत आलेले असून या कार्यालयाकडून कार्यारंभ आदेश देण्यात आलेले आहेत. प्रकरणी नियुक्त प्रकल्प सल्लागार हे सदर प्रकल्पातील प्रस्तावित Hi-tech Mangrove Nursery या कामासाठी सविस्तर प्रकल्प अहवाल (Detailed Project Report - DPR), अंदाजपत्रक तयार करीत असून त्यानुषंगाने प्रकल्पासाठी DPR तयार करण्याकरिता आवश्यक तंत्रज्ञान, कार्यपद्धती व तांत्रिक तपशील निश्चित करण्याची कार्यवाही सुरू आहे. DPR तयार करताना आवश्यक असलेल्या अनेक बाबी महाराष्ट्र सार्वजनिक बांधकाम विभागाच्या अनुसूची दरपत्रकात (State Schedule of Rates - SSR) समाविष्ट नसल्याचे निदर्शनास आले असून अशा अनुसूचीबाह्य (non-Schedule) बाबींसाठी वास्तव बाजारभाव तसेच सविस्तर तांत्रिक तपशील प्राप्त करणे आवश्यक आहे, जेणेकरून DPR मधील अंदाजपत्रके अचूक व प्रमाणित स्वरूपात तयार करता येतील.

त्याअनुषंगाने, या कार्यालयामार्फत पात्र उत्पादक, पुरवठादार, विक्रेते, सेवा संबंधित संस्थांकडून DPR तयार करण्यासाठी आवश्यक असलेल्या अनुसूचीबाह्य बाबींसाठी दरपत्रके तसेच सविस्तर तांत्रिक तपशील मागविणेकामी संदर्भीय पत्रान्वये या कार्यालयास विनंती करण्यात आलेली आहे. त्यास अनुसरून सदर दरपत्रकांसोबत संबंधित बाबींचे संपूर्ण तपशील, तांत्रिक तपशिल (Technical Specifications), उत्पादकाचे नाव (Make), मॉडेल क्रमांक (Model No.) (लागू असल्यास), कामाचे स्वरूप (Scope of Work), स्थापनेचे तपशील व इतर आवश्यक तांत्रिक माहिती विहित नमुन्यामध्ये यासोबत जोडण्यात आलेला आहे.

तरी सदरची जाहिरात ही आपले कार्यालयाच्या संकेतस्थळावर आणि सुचना फलकावर प्रसिद्धी करण्यात यावी ही विनंती.

(दि.पा.खाडे)
विभागीय वन अधिकारी,
कांदळवन विभाग-उत्तर कोकण.

प्रतिलिपी :- सर्व वनक्षेत्रपाल यांना सुचना फलकावर प्रसिद्धी करणेकामी रवाना.
प्रत :- मे. टंडन अर्बन सोल्यूशन, प्रा.लि. मुंबई यांना माहिती व आवश्यक कार्यवाहीकरिता रवाना.

C:\MDNK\17. 308_Mangrove Restoration\2. Hi-Tech Mangrove Nursary\General Letters.docx

Government of Maharashtra

Forest Department

Mangrove Division- North Konkan

Abhimaan II, 5th Floor, Teen Haat Naka, Naupada, Thane (W)-400 602.

Email- dfommcu@gmail.com.

PIM Notice No. DFO/MDNK/Hi-Tech Nursery/01/2026-27. **Date:-**28 / 10 /2026.

REQUEST FOR QUOTATION

RFQ invited for the technical and financial offers with intention of planning, estimation for the component of "Design, Supply, Installation, Testing, Commissioning, Operation and Maintenance of Four Laboratories for Five Years" at the Hi-Tech Mangrove Nursery, Kelwe, Palghar

Issuing Authority: The Divisional Forest Officer, Mangroves Division, North Konkan, Forest Department, Government of Maharashtra

Submission deadline: 06 -11-2026. Submission email / address: dfommcu@gmail.com

1. Invitation

Techno-commercial quotations are invited from experienced laboratory suppliers, system integrators and laboratory operating agencies for design, supply, installation, testing and commissioning of four laboratories, followed by five years of operation and comprehensive maintenance from successful commissioning, at the Hi-Tech Mangrove Nursery, Kelwe, Taluka and District Palghar. The facilities shall support mangrove and non-mangrove nursery operations of Minimum 5 lacs seeding capacity per year.

The quote shall be considered on assumption of Civil works, laboratory furniture and workbenches shall be considered available. The Bidders shall submit the quote in considering the Required Instruments shall comply with minimum specification and makes/models are provided in the **Annexure I**.

2. Laboratories Covered

Sr.No.	Laboratory	Principal Functions.
1	Propagule & Seed Quality	Identity, purity, grading, maturity, moisture, viability, germination, rooting and storage assessment.
2	Nursery Quality Control	Seedling growth, root development, grading, hardening, survival and establishment.
3	Soil, Sediment & Water Quality	Physical and chemical testing of soil, sediment, growing media and nursery water.
4	Plant Health & Plant Pathology	Health screening, microscopy, pest examination and preliminary disease investigation.

Tissue Culture Laboratory is excluded from the present scope.

3. Turnkey Scope

- Assess the testing programme and prepare laboratory-wise equipment layouts, workflows and utility requirements.
- Verify available rooms, furniture, workbenches, electricity, water, drainage, ventilation and IT provisions.
- Supply new instruments, reusable apparatus, accessories, instrument software, initial consumables and reference materials.
- Provide transportation, unloading, installation, equipment-side connections, calibration, testing and commissioning.

- Demonstrate the specified tests and prepare species/sample-specific SOPs, quality-control procedures and reporting formats.
- Deploy competent operating personnel and provide comprehensive maintenance, calibration and repairs for 60 months.
- Supply and replenish consumables against the agreed workload; maintain stock, safety and waste records.
- Train departmental staff, coordinate instrument interfaces with the LIMS agency and complete final handover.

Preference shall be given to digital readings, automated calculations, data storage and export, without compromising validated preparation and testing methods. Sample handling, interpretation and quality assurance shall be performed by trained personnel.

4. Testing Requirements

Laboratory	Tests / assessments
Propagule & Seed Quality	Species/source verification; physical purity; maturity/condition; size and weight; moisture; viability; germination; rooting/establishment; vigor; seed-health screening; dormancy/pretreatment trials; storage viability.
Nursery Quality Control	Height; root collar diameter; height-to-diameter ratio; root development/deformity; shoot quality; health screening; root-plug integrity; root/shoot dry weights and ratio; uniformity/grading; hardening; transplant survival; mangrove salinity acclimatization.
Soil, Sediment & Water Quality	Water pH, EC, salinity, temperature, calculated TDS, DO, turbidity, optical/reference TSS, nitrate, phosphate, ammonia, calcium, magnesium, hardness, alkalinity, chloride, sodium and SAR; soil/substrate pH, EC, moisture, available NPK, texture, carbon/organic matter, bulk density, water retention, porosity, permeability and redox potential.
Plant Health & Plant Pathology	Leaf/stem/root inspection; insect/mite examination; fungal microscopy; root/collar rot and damping-off investigation; preliminary fungal/bacterial culture screening; disease incidence/severity; nematode screening where indicated; validated targeted rapid tests; relative chlorophyll assessment.

Species-wise acceptance criteria and approved methods shall be agreed before routine operation. Screening results shall not be represented as definitive pathogen identification without adequate confirmation.

5. Minimum Instrument Schedule.

5.1 Propagule & Seed Quality Laboratory

No.	Instrument/equipment	Minimum quantity	Purpose
1	Digital precision balance, approximately 0.001 g readability	1	Small-seed weighing, seed-weight and moisture tests
2	Digital bench balance, approximately 0.1 g readability	1	Weighing larger mangrove propagules and bulk samples
3	Digital vernier calliper and measuring scale	1 set	Seed/propagule length, diameter and grading
4	Illuminated magnifying lamp	1	Routine inspection, sorting, maturity and damage checks
5	Stereo microscope with camera/display	1	Examination of seed filling, cut sections, insects and visible fungal growth

No.	Instrument/equipment	Minimum quantity	Purpose
6	Seed purity board, sorting trays, forceps, spatulas and hand sieves	1 set	Physical purity testing and separation of defective material
7	Programmable seed germination chamber, with temperature and light control	1	Germination, pretreatment and early vigour trials
8	Thermostatically controlled laboratory hot-air oven, with timer	1	Reference moisture-content testing using the appropriate method
9	Desiccator and moisture-testing containers	1 set	Cooling and handling samples during moisture testing
10	Digital temperature–humidity data loggers	2	Monitoring laboratory and seed-storage conditions
11	Handheld salinity/EC meter	1	Checking water used in mangrove rooting and establishment trials
12	Computer with camera connectivity and simple batch-record software	1	Recording results, photographs, calculations and batch traceability

5.2 Nursery Quality Control Laboratory

No.	Instrument/equipment	Minimum quantity	Purpose
1	Digital vernier caliper	1	Root collar diameter measurement
2	Graduated measuring board, ruler and measuring tape	1 set	Seedling height, root length and shoot measurements
3	Digital precision balance, approximately 0.001 g readability	1	Root and shoot dry-weight measurement
4	Laboratory hot-air drying oven, with digital temperature control	1	Drying root and shoot samples to constant weight
5	Desiccator	1	Cooling dried samples before weighing
6	Illuminated magnifying lamp or handheld magnifier	1	Screening leaves, stems and roots for defects, pests and disease symptoms
7	Root-washing trays, sieves and gentle water-spray arrangement	1 set	Cleaning roots for branching and deformity assessment
8	Root assessment board with measurement grid	1	Standardized root inspection and photographic records
9	Handheld digital salinity/EC meter	1	Monitoring water salinity during mangrove acclimatization trials
10	Temperature–humidity data logger	1	Recording conditions during hardening and assessment trials
11	Digital camera or camera-enabled tablet	1	Photographing seedlings, defects and trial progress
12	Computer with spreadsheet and batch-record templates	1	Calculating ratios, grading, uniformity and survival percentages

5.3 Soil, Sediment & Water Quality Laboratory

No.	Tests to perform	Instrument required	Minimum quantity
1	Water pH, EC, salinity, temperature, calculated TDS and dissolved oxygen	Portable multiparameter water-quality meter with optical DO probe	1 set
2	Soil, sediment and potting-media pH and EC	Digital soil/substrate pH–EC meter, suitable for standardized extracts	1 set
3	Rapid soil/substrate moisture assessment	Digital moisture probe, calibrated for the media and salinity	1
4	Sample moisture content	Halogen moisture analyzer, with validated settings	1
5	Water turbidity	Digital turbidity meter	1
6	Estimated suspended-solids concentration	Optical TSS meter with probe, calibrated against gravimetric results	1
7	Water nitrate, phosphate, ammonia, calcium, magnesium, hardness, alkalinity and chloride	Multiparameter photometer with parameter-specific reagent kits; confirm each method's availability and range	1 set
8	Water sodium	Sodium ion-selective electrode meter	1
9	Sediment/substrate redox potential	ORP meter with sediment-compatible electrode	1
10	Soil available NPK	Instrument-based soil nutrient analyser with validated extraction and reagent methods	1 set
11	Sodium Adsorption Ratio (SAR)	Computer/software calculation using sodium, calcium and magnesium results	1
12	Sample weighing and preparation	Digital precision balance, shaker and filtration accessories	1 set

Computers/tablets in these schedules shall be met through the separate LIMS/IT package where provided. Dedicated instrument-control computers essential to supplied equipment shall be included and identified. Repeated balances, ovens, desiccators and meters may be shared where capacity, workflow and contamination control permit; submit a consolidated quantity schedule.

5.4 Additional soil/sediment equipment

Test	Equipment	Minimum quantity
Soil/sediment texture	Laser diffraction particle-size analyser, with suitable sample-dispersion equipment	1 set
Organic carbon	Solid-sample carbon analyser, with provision to account for inorganic carbon	1 set
Organic matter by loss on ignition	Programmable muffle furnace, drying oven, balance and desiccator	1 set
Bulk density	Known-volume sampling cores, digital balance and programmable drying oven	1 set
Water-holding capacity and porosity	Substrate water-retention/porosity testing apparatus	1 set
Drainage/permeability	Laboratory permeameter	1 set
Reference TSS and gravimetric TDS	Filtration/evaporation apparatus, drying oven, analytical balance and desiccator	1 set

5.5 Plant Health & Plant Pathology Laboratory

No.	Equipment	Minimum quantity
1	Stereo microscope with digital camera/display	1 set
2	Compound microscope with digital camera	1 set
3	Illuminated magnifying lamp	1 set
4	Class II biological safety cabinet	1 set
5	Digital temperature-controlled incubator	1 set
6	Automatic laboratory autoclave	1 set
7	Laboratory refrigerator	1 set
8	Electronic balance	1 set
9	Hotplate with magnetic stirrer	1 set
10	Digital pH meter for media preparation	1 set
11	Micropipette set	1 set
12	Moist chambers and sterile dissection accessories	1 set
13	Camera/tablet with image records (coordinate with IT package)	1 set
14	Handheld chlorophyll meter	1 set
15	Nematode extraction apparatus and sieves	1 set
16	Validated target-specific rapid-test starter kits	1 set

5.6 Common support equipment

Equipment	Quantity
Purified-water system with storage/dispensing	1 set / lot
Ducted chemical fume hood	1 set / lot
Critical-instrument UPS and voltage protection	1 set / lot
Instrument software, interface cables and licences	1 set / lot
Equipment-side service connection accessories	1 set / lot
Chemical spill kit, eyewash and safety accessories	1 set / lot
Segregated chemical/biological waste containers	1 set / lot

The biological safety cabinet and chemical fume hood are distinct provisions and shall not be substituted for one another. Specialist molecular tests and unresolved diagnoses shall be referred externally under a disclosed allowance.

6. Initial Reusable Apparatus Package

Apparatus	Minimum starter provision
Seed-purity boards / sorting trays	2 boards / 12 trays
Forceps, spatulas and dissection tools	4 sets
Seed and soil sieves	1 complete set each
Germination trays/boxes	40
Glass Petri dishes	50
Moisture-testing containers	30
Beakers / conical flasks	24 each, assorted sizes
Volumetric flasks	20, assorted sizes
Measuring cylinders	12, assorted sizes
Burettes and stands, where required	2 sets

Apparatus	Minimum starter provision
Volumetric/graduated pipettes and fillers	1 assorted set
Test tubes / racks	100 tubes / 6 racks
Reusable sample bottles/containers	100, assorted sizes
Funnels	12
Crucibles / evaporation dishes	24 each
Wash bottles	12
Root-washing/sample trays	12
Soil/sediment sampling tools and rings	1 complete set
Slide boxes and microscopy accessories	1 lot
Cuvettes, sample holders and instrument accessories	Complete sets

Provide an itemized schedule. Use borosilicate glass and Class A volumetric ware where required. Select sizes/ materials against test methods; include all additional apparatus essential to operation.

7. Initial Consumables — Lump-Sum Package

Quote a separate lump-sum amount for commissioning, training and the first three months of the declared workload, supported by quantities, unit replenishment rates and shelf lives. The purchaser has not prescribed an arbitrary monetary allowance.

- Germination/blotting paper and suitable substrates.
- Filter papers, glass-fibre filters and syringe filters.
- Disposable sample containers, sterile bags, tubes, Petri dishes and pipette tips.
- Gloves, masks, coats and routine PPE.
- Microscope slides, coverslips and suitable stains.
- Photometer reagent kits and soil-extraction/nutrient reagents for all offered methods.
- pH buffers, EC/salinity/turbidity/ion standards and certified carbon reference materials.
- Culture media, disinfectants, sterilisation indicators and selected rapid diagnostic kits.
- Sample labels/tags, cleaning materials, waste bags, filters and desiccants.

Consumables shall have adequate remaining shelf life at delivery. Initial three-month provisions shall not be charged again in recurring operating consumables.

8. Five-Year Operation and Staffing

Operate all four laboratories for 60 months from commissioning: sample registration, preparation, testing, QC, review, reporting, inventory, storage monitoring, waste management and coordination with nursery management. Submit monthly reports on samples, tests, quality trends, calibration, stock, staffing, breakdowns and corrective actions.

Submit a qualified staffing plan comprising a laboratory in-charge, analytical personnel, plant-pathology expertise, trained technicians and support staff. Shared roles are acceptable only where competence and workload justify them. Include leave replacements and specialist support.

9. Workload and Consumable Pricing Basis

Declare included monthly seed/propagule batches, seedling assessments, soil/sediment/water samples and parameter determinations, and plant-health investigations. State fixed staffing charges, included consumable workload, additional per-test rates and external referral allowance. The workload shall be agreed before award; unlimited testing shall not be assumed.

10. Comprehensive Maintenance

Provide preventive maintenance, breakdown attendance, repairs, defective-part replacement, instrument software support and scheduled calibration throughout five years. State OEM warranties, response/repair times and prolonged-breakdown arrangements. Identify probes, electrodes, lamps, filters and limited-life

components, their expected replacement cycles and included costs. Identify calibration scope and traceability; use competent accredited providers where applicable.

11. Installation and Service Boundaries

Civil works and laboratory furniture are excluded. Normal installation and connections from available service points are included. Before supply, submit drawings, electrical/UPS loads, water quality, drainage, gas, exhaust, room-conditioning requirements and infrastructure deficiencies. Major building/service upgrades shall be separately identified and priced before execution. Include required equipment gas supplies, regulators and safe installation where relevant.

12. Data and LIMS Coordination

Provide digital export wherever available and declare interface compatibility. Cooperate with the separate Smart LIMS agency. Do not duplicate the LIMS, three desktops and laptop under this quotation where already supplied through that package. Include dedicated instrument-control computers when essential. All project-specific results and records belong to the Client.

13. Acceptance and Handover

Acceptance requires inventory verification, installation/operational checks, calibration certificates, representative performance tests with suitable standards and samples, approved SOPs, safety/maintenance procedures, training, manuals, licenses and asset registers. At the end of five years hand over working equipment, complete records, accessible data and service histories.

14. Financial Quotation Format

No.	Description	Amount excluding GST (INR)
1	Laboratory design, workflows and service assessment	
2	Propagule & Seed Quality instruments	
3	Nursery Quality Control instruments	
4	Soil, Sediment & Water Quality instruments	
5	Plant Health & Plant Pathology instruments	
6	Common equipment, safety and installation accessories	
7	Initial reusable apparatus/glassware — lump sum	
8	Initial three-month consumables/standards — lump sum	
9	Transport, installation, calibration and commissioning	
10	Training, SOPs and documentation	
11	Five-year staffing and laboratory operation	
12	Five-year comprehensive maintenance and calibration	
13	Operating consumables for Months 4–60 against declared workload	
14	External specialist-testing allowance	
	Total excluding GST	
	GST	
	Grand total for establishment and five years	

Provide equipment-wise costs, Year 1–5 operation/maintenance and consumable charges, taxes, escalation assumptions and unit rates for additional testing. Disclose all exclusions. No double charging of shared equipment or startup consumables is permitted.

15. Bidder Submission and General Conditions

This RFQ seeks technical and financial offers for planning, estimation and finalization of requirements and does not assure award. Clarifications, demonstrations or revised offers may be sought.

Address quotations to: The Divisional Forest Officer, Mangroves Division, North Konkan.
Submission address/email: dfommcu@gmail.com
Contact: 022-69309286

ANNEXURE I

The quote shall be considering the model anticipated and companies make as per the

Ref.	Instrument	General specification	Model make companies
B1	Precision balance	≥200 g; 0.001 g readability; calibration; overload protection; data output preferred	
B2	Bench balance	≥5 kg; 0.1 g readability; corrosion-resistant pan; tare	
B3	Digital calliper	0–150 mm minimum; 0.01 mm resolution; stainless steel	
B4	Seedling board	Approximately 1 m; stable base; washable; millimetre graduations	
B5	Magnifying lamp	Adjustable LED lamp; approximately 3–5 dioptre; stable mounting	
B6	Stereo microscope	Approximately 8×–35× or wider; reflected/transmitted light; digital camera and measurement software	
B7	Germination chamber	Approximately 150–250 L; approximately 10–45°C; programmable light/dark cycles; shelves, alarms and logging	
B8	Drying oven	Approximately 100 L; forced air; timer/controller; over-temperature protection; stainless chamber	
B9	Temperature/RH logger	Downloadable data; proposed accuracy ±0.5°C and ±3% RH or better in declared range	
B10	Salinity/EC meter	Temperature compensation; freshwater–seawater coverage; standards and case	
B11	Root assessment setup	Grid board, scale, camera support, wash trays and gentle spray	
B12	Seed storage	Species-specific controlled conditions; logging/alarm; separate ambient storage as needed	
C1	Water multiparameter	pH, EC, salinity, calculated TDS, temperature, optical DO; field protection; logging/export; complete probes	
C2	Soil-extract pH/EC	pH approximately 0–14, 0.01 resolution; temperature compensation; saline extracts; stand	
C3	Substrate moisture	Volumetric moisture; media calibration; declared saline limitations; reader/logger	
C4	Halogen moisture	≥50 g; approximately 0.001 g readability; programmable drying/endpoints; data export	
C5	Turbidimeter	Approximately 0–1,000 NTU minimum; low-range suitability; standards and storage	
C6	Optical TSS	Direct suspended-solids display; matrix-specific calibration; suitable range and cleaning kit	
C7	Photometer/spectrophotometer	Validated required parameter methods; QC; export; reagents, cuvettes and dilution kit; list uncovered tests	
C8	Sodium ISE system	Compatible meter/electrode; standards; ionic-strength reagents; sample-preparation kit	
C9	ORP/redox	Approximately ±1,000 mV or wider; sediment electrode; verification solution; reference details	

Ref.	Instrument	General specification	Model make companies
C10	Available NPK	Identify extractable forms, extraction and analytical methods; standards/QC; no unvalidated generic direct NPK probe	
C11	Shaker	Adjustable speed/timer; extraction-vessel clamps; corrosion-resistant platform	
C12	Analytical balance	≥200 g; 0.0001 g readability; draft shield; calibration/output	
C13	Particle-size analyser	Wet dispersion; adequate clay/silt/sand coverage; pretreatment and coarse fraction handling; software	
C14	Solid carbon analyser	Organic/inorganic differentiation or validated correction; autosampler preferred; standards; gas/consumables included	
C15	Muffle furnace	Working at ≥550°C; approximately 1,000–1,100°C maximum; programmable safety controller	
C16	Bulk density	Known-volume stainless rings and sampling tools; shared balance/oven	
C17	Retention/porosity	Controlled saturation/drainage; defined volume; validated growing-media procedure	
C18	Permeameter	Constant/falling head as applicable; holders, reservoirs, tubing and measurement	
C19	Reference TSS/TDS	Vacuum filtration/evaporation; filters, dishes, drying and desiccation; analytical weighing	
D1	Stereo microscope	As B6; dedicated/shared only if workflow and contamination control permit	
D2	Compound microscope	Approximately 40×–1,000×; mechanical stage; LED; camera and software	
D3	Class II cabinet	Approximately 1.2 m work width; HEPA; airflow alarm; operator/product/environment protection; installation certification	
D4	Incubator	Approximately 100 L; maintain intended 25–35°C; shelves, logging/alarm; cooling where ambient requires	
D5	Autoclave	Approximately 50–75 L; validated 121°C cycles; interlocks; pressure/temperature indication and cycle records	
D6	Refrigerator	Laboratory grade; approximately 200–300 L; 2–8°C; logger/display and alarm	
D7	Hotplate/stirrer	Digital controls; approximately 2 L stirring; probe; over-temperature protection	
D8	Media pH meter	Approximately pH 0–14; 0.01 resolution; temperature compensation; suitable electrode	
D9	Micropipettes	Suitable individual ranges together covering approximately 0.5–1,000 µL; tips and calibration	
D10	Moist chamber/sampling	Sealed washable chambers, sterile tools, slides and containment	
D11	Nematode extraction	Baermann-type assembly, sieves and counting dishes	
D12	Chlorophyll meter	Non-destructive relative chlorophyll; repeatable clamping; stored readings	

Ref.	Instrument	General specification	Model make companies
D13	Rapid kits	Target-specific validated kits, controls, expiry/storage and instructions	
E1	Purified water	Approximately 10 L/hour or justified capacity; method-suitable quality; storage/monitoring	
E2	Fume hood	Approximately 1.2 m; chemical-resistant surface; ducted exhaust; airflow alarm; performance check	
E3	UPS/protection	Sized to loads and defined backup/shutdown needs	
E4	Desiccators	Suitable volume, seal and desiccant	
E5	Glassware	Borosilicate; Class A volumetric ware where required; chemical compatibility	
E6	Sampling tools/trays	Corrosion-resistant; washable; suitable for saline samples	
E7	Camera/tablet	Clear sample images; timestamp/export; coordinate with IT scope	
E8	Safety/waste	Spill kit, eyewash, PPE, segregated labelled waste containers and containment	

Annexure I — Configuration and Method Notes

- Photometer coverage shall be verified parameter by parameter. Calcium/magnesium methods may report hardness equivalents; specify conversions and dilution/interference controls. Sodium requires its separate supported method.
- Optical TSS is an estimate requiring matrix calibration and gravimetric verification. Calculated TDS is not gravimetric TDS.
- Laser diffraction texture results require a defined interpretation and shall not be assumed identical to sedimentation-method texture.
- Organic matter by loss on ignition is method-dependent and is not interchangeable with directly measured organic carbon.
- Seed storage shall follow species-specific protocols; do not apply a universal refrigeration temperature.
- Chemical fume hood exhaust and biological safety cabinet certification shall be included. Additional room ventilation or building alterations must be disclosed.

Annexure I — Bidder Compliance Schedule

Reference	Offered make/model	Compliance/deviation	Accessories/interface	Five-year service
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Manufacturer reference information

Reference sources for model identification; bidder shall provide current OEM datasheets and supported configurations:

Leica microscopy: https://www.leica-microsystems.com/applications/education/life-science/

Mummert UF110: https://www.memmert.com/en/products/heating-drying-ovens/universal-oven/uf110-2

YSI ProDSS: https://www.ysi.com/ProDSS

Hach TSS Portable: https://www.hach.com/products/online-instruments/online-sensors-and-controllers/suspended-solids/tss-portable

Mettler Toledo HE73: https://www.mt.com/gb/en/home/library/datasheets/laboratory-weighing/ds-HE73.html

Mastersizer range: https://www.malvernpanalytical.com/en/products/product-range/mastersizer-range

Elementar soli TOC cube: https://www.elementar.com/en/products/toc-analyzers/soli-toc-cube

Esco Airstream AC2: https://www.escolifesciences.com/products/class-ii-biological-safety-cabinet/airstream-gen-3-class-ii-bsc-s-series