

PROCUREMENT OF GOODS

Under Open Framework Agreement

**Project Management Unit,
National Hydrology Project**

Country: India

Project: National Hydrology Project

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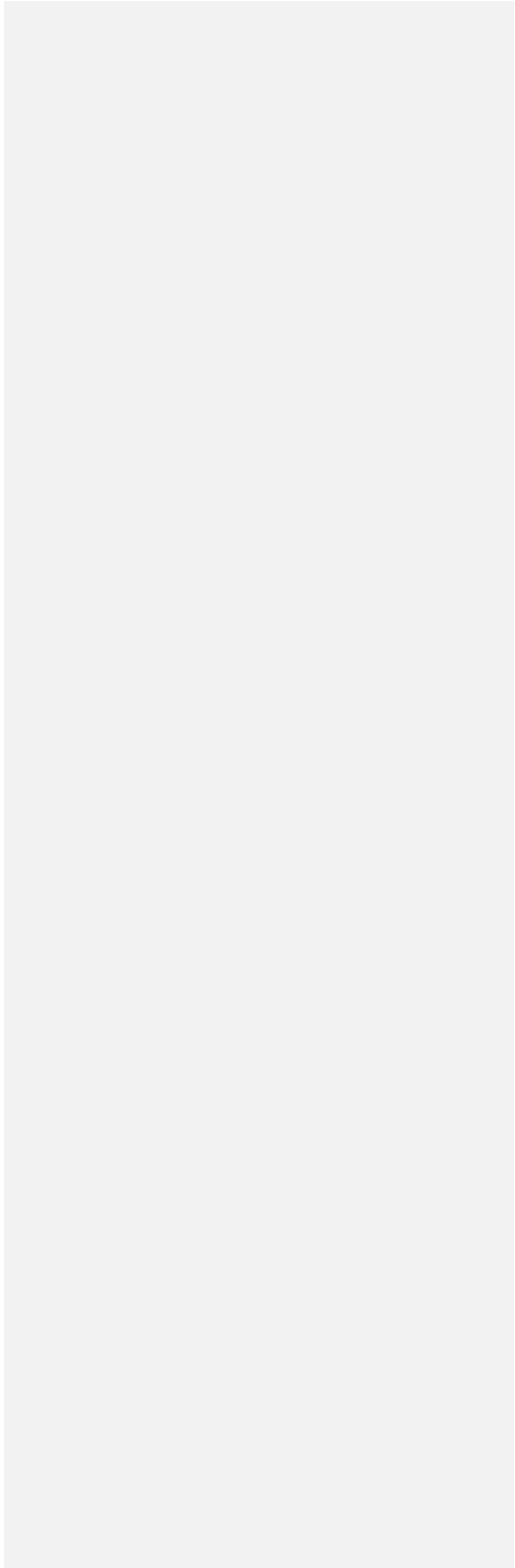
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INVITATION FOR PROPOSALS (IFP) FOR SUPPLY OF HYDRO-METEOROLOGICAL AND WATER QUALITY EQUIPMENT UNDER FRAMEWORK AGREEMENT

IFP REFERENCE	:	XXXXXXXXXX		Formatted: Highlight
DATE OF COMMENCEMENT OF SALE OF DOCUMENT FOR SETTING-UP FRAMEWORK AGREEMENT	:	XXXXXXXXXX		Formatted: Highlight
LAST DATE FOR SALE OF DOCUMENT FOR SETTING-UP FRAMEWORK AGREEMENT	:	XXXXXXXXXX		Formatted: Highlight
LAST DATE AND TIME FOR RECEIPT OF PROPOSALS	:	Date next to the last date for sale of the document) - 1500 Hrs.		
TIME AND DATE OF OPENING OF PROPOSALS	:	Same date as above - 1530 Hrs.		
PLACE OF OPENING OF PROPOSALS	:	Project Management Unit, National Hydrology Project.		
ADDRESS FOR COMMUNICATION	:	XXXXXXXXXX		Formatted: Highlight

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INVITATION FOR PROPOSALS



Invitation for Proposals (IFP)

India

National Hydrology Project.

Project ID: **xxxxxx**

IFP title: **Open Framework Agreement for XXXX**

IFP number HO: PMU: NDP I: **01/2012**

1. 1. The Government of India [GOI] is in the process of finalizing a credit from the *International Development Association* toward the cost of *National Hydrology Project (NHP)* and intends to apply part of the proceeds of this *credit* to payments for the Purchase Orders to be issued under the Framework Agreements to be set up through this IFP.

2. NHP is countrywide project, with 47 Implementing agencies (IAs) including eight central agencies, 37 state-level agencies and two river basin organizations (RBO)

3. 2. The *Project Management Unit, National Hydrology Project (NHP)* now invites sealed Proposals from eligible manufacturers and suppliers for setting up the Framework Agreements (FA) for supply of *Hydro-meteorological and Water Quality equipment*. The manufacturers and suppliers on the behalf of manufacturer (herein called as 'Proposer' in this document may) may submit Proposal for one or more items or multiple models of same item. However, evaluation and award of Framework Agreements will be done individually for each item. Prices of items are not to be submitted at this stage.

During the First stage framework agreement, only the makes and models of respective equipment would be evaluated against desired specifications and would be included in the framework.

5. During the second stage of the competition, Financial Bidding will be conducted through the procedures agreed with World Bank. The bids / quotations would be invited from all eligible bidders for supply, installation, operation and maintenance of the Hydro-meteorological equipment

6. Purchase Orders will be placed to the manufacturer/supplier that offers lowest price and comply with delivery requirements (out of Offering only those make/model of the equipment already accepted in first stage of Framework agreement) those who have signed the framework agreements, that offers lowest price and comply with delivery requirements. During the second stage price competition to be carried out by End Implementing Agencies (EIAs) of the Project. The framework agreements will impose no obligation on the *Project Management Unit, National Hydrology Project (NHP)* or the EIAs to purchase the estimated or any quantity from the Proposers who sign the framework agreements.

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7. 4. The Framework Agreement shall be valid for a period of 3 year from the date of signing of the Agreement. The validity may be extended for a further period (maximum 2 years) in accordance with the terms of the framework agreement. This being an open framework agreement, new Proposers may submit their Proposals (in the format given in original document for setting up the framework agreement) anytime after initial signing of these Agreements. Such offers received after initial signing of framework agreements will be opened on ~~yearly~~ quarterly basis (the date of opening will be intimated on the website of NHP) and will be evaluated on the basis of qualification and evaluation criteria specified in the original document for setting up the framework agreement.

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8. 5. Competition will be conducted through the Framework Agreement Procedures and is open to all Proposers from eligible source countries as defined in the World Bank's *Guidelines: Procurement under IBRD Loans and IDA Credits*.

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9. 6. Interested eligible Proposers may obtain further information from *Project Management Unit, National Hydrology Project (NHP)* and inspect the documents for setting up framework agreement at the address given below from [0930 to 1800 hrs.]. A pre-proposal meeting will be held on <date/time> at the address given below to provide additional clarifications. Non-attendance at the pre-proposal meeting will not be a cause for disqualification of a Proposer. Interested Proposers should depute their staff only to attend the pre-bid meeting

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10. 7. A complete set of documents for setting up framework agreement in English may be purchased by interested Proposers on the submission of a written application to the address below and upon payment of a nonrefundable fee of Rs.1,000/- between 1400 hrs to 1600 hrs. The method of payment will be a bank draft or certified banker's cheque made out in favour of the purchaser. The document will be sent by courier or speed post.

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11. Documents for setting up framework agreement may also be viewed and downloaded from the website www.mowr.gov.in free of cost. In such cases the Proposer would be solely responsible for ensuring that any subsequent addenda issued thereafter and available in website is also downloaded / incorporated in the document while preparing and submitting Proposals.

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12. 7. Proposals must be delivered to the address below on or before [insert time and date]. Electronic submission *will not* be permitted. All Proposals must be accompanied by a proposal security as specified in the documents for setting up framework agreement. Late Proposals will be rejected. Proposals will be opened in the presence of the Proposers' representatives who choose to attend at the address below.

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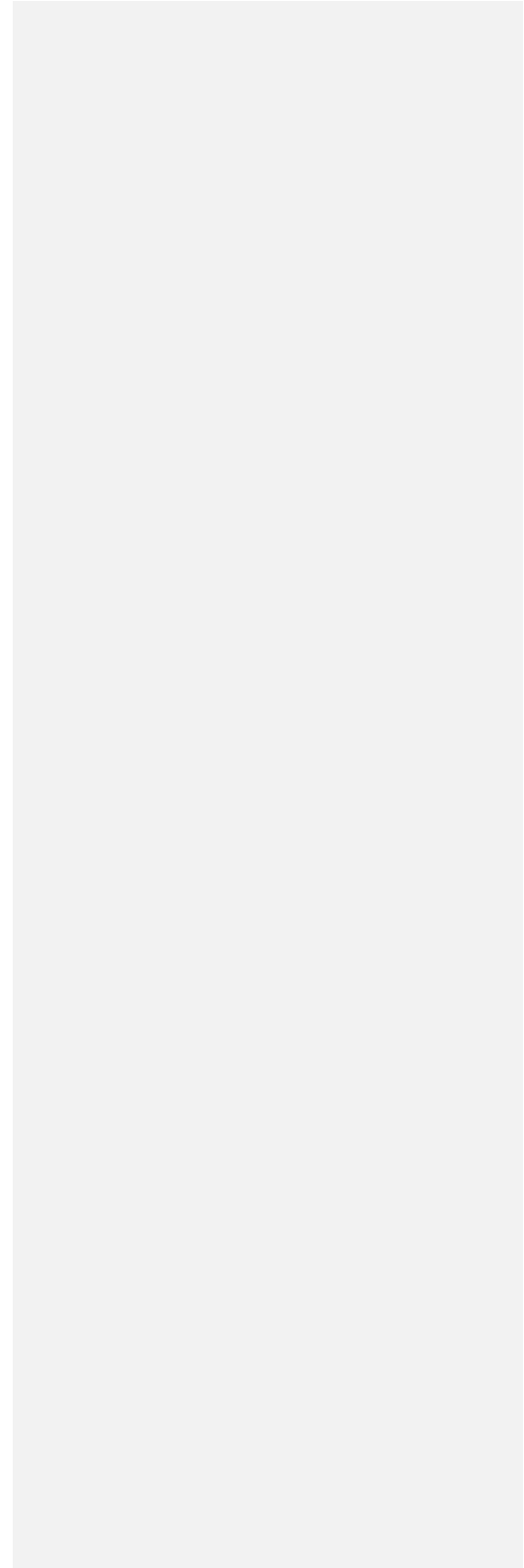
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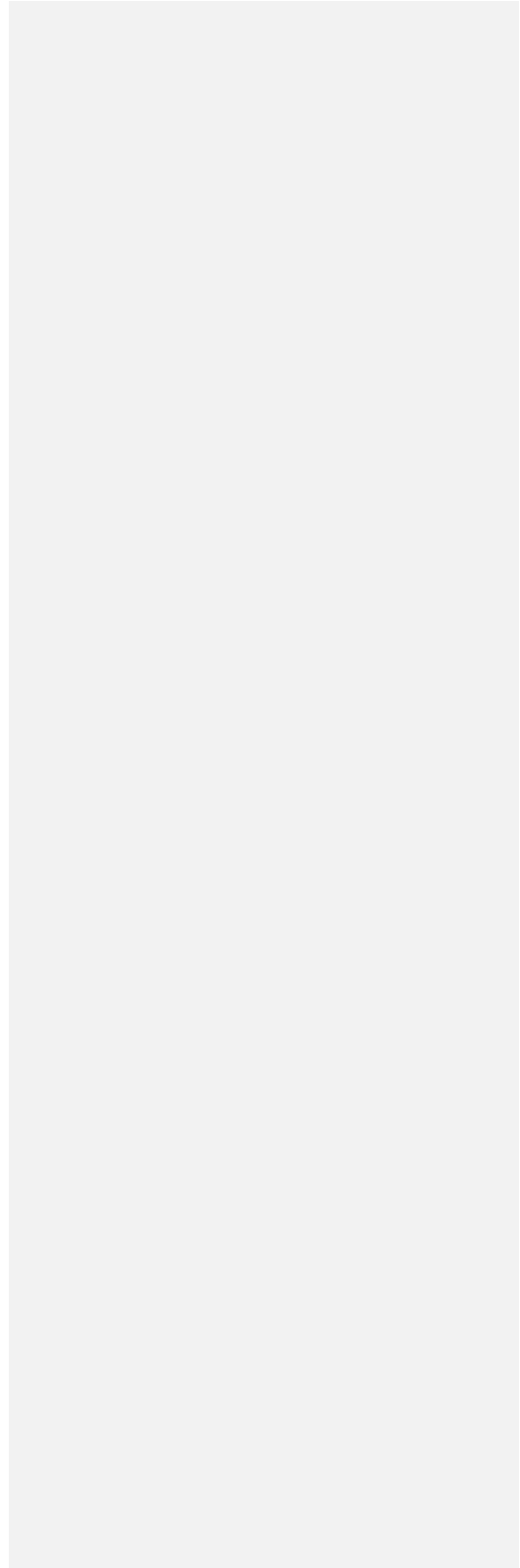
13. 8. In the event of the date being declared as a closed holiday for purchaser's office, date for submission of Proposals and opening will be the following day at the appointed times.

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Project Management Unit
National Hydrology Project (NHP)



SECTION I. INSTRUCTIONS TO PROPOSERS



Instructions to Proposers (ITP)

A. INTRODUCTION

- | | |
|--------------------------------|---|
| 1. Scope of Proposals | <p>1.1 Project Management Unit, <i>National Hydrology Project (NHP)</i> (hereinafter called the Purchaser), invites Proposals for setting up framework agreement for the supply of Goods (as described in the Schedule of Requirements).</p> <p>1.2 Throughout these documents, the terms “writing” means any handwritten, typewritten, or printed communication, including telex, cable, and facsimile transmission, and “day” means calendar day. Singular also means plural.</p> |
| 2. Source of Funds | <p>2.1 The Government of India (hereinafter called the Borrower) has applied for a credit (credit number 63708-IN, called a “loan” in these Documents) from the International Development Association (called “the Bank” in these Documents) equivalent to US\$ 352 Million U.S. dollars toward the cost of the <i>National Hydrology Project (NHP)</i>. The Borrower intends to apply a part of the proceeds of this loan to eligible payments under the Purchase Orders under Framework Agreements for which these documents are issued.</p> <p>2.2 Payment by the Bank will be made only at the request of the Borrower and upon approval by the Bank in accordance with the terms and conditions of the Loan Agreement, and will be subject in all respects to the terms and conditions of that Agreement. The Loan Agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of Goods, if such payment or import, to the knowledge of the Bank, is prohibited by a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations. No party other than the Borrower shall derive any rights from the Loan Agreement or have any claim to the loan proceeds.</p> |
| 3. Fraud and Corruption | <p>3.1 The Bank requires that Borrowers (including beneficiaries of Bank loans), proposer, bidders, suppliers, contractors and their agents (whether declared or not), sub-contractors, sub-consultants, service providers or suppliers, and any personnel thereof, observe the highest standard of ethics during the procurement and execution of Bank-financed</p> |

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contracts. In pursuance of this policy, the Bank:

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
 - (i) “corrupt practice” is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party ;
 - (ii) “fraudulent practice” is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation ;
 - (iii) “collusive practice” is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party ;
 - (iv) “coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party ;
 - (v) “obstructive practice” is
 - (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or
 - (bb) acts intended to materially impede the exercise of the Bank’s inspection and audit rights provided for under Clause 6 of the Framework Agreement.
 - (b) will reject a Proposal for award if it determines that the proposer or bidder recommended for award, or any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;
 - (c) will declare misprocurement and cancel the portion of the

loan allocated to a contract if it determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive or obstructive practices during the procurement or the implementation of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;

- (d) will sanction a firm or individual, at any time, in accordance with prevailing Bank's sanctions procedures, including by publicly declaring such firm or individual ineligible, either indefinitely or for a stated period of time: (i) to be awarded a Bank-financed contract; and (ii) to be a nominated sub-contractor, consultant, supplier or services provider of an otherwise eligible firm being awarded a Bank-financed contract;
- 3.2 Furthermore, Proposers shall be aware of the provision stated in Clause 25(c) of the Framework Agreement.
- 3.3 In pursuance of the policy defined in ITP Sub-Clause 3.1, the Bank will cancel the portion of the loan allocated to a Contract for Goods or works if it at any time determines that corrupt or fraudulent practices were engaged in by the representatives of the Borrower or of a beneficiary of the loan during the procurement or the execution of that Contract, without the Borrower having taken timely and appropriate action satisfactory to the Bank to remedy the situation.

4. Eligibility

- 4.1 Except as provided in ITP Sub-Clauses 4.2 and 4.3, this Competition process is open to all firms from eligible source countries, as defined in World Bank's "Guidelines: Procurement of goods, works and non-consulting services under IBRD loans and IDA credits & grants by World Bank borrowers" dated January 2011 (called "Procurement Guidelines" in this bid document).

The Bank maintains a list of countries from which Bidders, Proposers, Goods, and Services are not eligible to participate in procurement financed by the Bank. The list is regularly updated and can be obtained from the Public Information Center (PIC) of the World Bank. Joint ventures

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including members from ineligible source countries or including ineligible firms shall not be permitted to bid.

- 4.2 Firms of a member country may be excluded from bidding if:
- (a) either: (i) as a matter of law or official regulation, the Borrower's country prohibits commercial relations with that country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of the Goods required; or (ii) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of Goods from that country or any payments to persons or entities in that country.
 - (b) a firm (or any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm) has been engaged by (i) the Borrower or (ii) the Purchaser or (iii) End Implementing Agency that has been duly authorized to act on behalf of the Borrower or Purchaser to provide consulting services for the preparation of the design, specifications, and other documents to be used for the procurement of the Goods described in these Bidding Documents.
 - (c) government-owned enterprises in the Borrower's country may participate only if they can establish that they (i) are legally and financially autonomous and (ii) operate under commercial law. No dependent agency of the Borrower or Sub-Borrower or Purchaser under a Bank-financed project shall be permitted to bid or submit a Proposal for the procurement of Goods under the project.
- 4.3 A firm declared ineligible by the Bank in accordance with ITP Sub-Clause 3.1 (c) shall be ineligible to bid for a Bank-financed contract during the period of time determined by the Bank.
- 4.4 Pursuant to ITP Sub-Clause 14.1, the Proposer shall furnish, as part of its Proposal, documents establishing, to the Purchaser's satisfaction, the Proposer's eligibility to

participate in Bank financed procurement process.

- 4.5 Proposers shall provide such evidence of their continued eligibility satisfactory to the Purchaser as the Purchaser shall reasonably request.

5. Eligible Goods and Services

- 5.1 Funds from Bank loans are disbursed only on account of expenditures for the Goods and Services, provided by nationals of, and produced in or supplied from, eligible source countries as defined in the *Procurement Guidelines*. The Bank maintains a list of countries from which Proposers, Bidders, Goods, and Services are not eligible to participate in procurement financed by the Bank. The list is regularly updated and can be obtained from the Public Information Center of the World Bank. Goods are produced in a Bank member country when they are mined, grown, or manufactured in the territory of that country. Goods produced or Services supplied from a Bank member country may be excluded if that member country is subject to the conditions specified in ITP Sub-Clause 4.2 (a) (i) or (ii).
- 5.2 For purposes of this clause, the nationality of the bidder or Proposer is distinct from the country from where the Goods and Services are supplied.
- 5.3 For purposes of this clause, (a) the term “Goods” includes any Goods that are the subject of this Invitation for Proposals and (b) the term “Services” includes related services such as transportation, insurance, commissioning, and training.

B. FIRST STAGE COMPETITION

6. Documents Establishing Eligibility of Goods and Services and Conformity to Documents for setting up Framework Agreement

- 6.1 Pursuant to ITP Clause 14, the Proposer shall furnish, as part of its Proposal, documents establishing, to the Purchaser’s satisfaction, the eligibility of the Goods and services to be supplied under the Framework Agreement.
- 6.2 The documentary evidence of the eligibility of the Goods and Services shall consist of a statement in the Proposal of the country of origin of the Goods and Services offered.

- 6.3 The documentary evidence of conformity of the goods and services to the document for setting up framework agreement may be in the form of literature, drawings, and data and shall consist of:
- (a) a detailed description of the essential technical and performance characteristics of the Goods;
 - (b) an item-by-item commentary on the Purchaser's Technical Specifications demonstrating substantial responsiveness of the Goods and Services to those specifications, or a statement of deviations and exceptions to the provisions of the Technical Specifications;
- 6.4 Wherever applicable, the Goods to be supplied under the Framework Agreement shall be registered (if applicable) with the relevant authority in India. A Proposer who has already registered its Goods by the time of submission of Proposal should submit a copy of the Registration Certificate with its Proposal. Otherwise, the successful Proposer, by the time of signing of Framework Agreement, shall submit to the Purchaser a copy of the Registration Certificate of the Goods for use in India.
- 6.5 For purposes of the commentary to be furnished pursuant to ITP Clause 6.3 (b) above, the Proposer shall note that standards as well as references to brand names designated by the Purchaser in its Technical Specifications are intended to be descriptive only and not restrictive. The Proposer may substitute alternative standards, brand names, and/or catalog numbers in its Proposal, provided that it demonstrates to the Purchaser's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications.

**7. Documents
Establishing
Qualifications of
the Proposer**

- 7.1 The Proposer shall provide documentary evidence to establish to the Purchaser's satisfaction that:
- (a) the Proposer has the financial, technical, and production capability necessary to perform the Framework Agreement, meets the qualification

criteria specified in the **Section II**, and has a successful performance history in accordance with criteria specified in the **Section II**.

- (b) in the case of a Proposer offering to supply Goods, that the Proposer did not manufacture or otherwise produce, the Proposer has been duly authorized by the manufacturer or producer of such Goods to supply the Goods in India (as per Manufacturer's Authorization Form in Section VII);
- (c) in the case of a Proposer who is not doing business within India (or for other reasons will not itself carry out service/maintenance obligations), the Proposer is or will be (if awarded the Contract) represented by a local service/maintenance provider in India equipped and able to carry out the Proposer's warranty obligations prescribed in the Conditions of Contract and/or Technical Specifications; and
- (d) the Proposer meets the qualification criteria listed in the **Section II**.

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- 8. One Proposal per Proposer** 8.1 A firm shall submit only one Proposal as Individual Entity. Joint Ventures are not allowed. either individually or as a partner of a joint venture.—A firm that submits either individually or, as a member of a joint venture, more than one Proposal will cause all the Proposals with the firm's participation to be disqualified.
- 9. Cost of preparation and submission of Proposals** 9.1 The Proposer shall bear all costs associated with the preparation and submission of its Proposal, and the Purchaser will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the competition process.
- 10. Content of Document for setting up Framework Agreement** 10.1 The Documents for setting up Framework Agreement are those stated below and should be read in conjunction with any addendum issued in accordance with ITP Clause 12.
- | | |
|-------------|---------------------------------|
| Section I. | Instructions to Proposers (ITP) |
| Section II. | Qualification Requirements |
| Section III | Eligible Countries |
| Section IV. | Form of Framework Agreement |

Section V.	Form of Purchase Order
Section VI.	Technical Specifications
Section VII.	Sample Forms

10.2 The “Invitation for Proposals” does not form part of the Document for setting up Framework Agreement and is included as a reference only. In case of discrepancies between the Invitation for Proposals and the Document for setting up Framework Agreement listed in 10.1 above, said Document for setting up Framework Agreement will take precedence.

11. Clarification of Document for setting up Framework Agreement

11.1 A prospective Proposer requiring any clarification of the Document for setting up Framework Agreement shall contact the Purchaser in writing at the Purchaser’s address ~~(Project Management Unit, National Hydrology Project (NHP) National Dairy Plan I (National Dairy Support Project) National Dairy Development Board, Anand, India 388 001, Phone : 02692 260148/260149, Fax No. : 02692 260159).~~

The Purchaser will respond in writing to any request for clarification received no later than fourteen (14) calendar days prior to the deadline of submission of Proposals. Copies of the Purchaser’s response shall be sent to all prospective Proposers who have purchased the Document for setting up Framework Agreement, including a description of the inquiry but without identifying its source.

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11.2 A pre-proposal meeting will be held on ~~<date/time>~~ at the address given in sub-clause 11.1 above to provide additional clarifications. Non-attendance at the pre-proposal meeting will not be a cause for disqualification of a Proposer. Interested Proposers should depute their staff only to attend the pre-bid meeting.

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12. Amendment of Document for setting up Framework Agreement

12.1 At any time prior to the deadline for submission of Proposals, the Purchaser may amend the Document for setting up Framework Agreement by issuing Addenda.

12.2 Any addendum thus issued shall be part of the Document for setting up Framework Agreement pursuant to ITP Sub-Clause 10.1 and shall be communicated in writing to all purchasers of the Document for setting up Framework Agreement and will be binding on them. Proposers are

required to immediately acknowledge receipt of any such amendment, and it will be assumed that the information contained in the amendment will have been taken into account by the Proposer in its Proposal. The addendum will also be uploaded on the website www.mowr.gov.in. Proposers would be solely responsible for ensuring that any subsequent addenda issued thereafter and available in website is also downloaded / incorporated while preparing and submitting Proposals.

- 12.3 To give prospective Proposers reasonable time in which to take the amendment into account in preparing their Proposals, the Purchaser shall extend, at its discretion, the deadline for submission of Proposals, in which case, the Purchaser will notify all Proposers by [eable-email](#) confirmed in writing of the extended deadline.

13. Language of Proposal

- 13.1 The Proposal, as well as all correspondence and documents relating to the Proposal exchanged by the Proposer and the Purchaser, shall be written in English language. Supporting documents and printed literature furnished by the Proposer may be in another language provided they are accompanied by an accurate translation of the relevant passages in English, in which case, for purposes of interpretation of the Proposal, the translation shall govern.

14. Documents Constituting the Proposal

- 14.1 The Proposal submitted by the Proposer shall comprise the following:
- (a) duly filled-in Form of Proposal, in accordance with the forms indicated in Section VII;
 - (b) original form of proposal security in accordance with the provisions of ITP Sub-Clause 19 (Proposal Security);
 - (c) written power of attorney authorizing the signatory of the Proposal to commit the Proposer;
 - (d) the documentary evidence in accordance with ITP Sub-Clause 4.4 establishing to the Purchaser's satisfaction the Proposer's eligibility to submit Proposal including but not limited to documentary evidence that the Proposer is legally incorporated in a territory of an eligible source country as defined

under ITP Clause 4;

- (e) documentary evidence establishing to the Purchaser's satisfaction, and in accordance with ITP Clause 6 that the Goods and ancillary services to be supplied by the Proposer are eligible Goods and Services, pursuant to ITP Clause 5, and that they conform to the Document for setting up Framework Agreement;
- (f) documentary evidence establishing to the Purchaser's satisfaction, and in accordance with ITP Clause 7 that the Proposer is qualified to perform the Contract if its Proposal is accepted.; and
- (h) The manufacturers' authorization form in **Form 4 of Section VII**.

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15. Proposal Form 15.1 The Proposer shall complete the Proposal Form and other forms furnished in the Document for setting up Framework Agreement, indicating the Goods to be supplied, a brief description of the Goods, their country of origin, etc.

16. Period of Validity of Proposals 16.1 Proposals shall remain valid for the period 90 days after the date of proposal submission specified in ITP Clause 21. A Proposal valid for a shorter period shall be rejected by the Purchaser as non-responsive.

16.2 In exceptional circumstances, prior to expiry of the original proposal validity period, the Purchaser may request that the Proposers extend the period of validity for a specified additional period. The request and the responses thereto shall be made in writing. A Proposer may refuse the request without forfeiting its proposal security. A Proposer agreeing to the request will not be required or permitted to modify its Proposal, but will be required to extend the validity of its proposal security for the period of the extension.

17. Proposal Security 17.1 **The Proposer shall furnish, as part of its Proposal, a proposal security in the amount stipulated in the Annexure A of Section IV in Indian Rupees.**

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17.2 The proposal security shall remain valid for a period of 45 days beyond the validity period for the Proposal.

17.3 The proposal security shall be denominated in Indian

Rupees, and shall be, at the Proposer's option, in one of the following forms:

- (a) a demand draft drawn in favour of the Purchaser;
- (b) a (bank) guarantee issued by a nationalized/scheduled bank in India selected by the Proposer or any reputable bank located in any eligible country. The format of the (bank) guarantee shall be in accordance with the form of proposal security included in Section VII or any other form acceptable to the Purchaser.

17.4 Any Proposal not accompanied by an acceptable proposal security shall be rejected by the Purchaser as non-responsive. ~~The proposal security of a joint venture must be in the name of the joint venture submitting the Proposal.~~

17.5 The proposal securities of unsuccessful Proposers will be returned as promptly as possible, but not later than 28 days after the expiration of the period of proposal validity.

17.6 The proposal security of the successful Proposer will be returned when the Proposer has signed the Agreement and furnished the required performance security.

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17.7 The proposal security may be forfeited

- (a) if the Proposer withdraws its Proposal, except as provided in ITP Sub-Clauses 16.2 and 23.3; or
- (b) in the case of a successful Proposer, if the Proposer fails within the specified time limit to:
 - (i) sign the framework agreement, or
 - (ii) furnish the required performance security.

18. Alternative Proposals by Proposers

18.1 Alternative Proposals shall not be accepted.

19. Format and Signing of Proposal

19.1 The Proposer shall prepare one original and 2 copies/sets of the Proposal, clearly marking each one as "ORIGINAL PROPOSAL" and "COPY OF PROPOSAL," as appropriate. In the event of any discrepancy between them, the original

shall govern.

19.2 The original and all copies of the Proposal, each consisting of the documents listed in ITP Sub-Clause 14.1, shall be typed or written in indelible ink and shall be signed by the Proposer or a person or persons duly authorized to bind the Proposer to the Contract. The later authorization shall be indicated by written power of attorney, which pursuant to ITP Sub-Clause 14.1 (d) shall accompany the Proposal.

21.3 Any interlineation, erasures, or overwriting to correct errors made by the Proposer should be initialed by the person or persons signing the Proposal.

21.4 The Proposer shall furnish in the Proposal Form (a sample of which is provided in the Sample Forms Section of this document) information regarding commissions or gratuities, if any, paid or to be paid to agents relating to this Proposal and to the execution of the Agreement/Purchase Order if the Proposer is awarded the Agreement/Purchase Order.

20. Sealing and Marking of Proposals

20.1 The Proposer shall enclose the original and 2 copies of the Proposal, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL" and "COPY." The envelopes containing the original and copies shall then be enclosed in another envelope.

20.2 The inner and outer envelopes shall:

- (a) bear the name and address of the Proposer;
- (b) be addressed to the Purchaser at the address below:
Project Monitoring Unit, National Hydrology Project,
New Delhi.
- (c) bear the specific identification of this Competition process e.g. **Proposal for setting up Framework Agreement, IFP No. HO:PUR:NDP I:01/2012** ; and
- (d) bear a statement "DO NOT OPEN BEFORE [date and time]".

20.3 If the outer envelope is not sealed and marked as required by ITP Sub-Clause 20.2, the Purchaser will assume no

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responsibility for the misplacement or premature opening of the Proposal.

- 21. Deadline for Submission of Proposals**
- 21.1 Proposals must be received by the Purchaser at the address specified in ITP Sub-Clause 20.2 (b) no later than <date/time>. In the event of the specified date for the submission of Proposals being declared a holiday for the Purchaser, the Proposals will be received up to the appointed time on the next working day.
- 21.2 The Purchaser may, at its discretion, extend the deadline for the submission of Proposals by amending the document for setting up Framework Agreement in accordance with ITP Sub-Clause 12.3, in which case all rights and obligations of the Purchaser and Proposers previously subject to the deadline will thereafter be subject to the deadline as extended.
- 22. Late Proposals**
- 22.1 Any Proposal received by the Purchaser after the deadline for submission of Proposals prescribed by the Purchaser in the ITP Clause 21 will be rejected and returned unopened to the Proposer.
- 23. Modification and Withdrawal of Proposals**
- 23.1 The Proposer may modify or withdraw its Proposal after submission, provided that written notice of the modification, or withdrawal of the Proposals duly signed by an authorized representative, is received by the Purchaser prior to the deadline prescribed for submission of Proposals. No Proposal can be modified subsequent to the deadline for submission of Proposals.
- 23.2 The Proposer's modification shall be prepared, sealed, marked, and dispatched as follows:
- (a) The Proposer shall provide an original and the number of copies specified ITP Sub-Clause 20.1 of any modifications to its Proposal, clearly identified as such, in two inner envelopes duly marked "PROPOSAL MODIFICATION-ORIGINAL" and "PROPOSAL MODIFICATION-COPIES." The inner envelopes shall be sealed in an outer envelope, which shall be duly marked "PROPOSAL MODIFICATION."
 - (b) Other provisions concerning the marking and dispatch of Proposal modifications shall be in accordance with

ITP Sub-Clauses 20.2 and 20.3.

23.3 A Proposer wishing to withdraw its Proposal shall notify the Purchaser in writing prior to the deadline prescribed for Proposal submission. A withdrawal notice shall be received prior to the deadline for submission of Proposals. The notice of withdrawal shall:

- (a) be addressed to the Purchaser at the address named in the **ITP Sub-Clause 20.2(b)**,
- (b) bear the specific identification of the IFP title and IFP number, and the words “PROPOSAL WITHDRAWAL NOTICE,” and
- (c) be accompanied by a written power of attorney authorizing the signatory of the withdrawal notice to withdraw the Proposal.

23.4 Proposals requested to be withdrawn in accordance with ITP Sub-Clause 23.3, shall be returned unopened to the Proposers.

23.5 No Proposal may be withdrawn after the Proposal submission deadline. Withdrawal of a Proposal after proposal submission deadline may result in the forfeiture of the Proposer’s proposal security, pursuant to ITP Sub-Clause 17.7.

24. Proposal Opening

24.1 The Purchaser will open all Proposals, including withdrawal notices and modifications, in public, in the presence of Proposers’ representatives who choose to attend, at **<the time>**, on **<the date>**, and at the place specified in the ITP Sub-Clause **20.2(b)**. Proposers’ representatives shall sign a register as proof of their attendance. In the event of the specified date of the proposal opening being declared a holiday for the Purchaser, the Proposals shall be opened at the appointed time and location on the next working day.

24.2 Envelopes marked “WITHDRAWAL” shall be read out and the envelope with the corresponding Proposal shall not be opened but returned to the Proposer. No Proposal withdrawal notice shall be permitted unless the corresponding withdrawal notice is read out at proposal opening. Envelopes marked “MODIFICATION” shall be

read out and opened with the corresponding Proposal.

- 24.3 Proposals shall be opened one at a time, reading out: the name of the Proposer and whether there is a modification;; the presence or absence of a proposal security; the presence or absence of requisite powers of attorney; and any other such details as the Purchaser may consider appropriate. No Proposal shall be rejected at proposal opening except for late proposals pursuant to Sub-Clause 22.1.
- 24.4 Proposals (and modifications sent pursuant to ITP Sub-Clause 23.2) that are not opened and read out at proposal opening shall not be considered further for evaluation, irrespective of the circumstances.
- 24.5 The Purchaser will prepare minutes of the proposal opening at the end of the opening session, including, as a minimum: the name of the Proposer and whether there was a withdrawal or modification; the presence or absence of a proposal security; the presence or absence of requisite powers of attorney.

The Proposer's representatives who are present shall be requested to sign the minutes. The omission of a Proposer's signature on the minutes shall not invalidate the content and effect of the minutes. The minutes should be distributed to all Proposers who request them.

25. Clarification of Proposals

- 25.1 During evaluation of the Proposals, the Purchaser may, at its discretion, ask the Proposer for a clarification of its Proposal. The request for clarification and the response shall be in writing, and no change in the substance of the Proposal shall be sought, offered, or permitted. The maximum time limit for response from proposer on the clarification sought shall be two weeks from the date of written communication.

26. Confidentiality

- 26.1 Information relating to the examination, clarification, evaluation, and comparison of Proposals, and recommendations for the award of a Contract shall not be disclosed to Proposers or any other persons not officially concerned with such process until the notification of Contract award is made to all Proposers.

- 26.2 Any effort by the Proposer to influence the Purchaser in the

Purchaser's proposal evaluation, proposal comparison, or contract award decisions may result in the rejection of the Proposer's Proposal.

26.3 From the time of proposal opening to the time of Contract award, if any Proposer wishes to contact the Purchaser on any matter related to its Proposal, it should do so in writing.

27. Examination of Proposals and Determination of Responsiveness

27.1 The Purchaser will examine the Proposals to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Proposals are generally in order.

27.2 The Purchaser may waive any minor informality, nonconformity, or irregularity in a Proposal that does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Proposer.

27.3 Prior to the detailed evaluation, pursuant to ITP Clause 28, the Purchaser will determine whether each Proposal is of acceptable quality, is complete, and is substantially responsive to the document for setting up framework agreement. For purposes of this determination, a substantially responsive Proposal is one that conforms to all the terms, conditions, and specifications of the document for setting up framework agreement without material deviations, exceptions, objections, conditionalities, or reservations. A material deviation, exception, objection, conditionality, or reservation is one: (i) that limits in any substantial way the scope, quality, or performance of the Goods and related Services; (ii) that limits, in any substantial way that is inconsistent with the document for setting up framework agreement, the Purchaser's rights or the successful Proposer's obligations under the Contract; and (iii) that the acceptance of which would unfairly affect the competitive position of other Proposers who have submitted substantially responsive Proposals.

27.4 If a Proposal is not substantially responsive, it will be rejected by the Purchaser and may not subsequently be made responsive by the Proposer by correction of the nonconformity. **However, the proposer is free to modify its design to become responsive and bid for acceptance during subsequent evaluation as per clause 31 of ITP**

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The Purchaser's determination of a Proposal's responsiveness is to be based on the contents of the Proposal itself without recourse to extrinsic evidence.

28. Evaluation of Proposals

28.1 The Purchaser will determine to its satisfaction whether the Proposers that are selected as having submitted the responsive Proposals are qualified to perform the Contract satisfactorily, in accordance with the criteria listed in ITP Sub-Clause 7.1 read with **Section II**.

28.2 The determination will evaluate the Proposer's financial, technical, and production capabilities. It will be based on an examination of the documentary evidence of the Proposer's qualifications submitted by the Proposer, pursuant to ITP Sub-Clause 7.1, as well as other information the Purchaser deems necessary and appropriate. The Purchaser will also determine whether the products offered by the Proposer meet the technical specifications given in Section VI.

28.3 For qualification of particular item(s)/product(s), the proposer shall submit the testing and certification reports relevant to each equipment like IMD, CWC, ISRO, WMO, UL / CE Certification. The purchaser may, at its discretion, ask the proposer to bring bring the item/product for its testing as per standard at testing lab designated by Purchaser (like CWPRS) CWPRS Pune, and after satisfactory testing at Testing Lab CWPRS conforming to specification and requirement, the item(s)/product(s) shall qualify for framework agreement.

28.4 An affirmative post qualification determination will be a prerequisite for award of the framework agreement to the Proposers. A negative determination will result in rejection of the Proposer's Proposal.

28.5 All the cost related to transport/shipment, packing of equipment for testing testing of equipment has to be borne by the proposer and proposer equipment has to be taken back by the proposer after 7 days of its testing at their own cost. However, the cost of actual testing of equipment at designated lab would be borne by purchaser.

29. Award Criteria

29.1 The Purchaser will award the Framework Agreements to the Proposers whose Proposals have been determined to be substantially responsive, provided further that the Proposers are determined to be qualified to perform the Contract

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satisfactorily, pursuant to ITP Clause 28.

30. Purchaser's Right to Accept Any Proposal and to Reject Any or All Proposals

30.1 The Purchaser reserves the right to accept or reject any Proposal, or to annul the first stage competition and reject all Proposals at any time prior to Framework Agreement award, without thereby incurring any liability to the affected Proposer or Proposers.

31. Participation by new Proposers

31.1 This being an open framework agreement, new Proposers may submit their Proposals (in the format given in original document for setting up the framework agreement) anytime after initial signing of these Agreements. Such offers received after initial signing of framework agreements will be opened on **yearly-Quarterly** basis (the date of opening will be intimated on the website of MoWR) and will be evaluated on the basis of qualification and evaluation criteria specified in the original document for setting up the framework agreement.

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32. Notification of Award

32.1 Prior to the expiration of the period of proposal validity, the Purchaser will notify the successful Proposers in writing by registered letter or by [eablecable-mail](#), to be subsequently confirmed in writing by registered letters, that their Proposals have been accepted.

32.2 The notification of award will constitute the formation of the framework agreement.

32.3 Upon the successful Proposers furnishing of the signed Framework Agreement and performance security pursuant to ITP Clause 34, the Purchaser will promptly notify each unsuccessful Proposer and will discharge its proposal security, pursuant to ITP Clause 17.

32.4 If, after notification of award, a Proposer wishes to ascertain the grounds on which its Proposal was not selected, it should address its request to the Purchaser. The Purchaser will promptly respond in writing to the unsuccessful Proposer.

33. Signing of Framework Agreement

33.1 Promptly after the Purchaser notifies the successful Proposers that their Proposals have been accepted, the Purchaser will send the Proposers the Form for setting up the framework

agreements provided in the document for setting up framework agreement, incorporating all agreements between the parties.

33.2 Within twenty-one (21) days of receipt of the Form for setting up the framework agreement, the successful Proposers shall sign and date the Form and return it to the Purchaser.

34. Performance Security

34.1 Within twenty-one (21) days of the receipt of notification of award from the Purchaser, the successful Proposers shall furnish the performance security in accordance with the Conditions of Framework Agreement, using the Performance Security Form provided in Section VII of the document for setting up framework agreement, or in another form acceptable to the Purchaser.

34.2 Failure of the successful Proposer to comply with the requirement of ITP Clause 33 or ITP Sub-Clause 34.1 shall constitute sufficient grounds for the annulment of the award and forfeiture of the proposal security.

B. SECOND STAGE COMPETITION

35. Invitation of Second Stage Bid

35.1 During the period of validity of the Framework Agreement, the End Implementation Agencies (EIAs) will invite the second stage ~~price bid~~financial bid, ~~from the successful Proposers who have signed the Framework Agreements (called "Supplier" in the Framework Agreement and hereinafter).~~ The ~~letter inviting the~~ second stage price bid will specify the quantity estimated to be procured under a particular Purchase Order, the requirement of associated services along with the delivery schedule and place of delivery. The second stage bid would be open to all suppliers / bidders who are otherwise eligible and qualified to participate. During second stage, bidders would be allowed to offer only the equipment model already accepted during first stage of framework agreement.

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36. Bid Prices

36.1 During the second stage competition, the Supplier shall indicate on the Price Schedule, the unit prices of each item, and the total Bid price of the Goods it proposes to supply under the purchase order. The ~~forms issued~~procedures laid

~~out for~~ second stage competition ~~would be published by EIAs and~~ must be completed ~~without any alterations to its format and no substitute shall be accepted.~~ The Prices shall be quoted in Indian Rupees

- 36.2 Prices indicated on the Price Schedule shall be quoted on EXW (ex works, ex factory, ex warehouse, ex showroom, or off-the-shelf, as applicable) basis, including all duties and sales tax and other duties and taxes already paid or payable and transportation, insurance, and other local costs incidental to delivery of the Goods to their final destination and the price of other incidental Services (if specified in the invitation to second stage bid). Foreign Suppliers may quote on CIP destination basis instead of EXW.
- 36.3 The terms EXW, CIP etc., shall be governed by the rules prescribed in the current edition of *Incoterms* published by the International Chamber of Commerce, Paris.
- 36.4 The prices quoted by the Supplier shall be fixed during the Supplier's performance of the Purchase Order and not subject to variation on any account. A bid submitted with an adjustable price will be treated as non-responsive and will be rejected.
- 36.5 ~~The second stage bids will be invited for one or more items. These items are XXX. Each item offered must comprise the full quantity required under that item. Suppliers have the option to bid for one or more item and the purchaser will evaluate the bids for each item separately.~~

37. Award of Purchase Orders

- 37.1 The Supplier who has offered the lowest rates during the second stage competition and agrees to supply required quantity of items to be delivered along with associated services, as per required schedule to the required consignees for a particular item will be awarded purchase order for that item. Arithmetical errors will be rectified as follows. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit or subtotal price shall prevail. If there is a discrepancy between subtotals and the total price, the total price shall be corrected. If there is a discrepancy between words and figures, the amount in words will prevail.
- 37.2 The process of second stage competition will be repeated

for each of the purchase orders to be issued during the validity of Framework Agreement.

SECTION II. QUALIFICATION REQUIREMENTS (REF: ITP 7.1 (A))

The Proposer (as defined in Section-I, Instruction to bidder) should submit documentary evidence on its qualifications to perform the Contract if its bid is accepted as detailed below:

- (i) that, in the case of a Proposer offering to supply Goods under the Contract which the Proposer manufactures or otherwise produces, that the Proposer:
 - (a) is incorporated in the country of manufacture of the Goods;
 - (b) is in the continuous business of manufacturing / marketing / installing the hydro-meteorological / Geophysical / water quality equipment for at-least last five years,
 - (c) has manufactured and marketed the specific goods covered by this Bidding Document during the last three years . In support of this, data on past performance should be submitted as per Form 5 in Section VII.:

Sl No.	Item	Minimum quantity *
1)	Automatic rain gauges Stations	750*200
2)	Rain and snow gauges Stations	50*
3)	Snow depth sensor	50*
4)	Shaft encoder	50*200
5)	Radar	150*200
6)	Ultrasonic sensor	150*100
7)	Bubbler	300*100
8)	Pressure transducer	50*200
9)	Automatic weather stations	200*100
10)	Groundwater level sensor with vent tube Digital Water Level Recorder with Telemetry System	200*
11)	Groundwater level sensor without vent tube	200*
12)	ADCPdep	50*
13)	GSMsm / GPRSgprs modem	300*
14)	INSATpsat radio	500*
15)	VSATsat trans-receiver	100*200*
16)	Data collection platform (data-logger)	300*500*
17)	Multi electrode resistivity imaging system	100*
18)	Time domain electromagnetic (tem) equipment	100*
19)	Resistivity meter (signal averaging system)	100*
20)	Multi-parameter digital geophysical logger (500 m)	100*
21)	Multi-parameter digital geophysical logger (1000 m)	100*
22)	Resistivity meter (indigenous or equivalent)	100*
23)	Snow Depth Sensor	50*



27)	Snow water equivalent	50*
23)		

*

The numbers are indicative only and will be finalized after getting requirement as PIP details of states to be given by MoWR/WB. As per eligibility criteria finalized by Committee, it has to be taken at 30% of scheduled quantities of Items.

- (ii) When offering their bid for more than one item, the Proposer or the manufacturer whose product is offered by the Proposer must provide evidence that it meets or exceeds the sum of all the individual requirements for the items being applied for in regard to average annual turnover manufacturing and marketing capacity, as mentioned above

In case the Proposer or the manufacturer whose product is offered by the Proposer fails to fully meet any of these criteria, it will be qualified only for those items for which the Proposer meets the above requirement.

- (iii) that, in the case of a Proposer offering to supply Goods under the Contract that the Proposer does not manufacture or otherwise produce, the Proposer has been duly authorized by a manufacturer of the Goods that meets the above criteria, to supply the Goods in India, as per authorization Form 4 in Section VII; and
- (iv) _____ The Proposer shall also furnish the following documents along with his Proposal:
- copies of its audited financial statements for the past three financial years;
 - list of major supply contracts conducted within the last five years as per Form 5 in Section VII.
 - Copies of satisfactory completion certificate of performances made during last three years.

- v) For qualification of particular item(s)/product(s), the proposer shall submit the testing and certification reports relevant to each equipment like IMD, CWC, ISRO, WMO, UL / CE Certification. The purchaser may, at its discretion, ask the proposer to bring the item/product for its testing as per standard at testing lab designated by Purchaser (like CWPRS), and after satisfactory testing at Testing Lab conforming to specification and requirement, the item(s)/product(s) shall qualify for framework agreement. For qualification of particular item(s)/product(s), the proposer shall bring the item/product for its testing as per standard at CWPRS Pune and after satisfactory testing at CWPRS conforming to specification and requirement, the item(s)/product(s) shall qualify for framework agreement. The CWPRS shall be the only third party for inspections and tests.

- vi) _____ All the cost related to transport/shipment, packing of equipment for testing has to be borne by the proposer and equipment has to be taken back by the proposer after 7 days of its testing at their own cost. However, the cost of actual testing of equipment at designated lab would be borne by purchaser. All the cost related to testing of equipment has to be borne by the proposer and proposer has to taken back by the proposer after 7 days of its testing at their own cost.

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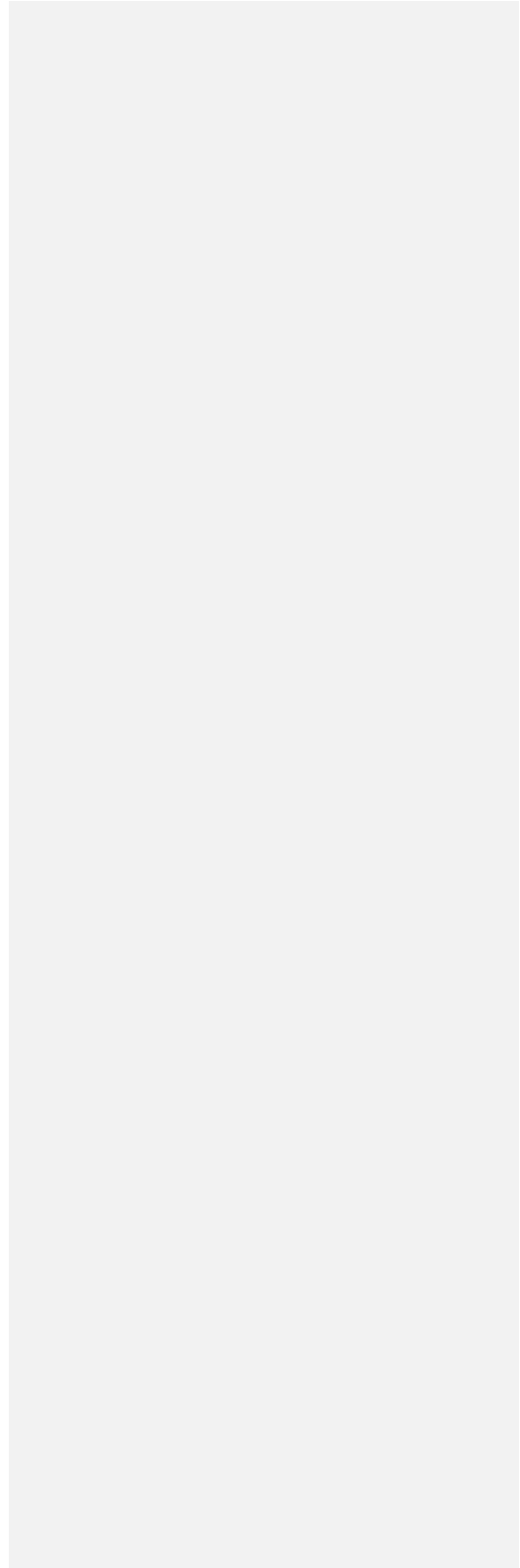
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**SECTION III. ELIGIBILITY FOR THE PROVISION OF GOODS, WORKS, AND
SERVICES IN BANK-FINANCED PROCUREMENT**



Public Information Center¹

Eligibility for the Provision of Goods, Works and Services in Bank-Financed Procurement

As of 29 March 2012

1. In accordance with Para 1.8 of the Guidelines: Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers of January 2011, the Bank permits firms and individuals from all countries to offer goods, work and services for Bank-financed projects. As an exception, firms of a Country or goods manufactured in a Country may be excluded if:

Para 1.8 (a) (i): as a matter of law or official regulation, the Borrower's Country prohibits commercial relations with that Country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of the Goods or Works required, or

Para 1.8 (a) (ii): by an Act of Compliance with a Decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's Country prohibits any import of goods from that Country or any payments to persons or entities in that Country.

2. For the information of borrowers and Proposers, at the present time firms, goods and services from the following countries are excluded from this bidding¹:

(a) With reference to paragraph 1.8 (a) (i) of the Guidelines: None

(b) With reference to paragraph 1.8 (a) (ii) of the Guidelines: None

¹ Any questions regarding this list should be addressed to the Director, Procurement Policy and Services Group, Operational Core Services Network, the World Bank.

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SECTION IV. FORM OF FRAMEWORK AGREEMENT

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Form of Framework Agreement

THIS Agreement (“Agreement”) is entered into this *[insert starting date]*, by and between *Project Management Unit, National Hydrology Project—National Dairy Plan I (National Dairy Support Project), National Dairy Development Board*, (“the Purchaser”) having its principal place of business at *Anand, Gujarat, India-388-001*, and *[insert Supplier's name]* (“the Supplier”) having its principal office located at *[insert Supplier's address]*.

This Agreement is a binding contract but imposes no obligation on the Purchaser to purchase the estimated or any quantity from the Supplier.

WHEREAS, the Purchaser wishes to have the Supplier supply the Goods hereinafter referred to, and

WHEREAS, the Supplier is willing to supply these Goods,

NOW THEREFORE THE PARTIES hereby agree as follows:

1. Scope

The Purchaser has entered into Framework Agreements with one or more Suppliers for the same items in order to allow End implementing Agencies (EIAs) (acting on behalf of Purchaser) to award Purchase Order following the second stage competition under the Framework Agreement. The Supplier shall supply the Goods specified in Annex A (“Schedule of Requirements,” which is made an integral part of this Agreement) as and when the EIAs invite the second stage bid ~~(in the format specified at Annex B)~~ specifying the details of Goods to be delivered along with the delivery schedule and consignee’s address. Purchase Order (in the format specified at Section V) awards shall be made to the Framework Agreement Suppliers offering the lowest price during the second stage competition and offering required quantity of items to be delivered as per required schedule to the required consignees.

If that Supplier (who has been awarded a Purchase Order) for any reason is not able to supply the item(s) at that time, the respective EIA shall go to the Supplier offering the next lowest price(s) and offering required quantity of items to be delivered as per required schedule to the required consignees.

2. Term

This framework agreement shall be valid for a period of 3 year during the period commencing *[insert starting date]* and continuing through *[insert completion date]*, or any other period (maximum duration of the agreement shall not be more than 3 years) as may be subsequently agreed by the parties in writing.

3. Country of Origin

All Goods and Services supplied under this Agreement shall have their origin in the countries and territories eligible under the rules of the World Bank (“the Bank”).

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- 4. Standards** The Goods supplied under this Agreement shall conform to the standards mentioned in the Technical Specifications and, when no applicable standard is mentioned, to the authoritative standards appropriate to the Goods' country of origin.
- 5. Use of Documents and Information** The Supplier shall not, without the Purchaser's prior written consent, disclose the Agreement, or any provision thereof, or any specification, plan, drawing, pattern, sample, or information furnished by or on behalf of the Purchaser in connection therewith, to any person other than a person employed by the Supplier in the performance of the Agreement.
- 6. Inspection and Audit by the Bank** The Supplier shall permit the Bank and/or persons appointed by the Bank to inspect the Supplier's Offices and/or the accounts and records of the Supplier and its sub-contractors, agents, personnel, consultants, service providers or suppliers relating to the performance of the Agreement, and to have such accounts and records audited by auditors appointed by the Bank if required by the Bank. The Supplier's attention is drawn to Clause 7, which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under this Sub-Clause constitute a prohibited practice subject to Agreement termination (as well as to a determination of ineligibility under the Procurement Guidelines).
- 7. Fraud and Corruption** The Bank requires that Borrowers (including beneficiaries of Bank loans), bidders, suppliers, contractors and their agents (whether declared or not), sub-contractors, sub-consultants, service providers or suppliers, and any personnel thereof, observe the highest standard of ethics during the procurement and execution of Bank-financed contracts . In pursuance of this policy, the Bank:
- (a) defines, for the purposes of this provision, the terms set forth below as follows:
 - (i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party ;
 - (ii) "fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation ;
 - (iii) "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party ;
 - (iv) "coercive practice" is impairing or harming, or threatening to

impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party ;

- (v) “obstructive practice” is
 - (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or
 - (bb) acts intended to materially impede the exercise of the Bank’s inspection and audit rights provided for under Clause 6 above.
 - (b) will reject a Proposal for award if it determines that the bidder recommended for award, or any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;
 - (c) will declare misprocurement and cancel the portion of the loan allocated to a contract if it determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive or obstructive practices during the procurement or the implementation of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;
 - (d) will sanction a firm or individual, at any time, in accordance with prevailing Bank’s sanctions procedures , including by publicly declaring such firm or individual ineligible, either indefinitely or for a stated period of time: (i) to be awarded a Bank-financed contract; and (ii) to be a nominated sub-contractor, consultant, supplier or services provider of an otherwise eligible firm being awarded a Bank-financed contract;

8. Conflict of Interest

The Supplier declares that it (or any affiliate that directly or indirectly controls, is controlled by, or is under common control with Supplier) has not been engaged by (i) the Borrower or (ii) the Purchaser or (iii) the End Implementing Agency (that has been duly authorized to act on behalf of the

Purchaser) to provide consulting services for the preparation of the design, specifications, and other documents to be used for the procurement of the Goods described in this framework agreement.

- 9. Registration of Goods** If required under the Applicable Law, Goods supplied under the Agreement shall be registered for use in India.
- 10. Patent Rights** The Supplier shall indemnify the Purchaser against all third party claims of infringement of patent, trademark, or industrial design rights arising from use of the Goods or any part thereof.
- 11. Performance Security** ~~Within twenty-eight (28) days of receipt of the notification of the Agreement award, the successful Proposer shall furnish to the Purchaser the performance security in the amount specified in the Annex A to this Agreement. The performance security shall be denominated in Indian Rupees, and shall be in the form of either an unconditional bank guarantee or irrevocable letter of credit issued by a nationalized/scheduled bank located in India or bank located abroad, acceptable to the Purchaser, in the format provided in the Bidding Documents; or demand draft or a pay order drawn in favor of the Purchaser. The performance security will be returned to the Supplier not later than thirty (30) days following the date of expiry of the Agreement and Purchase Orders issued under the Agreement, including any warranty obligations. The performance security is not required during first stage of framework agreement. The requirement would be specified in the bid document for second stage of the contract.~~
- 12. Inspections and Tests** Pre dispatch inspection (to check compliance to technical specifications defined in FA) may be carried out by the Purchaser or an agency appointed and paid by Purchaser for this purpose. Goods shall be dispatched only after receipt of satisfactory inspection report and communication to this effect by the End Implementing Agency/ Inspection Agency.
- 13. Packing** The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Purchase Order.
- 14. Delivery and Documents** Delivery of the Goods shall be made by the Supplier in accordance with the terms specified in the Purchase Orders. The shipping and/or other documents to be furnished by the Supplier are (a) two originals and two copies of the Supplier's invoice, showing Purchaser, the Agreement number, Purchase Order number; Goods' description, quantity, unit price, and total amount. Invoices must be signed in original and stamped or sealed with the company stamp/seal; (b) two copies of delivery note showing Purchaser's name and delivery through to final destination as

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stated in the Purchase Order; (c) one original of the manufacturer's or Supplier's Warranty certificate covering all items supplied; and (d) copy of the Certificate of Inspection furnished to Supplier by the nominated inspection agency (where inspection is required).

15. Insurance The Goods supplied under the Purchase Orders to be issued under the Agreement shall be adequately insured against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery.

16. Transportation The price indicated in Purchase Orders shall include the cost of transportation, including insurance, to the consignees indicated in the Purchase Order.

17. Incidental Services ~~Following incidental services are required, the price of which will be quoted by the Suppliers during the second stage competition:~~

- (a) ~~Annual Maintenance for the supplied Goods, for a period of 5 yrs after the expiry of warranty period, provided that this service shall not relieve the Supplier of any warranty obligations under this Agreement; and~~
- (b) ~~Training of the Purchaser's personnel, at the Purchaser's site, in assembly, start-up, operation, maintenance and/or repair of the supplied Goods. The incidental services required would be specified in the bid document during second stage of the agreement. The services could include but not limited to, installation, operation, maintenance and training etc.~~

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18. Warranty (a) The Supplier warrants that the Goods supplied under this Agreement are new, unused, of the most recent or current models and that they incorporate all recent improvements in design and materials unless provided otherwise in the Agreement. The Supplier further warrants that all Goods supplied under this Agreement shall have no defect arising from design, materials or workmanship or from any act or omission of the Supplier, that may develop under normal use of the supplied Goods. This warranty shall remain ~~valid for 24 months~~ **Five (5) Years** after the Goods have been delivered to and accepted at the final destination indicated in the Purchase Order.

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(b) The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall, within the period of 48 hours and with all reasonable speed, repair or replace the defective Goods or parts thereof, without cost to the Purchaser. If the Supplier, having been notified, fails to remedy the defect(s) within the period of 48 hours, the Purchaser may proceed to take such remedial action as may be

necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Agreement.

19. Payment

~~Hundred (100) percent of the Price of Goods received under each Purchase Order shall be paid by EIA within thirty (30) days of receipt of the Goods upon submission of invoice and other documents described in Clause 14 of this Agreement.~~

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The method and conditions of payment to be made to the the Bidder under this Contract shall be specified in the bid document for second stage of the contract, as follows:
follows:

19.1 Payment will be made in Indian Rupees only. The payment will be released through a crossed account payee cheque/ draft/ECS in favour of the Bidder.

19.2 ~~Payments shall be made in running account (R/A) bills on satisfactory completion of works/ services at following the milestones to be specified in the bid document for second stage.;~~

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~~(a) On receipt of goods by the consignee on production production of the delivery challans, the 40% of the cost of the supplied items shall be paid. In case of part supply, the amount to be paid under this clause, shall be decided on pro-rata basis and decision of Engineer-in-Charge in this regard shall be final and binding on the Bidder.~~

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~~(b) Remaining 25% of cost of the supplied items along with 65% of installation cost and other payments shall be paid on successful completion of civil works at the site for proper installation of the equipment and commissioning of the system. The payment can also be made on pro-rata basis on commissioning of the system in particular region, however, the decision of Engineer in Charge in this regard shall be final and binding on the Bidder.~~

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~~(-) The balance 35% payment of the contract shall be released @ 5% during each warranty year and AMG.~~

~~(-) The cost of annual maintenance contract as agreed shall be paid in equal quarterly installments after successful maintenance of the system against a certificate certificate to this effect from engineer-in-charge during the quarter.~~

~~(-) The Annual maintenance charges during any block shall be payable on pro-rata basis on the basis of actual quantities of components being covered under AMG.~~

19.3 Deductions from the bill

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- 20. Prices** Price quoted by the Suppliers in second stage shall be fixed and firm for the duration of the Purchase Order, including any extensions.
- 21. Amendments** Any variation or modification to this Agreement or the Purchase Orders shall be made only by written amendment signed by the parties.
- 22. Assignment** The Supplier shall not assign, in whole or in part, its obligations to perform under this Agreement, except with the Purchaser's prior written consent.
- 23. Delays in the Supplier's Performance** Delivery of the Goods and performance of related Services shall be made by the Supplier in accordance with the time schedule prescribed by the Purchaser in the Purchase Orders. If at any time during performance of the Purchase Order, the Supplier should encounter conditions impeding timely delivery of the Goods and performance of Services, the Supplier shall promptly notify the Purchaser in writing of the fact of the delay, its likely duration, and its cause(s). As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may at its discretion extend the Supplier's time for performance, with or without liquidated damages, in which case the extension shall be ratified by the parties by amendment of the Purchase Order.
- 24. Liquidated Damages** Subject to Clause 23, if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Purchase Order, the Purchaser shall, without prejudice to its other remedies under the Agreement, deduct from the Purchase Order Price, as liquidated damages, a sum equivalent to 0.5% of price of the delayed Goods or unperformed Services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the 10% of the Purchase Order price. Once the maximum is reached, the Purchaser may consider termination of the Agreement or the Purchase Order pursuant to Clause 25.
- 25. Termination for Default** The Purchaser, without prejudice to any other remedy for breach of the Agreement, by written notice of default sent to the Supplier, may terminate this Agreement in whole or in part:
- (a) if the Supplier fails to deliver any or all of the Goods within the period(s) specified in the Purchase Order, or within any extension thereof granted by the Purchaser; or
 - (b) if the Goods do not meet the Technical Specifications or registration requirement (if any) stated in the Agreement; or
 - (c) if the Supplier, in the judgment of the Purchaser has engaged in

fraud and corruption, as defined in Clause 7, in competing for or in executing the Agreement; or

- (b) if the Supplier fails to perform any other obligation(s) under the Agreement.

In the event the Purchaser terminates the Agreement in whole or in part, pursuant to this Clause, the Purchaser may procure, upon such terms and in such manner as it deems appropriate, Goods or Services similar to those undelivered, and the Supplier shall be liable to the Purchaser for any excess costs for such similar Goods or Services.

- 26. Termination for Insolvency** The Purchaser may at any time terminate the Agreement by giving written notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent.
- 27. Termination for Convenience** The Purchaser, by written notice sent to the Supplier, may terminate the Agreement or the Purchase Order, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Agreement or Purchase Order is terminated, and the date upon which such termination becomes effective. The Goods that are already supplied before the Supplier's receipt of notice of termination shall be accepted by the Purchaser at the terms and prices described in the Agreement and the Purchase order.
- 28. Dispute Resolution** Any dispute arising out of the Agreement, which cannot be amicably settled between the parties, shall be referred to adjudication/arbitration in accordance with the Arbitration and Conciliation Act of 1996 of India. The venue of adjudication/arbitration shall be Ahmedabad.
- 29. Applicable Law** The Agreement shall be interpreted in accordance with the laws of Union of India.
- 30. Notices** Any notice given by one party to the other pursuant to this Agreement shall be sent to the other party in writing. The Purchaser's addresses for notice purposes is:

Project Monitoring Unit, National Hydrology Project, New Delhi.

The Supplier's addresses for notice purposes is:

Telephone No. _____

Fax No. _____

31. Taxes and Duties

The Supplier shall be entirely responsible for all taxes, duties, octroi, road permits, license fees, etc., incurred until delivery of the contracted Goods to the Purchaser.

FOR THE PURCHASER

FOR THE SUPPLIER

Signed by _____

Signed by _____

Title: _____

Title: _____

⊕ Annex A: Schedule of Requirements

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S. No	Item	Unit	Estimated requirement in 1 year	Tentative Delivery Schedule	Likely consignees	Bid Security (in lakh Rupees)	Performance Security (in lakh Rupees)
1)	Automatic Rain Gauge Stations	No.			End Implementing Agencies of the Project. There are a total of 47 implementing agencies (IAs) including eight central agencies, 37 state-level agencies and two river basin organizations (RBO).		
2)	Rain and Snow Gauge Stations	No.					
3)	Snow Depth Sensor	No.					
4)	Shaft Encoder	No.					
5)	Radar	No.					
6)	Ultrasonic Sensor	No.					
7)	Bubbler	No.					
8)	Pressure Transducer	No.					
9)	Automatic Weather Stations	No.					
10)	Groundwater Level Sensor with Vent Tube Digital Water Level Recorder with Telemetry System	No.					
11)	Groundwater Level Sensor without Vent Tube	No.					
12)	ADCP	No.					
13)	GSM / GPRS	No.					

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	MODEM						
14)	INSAT RADIO	No.					
15)	VSAT TRANS-RECEIVER	No.					
16)	DATA COLLECTION PLATFORM	No.					
17)	MULTI ELECTRODE RESISTIVITY IMAGING SYSTEM	No.					
18)	Time Domain Electromagnetic (TEM) Equipment	No.					
19)	Resistivity Meter (Signal Averaging System)	No.					
20)	Multi-Parameter Digital Geophysical Logger (500 m)	No.					
21)	Multi-Parameter Digital Geophysical Logger (1000 m)	No.					
22)	Resistivity Meter (Indigenous or Equivalent)	No.					
23)	Snow Depth Sensor	No.					
32)23)	Snow Water Equivalent	No.					

Note:

1. Proposers may note that the required quantity and consignees indicated above are tentative only. These will be further specified in the individual Purchase Orders to be issued by the End Implementing Agencies (EIA) of the Project.

~~1.~~ There are a total of 47 implementing agencies (IAs) including eight central agencies, 37 state-level agencies and two river organizations (RBO).

Annex B: Invitation of Price Bid for Second Stage Competition

Framework Agreement Ref. No: _____

Invitation for Second Stage Price Bid Ref No. _____ Dated _____

To _____

Dear sirs,

~~Sub.: INVITATION OF PRICE BID FOR SECOND STAGE COMPETITION UNDER THE FRAMEWORK AGREEMENT SIGNED FOR SUPPLY OF _____~~

0. ~~With reference to above Framework Agreement, you are invited to submit your most competitive quotation for the following goods:-~~

Sl.No.	Item	Quantity required	Delivery period	After-sales service requirement	Training requirement	Consignees

0. ~~BID PRICE~~

~~)- Corrections, if any, shall be made by crossing out, initialing, dating and rewriting.~~

~~)- The price bid shall be submitted in the format enclosed at Annexure 1~~

~~)- The rates quoted by the bidder shall be fixed and shall not be subject to adjustment on any account.~~

~~)- The prices shall be quoted in Indian Rupees only.~~

0. ~~You are requested to provide your offer latest by _____ hrs. on _____ (date).~~

0. ~~The price bids will be opened in the presence of the Bidders or their representatives who choose to attend at _____ AM/PM on _____ in the office of the _____~~

0. ~~Other Terms and Conditions are mentioned in the Framework Agreement referred above.~~

 —(Purchaser)

 Name: _____

 Address: _____

 Tel. No. : _____

 Fax No. : _____

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FORMAT OF PRICE BID (FOR SECOND STAGE COMPETITION)

Date: ~~[insert: *date of bid*]~~
~~[Framework Agreement No.: [number]]~~
~~[Invitation for Second Stage Price Bid Ref No.: [number]]~~
~~[insert: *name of Contract*]~~

To: ~~[Purchaser insert: *Name and address of Purchaser*]~~

Dear Sir or Madam:

— With reference to the Framework Agreement (referred above) and your invitation of the price bid for second stage competition, the receipt of which is hereby acknowledged, we, the undersigned, offer to supply and deliver the Goods and associated services in full conformity with the said framework agreement and invitation for price bid for second stage competition, for the sum of Rs. _____ (hereinafter called “the Total Bid Price”). The above amounts are in accordance with the Price Schedules attached herewith and are made part of this bid.

— We undertake, if our bid is accepted, to deliver the Goods in accordance with the delivery schedule and consignees indicated in your invitation for the price bid.

— We undertake that, in competing for (and, if the award is made to us, in executing) the above Agreement, we will strictly observe the laws against fraud and corruption in force in India namely “Prevention of Corruption Act 1988”.

— We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

— We understand that you are not bound to accept the lowest or any bid you may receive.

— We confirm that there is no change in our eligibility and no adverse change in qualification information submitted during the first stage bidding.

Dated this ~~[insert: *number*]~~ day of ~~[insert: *month*]~~, ~~[insert: *year*]~~.

Signed: _____

Date: _

In the capacity of ~~[insert: *title or position*]~~

Duly authorized to sign this bid for and on behalf of
~~[insert: *name of Bidder*]~~

Framework Agreement Ref. No.

Dated

Purchase Order Ref. No.

To

Dear sirs,

Sub.: PURCHASE ORDER FOR SUPPLY OF _____

With reference to above Framework Agreement and second stage price bid submitted by you, which shall be fully incorporated herein, you are requested to supply the following goods and associated services subject to terms and conditions mentioned in above referred framework agreement:-

Sl No.	Item	Qty	Delivery period	Consignees	Agreed Unit Rate	Total Price
TOTAL						

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PRICE SCHEDULE (FOR SECOND STAGE COMPETITION)

1	2	3	4					5	9	11	12
Sl.No	Item	Qty	Unit prices					Total unit price 4{a+b+c+d+e}	Total price per item for evaluation purpose {3 x 5}	Name of manufacturer (if items are not manufactured by self)	Remarks
			{a} EXW (Ex-factory Ex-warehouse Ex-showroom Off-the-shelf) price	{b} Inland transp. insurance-& other local costs incidental to delivery	{c} After- sales service	{d} Training	{e} Taxes/Duties				

Note:

(a) In case of discrepancy between unit price and total price, the unit price shall prevail.

Total bid price in Rs.
In words

Signature of Bidder

Name

Business address

Place:

Date:

SECTION V: FORMAT OF PURCHASE ORDER

Framework Agreement Ref. No.

Dated

Purchase Order Ref. No.

To

Dear sirs,

Sub.: PURCHASE ORDER FOR SUPPLY OF _____

With reference to above Framework Agreement and second stage price bid submitted by you, which shall be fully incorporated herein, you are requested to supply the following goods and associated services subject to terms and conditions mentioned in above referred framework agreement:-

Sl No.	Item	Qty	Delivery period	Consignees	Agreed Unit Rate	Total Price
TOTAL						

Unit price mentioned above is inclusive of After-sales services/extended warranty, training of the staff in operation/maintenance of equipment, all other incidental services, taxes and duties.

TOTAL PURCHASE ORDER PRICE (inclusive of all) **XXXXXXXXXXXXXX**

Other terms and conditions are mentioned in the Framework Agreement referred above.

(Purchaser or Purchaser's Representative)

Name: _____

Address: _____

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Tel. No. : _____

Fax No. ; _____

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SECTION VI. TECHNICAL SPECIFICATIONS

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ITEM ___-1 :AUTOMATIC RAIN GAUGE STATIONS

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FUNCTIONAL REQUIREMENT:

- i. Rainfall shall be measured using the tipping bucket method and shall be able to record cumulative rainfall.
- ii. A spout filter shall prevent ingress of insects and debris.
- iii. IMD/WMO certification is required.

DESIGN REQUIREMENTS:

The equipment offered should conform to the following technical Specifications:

Feature	Value
Site Conditions	
Ambient Temperature	From -20 to +60
Humidity	5 to 100 %
Altitude	0 to 2500 meter
Sensor	
Sensor Type	Tipping Bucket type with Reed Switch
Capacity	250 mm/hour or better
Resolution	0.5 mm or better
Accuracy (Intensity)	2 % or better, ± 2 mm
General Features	
Output Interface	SDI12/ RS 485 / / 4-20 mA / Compatible with Data logger
Power Supply	12 V DC or switch rated for 12 VDC
Material	Corrosion Resistance Metal (Stainless steel or Aluminum)
Enclosure	NEMA 4
Tools	Complete tool kit for operation and routine maintenance
Manuals	Full Documentation and maintenance manual in English
Accessaries	Sensor Mounting support, cables and other accessories as required

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ITEM__—2 :RAIN AND SNOW GAUGE STATIONS

FUNCTIONAL REQUIREMENT: To measure the hourly rainfall and snowfall

DESIGN REQUIREMENTS:

The equipment offered should conform to the following technical Specifications:

Feature	Value
Site Conditions	
Ambient Temperature	From -20 to +60
Humidity	5 to 100 %
Altitude	2000 to 5000 meter
Sensor	
Sensor Type	Storage Gauge with Anti-freeze system without heating
Capacity	1000 mm minimum
Resolution	0.5 mm or better
Accuracy (Intensity)	2 % or better, ± 2 mm
General Features	
Output Interface	SDI12/ RS 485 / / 4-20 mA / Compatible with Data logger
Power Supply	12 V DC or switch rated for 12 VDC
Material	Corrosion Resistance Metal (Stainless steel or Aluminum)
Enclosure	NEMA 4
Tools	Complete tool kit for operation and routine maintenance
Manuals	Full Documentation and maintenance manual in English
Accessories	Sensor Mounting support, cables and other accessories as required

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ITEM 3: SNOW DEPTH SENSOR**FUNCTIONAL REQUIREMENT:** To measure the depth of snow**DESIGN REQUIREMENTS:**

The equipment offered should conform to the following technical Specifications:

Feature	Units
Site Conditions	
Ambient Temperature	From -20 to +60
Humidity	5 to 100 %
Altitude	2000 to 5000 meter
Sensor	
Sensor Type	Ultrasonic sensor
Range	0-10 meter
Resolution	1 mm or better
Accuracy	0.25 % of measuring distance
General Features	
Output Interface	SDI12/ RS 485 / / 4-20 mA / Compatible with Data logger
Power Supply	9-18 V DC
Material	Corrosion Resistance Metal (Stainless steel/ Aluminum or PVC)
Enclosure	NEMA 4
Tools	Complete tool kit for operation and routine maintenance
Manuals	Full Documentation and maintenance manual in English
Accessories	Sensor Mounting support, cables and other accessories as required

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ITEM__4 :SHAFT ENCODER**FUNCTIONAL REQUIREMENT:** To measure the water level**DESIGN REQUIREMENTS:**

The equipment offered should conform to the following technical Specifications:

Feature	Value
Site Conditions	
Ambient Temperature	From -20 to +60
Humidity	5 to 100 %
Altitude	0 to 2500 meter
Sensor	
(*) Sensor Type	Shaft Encoder based rotary position sensor with Digital Display
(*) Range	1-100 meter
(*) Resolution	3 mm or better
(*) Accuracy	0.025 % FSO
Output Interface	SDI-12 / RS 485 / 4-20 mA / compatible with data logger
Power Supply	12 V DC or Switch rated for 12 V DC
General Features	
Material	Corrosion Resistance Metal (Stainless steel or Aluminum)
(*) Enclosure	Lockable (key) box provided by the supplier to be mounted in Stilling well or Gauge hut, with IP65 or NEMA 4 protection
Tools	Complete tool kit for operation and routine maintenance
Manuals	Full Documentation and maintenance manual in English
Graduated Tape	The tape should be of high quality to withstand harsh and humid environment, should not get twisted or wrinkled while operation.
Accessories	Sensor Mounting support, Floats, graduated tapes (metric), wheel, counterweight, and cabling

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ITEM__—5 : RADAR

FUNCTIONAL REQUIREMENT: To measure the water level

DESIGN REQUIREMENTS:

The equipment offered should conform to the following technical Specifications:

Feature	Value
Site Conditions	
Ambient Temperature	-20°C to +60°C
Humidity	0 to 100 %
Altitude	0 to 2500 meter
Sensor	
(*) Sensor Type	Microwave non-contact sensor
(*) Range	15M / 20M/35M/75M
(*) Resolution	3 mm or better
(*) Accuracy	0.02 % FSO
Beam Angle:	≤ 16 °
Output Interface	SDI-12 / RS 485 / 4-20 mA / compatible with data logger
Power Supply	10-15 V DC
General Features	
Material	Corrosion Resistance Metal (Stainless steel / Aluminum or PVC)
Enclosure	The Sensor shall be easy to dismount and replace in the event of malfunction.
Tools	Complete tool kit for operation and routine maintenance
Manuals	Full Documentation and maintenance manual in English
Accessories	Sensor Mounting support, cables and other accessories as required
(*) Protection	NEMA 4 or IP65
Horizontal Mounting /Installation Arrangements	Above FRL, Below a bridge girder wherever available otherwise horizontal cantilever arrangement from a mast/wall/pedastal
Radar Sensor should have display feature for diagnostic purpose	

ITEM__—6 : ULTRASONIC SENSOR**FUNCTIONAL REQUIREMENT: To measure the water level****DESIGN REQUIREMENTS:**

The equipment offered should conform to the following technical Specifications:

Feature	Value
Site Conditions	
Ambient Temperature	From -20 to +60
Humidity	5 to 100 %
Altitude	0 to 2500 meter
Sensor	
(*) Sensor Type	Ultrasonic non-contact sensor
(*) Range	Upto 10 meter
(*) Resolution	3 mm or better
(*) Accuracy	0.02 % FSO
Output Interface	SDI-12 / RS 485 / 4-20 mA / compatible with data logger
Power Supply	10-15 V DC
General Features	
Material	Corrosion Resistance Metal (Stainless steel / Aluminum or PVC)
Enclosure	The Sensor shall be easy to dismount and replace in the event of malfunction.
Tools	Complete tool kit for operation and routine maintenance
Manuals	Full Documentation and maintenance manual in English
Accessories	Sensor Mounting support, cables and other accessories as required
(*) Protection	NEMA 4 or IP65

ITEM__—7 : BUBBLER**FUNCTIONAL REQUIREMENT: To measure the water level****DESIGN REQUIREMENTS:**

The equipment offered should conform to the following technical Specifications:

Feature	Value
Site Conditions	
Ambient Temperature	From -20 to +60
Humidity	5 to 100 %
Altitude	0 to 2500 meter
Sensor	
(*) Sensor Type	Continuous bubbling system and non-submersible transducer
(*) Range	15/30 PSI
(*) Resolution	0.0001 psi or better
(*) Accuracy	0.1 % FSO
Output Interface	SDI-12 / 4-20 mA / RS485, compatible with Data logger
Power Supply	11 to 15 V DC
Average current Draw	<15mA based on 1 bubble per second
Purge	Manual line purge
Bubble Rate	Programmable 30–120 bubbles per minute
(*) Desiccators	The bubbling mechanism and the non-submersible transducer must be equipped with a desiccating system to keep system from malfunction for a period not less than 6 months.
General Features	
Tools	Complete tool kit for installation and routine maintenance
Manuals	Full documentation and maintenance instructions in English
Accessories	Sensor Mounting support, cables and other accessories as required
(*) Enclosure	NEMA4 or IP65

ITEM__—8 : PRESSURE TRANSDUCER**FUNCTIONAL REQUIREMENT:** To measure the water level**DESIGN REQUIREMENTS:**

The equipment offered should conform to the following technical Specifications:

Feature	Value
Site Conditions	
Ambient Temperature	From -20 to +60
Humidity	5 to 100 %
Altitude	0 to 2500 meter
Sensor	
(*) Sensor Type	Pressure Sensor
(*) Range	Upto 30 meter of water column
(*) Resolution	3 mm or better
(*) Accuracy	0.02 % FSO
Output Interface	SDI-12 / RS 485 / 4-20 mA / compatible with data logger
Power Supply	10-15 V DC
General Features	
Material	Corrosion Resistance Metal (Stainless steel / Aluminum or PVC)
Enclosure	The Sensor shall be easy to dismount and replace in the event of malfunction.
Tools	Complete tool kit for operation and routine maintenance
Manuals	Full Documentation and maintenance manual in English
Accessories	Sensor Mounting support, cables and other accessories as required
(*) Protection	NEMA 4 or IP65

ITEM__—9 : AUTOMATIC WEATHER STATIONS**FUNCTIONAL REQUIREMENT: To measure the weather parameter****DESIGN REQUIREMENTS:**

The equipment offered should conform to the following technical Specifications:

Feature	Value
Site Conditions	
Ambient Temperature	From -20 to +60
Humidity	5 to 100 %
Altitude	0 to 2500 meter
Air Temperature Sensor	
Sensor Type	Platinum resistance or better or equivalent
Range	-20 Degree Celsius to + 60 Degree Celsius
Resolution	± 0.1°C
Accuracy	Within ± 0.1° Celsius in the entire working range
Response time	10 Secs or lesser
Self-aspirated	To ensure continuous supply of air. Free from turbulence, water droplets and Radiation
Power Supply	12 V DC or switch rated for 12 VDC
Accessories	All accessories for mounting the instrument e.g. special cross arm clamps or flag, if any, shall be provided.
Relative humidity Sensor	
Sensor Type	Capacitive/ Solid State Humidity Sensor
Range	0 to 100 %
Resolution	1%
Accuracy	±3% or better
Power Supply	12 V DC or switch rated for 12 VDC
Response time	10 Secs or lesser
Wind Speed and Direction Sensor	
Sensor Type	Ultrasonic sensor (No moving Parts)
Range	0-60 m/s for speed & 0-360 degrees for direction or better
Resolution	0.1 m/s for Speed; ±5 degree for direction
Accuracy	Better than 1% full scale
Response time	Less than 1 second lag in operating range
Mounting	All accessories for mounting the instrument e.g. special cross arm clamps or flag if any shall be provided.
Air Pressure Sensor	
Sensor Type	Temperature Compensated
Range	800 - 1200 hPa
Resolution	± 0.01 hPa

Accuracy	± 0.5 hPa
Power Supply	12 V DC or switch rated for 12 VDC
Solar Radiation Sensor	
Sensor Type	ISO Class 1 Pyranometer (CMP 11 or better)
Threshold	120 W/m ² of direct solar irradiance
Methodology	Alternate shading of sensor to account for sky radiation
Spectral Range	400nm to 1100 nm
Range	0-2000 W/Square meter
Resolution	1 W/Square meter
Accuracy (Including Temperature Compensation)	3% or better
General Features	
Material	Corrosion Resistance Metal (Stainless steel/ Aluminum or PVC)
Tools	Complete tool kit for operation and routine maintenance
Manuals	Full Documentation and maintenance manual in English
Accessories	Sensor Mounting support, cables and other accessories as required
Output Interface	SDI 12/RS 485/ 4-20 mA/ Compatible with Data logger
Evaporation- Pan Specification	
Operating temperature	-5 to 60 degree Celsius.
Diameter of the pan	1.2 m or more
Accuracy	+/- 1%
Accessories	As required for complete installation of the sensors and Equipment
Material	Clean cast seamless acrylic plastic tubing or brass sheet
Platform	Rot resistant timber treated with creosote or other effective Wood preservative.
Graduation	in millimetre

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ITEM — 10 : ~~DIGITAL GROUNDWATER WATER~~ LEVEL RECORDER (DWLR) WITHOUT VENT TUBE TELEMETRY SYSTEM

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FUNCTIONAL REQUIREMENT: To measure the ground water level

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DESIGN REQUIREMENTS:

The equipment offered should conform to the following technical Specifications:

Feature	Value
Site Conditions	
Ambient Temperature	From -20 to +60
Humidity	5-100 %
Altitude	0-2500 meter
Sensor	
Sensor Type	Submersible pressure transducer having vent tube, with atmospheric pressure and temperature compensation
Range	30 psi The full scale water fluctuation measuring range will be specified by the implementing agency depending on the requirement 0-5/10/20/30/50 m of water column
Installation Depth	The installation depth will be specified by the implementing Agency depending upon their requirements 0-10/20/50/100/150/200/300m as specified
Accuracy	0.1% FSO
Temperature Coefficient	<0.01% Full scale/degree centigrade for water temperatures between 10°C and 40°C
Resolution	3 mm
Reproducibility	0.1% full scale or better
Long Term Stability	0.1% Full scale and should ensure long term stability without any field calibration requirements except barometric compensation
Temperature Measuring Range	0 to 50°C
Accuracy	Better than 0.1°C
Burst Pressure	>=3 Time Full scale
Overload Pressure	2 Time full scale without effect on calibration
Over voltage protection on supply & sensor wires	Over voltage protection should be provided on power supply lines
Non-Vented Cable	Includes barometric sensor for post-processing
Output	SDI-12, RS-485
Datalogger	
Atmospheric Pressure correction	Should be applied automatically
Resolution of Measurement	1mm or better
Measuring interval and	Should be programmed to store data from 1 minute one reading to 24 hours one

<u>measuring modes</u>	<u>reading with future start option.</u>
<u>Settling up Time</u>	<u><30 minutes after submersion</u>
<u>Recording Capacity</u>	<u>Non-Volatile flash data storage of more than 1,00,000 data points (at least)</u>
<u>Memory Type</u>	<u>Non-Volatile memory</u>
<u>Power Supply</u>	<u>Should be equipped with lithium or alkaline battery pack, giving at least 5 years operation (with one transmission and four recordings per day). Battery must be replaceable in the field or in local offices of the implementing Agency or supplier. Replacement batteries must be readily available in India.</u>
<u>Battery Voltage Monitoring</u>	<u>Monitoring and transmission of Battery Voltage level</u>
<u>Datalogger Location</u>	<u>If Data logger and transmitter are integral parts of sensor, it should be located on top (near ground surface) instead of bottom</u>
<u>Built in clock</u>	<u>Accurate to ± 1 minute per year</u>
<u>Displayed Time Resolution</u>	<u>1 second</u>
<u>Over-voltage Protection</u>	<u>Should include lightening, over-voltage and surge protection</u>
Enclosure	
<u>Enclosure for Pressure sensor and Data Logger</u>	<u>Data Logger should be concealed into a single tubular enclosure which is waterproof and corrosion proof.</u>
<u>Dimension</u>	<u>Outer diameter of sensor unit: ≤ 50mm, (for sensor & logger only)</u>
<u>Material</u>	<u>Titanium, stainless Steel or other corrosion resistant material</u>
<u>Installation</u>	<u>The system should be provided with a suspension bracket or Well Cap allowing secure installation within the Piezometers' headwork, including appropriate cable mounting to allow the sensor to be adjusted to the required depth</u>
<u>Direct Read Cable</u>	<u>The cable shall have following features: Diameter of cable should be less than 30mm Strength members for good longitudinal stability of cable The cable and contacts should be fixed or quick connect</u>
<u>Protection</u>	<u>IP67 with Impact Resistant</u>
Communication Interface	
<u>Computer Interface</u>	<u>The Logger must be capable of connection to a computer via USB 2.0/USB 3.0 and supply should include the necessary interface cables.</u>
<u>Wireless Communication</u>	<u>Option for Bluetooth/IR/Wi-Fi interface (atleast any one of the three options specified) should be available.</u>
<u>File Format</u>	<u>The format of the data downloaded by communication interface shall be in standard ASCII/CSV/XML format.</u>
GSM / GPRS Transmitter	
<u>Transmission System</u>	<u>GPRS/edge based data transmission system</u>
<u>Performance</u>	<u>Data Reception availability of 95% or better</u>
<u>Communication Direction</u>	<u>Utilize GPRS network for two-way TCP/IP (INTERNET) connection</u>
<u>VPN protocol</u>	<u>Radio to utilize VPN protocol</u>
<u>Transmission trigger</u>	<u>Data collection to be triggered by interrogation from Data Center, or by event based transmission triggered by remote site</u>
<u>Power Saving</u>	<u>Ability to disable interrogation system in order to save power at remote site</u>

<u>Communication Protocol</u>	<u>Data transmission to execute HTTP Post or FTPS to transmit data to the Data Center</u>
<u>Accessories</u>	<u>All associated equipment, including Antenna all cables and mounting hardware</u>
Software	
<u>Operating System</u>	<u>Windows software for system configuration, transfer and analysis of data to computer</u>
<u>Version</u>	<u>English language version</u>
<u>License</u>	<u>All required licenses included</u>
General Features	
<u>Battery</u>	<u>The battery should be easy to replace, and easily available in the market</u>
<u>Tools</u>	<u>Complete tool kit for installation and routine maintenance</u>
<u>Manuals</u>	<u>Full documentation and maintenance instructions in English</u>

Supplementary Specification for Data Transmission System

The transmission data system should be tightly integrated with the DWLR along with compact remote/ field mounted systems consisting of data logger, modem and antenna in one single metal cast housing (Die Cast).

- 0. The system should be watertight (IP67) and impact resistant.
- 0. The system should allow easy access into the well for control measurements without removing the complete system.
- 0. The system must be power supplied by standard lithium/alkaline batteries for operation time at least five year by one set of batteries (one transmission per day, 4 measurements per day) and must be placed in a water resistant (IP67) cylindrical container in the pipe of main unit or on the surface.
- 0. The system must have integrated energy management system using free programmable time slots for measurement and transmission to minimize power consumption.
- 0. The connectors should be water tight (IP67).
- 0. An Alarm notification must be sent by the system via SMS to four mobile phone number through suitable means of communication in case of station component failure. This includes battery performance (battery voltage) and life expectancy.
- 0. A standard USB communication interface should be available for set up and configuration and must be easily accessible.
- 0. All measurement and setup options, data download and programming of data logger shall also be done by online session similar to all functions at site by direct connection to a PC or PDA without any difference.
- 0. Option for Bluetooth/IR/Wi-Fi interface should be available.
- 0. Option for data download/retrieval from remote PC via GSM/GPRS network. Output of this software shall be in standard ASCII/CSV/XML format.
- 0. The software should be provided to allow download of data from the data logger on to a laptop in the field.

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ITEM__—11 : GROUNDWATER LEVEL SENSOR-RECORDER (DWLR) WITH VENT TUBE
FUNCTIONAL REQUIREMENT: To measure the ground water level

DESIGN REQUIREMENTS:

The equipment offered should conform to the following technical Specifications:

Feature	Value
Site Conditions	
Ambient Temperature	From -20 to +60
Humidity	5-100 %
Altitude	0-2500 meter
Sensor	
Sensor Type	Submersible pressure transducer <u>without vent tube, having atmospheric pressure compensation sensor on each individual equipment</u> with atmospheric pressure and temperature compensation
Range	30 psi <u>The full scale water fluctuation measuring range will be specified by the implementing agency depending on the requirement</u> <u>0-5/10/20/30/50 m of water column</u>
<u>Installation Depth</u>	<u>The installation depth will be specified by the implementing Agency depending upon their requirements</u> <u>0-10/20/50/100/150/200/300m as specified</u>
Accuracy	0.1% FSO
<u>Temperature Coefficient</u>	<u><0.01% Full scale/degree centigrade for water temperatures between 10°C and 40°C</u>
Resolution	3 mm
<u>Input Power</u>	<u>10-16 VDC</u>
<u>Reproducibility</u>	<u>0.1% full scale or better</u>
<u>Long Term Stability</u>	<u>0.1% Full scale and should ensure long term stability without any field calibration requirements except barometric compensation</u>
<u>Temperature Measuring Range</u>	<u>0 to 50°C</u>
<u>Accuracy</u>	<u>Better than 0.1°C</u>
<u>Burst Pressure</u>	<u>>=3 Time Full scale</u>
<u>Overload Pressure</u>	<u>2 Time full scale without effect on calibration</u>
<u>Over voltage protection on supply & sensor wires</u>	<u>Over voltage protection should be provided on power supply lines</u>
Non-Vented Cable	Includes barometric sensor for post-processing
Output	SDI-12, RS-485
Datalogger	
<u>Atmospheric Pressure correction</u>	<u>Should be applied automatically</u>
<u>Resolution of Measurement</u>	<u>1mm or better</u>
<u>Measuring interval and measuring modes</u>	<u>Should be programmed to store data from 1 minute one reading to 24 hours one reading with future start option.</u>

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<u>Settling up Time</u>	<u><30 minutes after submersion</u>
<u>Recording Capacity</u>	<u>Non-Volatile flash data storage of more than 1,00,000 data points (at least)</u>
<u>Memory Type</u>	<u>Non-Volatile memory</u>
<u>Power Supply</u>	<u>Should be equipped with lithium or alkaline battery pack, giving at least 5 years operation (with one transmission and four recordings per day). Battery must be replaceable in the field or in local offices of the implementing Agency or supplier. Replacement batteries must be readily available in India.</u>
<u>Internal Memory</u> <u>Memory should be enough to store 1,00,000 data values</u>	
<u>Battery Voltage Monitoring</u>	<u>Monitoring and transmission of Battery Voltage level</u>
<u>Datalogger Location</u>	<u>If Data logger and transmitter are integral parts of sensor, it should be located on top (near ground surface) instead of bottom</u>
<u>Built in clock</u>	<u>Accurate to ±1 minute per year</u>
<u>Displayed Time Resolution</u>	<u>1 second</u>
<u>Over-voltage Protection</u>	<u>Should include lightening, over-voltage and surge protection</u>
<u>Enclosure</u>	
<u>Enclosure for Pressure sensor and Data Logger</u>	<u>Data Logger should be concealed into a single tubular enclosure which is waterproof and corrosion proof.</u>
<u>Dimension</u>	<u>Outer diameter of sensor unit: ≤50mm, (for sensor & logger only)</u>
<u>Material</u>	<u>Titanium, stainless Steel or other corrosion resistant material</u>
<u>Installation</u>	<u>The system should be provided with a suspension bracket or Well Cap allowing secure installation within the Piezometers' headwork, including appropriate cable mounting to allow the sensor to be adjusted to the required depth</u>
<u>Direct Read Cable</u>	<u>The cable shall have following features: Diameter of cable should be less than 30mm Strength members for good longitudinal stability of cable The cable and contacts should be fixed or quick connect</u>
<u>Protection</u>	<u>IP67 with Impact Resistant</u>
<u>Communication Interface</u>	
<u>Computer Interface</u>	<u>The Logger must be capable of connection to a computer via USB 2.0/USB 3.0 and supply should include the necessary interface cables.</u>
<u>Wireless Communication</u>	<u>Option for Bluetooth/IR/Wi-Fi interface (atleast any one of the three options specified) should be available.</u>
<u>File Format</u>	<u>The format of the data downloaded by communication interface shall be in standard ASCII/CSV/XML format.</u>
GSM / GPRS Transmitter	
<u>Transmission System</u>	<u>GPRS/edge based data transmission system</u>
<u>Performance</u>	<u>Data Reception availability of 95% or better</u>
<u>Communication Direction</u>	<u>Utilize GPRS network for two-way TCP/IP (INTERNET) connection</u>
<u>VPN protocol</u>	<u>Radio to utilize VPN protocol</u>

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Transmission trigger	Data collection to be triggered by interrogation from Data Center, or by event based transmission triggered by remote site
Power Saving	Ability to disable interrogation system in order to save power at remote site
Communication Protocol	Data transmission to execute HTTP Post or FTPS to transmit data to the Data Center
Accessories	All associated equipment, including Antenna all cables and mounting hardware
Software	
Operating System	Windows software for system configuration, transfer and analysis of data to computer
Version	English language version
License	All required licenses included
General Features	
Battery	The battery should be easy to replace, and easily available in the market
Tools	Complete tool kit for installation and routine maintenance
Manuals	Full documentation and maintenance instructions in English

ITEM 12: ADCP**FUNCTIONAL REQUIREMENT: To measure the discharge****DESIGN REQUIREMENTS:**

The equipment offered should conform to the following technical Specifications:

Feature	Value
Site Conditions	
Ambient Temperature	-5 to 45 Degree C
Humidity	5-100 %
Altitude	0-2500 meter
mode of operation	real time from a sailing boat/Bridge/cableway
Sensor	
ADCP Type	Down looking ADCP for measurement of discharge in open channel environment
Velocity Profiling Range	0.1 to 5 meter / 0.4–25 meter / 0.4 to 40 meter (Actual requirement would be specified by implementing agency based on site conditions)
Profiling Velocity	+/-20 m/s
Velocity Accuracy	0.25% of measured velocity
Velocity Resolution	0.001m/s
Depth Range	0.3-80 m
Depth Accuracy	1%.
Depth Resolution	0.001 m
Positioning	Optional capability to acquire position by bottom tracking or DGPS.
Computations	All performed internally or on Windows-based software (also to be supplied)
Accessories	
Platform	Floating platform/ Trimaran for ADCP deployment (optional as per requirement of Intender)
Positioning	GPS for positioning
Tethers	All necessary tethers and taglines
Software	Windows-based software for display of velocity, discharge, depth, and width information in real-time.
General Features	
Tools	Complete tool kit for installation and routine maintenance
Manuals	Full documentation and maintenance instructions in English

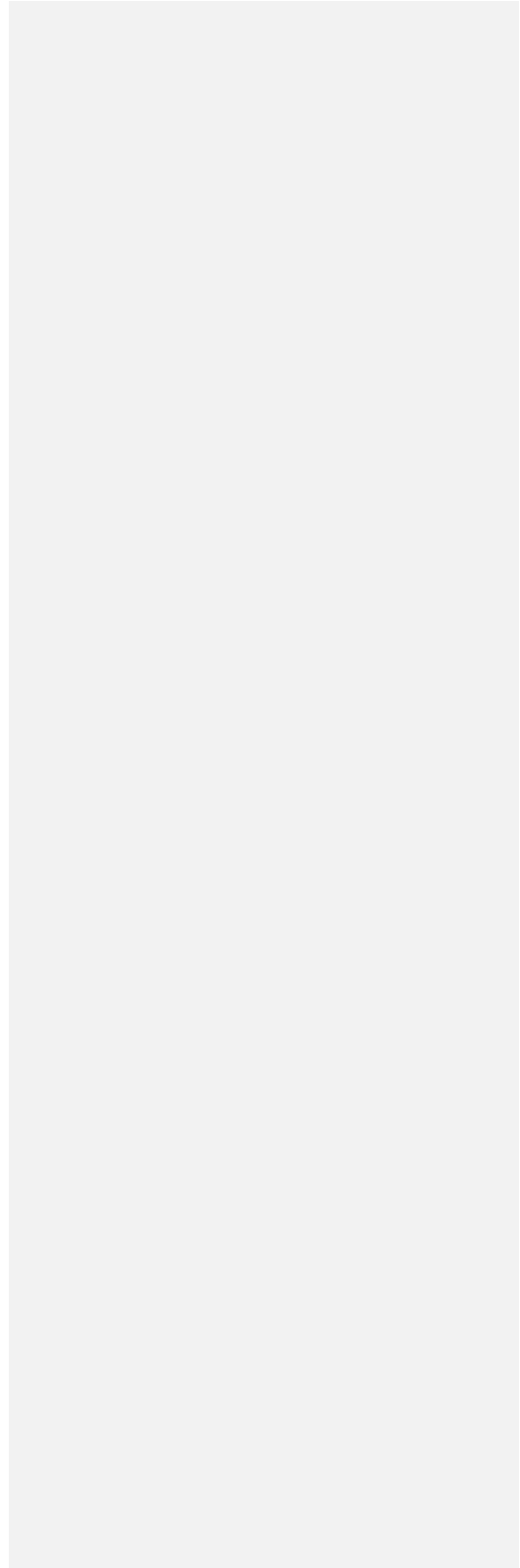
ITEM__13 : GSM / GPRS MODEM**FUNCTIONAL REQUIREMENT: To transmit data****DESIGN REQUIREMENTS:**

The equipment offered should conform to the following technical Specifications:

Feature	Value
Ambient Site Conditions	
Operating Temperature	From -20 to +60
Performance	Data Reception availability of 95% or better
Form factor	The Transmitter should either be integral part of data logger specified above, or it should be supplied as independent unit compatible with supplied data logger
Specific Features	
Communication Direction	Utilize GPRS network for two-way TCP/IP (INTERNET) connection
VPN protocol	Radio to utilize VPN protocol
Transmission trigger	Data collection to be triggered by interrogation from Data Center, or by event based transmission triggered by remote site
Power Saving	Ability to disable interrogation system in order to save power at remote site
Communication Protocol	Data transmission to execute HTTP Post or FTPS to transmit data to the Data Center
Accessories	All associated equipment, including Antenna all cables and mounting hardware
Antenna features	
Frequency range	900 MHz: 824-960 MHz/1800MHz:1710-1880 MHz
Impedance	50 ohms
VSWR	≤ 2.0
Radiation	Omni-directional
Operating temperature	-10 to + 60 degrees Celsius
Connector	SMA adaptable to GSM/GPRS modem
Cable length	As required
Accessories	All associated equipment, including Antenna all cables and mounting hardware

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— Frequency range 900 MHz- 824-960 MHz/1800MHz/1710-1880 MHz



ITEM__—14 : INSAT RADIO**FUNCTIONAL REQUIREMENT: To transmit data****DESIGN REQUIREMENTS:**

The equipment offered should conform to the following technical Specifications:

Feature	Value
Operating Temperature	From -20 to +60
Environment Relative Humidity	0 to 100 %
Career Frequency	402 - 403 MHz
Carrier Settability	In steps of 100 Hz from 402.0 MHz to 403.0 MHz
Modulator	PCM/BPSK
Data coding	NRZ(L)
Output Power	3-10 W, user settable
Data Bit Rate	4.8 kbps
Frequency Stability	
a) Long term	Transmit frequency inaccuracy including aging of oscillator should not exceed \pm 400 Hz per year. Oscillator/synthesizer should have provision to adjust for the long term drift
b) for temperature	\pm 1 ppm or better (-40 to +55°C)
Signal Bandwidth	6.0 KHz maximum or better
Output Power	3-10 W (settable)
Power Stability	\pm 1 dB
Spurious	-60 dB or better
Harmonics	-40 dB or better
Antenna cable	LMR 400 grade or better
Performance	Data Reception availability of 99% or better
Form factor	The Transmitter should either be integral part of data logger specified above, or it should be supplied as independent unit compatible with supplied data logger
Operating power	Switched 12V D.C controlled by data logger.
Yagi Antenna	
Polarization	LHCP or RHCP, switchable in field
Gain	Minimum 11 dbi or better
Center Frequency	402-403 MHz
Mounting	Proper mounting and Pointing arrangement for 360 degree azimuth and elevation adjustment
Operating Wind speed	250 kmph
Wind Survival	300 kmph
Material	Rust-proof and Oxidation-proof
Specific Features	

Satellite System	INSAT Radio System to be Used on the INSAT Satellite operated by ISRO
Certification	Certificate of acceptance required by ISRO and/or IMD as part of the bid package
Demonstration in India	Demonstrated use of the satellite radio with at least 200 radios in current operation in India using INSAT
Accessories	All associated equipment, including GPS, GPS Antenna, INSAT Antenna, all cables and mounting hardware

ITEM__—15 : VSAT TRANS-RECEIVER**FUNCTIONAL REQUIREMENT: To transmit and receive data****DESIGN REQUIREMENTS:**

The equipment offered should conform to the following technical Specifications:

Feature	Value
Operating Temperature	From -20 to +60
Antenna cable	LMR 400 grade or better
Performance	Data Reception availability of 99% or better
Specific Features	
Communication Direction	VSAT Radio system to allow two-way communication system between Data Center and remote station
Single Hop	VSAT communication will be direct link, and use the internet or any surface based topology for data communication (i.e. leased lines)
Bandwidth Sharing	VSAT bandwidth will be able to be shared among all stations
Alarm Conditions	VSAT remote stations shall be able to transmit based on alarm conditions at the remote site such as critical water level or exceptional precipitation events
Accessories	All associated equipment, including Antenna all cables and mounting hardware

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ITEM__—16 : DATA COLLECTION PLATFORM**FUNCTIONAL REQUIREMENT:**

- ~~1. The system shall automatically collect the observations from attached sensors, process the same and store them into its memory as per the pre-programmed procedure at every full hour IST and data shall be transmitted to the INSAT DRT in TDMA mode/GSM/GPRS/Vsat mode.~~
- ~~3. The number of analog/ digital/ SDI channels in the data logger must be compatible to the sensors being supplied & sensors to be added in future and also for other monitoring systems for battery, solar panel etc.~~
- ~~5.3. The system shall have provision to easily include and change the following information in field as mandatory requirements:
 - Unique station identification code.
 - Time of observation.
 - Sensor identification.~~
- ~~6.4. The system shall have an integrated microprocessor based data acquisition and storage system having adequate hardware configuration and software support to serve as an interface between sensors and the communication link to perform tasks as stated below.~~
- ~~7.5. Providing necessary electrical power to the sensors and conversion of electrical output signals from the sensors into engineering values based on calibration equations stored in the memory. Full compatibility with all types of sensors provided in the packages shall be mandatory.~~
- ~~8. Storage of observed data along with time for all the parameters in the memory. Memory capacity to retain at least 180 days data is required. Data shall be available even if the power supply to the system has failed (RAM Backup battery) for one year.~~
- ~~11.7. The system should be capable of continuous updating of the values of sensed parameters and post processing the instantaneous values into average values over a specified period of time for transmission to the DCP with earth receiving station/modeling center.~~
- ~~12. Management of data transmission to DCP to earth receiving station through satellite/modeling center, which shall include formatting of transmitted data with necessary preambles, station ID codes, parity checks etc. as per transmission methodology for transmission through satellite for field installation, two-point calibration/ re-calibration and maintenance of the sensors.~~
- ~~17.9. The system shall support the following functions:
 - Easy programming set up.
 - Multi tasking capability
 - User friendly software programming.
 - The system shall have self-diagnostic facility and be capable of displaying Station ID/ Sensor ID codes and messages on the display panel for general identification of the~~

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fault. It should have facility to monitor these codes and other health status through an external laptop/ PC.

- Setup shall be organised in a tree of menus and sub-menus. Protection of setup parameters and data through password should be supported by the system. In addition, the DCU-DCP shall support the manual entry of data through keypad and its display.
- Data including the setup and program files shall be transferable from the system via a serial port to PC and SD card or other suitable memory device and vice versa.

18. ~~The DCP shall be housed in a weather proof and temper proof housing of NEMA 4 type enclosure of steel or fibre glass. In case of steel enclosure the housing shall have 16 gauge steel body and 14 gauge door, external mounting feet, seams continuously welded, rolled lip around door to exclude liquids, oil resistant gasket, hasp and staple for padlocking, grey polyester powder coating inside and outside. In case of fibre glass enclosure the housing shall have moulded fiber glass reinforced material, resist corrosion, seamless foam in place gasket, detachable mounting feet, moulded drip seals, type 216 stainless steel, quarter turn latch.~~

22. ~~There will be only one type of DCP with specification as given in this para at all sites.~~

24. ~~The DCP, satellite transmitter, antenna have to be IMD certified.~~

Feature	Value
Site Conditions	
Ambient Temperature	From -20 to +50 Degree C
Humidity	5 to 100 %
Altitude	0 to 5000 meter
Sensor Interface	
Analogue Inputs	1/8 Analogue Input Channels
Analog inputs	4 to 20 mA ; 100% over-range withstand
SDI Port	One SDI-12 Interface port
Digital Inputs	1/6 Digital Channels, bidirectional
Pulse Input	1/2 Input for Rain Gauge impulse
Input - Output Interfaces	
Data Transfer	USB stick option for Data transfer
Port for Configuration	One Serial Port (RS232) for communication with Laptop for programming
Port for Telemetry	2 Ports for Communication with Telemetry (GSM / VSAT / INSAT) Device (See Note 1 Below)(GSM/VSAT/INSAT)
Serial/RS 485	One for the INSAT radio
RS232	One for the addition of GSM radio
Analog inputs	4 to 20 mA ; 100% over-range withstand

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LAN Port	RJ 45 port for LAN / VSAT
Display Port	Optional port for connecting external display screen for Data in running text (See Note 2 Below)
Computer Software	
Operating System	Windows software for system configuration / communication
Version	English language version
Licenses	All required licenses included
Analog to digital converter	
Resolution	16 bit or better
Conversion Accuracy	± 1 LSB
Sample Intervals	1 sec. to 24 hr. in 1 second increments (user selectable)
General Features	
Flash memory	Non-volatile Flash memory that can one store one year of data and expandable to a minimum of 1GB.
Resolution	A/D resolution ≥16 bit
Recording Interval	Individual recording intervals for each sensor/parameter
Firmware Operating System	Multi-tasking operating system - must log data and transmit at same time
Display	Inbuilt Digital Display for viewing current data and setting values
Power Supply	Power supply 12V DC, low current drain (quiescent ≤10.0mA)
Battery Voltage	Monitoring of battery voltage level
Internal battery	Internal battery backup for clock, Lithium Battery, storage: 2 years
Power Consumption	< 2 mA quiescent
Charge controller	Internal or External
User Permissions	Different user levels, system of user rights / passwords, access restricted to authorized personnel
Internal clock	Internal clock with drift less than 2 seconds per day-year or using GPS
Keypad	Keypad for displaying or transferring data to memory stick, configuration of data-logger and sensors
Real-Time Clock	GPS synchronised
System integrity	System integrity check procedures
Enclosure	for wall-mounting in a shelter / enclosure with IP65 (NEMA 4) protection or better
Accessories	Serial cable + adaptor (if required) for notebook connection. All accessories (fixing units, etc.) as required
Tools	complete tool kit for installation and routine maintenance giving full detail(number of pieces and type)
Manuals	full documentation and maintenance instructions in English (1 copy per station).

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Note 1: The datalogger should have atleast 2 ports for data transmission via telemetry devices (GSM / VSAT / INSAT). Both telemetry systems should work simultaneously for redundancy. The type of port required for telemetry device may be different (Serial, RS 485, RS 232, RJ-45 etc) and proposer may offer multiple models having different combination of ports.

Note 2: The port for attaching external display device to show data as running text is optional. The proposer may offer two different models, with or without port for display device.

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16B. Specification of Data Logger for more than 2 Sensors

Feature	Value
Site Conditions	
Ambient Temperature	From -20 to +50 Degree C
Humidity	5 to 100 %
Altitude	0 to 5000 meter
Sensor Interface	
Analogue Inputs	8 Analogue Input Channels
Analog inputs	4 to 20 mA ; 100% over-range withstand
SDI Port	One SDI-12 Interface port
Digital Inputs	6 Digital Channels, bidirectional
Pulse Input	2 Input for Rain Gauge impulse
Input - Output Interfaces	
Data Transfer	USB stick option for Data transfer
Port for Configuration	One Serial Port (RS232) for communication with Laptop for programming
¹ Port for Telemetry	2 Ports for Communication with Telemetry (GSM / VSAT / INSAT) Device (See Note 1 Below)
² Display Port	Optional port for connecting external display screen for Data in running text (See Note 2 Below)
Computer Software	
Operating System	Windows software for system configuration / communication
Version	English language version
Licenses	All required licenses included
Analog to digital converter	
Resolution	16 bit or better
Conversion Accuracy	± 1 LSB
Sample Intervals	1 sec. to 24 hr. in 1 second increments (user selectable)
General Features	
Flash memory	Non-volatile Flash memory that can one store one year of data and expandable to a minimum of 1GB.
Resolution	A/D resolution ≥16 bit
Recording Interval	Individual recording intervals for each sensor/parameter
Firmware Operating System	Multi-tasking operating system - must log data and transmit at same time
Display	Inbuilt Digital Display for viewing current data and setting values
Power Supply	Power supply 12V DC, low current drain (quiescent ≤10.0mA)

Battery Voltage	Monitoring of battery voltage level
Internal battery	Internal battery backup for clock, Lithium Battery, storage: 2 years
Charge controller	Internal or External
User Permissions	Different user levels, system of user rights / passwords, access restricted to authorized personnel
Internal clock	Internal clock with drift less than 2 seconds per year or using GPS
Keypad	Keypad for displaying or transferring data to memory stick, configuration of data-logger and sensors
Real-Time Clock	GPS synchronised
System integrity	System integrity check procedures
Enclosure	for wall-mounting in a shelter / enclosure with IP65 (NEMA 4) protection or better
Accessories	Serial cable + adaptor (if required) for notebook connection. All accessories (fixing units, etc.) as required
Tools	complete tool kit for installation and routine maintenance giving full detail (number of pieces and type)
Manuals	full documentation and maintenance instructions in English (1 copy per station).

Note 1: [The datalogger should have atleast 2 ports for data transmission via telemetry devices \(GSM / VSAT / INSAT\). Both telemetry systems should work simultaneously for redundancy. The type of port required for telemetry device may be different \(Serial, RS 485, RS 232, RJ-45 etc\) and proposer may offer multiple models having different combination of ports.](#)

Note 2: [The port for attaching external display device to show data as running text is optional. The proposer may offer two different models, with or without port for display device.](#)

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16C. Power Supply for DCP

The equipment offered should conform to the following technical Specifications:

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Feature	Units
Battery	
Voltage	From -20 to +60
Type	Sealed Maintenance free
Capacity	Based on site conditions and Telemetry method, to provide 21 days of backup
Solar Panels	
Size	Based on Site conditions and Telemetry method used for 21 days of backup
Mounts	The mounts should be sturdy in design; the solar panel should not move or rotate with wind. It should have provision to adjust direction and elevation during installation for optimal solar power generation
Charger	Smart solar charger with protection
General	
The supplier should determine optimal size of solar panels and batteries, such that system should be operational for at least 21 days in the absence of charging	

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~~DETAILS OF EXISTING EARTH RECEIVING STATIONS AND ISRO SATELLITE~~

~~SYSTEM~~

~~FEATURES OF ISRO TDMA TRANSMISSION~~

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~~FEATURES OF ISRO TDMA TRANSMISSION SCHEME ARE PROVIDED FOR
GENERAL GUIDANCE. HOWEVER INTERNATIONAL NORMS APPLICABLE FOR
TDMA MAY BE FOLLOWED.~~

~~FEATURES OF LNA~~

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Feature	Specification
General Features	
General	The unit should be compact and light with display, main processing unit; internal memory and multi-electrode system are integrated in the same housing. No separate electronics other than cables.
Environmental	Weather proof, Shock proof
Operating Temp	From -5 Degree C to +50 Degree C
Interface	Equipment can be interfaced with PC or laptop for upload and load of sequence file and data file.
Power source	Internal and external rechargeable battery source for imaging, data acquisition and data transfer to external PC or Laptop.
Specific Features	
Injection Current	Automatic injection current ranging and stacking and averaging.
Resistivity Measurement	Direct measurement of Resistivity, SP and IP.
Cable	120 takes out in 10m spacing
No. of Channels	10 channels or more.
Automatic Ranging	Microprocessor controlled.
Current measurement precision	0.2 percent.
Voltage measurement precision/ resolution	0.2 percent typical/ 1 micro volt or better
Noise Reduction	Continuous stacking selectable manually or automatic.
SP compensation	Through automatic line at drift correction.
Resistivity accuracy	0.2 percent typical or better.
Induced Polarization	Arbitrary windows flexibility, configured to power line frequencies
Output	
Output Voltage	400 V or more. (Peak to Peak 800 V or more)
Output current	2 A or more
Output Power	200W or more
Input	
Input Impedance	100 Mega Ohm
Input Voltage protection	up to 1000V
External Transmitter	
Transmitter	Not less than 250 watt with external power Booster or Not less than 250 with external 5 KW

Current Output option	2.5 Amps or more
Interface	-
LCD Display	Color & day light visible
Interface I/O port	USB and through LAN
Memory Capacity	Greater than or equal to 20,000 readings

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Item— 18 Time Domain Electromagnetic (TEM) Equipment

Feature	Specification
General Features	
Operating temperature	-20° C + 65° C
Specific Features	
Time gates	48 geometrically spaced
Time range	Up to 16000 us or more
Transmitter's current	Max. 10 A or more
Transmitter Loop size	1600-2500 m ²
Sounding Depth Range	Up to 300m or more in favorable condition
Sensitivity	≈ 0.1μV
Stacking	Up to 65000 stack in single loop
Display	Note book or Hand held PC
Weight(kg)	Compact and light weight
Transmitter Protection	Electronic and electromechanical protection.
Casing	The unit should be compact and light with generating and measuring block with the internal battery housed in a water proof case.
Accessories:	
-	Cable for connection of the computer with port RS 232.
-	Cable for measurements with the single receiving –generating antenna.
-	Cable for measurements with the receiving and generating antenna (4 wires).
-	Cables for connection of the external battery.
-	Test –coil.
-	Charging device with a cable.
-	Antenna 50m X 50m (100m cable R=< 2 Ohm and 2X50 = 100 m. R= < 4 Ohm).
-	Additional sockets for antennas.
-	Dedicated Software.

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B. Accessories:

1. Cable for connection of the computer with port RS 232.
2. Cable for measurements with the single receiving –generating antenna.
3. Cable for measurements with the receiving and generating antenna (4 wires).
4. Cables for connection of the external battery.
5. Test –coil.
6. Charging device with a cable.

7. ~~Antenna 50m X 50m (100m cable R=< 2 Ohm and 2X50 = 100 m, R=< 4 Ohm).~~

ITEM__—19 RESISTIVITY METER (SIGNAL AVERAGING SYSTEM)

Feature	Specification
General Features	
Power input	12/24 V rechargeable batteries
Display	Alphanumeric LCD
Specific Features	
Power Out	100 watts or more
Current	up to 2 Amp
Frequency	Less than or equal to 0.8 Hz
Noise rejection	95 db or more
Potential measuring	10 micro volts
Range Resolution Range selection	Automatic
Resistance range	10 micro ohms to 10 Kilo ohms
SP Cancellation	Automatic
Dynamic range	Better than 15 bits
Data averaging	up to 64 cycles
Input Impedance	10 M ohms or more
Accuracy	1%
Interface	
-	User friendly menu operation with feather touch key pad
-	Provision for data transfer to any window based PC
-	Provision to display error signals in case of poor electrode contacts or discontinuity

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1. Power input : 12/24 V rechargeable batteries
2. Power Out : 100 watts or more
3. Current : up to 2 Amp
4. Frequency : Less than or equal to 0.8 Hz
5. Noise rejection : 95 db or more
6. Potential measuring : 10 micro volts
7. Range Resolution Range selection : Automatic
8. Resistance range : 10 micro ohms to 10 Kilo ohms
9. Display : Alphanumeric LCD
10. SP Cancellation : Automatic
11. Dynamic range : Better than 15 bits
12. Data averaging : up to 64 cycles
13. Input Impedance : 10 M ohms or more
14. Accuracy : 1%
15. User friendly menu operation with feather touch key pad
16. Provision for data transfer to any window based PC

17. Provision to display error signals in case of poor electrode contacts or discontinuity

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ITEM__—20 : MULTI-PARAMETER DIGITAL GEOPHYSICAL LOGGER (500 M):

Feature	Specifications
General module and Acquisition Console	
<u>Power supply</u>	230 Volt \pm 5% by Generator driven at 50 hertz AC frequency, suitable horse power Generator which enable to take load of 500m cable in viscous mud fluid for measuring during down and upward below 500m borehole. Generator may bear all weather temperature of Indian tropical climate condition during running condition.
<u>Communication Interface</u>	RS 232 or Latest for communication with latest Laptop
<u>Software</u>	Acquisition and interpretation Software's with editing and presentation facility . Instantly plot the recorded graph during measurement and facility to store in external drive like Pen-drive or better storage facility. Data collected by the down hole & Up-hole probes are digitally stored during acquisition in a Laptop PC, Low resolution field printouts are produced while the data is being acquitted allowing the operator to review the data for completeness Later, appropriate scale are chosen and filters may be applied and high resolution printouts are made. Presentation quality logs from several probes are merged on the final printouts.
<u>Front Panel</u>	Voltmeter, current meter, torque, Speedo meter and Depth indicator etc will be fitted in front panel along with operating of which drive system. Or suitable device may be given for above monitoring.
<u>Operating Temperature</u>	Operating system of modules, which drive and borehole location should be aligned after mounting the Logger. So that operator may observe up to borehole during operation of GP Logging.
<u>Storage Temperature</u>	All weather Indian tropical condition including natural borehole temperature up to 500m (Hot water borehole to icing condition) or better.
<u>Winch Assembly</u>	-5 to 60°C or better (All should be fitted in suitable vehicle with capacity of sitting of operators at least three persons in comfort, all equipments with all probes, tool box and Generator etc).
<u>Motor</u>	Suitable capacity, SCR type, motor can take load up to 500m in borehole filled with viscous mud fluid during logging operation.
<u>Controller</u>	SCR controller, with 10 amp current limit or better
<u>Speed</u>	0 to 30 m/min
<u>Maximum cable capacity</u>	500m
<u>Emergency Brake</u>	Winch assembly should be provided with emergency brake & provision to drive manually in case failure of Generator
Caliper tool	
<u>Number of Arms</u>	Three or four (Two set short and long arms)

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<u>Diameter</u>	$\leq 60\text{mm}$
<u>Length</u>	$\leq 150\text{cm}$
<u>Measurement range</u>	Up to 31cm approx. OR more by short arms and long arms up to 50.4cm approx. OR more
<u>Probes and Tools</u>	
<u>Fluid Resistivity measuring range</u>	0-100 ohm meter
<u>Temperature measuring range</u>	All borehole natural temperature from hot to icy condition.
<u>Fluid Resistivity Resolution</u>	$\leq 0.05\%$
<u>Temperature Resolution</u>	$\leq 0.1^\circ\text{C}$
<u>Accuracy</u>	$\leq 1\%$
<u>Probe Diameter</u>	60 mm or lower
<u>Gamma tool:</u>	Provision for various time constants desirable
<u>Electric tool:</u>	-
<u>Low range normal Resistivity range</u>	0-250 ohm-meter
<u>High range normal Resistivity range</u>	0-10000 ohm-meter
<u>Resistivity accuracy</u>	$\leq 1\%$
<u>Resistivity Resolution</u>	$\leq 0.02\%$
<u>Self Potential range</u>	$\leq -1.5\text{ to }1.5\text{ VDC}$
<u>Self Potential accuracy</u>	$\leq 1\%$
<u>Self Potential resolution</u>	$\leq 0.02\%$
<u>Calibration Box</u>	Calibration box of above measurement parameters
<u>Mud Resistivity Meter</u>	Portable, measured range 0 to 250 ohm meter
<u>Water Analysis Tool</u>	Portable Water analysis Tool
<u>Tool Kit</u>	Complete geophysical tool kit for field operations including tripod and digital Multi-meter
<u>Spares</u>	Acquisition system spares including complete cable head spares, probe parts, winch parts, O-rings and consumables

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<u>Sl.No</u>	<u>Description</u>	<u>Specifications</u>
4	General module and Acquisition Console with LCD display and plotter etc.	<ol style="list-style-type: none"> Power supply: 230 Volt $\pm 5\%$ by Generator driven at 50 hertz AC frequency, suitable horse power Generator which enable to take load of 500m cable in viscous mud fluid for measuring during down and upward below 500m borehole. Generator may bear all weather temperature of Indian tropical climate condition during running condition. Communication Interface: RS-232 or Latest for communication with latest Laptop

		3. Acquisition and interpretation Software's with editing and presentation facility.
--	--	---

8 The Equipment should be mounted on a suitable vehicle having following specifications

Feature	Specifications
General module and Acquisition Console	
<u>Power supply</u>	230 Volt \pm 5% by Generator driven at 50 hertz AC frequency, suitable horse power Generator which enable to take load of 1000m cable in viscous mud fluid for measuring during down and upward below 1000m borehole. Generator may bear all weather temperature of Indian tropical climate condition during running condition.
<u>Communication Interface</u>	RS 232 or Latest for communication with latest Laptop
<u>Software</u>	Acquisition and interpretation Software's with editing and presentation facility . Instantly plot the recorded graph during measurement and facility to store in external drive like Pen-drive or better storage facility. Data collected by the down hole & Up-hole probes are digitally stored during acquisition in a Laptop PC, Low resolution field printouts are produced while the data is being acquitted allowing the operator to review the data for completeness Later, appropriate scale are chosen and filters may be applied and high resolution printouts are made. Presentation quality logs from several probes are merged on the final printouts.
<u>Front Panel</u>	Voltmeter, current meter, torque, Speedo meter and Depth indicator etc will be fitted in front panel along with operating of which drive system. Or suitable device may be given for above monitoring.
<u>-</u>	Operating system of modules, which drive and borehole location should be aligned after mounting the Logger. So that operator may observe up to borehole during operation of GP Logging.
<u>Operating Temperature</u>	All weather Indian tropical condition including natural borehole temperature up to 1000m (Hot water borehole to icing condition) or better.
<u>Storage Temperature</u>	-5 to 60°C or better (All should be fitted in suitable vehicle with capacity of sitting of operators at least three persons in comfort, all equipments with all probes, tool box and Generator etc).
Winch Assembly	
<u>Motor</u>	Suitable capacity, SCR type, motor can take load up to 1000m in borehole filled with viscous mud fluid during logging operation.
<u>Controller</u>	SCR controller, with 10 amp current limit or better
<u>Speed</u>	0 to 30 m/min
<u>Maximum cable capacity</u>	1000m
<u>Emergency Brake</u>	Winch assembly should be provided with emergency brake & provision to drive manually in case failure of Generator

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Caliper tool	
Number of Arms	Three or four (Two set short and long arms)
Diameter	≤ 60mm
Length	≤150cm
Measurement range	Up to 31cm approx. OR more by short arms and long arms up to 50.4cm approx. OR more
Probes and Tools	
Fluid Resistivity measuring range	0-100 ohm meter
Temperature measuring range	All borehole natural temperature from hot to icy condition.
Fluid Resistivity Resolution	≤0.05%
Temperature Resolution	≤0.1°C
Accuracy	≤1%
Probe Diameter	60 mm or lower
Gamma tool:	Provision for various time constants desirable
Electric tool:	-
Low range normal Resistivity range	0-250 ohm-meter
High range normal Resistivity range	0-10000 ohm-meter
Resistivity accuracy	≤1%
Resistivity Resolution	≤0.02%
Self Potential range	≤ -1.5to 1.5 VDC
Self Potential accuracy	≤1%
Self Potential resolution	≤0.02%
Calibration Box	Calibration box of above measurement parameters
Mud Resistivity Meter	Portable, measured range 0 to 250 ohm meter
Water Analysis Tool	Portable Water analysis Tool
Heavy duty tripod assembly	Can take load of 1000 m armored cable up to depth 1000 m in viscous mud filled fluid
Tool Kit	Complete geophysical tool kit for field operations including tripod and digital Multi-meter
Spares	Acquisition system spares including complete cable head spares, probe parts, winch parts, O-rings and consumables

S.No	Description	Specifications
4	General module and Acquisition Console with LCD display and	1. Input Power supply: 230 Volt ± 5 % by Generator driven at 50 hertz's frequency, Suitable

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	plotter etc.	Horse Power Generator which enable to take load of 4000 m cable in viscous mud fluid for measuring during down and upward below 1000 m borehole. Generator may bear all weather temperature of Indian tropical climatic condition during running condition.
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Feature	Specification
General Features	
Input Power Source	12/24V rechargeable batteries
Display with the System	Alphanumeric Liquid Crystal Display.
Specific Features	
Power Output	40 Watts or more
Noise Rejection	95 db or more
Potential Measuring range	10 micro volts.
Range selection	Manual/Automatic
Resistance Measuring Range	10 ⁻³ to 10 ⁴ ohms.
Self potential cancellation	Automatic
Data Averaging	Upto 16 cycles or more
Input Impedance	1 Mega Ohm or more
Accuracy	± 1%
Output	Resistance
Protection	Protected against circuit overloads.
Weight and Dimension	Light weight and small

Input Power Source : 12/24V rechargeable batteries
Power Output : 40 Watts or more
Noise Rejection : 95 db or more
Potential Measuring range : 10 micro volts.
Range selection : Manual/Automatic
Resistance Measuring Range : 10⁻³ to 10⁴ ohms.
Self potential cancellation : Automatic
Data Averaging : Upto 16 cycles or more
Input Impedance : 1 Mega Ohm or more
Accuracy : ± 1%
Display with the System : Alphanumeric Liquid Crystal Display.
Output : Resistance
Protection : Protected against circuit overloads.
Weight and Dimension : Light weight and small

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ITEM 23: SNOW DEPTH SENSOR

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FEATURE	Specification
Site Conditions	
Ambient Temperature	From -40 to +60
Humidity	5 to 100 %
Altitude	2000 to 5500 meter
Snow Pillow	<ul style="list-style-type: none"> • For measurement of snow water equivalent • Consisting of liquid-filled pillow and pressure transducer (or, alternatively, a system consisting of a standpipe, float and shaft encoder) • Four snow pillow per station plumbed together • Total area min 7 m2 (80 sqft) • Tanks made from stainless steel by manufacture experienced with fabricating snow pillow tanks. • Antifreeze solution for filling snow pillow • Pipes and valve as required
Range	1000 mm water equivalent
Pressure measuring Accuracy	1% full scale (10mm)
General Features	
Output Interface	SDI12/ RS 485 / / 4-20 mA / Compatible with Data logger
Power Supply	12 V DC or switch rated for 12 VDC
Material	Corrosion Resistance Metal (Stainless steel or Aluminum)
Enclosure	NEMA 4
Tools	Complete tool kit for operation and routine maintenance
Manuals	Full Documentation and maintenance manual in English
Accessories	Sensor Mounting support, cables and other accessories as required

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1. Equipment with Integrated features

Some manufacturers produce equipment with more than one item integrated into one equipment. The examples of such integration could be Shaft Encoder with Datalogger, Rain Gauge with Datalogger, Datalogger with GSM Modem, Datalogger with Satellite Transmitter etc.

The proposer is free to offer integrated equipment having features of more than one item. However, the integrated equipment must satisfy **all** the specification requirement of individual items. For example, if a proposer offers a equipment model with Data logger as integral part of Shaft encoder, the proposed equipment must meet all specification requirement of Shaft Encoder **AND** Datalogger.

The examples of integrated equipment provided above are indicative only; the proposer is free to offer any combination of equipment as integrated equipment.

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SECTION VI-A

COMPLIANCE MATRIX

For Each clause of Technical Specifications the Proposer shall prepare a table below:

<u>Technical Specifications</u>	<u>Compliance</u>	<u>Make and Model Number of the equipment Proposed</u>	<u>Page Number in the Proposal submitted where documentary evidence is enclosed.</u>
<u>1</u>	<u>Yes/No</u>		
<u>2</u>			
<u>3</u>			
<u>4</u>			

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APPENDIX 1:

FEATURES OF ISRO TDMA TRANSMISSION

Features of ISRO TDMA transmission scheme are provided for general guidance. However international norms applicable for TDMA may be followed.

- *Total number of DCU that could be accommodated in a single carrier is 1800.*
- *By including CRC in the data frame, data validity could be ensured.*
- *With preserving BCH coding of SID, data quality could be checked and valid data retrieved even for the bad CRC.*
- *By preserving present SID (Station Identification Code) structure of IMD, SID for all users of DRT could be standardized. The SID consists of 21bits (9 bits for user type, 2 bits for priority, and 10 bits for Platform ID).*
- *With Forward error correction convolution coding, better data quality is ensured.*
- *With one repeat transmission, reliability of data reception is improved.*

1	<u>CRC CODE GENERATION</u>	Polynomial: CRC-CCITT-16 $X^{16}+X^{12}+X^5+1$
2	<u>DATA SCRAMBLING</u>	Polynomial: $1+X^{-1}+X^{-15}$ Initial State: 6959 (Hex)
3	<u>CONVOLUTION ENCODING</u>	Convolution Coding $\frac{1}{2}$ Rate, Constraint Length K=7 Polynomial: G1=133(Octal), G2=171(Octal)
4	<u>HEADER DETAILS</u>	CR: 192 Symbols (all '0's) BTR: 64 Symbols (all '1's) UW: 64 Symbols (07EA CDDA 4E2F 28C2 (Hex)) Note: UW transmitted with LSB first of every byte, starting from 07EA. (See Fig.1)
5	<u>RF DATA ENCODING</u>	Differential coding (NRZ-L) is done for the entire burst (Preamble and the convolution coded bits) before RF modulation.

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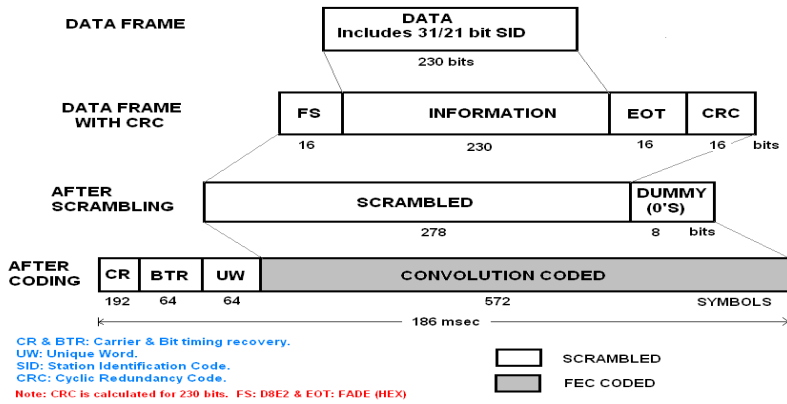


Fig 1: Burst Transmission Format for TDMA Technique (4800 Symbols/sec.)

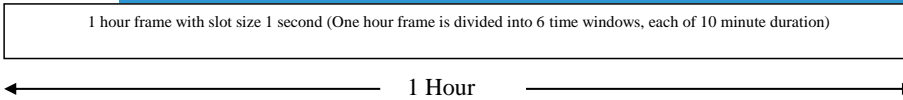


Fig 2: TDMA Transmission Frame Format

Fig.1 may be referred to. CRC is calculated for 262 bits which include FS and EOT. It is then scrambled. 1byte, all '0's is added with the scrambled bits, after which the entire bits are convolution coded. Preamble (CR, BTR and UW) is appended with the convolution coded bits. The resulting bits are then differential coded and transmitted.

The system should have flexibility to accommodate more number of carrier channels by suitable changes in the TDMA transmission scheme.

Additional details, if required, will be provided at the time of the design review meeting which will be held with the successful tenderer. However, it should be ensured by the tenderer that the system configuration is flexible and accommodate more than 30 sensors without any additional cost.

INSAT DRT SPECIFICATIONS

For the purpose of data transfer from field DCU to Data Receiving Earth Station at New Delhi, the Data Relay Transponder (DRT) on the different INSAT/ KALPANA-1 series of satellites shall be used and the specifications given below shall be treated as standard to be adhered by the offered telemetry system.

SATELLITE	KALPANA-1 (74° E)	INSAT-3A (83°E)	INSAT-3D (82°E)
RECEIVE FREQ. BAND	402.65 - 402.85Mhz	402.65 - 402.85Mhz	402.10 - 402.50Mhz
TRANSMIT FREQ. BAND	4500-4510Mhz band 4506.05Mhz	4500-4510Mhz band 4506.05Mhz	4500-4510Mhz band 4506.05Mhz

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<u>RECEIVE G/T</u>	<u>-19db/deg.K</u>	<u>-19db/deg.K</u>	<u>-19db/deg.K</u>
<u>MAX.EIRP</u>	<u>24dBW peak</u>	<u>24 dbW peak</u>	<u>24 dbW peak</u>
<u>C-BAND EIRP for RECEIVE FLUX DENSITY</u>	<u>2.0dBW for -146 dBW/m²</u>	<u>2.0 dbW for -146 dbW/m²</u>	<u>2.0 dbW for -146 dbW/m²</u>
<u>REC.POLARISATION</u>	<u>RHCP</u>	<u>LHCP</u>	<u>LHCP</u>
<u>TRANSMIT POL</u>	<u>LINEAR</u>	<u>LINEAR</u>	<u>LINEAR</u>
<u>FREQ.TRANSLATION ERROR</u>	<u>± 40Khz over life ± 6Khz over 1 month</u>	<u>± 40Khz over life ± 6Khz over 1 month</u>	<u>± 40Khz over life ± 6Khz over 1 month</u>

Data Relay Transponder (DRT) onboard INSAT 3D will have a receiving frequency band of 402.3 MHz ± 200 KHz.

CHANNEL SPECIFICATIONS FOR TDMA TRANSMISSION FORMAT

Table below gives the present AWS parameters and their identification code used in the TDMA transmission format.

<u>Sl.No.</u>	<u>Channel No.</u>	<u>Identification Code</u>	<u>Parameter</u>
<u>1.</u>	<u>1</u>	<u>0000 (:0)</u>	<u>Instantaneous sampled value of air temperature in deg C at the end of every full hour UTC.</u>
<u>2.</u>	<u>2.</u>	<u>0001(:1)</u>	<u>Water level sampled at end of every full hour IST</u>
<u>3.</u>	<u>4</u>	<u>0100(:4)</u>	<u>Wind speed in knots (3 minute vector averaging prior to full hour UTC).</u>
<u>4.</u>	<u>5</u>	<u>0101(:5)</u>	<u>Wind direction in degrees (3 minute vector averaging prior to full hour UTC).</u>
<u>5.</u>	<u>7</u>	<u>0111(:7)</u>	<u>Instantaneous value of RH at the end of every full hour UTC.</u>
<u>6.</u>	<u>10</u>	<u>1110(:14)</u>	<u>Duration of bright sunshine since last 20 UTC. Reset to zero at 20 UTC. (Global radiation will be transmitted in this slot instead of duration of sunshine.</u>
<u>7.</u>	<u>Cal1</u>	<u>:C1</u>	<u>Battery voltage (volts)</u>
<u>8.</u>	<u>Cal2</u>	<u>:C2</u>	<u>Hourly rainfall (rounded off to next higher integer).</u>

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SPECIFICATIONS OF EXISTING EARTH RECEIVING STATION

EQUIPMENTS

DETAILS OF EARTH RECEIVING STATION ANTENNA

<u>i.</u>	<u>Reflector size</u>	:	<u>3.8 metres</u>
<u>ii.</u>	<u>Reflector type</u>	:	<u>Solid fibre glass material</u>
<u>iii.</u>	<u>Mount Design</u>	:	<u>Polar mount/ any other suitable design (TBS)</u>
<u>iv.</u>	<u>Feed Mount</u>	:	<u>Prime focus feed</u>
<u>v.</u>	<u>Feed type</u>	:	<u>Linear</u>
<u>vi.</u>	<u>Input frequency (for feed)</u>	:	<u>4.5 to 4.8 GHz</u>
<u>vii.</u>	<u>G/T</u>	:	<u>31.7 dB /°K</u>
<u>viii.</u>	<u>Operating frequency</u>	:	<u>4500- 4800 MHz</u>
<u>ix.</u>	<u>Gain</u>	:	<u>>43 dB</u>
<u>x.</u>	<u>Polarization</u>	:	<u>LHCP / RHCP selectable</u>
<u>xi.</u>	<u>Elevation Adjustment Range</u>	:	<u>0-90 °(Coarse & fine adjustment) Angles to be engraved on the antenna</u>
<u>xii.</u>	<u>Azimuth Adjustment Range</u>	:	<u>0-360 °(Coarse & fine adjustment) Angles to be engraved on the antenna</u>
<u>xiii.</u>	<u>Wind loading :</u>		
	<u>a) Operational</u>	:	<u>100 KMPH or better</u>
<u>xiv.</u>	<u>b) Survival</u>	:	<u>175 KMPH or better</u>
<u>xv.</u>	<u>Operating rainfall rate</u>	:	<u>100mm/hr and water proof.</u>

FEATURES OF LNA

<u>—</u>	<u>Frequency range</u>	:	<u>4500 – 4800 MHz</u>
	<u>Bandwidth</u>	:	<u>300 MHz(typical)</u>
	<u>Noise temperature</u>	:	<u>≤50 °K (45 °K typical)</u>
	<u>(Ambient Temp. 25°C)</u>		
	<u>Gain</u>	:	<u>> 60 dB</u>
	<u>Gain ripple</u>	:	<u>Not more than ±0.5 dB (Over entire 300 MHz pass band)</u>
	<u>Max. RF input</u>	:	<u>-50 dBm composite</u>
	<u>Max. RF input with no damage</u>	:	<u>0 dBm CW in pass band</u>
	<u>Input / Output VSWR</u>	:	<u>1.2 : 1</u>

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(4.5 GHz to 4.8 GHz)

Operating Temperature : -10 to 55 °C

Humidity : 0-100 per cent with condensation

FEATURES OF SYNTHESIZED DOWN CONVERTER

The general features are listed below.

<u>RF input</u>	:	<u>4500 – 4800 MHz</u>
<u>IF output range</u>	:	<u>Compatible to Demodulator Input</u> <u>(May be 100-180 MHz)</u>
<u>RF input level</u>	:	<u>-55 dBm typical</u>
<u>IF output level</u>	:	<u>+20 dBm at 1 dB compression</u>
<u>Frequency stability over time</u>	:	<u>+/- 1 x 10⁻⁹ / day</u>
<u>Frequency stability over temperature</u>	:	<u>+/- 1 x 10⁻⁸ / day</u>

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1. PROPOSAL FORM (FOR FIRST STAGE COMPETITION)

Date: [insert: *date of Proposal*]

Loan/Credit No.: [Purchaser insert: *number*]

[Purchaser to specify: "IFP No.: [number]"]

[insert: *name of Framework Agreement*]

To: [Purchaser insert: *Name and address of Purchaser*]

Dear Sir or Madam:

Having examined the Document for setting up framework agreement, including Addenda Nos. [insert *numbers*], the receipt of which is hereby acknowledged, we, the undersigned, offer to supply and deliver the Goods under the above-named Agreement in full conformity with the said document for setting up framework agreement for the sums as may be determined in accordance with the terms and conditions of the Purchase Orders to be issued under the above mentioned framework agreement.

We undertake, if our Proposal is accepted, to deliver the Goods in accordance with the tentative delivery schedule and list of consignee indicated in the Schedule of Requirements (exact requirements to be further specified in the Purchase Orders). The Goods are sourced from <name of the country>.

If our Proposal is accepted, we undertake to provide a performance security in the form, in the amounts, and within the times specified in the document for setting up framework agreement.

We agree to abide by this Proposal, for the Proposal Validity Period specified in the document for setting up framework agreement and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period.

Until the formal final Framework Agreement is prepared and executed between us, this Proposal, together with your written acceptance of the Proposal and your notification of award for setting up the Framework Agreement, shall constitute a binding Contract between us. We understand that you are not bound to accept any Proposal you may receive.

We undertake that, in competing for (and, if the award is made to us, in executing) the above agreement, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988".

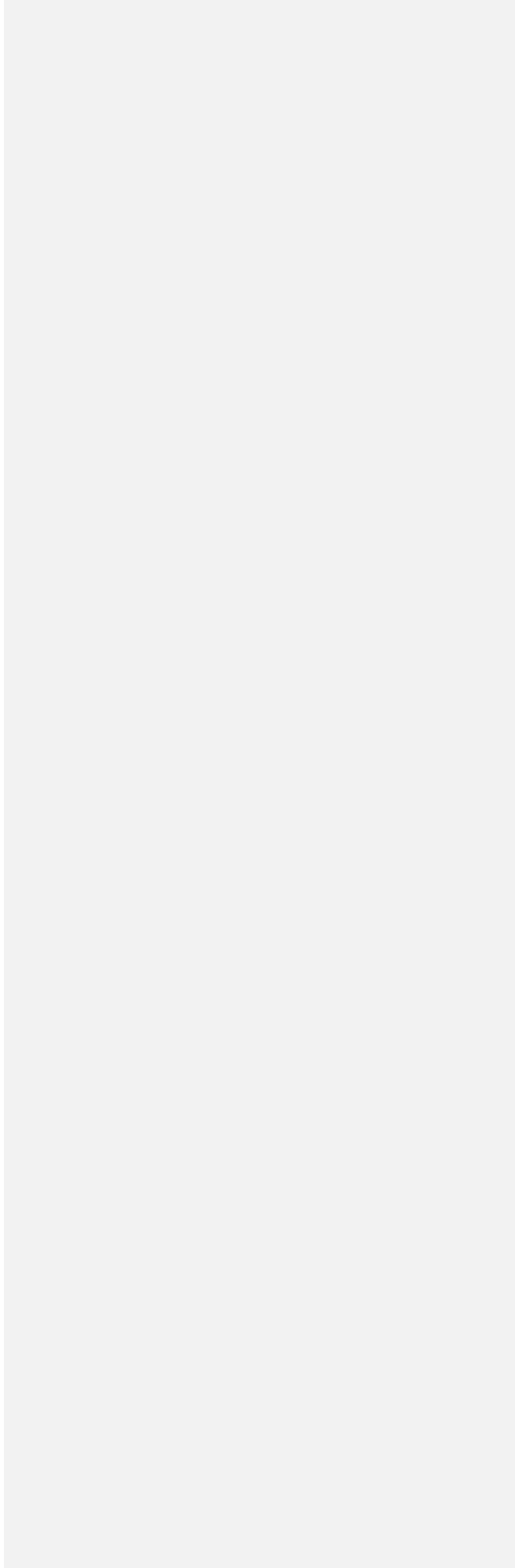
We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Proposal, and to agreement execution if we are awarded the Agreement, are listed below:

Name and Address of Agent	Amount in Indian Rupees	Purpose of Commission or Gratuity
_____	_____	_____
_____	_____	_____
_____	_____	_____

(if none, state "none")

SECTION VII. SAMPLE FORMS



1. PROPOSAL FORM (FOR FIRST STAGE COMPETITION)

Date: [*insert: date of Proposal*]

Loan/Credit No.: [*Purchaser insert: number*]

[*Purchaser to specify: "IFP No.: [number]"*]

[*insert: name of Framework Agreement*]

To: [*Purchaser insert: Name and address of Purchaser*]

Dear Sir or Madam:

Having examined the Document for setting up framework agreement, including Addenda Nos. [*insert numbers*], the receipt of which is hereby acknowledged, we, the undersigned, offer to supply and deliver the Goods under the above-named Agreement in full conformity with the said document for setting up framework agreement for the sums as may be determined in accordance with the terms and conditions of the Purchase Orders to be issued under the above mentioned framework agreement.

We undertake, if our Proposal is accepted, to deliver the Goods in accordance with the tentative delivery schedule and list of consignee indicated in the Schedule of Requirements (exact requirements to be further specified in the Purchase Orders). The Goods are sourced from <name of the country>.

If our Proposal is accepted, we undertake to provide a performance security in the form, in the amounts, and within the times specified in the document for setting up framework agreement.

We agree to abide by this Proposal, for the Proposal Validity Period specified in the document for setting up framework agreement and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period.

Until the formal final Framework Agreement is prepared and executed between us, this Proposal, together with your written acceptance of the Proposal and your notification of award for setting up the Framework Agreement, shall constitute a binding Contract between us. We understand that you are not bound to accept any Proposal you may receive.

We undertake that, in competing for (and, if the award is made to us, in executing) the above agreement, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988".

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Proposal, and to agreement execution if we are awarded the Agreement, are listed below:

Name and Address of Agent	Amount in Indian Rupees	Purpose of Commission or Gratuity
_____	_____	_____
_____	_____	_____
_____	_____	_____

(if none, state "none")

We confirm that we comply with the eligibility requirements as per ITP clause 4 of the document for setting up framework agreement.

Dated this [*insert: number*] day of [*insert: month*], [*insert: year*].

Signed: _____

Date: _____

In the capacity of [*insert: title or position*]

Duly authorized to sign this Proposal for and on behalf of [*insert: name of Proposer*]

Checklist for documents to be submitted with first stage Proposal

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<u>Document</u>	<u>Attached (Yes / No)</u>
<u>Power of Attorney in favour of the signatory of Proposal</u>	
<u>Proposal Security in the required amount and format</u>	
<u>Certificate of incorporation of the Proposer</u>	
<u>Performance statement as per required format, along with copies of purchase order, client certificate etc.</u>	
<u>Copies of balance sheet & Profit & Loss statement for last 3 fiscal years</u>	
<u>No deviation statement on technical specification</u>	
<u>Declaration of agreement with all terms and condition of the document for setting up framework agreement</u>	
<u>Manufacturer's authorization (if item is not manufactured by the Proposer)</u>	
<u>Any other documents as per ITP 7.1 and 14</u>	

Power of Attorney in favour of the signatory of Proposal
 Proposal Security in the required amount and format
 Certificate of incorporation of the Proposer
 Performance statement as per required format, along with copies of purchase order, client certificate etc.
 Copies of balance sheet & Profit & Loss statement for last 3 fiscal years
 No deviation statement on technical specification
 Declaration of agreement with all terms and condition of the document for setting up framework agreement
 Manufacturer's authorization (if item is not manufactured by the Proposer)
 Any other documents as per ITP 7.1 and 14

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2. PROPOSAL SECURITY FORM

Date: [insert: **date**]
Loan/Credit Number: [insert: **loan or credit number from IFP**]
IFP: [insert: **name and number of IFP**]
Framework Agreement: [insert: **name and number of Agreement**]

To: [insert: **name and address of Purchaser**]

WHEREAS [insert: **name of Proposer**] (hereinafter called “the Proposer”) has submitted its Proposal dated [insert: **date of Proposal**] for the performance of the above-named Framework Agreement (hereinafter called “the Proposal”)

KNOW ALL PERSONS by these present that WE [insert: **name of bank**] of [insert: **address of bank**] (hereinafter called “the Bank”) are bound unto [insert: **name of Purchaser**] (hereinafter called “the Purchaser”) in the sum of: [insert: **amount**], for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors and assigns by these presents.

Sealed with the Common Seal of the said Bank this [insert: **number**] day of [insert: **month**], [insert: **year**].

THE CONDITIONS of this obligation are the following:

1. If, after the Proposal submission deadline, the Proposer
 - (a) withdraws its Proposal during the period of Proposal validity specified by the Proposer in the Proposal Form, or
 - (b) does not accept the Purchaser’s corrections of arithmetic errors in accordance with the Instructions to Proposers; or
2. If the Proposer, having been notified of the acceptance of its Proposal by the Purchaser during the period of Proposal validity
 - (a) fails or refuses to sign the Framework Agreement when required; or
 - (b) fails or refuses to issue the performance security in accordance with the Instructions to Proposers.

We undertake to pay to the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due it, owing to the occurrence of any one of the two above-named CONDITIONS, and specifying the occurred condition or conditions.

This guarantee will remain in full force up to and including [*insert: the date that is 45 days after the period of Proposal validity*], and any demand in respect thereof must reach the Bank not later than the above date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

For and on behalf of the Bank

Signed: _____

Date: _____

in the capacity of: [*insert: title or other appropriate designation*]

Common Seal of the Bank

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3. PERFORMANCE SECURITY BANK GUARANTEE

(unconditional)

Date: [insert: *date*]

Loan/Credit Number: [insert: *loan or credit number from IFP*]

IFP: [insert: *name or number of IFP*]

Agreement: [insert: *name or number of Agreement*]

To: [insert: *name and address of Purchaser*]

Dear Sir or Madam:

We refer to the Framework Agreement (“the Agreement”) signed on [insert: *date*] between you and [insert: *name of Supplier*] (“the Supplier”) concerning setting up the Framework Agreement for the supply and delivery of [insert: *a brief description of the Goods*]. By this letter we, the undersigned, [insert: *name of bank*], a bank (or company) organized under the laws of [insert: *country of bank*] and having its registered/principal office at [insert: *address of bank*], (hereinafter, “the Bank”) do hereby jointly and severally with the Supplier irrevocably guarantee payment owed to you by the Supplier, pursuant to the Agreement, up to the sum of [insert: *amount in numbers and words*]. This guarantee shall be reduced or expire as provided for by the Framework Agreement Clause 11.

We undertake to make payment under this Letter of Guarantee upon receipt by us of your first written demand signed by your duly authorized officer declaring the Supplier to be in default under the Agreement and without cavil or argument any sum or sums within the above-named limits, without your need to prove or show grounds or reasons for your demand and without the right of the Supplier to dispute or question such demand. Our liability under this Letter of Guarantee shall be to pay to you whichever is the lesser of the sum so requested or the amount then guaranteed under this Letter in respect of any demand duly made under this Letter prior to expiry of this Letter of Guarantee, without being entitled to inquire whether or not this payment is lawfully demanded.

This Letter of Guarantee shall be valid from the date of issue until the date of expiration of the guarantee, as governed by the Agreement. Except for the documents herein specified, no other documents or other action shall be required, notwithstanding any applicable law or regulation. Our liability under this Letter of Guarantee shall become null and void immediately upon its expiry, whether it is returned or not, and no claim may be made under this Letter after such expiry or after the aggregate of the sums paid by us to you shall equal the sums guaranteed under this Letter, whichever is the earlier. All notices to be given under this Letter shall be given

by registered (airmail) post to the addressee at the address herein set out or as otherwise advised by and between the parties hereto.

We hereby agree that any part of the Agreement may be amended, renewed, extended, modified, compromised, released, or discharged by mutual agreement between you and the Supplier, and this security may be exchanged or surrendered without in any way impairing or affecting our liabilities hereunder without notice to us and without the necessity for any additional endorsement, consent, or guarantee by us, provided, however, that the sum guaranteed shall not be increased or decreased.

No action, event, or condition that by any applicable law should operate to discharge us from liability hereunder shall have any effect, and we hereby waive any right we may have to apply such law, so that in all respects our liability hereunder shall be irrevocable and, except as stated herein, unconditional in all respects.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

For and on behalf of the Bank

Signed: _____

Date: _____

in the capacity of: [insert: *title or other appropriate designation*]

Common Seal of the Bank

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4. MANUFACTURER'S AUTHORIZATION FORM

(Manufacturer's or Producer's letterhead)

To: [insert: *name of the Purchaser*]

WHEREAS [*name of the manufacturer or producer*] (hereinafter, "we" or "us") who are established and reputable manufacturers or producers of [*name and/or description of the Goods requiring this authorization*] (hereinafter, "Goods") having production facilities at [*insert: address of factory*] do hereby authorize [*name and address of Proposer*] (hereinafter, the "Proposer") to submit a Proposal, and sign the Agreement with you against IFP [*title and reference number of the Invitation for Proposals*] including the above Goods produced by us.

We hereby extend our full guarantee and warranty for the above specified Goods against this document for setting up framework agreement.

For and on behalf of the Manufacturer or Producer

Signed: _____

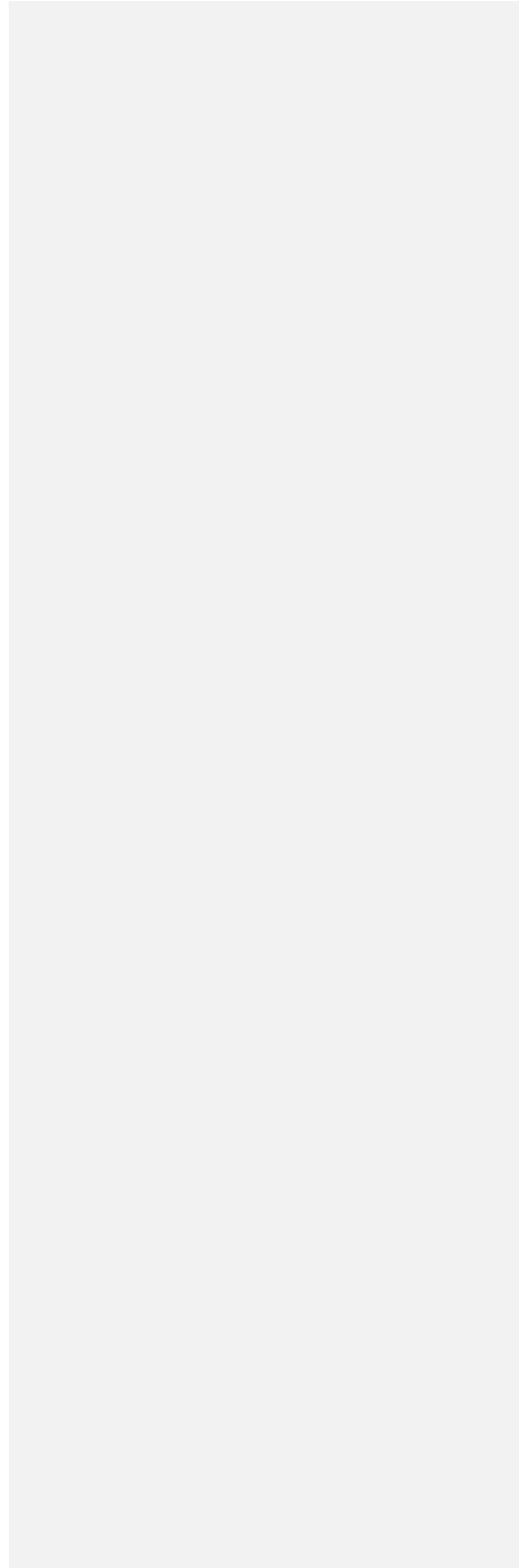
Date: _____

In the capacity of [*title, position, or other appropriate designation*] and duly authorize to sign this Authorization on behalf of [*name of manufacturer or producer*]

Note: This letter of authority should be on the letter head of the manufacturers and should be signed by a person competent and having the power of attorney to legally bind the manufacturer. This should be included by the Proposer in its Proposal.

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5. PROFORMA FOR PERFORMANCE STATEMENT



5. PROFORMA FOR PERFORMANCE STATEMENT

5. PROFORMA FOR PERFORMANCE STATEMENT

(For a period of last five years)

IFP No: _____ Date of Opening: _____ Time : _____ Hours

Name of the Firm : _____

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<u>Order Placed By</u> (Full address of Purchaser)	<u>Order No.</u> and Date	<u>Description and quantity</u> of ordered	<u>Value of order</u>	<u>Date of completion of delivery</u> As per contract Actual		<u>Remarks indicating</u> reasons for late delivery, if any	<u>Was the supply of goods</u> satisfactory ? (Attach a certificate from the Purchaser/Consignee)
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Signature and seal of the Proposer _____

