Government of West Bengal
Irrigation & Waterways Directorate
Office of the Executive Engineer
River Research Institute, Mohanpur, Nadia - 741246
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Memo No: 1460 **Dated: 09.12.2025**

SHORT NOTICE INVITING TENDER (SNIT) No: - 03/EE/SDP /2025-26

(Ref.: I & W. Dept.'s No. 11-W/2023-24 Dt. 30.06.2023)
(For works of estimated cost up to Rs 20.00 lakh)

Sealed and Separate tenders in specified tender forms are invited by the **Executive Engineer, Sundarban Delta Project, River Research Institute, Irrigation & Waterways Directorate, Mohanpur, Nadia** for the works mentioned in the annexed list, from the eligible Contractors of as mentioned in the said Annexure. The Contract Documents can be seen / collected at the office of the Executive Engineer, Sundarban Delta Project, River Research Institute, Irrigation & Waterways Directorate, Mohanpur, Nadia between the hours of 10:15 A.M. to 5:15 P.M. on all working days as well as can be downloaded from **http://wbiwd.gov.in/index.php/applications/tenders**

1. Eligibility for participation in tenders under National Comparative Bidding (NCB)

All Bona-fide Indian contractors/Agencies/Organizations, Registered Companies/ Firms including Registered Partnership Firms, Proprietorship Firms, Registered Consortiums & valid 'Joint Ventures' and contractors/bidders of equivalent grade or class having Pre-Qualification (PQ) Credential from the Government of West Bengal, Union Government Departments/ Other State Government Departments/ Engineering Wings of GoI /IRCON/RVNL/NHPC, Autonomous Project Authority and other similar organizations of GoI and State Governments/PSU and Corporations of Government of India and other States having successfully completed at least one similar nature project and not otherwise debarred are eligible to participate subject to fulfilling the other PQ eligibility criteria laid down in the subsequent paragraph. **Consortiums and Joint Ventures are not allowed** to participate in tenders of value up to Rs. 5.00 lakh

2. Participation in more than one serial of work out of list of works published in one SNIT.

Any contractor/bidder may bid for any number of Serials of work in a particular SNIT, if more than one work have been published in that SNIT, subject to fulfillment of all of the following conditions:

a. There should be full compatibility (matching between the technical PQ credential submitted by the bidder in the form of Credential Certificate (CC) along with other relevant documents as stated under Clause 3.2B III) relating to any work successfully completed by the bidder and technical PQ criteria specified in the NIT for any particular serial of works for which the bidder intends to bid. In other words, technical PQ credential certificate along with relevant documents submitted for any work should at the minimum; satisfy the technical PQ eligibility criteria specified for that work. Normally there should be separate CC along with relevant documents for each of the serial of works, the bidder intends to bid and the serial number relevant to the CC should be clearly written on the body of the CC and also on the other documents stated under **Clause 3.2B III**. However, the bidder will also reserve the right to submit one CC along with relevant documents for bidding in more than one serial of work, provided cumulative technical PQ credential of all such serials should be fulfilled by one single CC. In such case also, serial numbers of the relevant works for which the CC is submitted should be clearly written on the body of the CC by the bidder. Omission of serial numbers on the body of the CC and also on the other documents stated under **Clause 3.2B III**, in case of bidding for more than one serial will lead to rejection of all the bids.

b. Average of gross annual turnover of the individual bidder/Organization for any three financial years within preceding five financial years, as stated under Clause 7V, should not less than the summation of turnover requirements of the relevant individual serial of works for which the bidder intends to bid.

3. Submission of bid

3.1 General procedure for submission of off-line bid

Bids are to be submitted at tender box kept at Executive Engineer, Sundarban Delta Project, River Research Institute, Irrigation & Waterways Directorate, Mohanpur, Nadia. All documents uploaded by the Tender Inviting Authority at departmental tender link (**http://wbiwd.gov.in/index.php/applications/tenders**) forms an integral part of the works contract/Agreement. Contractors/bidders are required to submit the entire tender documents along with all other relevant PQ credential documents as asked for in the NIT, physically, at the above address, within the stipulated date and time as notified in the NIT. Tenders are to be submitted In a single cover/packet/parcel at the same time for each work, clearly mentioning NIT No. and Serial No of the NIT. The contractor/bidder should carefully go through all the documents of the tender and submit all relevant documents as described below.

All the documents as mentioned in Para 3.2 A & 3.2 B, Earnest Money Draft vide Para 4 below along with one sealed cover labeled "Tender Documents of Sl. No…. of SNIT No….." will be placed in an outer/main sealed cover and labeled distinctly & correctly. The inner cover labeled "Tender Documents of Sl. No…… of SNIT No….. " should contain documents mentioned in Para 3.3 below i.e. SNIT documents, 2911, the BoQ/Schedule of work, corrigendum, if any, containing signature of the applicant in each page as a token of acceptance along with quoted rate at specified place

Extension of last date for bid submission or insertion of any of Addendum/Corrigendum, if unavoidable is to be notified as per Finance Department guidelines in the Departmental website, Newspapers and in Notice boards. Whenever any corrigendum is issued irrespective of the content (date corrigendum or otherwise), due date of submission of bid will be extended by 7 (seven) calendar days to be published before expiry of the last date for original validity period of bid submission. Extension of last date and time for bid submission by issuance of a Corrigendum shall not be treated as 2nd Call or Re-tender.

3.2 APPLICATION FOR TENDER PAPER

Applications for issuing of tender forms are to be made to the Executive Engineer, Sundarban Delta Project, River Research Institute, Irrigation & Waterways Directorate, Mohanpur, Nadia. Application is to be made in the Applicant's letter-head in prescribed proforma (FORM-I) attached herewith, failing which application will be treated as incomplete and void.

3.2 A Descriptions of "APPLICATION FOR TENDER PAPER" and required documents

1. Applications for Tender: vide self-declaration format in specimen ***Form-1***,
   Self-declaration of bidder not having common interest as a different bidder organization in any other work tendered under different serials of this particular NIT *vide specimen* ***Form-2***, and self-declaration on antecedents and performance of the bidder in specimen **Form-4**.
   All above are to be filled up completely, signed and submitted in sealed cover.
2. Earnest Money Draft as stated in **Para 4** below / order of Exemption.

3.2A. NOTE:

I. Contractors/bidders are required to keep track in the departmental website **(http://wbiwd.gov.in/index.php/applications/tenders)** for all the Addenda or Corrigenda notices and documents published in connection with a particular Tender within the bidding period and submit the same, signed by him/her along with their bid. Tenders submitted without Addendum/Corrigendum are liable to be treated as incomplete and thereby liable for disqualification or rejection.

iii. Form 1, Form 2 and Form 4 are taken from bidders by TIA as bidder's self-declarations' or undertakings. These formats are specimens or samples only, which are to be firstly downloaded by the bidders from the NIT in Departmental portal, filled up completely preferably in letter head and submitted with their bids.

3.2 B. Other Documents required for accepting APPLICATION FOR TENDER PAPER*:*

Note:

i. It is desirable that all documents stated here shall be submitted by bidders in specified cover/packet/parcel during bid submission. No other document will be accepted and considered during tender evaluation stage from bidders before publishing of final selection of 1st lowest bidder. Verification by TEC may be undertaken directly from PQ Credential issuing authority.

ii. Validity of documents submitted by bidder shall be stand determined on the date of publication of tender notice (Notice Inviting Tender)

3.2 B(I) The certificate documents mentioned below under Serial a, b c & d are to be submitted

a. Latest available Professional Tax Payment Certificate (PTPC) or the PT payment challan/ receipt for current financial year/Waiver Order of competent authority in other States if applicable.

b. Valid PAN Card of the bidder/s are required;

c. Income Tax Return of current Assessment Year or, IT Return of immediately preceding Assessment year under IT Act & Rules, whichever latest available with the bidder.

d. Valid 15digit Goods and Service Tax payer Identification Number (GSTIN) as per GST Act, 2017 & Rules of the bidder.

3.2B (II) Following documents also should be uploaded during bid submission

1. For Partnership Firms: Documents of Registration of Partnership Firms in the certified copy of 'Form No. VIII,' issued under Indian Partnership Act, 1932 (Act-IX of 1932) by the Registrar of Firms. In case a Partnership Firm is yet to receive Form No. VIII, a "Memorandum" issued by the Registrar of Firms may also be accepted.

2. For Companies: Incorporation Certificate, valid Trade License or acknowledgement of issuing authority of receipt of application for Trade License / renewal, 'Memorandum of Articles' registered under the Registrar of Companies (ROC) under the Indian Companies Act, List of owners/ Directors/Board Members are to be submitted with the bid.

3. For State Registered Co-operative Societies:

   a. Society Registration certificate from ARCS (Assistant Registrar of Co-operative Societies, Govt. (WB) and By-Laws for Cooperative Societies under West Bengal Co-operative Societies Act, 2006 and Rules, 2011 and all amendments.
   b. Latest Auditor's Report of Directorate of Co-operative Audit under Department of Co-operative, Government of West Bengal within preceding five financial years as per Societies Act & Rules.

3.2B (III) Eligibility criteria based on Credential of work/Prequalification Work Credential

i. Work Order/Award of Contract or the Letter of Acceptance (LOA) duly authenticated by the competent issuing authority is to be submitted.
ii. Pre-Qualification (PQ) credential of one 100% completed work of Gross Notional Value as desired in the NIT as the Credential Certificate (CC) duly authenticated by competent authority.

3.2B (IV) PQ Financial credential:

a. Disqualification during PQ evaluation of financial capability of bidder shall not be decided during Processing application up to work of Rs 5 lakh, as no minimum financial capacity is fixed, except if reveals from documents beyond any doubt of the financial liquidity & bankruptcy of the bidder, determining absolute incapacity to execute the work.

b. But, i. 'Payment certificate' of works authenticated by appropriate authority for preceding three Financial Years, or, ii. Valid Income Tax Returns for preceding three FY, or, iii. Audited Profit & Loss Accounts statements of three FY, any one of i, ii, or iii as a complete set for three FY within zone of immediately preceding five FY is to be submitted, else the bidder may be disqualified. Name, address, contact no. and registration no. of auditor Firm is desirable for Profit & Loss accounts statement, if submitted.

Note: *If the bidder Company/Firm was set up less than three years ago, audited balance sheets and P/L Accounts for the number of years since inception are to be submitted under technical cover and the average value would be evaluated only for the period since inception and not three years. Credential Certificate (CC) given as PQ Work Credential may also contain payment certificate and in those cases separate payment certificate is not required.*

3.3 Tender Documents for Financial proposal / bid:-

The financial bid should contain the following documents in one sealed cover or packet or parcel labeled **"Tender Documents of Sl. No. ……of SNIT No…..... "**.

i. NIT: Notice Inviting Tenders to be submitted in entirely, after signing by authorized signatory along with corrigendum, if any.
ii. Bill of Quantities (BOQ) or Schedule: The contractor/bidder is required to quote the financial offer/bid price or rate as percentage above or below the estimated amount put to tender or 'at-par' with tender value, in the space marked for quoting rate in the Schedule of the tendered work.
iii. Contract /Agreement in WB Form No. 2911 published in the Tender is to be downloaded filled up properly, quoted rate as % above /below /at par in the specified place, signed and submitted during bid submission in a sealed cover sated above**.**

iv. Only the downloaded/issued sheet of the above documents is required to be submitted by the contractor/bidder.

v. BOQ/Schedule/2911 Agreement without a valid numeric rate at the designated space provided in the BOQ/Schedule/2911 Agreement will be disqualified and rejected outright. Contractors/bidders willing to quote "at-

par" rate shall need to write "at-par" in the 'space' provided for rates in the BOQ/Schedule/2911 Agreement of the tendered work.

4. Tender Fee and Earnest Money Deposit (EMD)

i. **Tender Fees:**

Entire set of Tender documents are made available free of cost through the Tender link of Departmental website www.wbiwd.gov.in. Cost for tender documents will not be charged even during execution of a formal tender contract/agreement. However, the contractors/bidders may wherever necessary shall be suitably charged for additional/multiple copies of drawings, specifications, Schedule of Rates booklet etc. and such fee may be suitably determined by the Tender Inviting Authority as per existing Rules.

ii. **(a) Earnest Money Deposit (EMD):**

Bidders are required to make payment of Earnest Money (EMD) through the Demand Draft only. Only if the bidder is exempted from payment of EMD by the State Finance Department, the Govt. order for such exemption is to be submitted while opting for EMD exemption category. Any misjudgment and resultant non submission of EMD will lead to rejection of the bid. Finance Department has exempted from payment of EMD to State Registered Labour Cooperative Societies, Mackintosh Burn Limited, Westinghouse Saxby Farmer Limited & Britannia Engineering Limited only. State & Central Govt. SSI Units are exempted from EMD for tenders for procurements and supply of **Goods only** and not works contracts. However, all other PQ credentials are to be fulfilled by each

(b) Additional Performance Bank Guarantee:

"Additional Performance Security" has been made mandatory which shall be obtained only from the successful bidder, if the accepted bid price is below 20% or below by more than 20% of the amount put to tender. This Additional Performance Security shall be equal to 10% of the **tendered amount** i.e., the 1st lowest bid price.

The Additional Performance Security shall have to be submitted by the selected 1st lowest bidder after issuance of Letter of Acceptance / Letter of Invitation (LOA/LOI) within seven working days and before issuance of Award of Contract (AOC) in the form of "Bank Guarantee" of any Scheduled Bank approved by RBI, payable at Kalyani West Bengal, as per specimen format Form-6. If the bidder fails to submit the said value of BG as Additional Performance Security within the seven working days, he may pray for extension of BG submission date within the prescribed 7 days period by another seven days with reasons to be recorded in writing (which is 14 working days from date of issuance of LOA). Else, its/their Earnest Money Deposit (EMD) will be forfeited without any prejudice by the Tender inviting authority and the defaulting bidder also debarred from further participation in all future I&WD tenders for a period of one year for committing the offence on the first occasion and for a period of two years for recurrence of the same offence.

The said Bank Guarantee (BG) shall have to be valid up till the end of the contract/Agreement period including extended time period till 100% physical completion of work in all respects and shall be renewed within validity period accordingly if required. The said Bank Guarantee shall remain in custody of the DDO & Executive Engineer in-charge of the work, which shall be returned to the bidder/contractor after successful physical completion of the work as per contract. If the bidder fails to complete the work successfully, this Additional Performance Security shall be forfeited at any time during the pendency of the contract period after serving suitable notice to the contractor/bidder agency. Necessary provisions regarding deduction of security deposit from progressive bills of the contractor in respect of the tendered work shall be governed as per relevant clauses of the tender contract/Agreement which will in no way be affected / altered due to this Additional Performance Security.

As per Dept. Memo no. - 306-IB/IW-14011(34)/1/2018-JS (IW), dated: 06.08.2018, the entire Security Deposit or the Performance Security may be released after physical and financial completion of the project but before expiry of the security period or defect liability period against receipt of equivalent amount of bank guarantee of approved bank of RBI which should remain valid till the expiry of the defect liability period.

4A. EMD payment procedure:

Each Tenderer will have to deposit earnest money (EMD) of the amount specified in the annexure list of works in the following forms: -

i. Earnest money deposited in S.B.I or any Nationalized Bank in the shape of Bank Draft / D.C.R. in favor of the **Executive Engineer (SDP), RRI and I. &W.D. payable at Kalyani** will be valid for the purpose. **The original document must be affixed with the Application**.

ii. **No cheque or cash money will be accepted as Earnest Money**.

iii. Earnest Money in the shape of N.S.C, K.V.P, and N.S.S. will not be accepted.

iv. Adjustment of Earnest money with previous deposit if any cannot be entertained in any case.

v. Contractors should have to deposit 2.00% (Two Point zero percent) of amount put to tender as stated in the list of works during dropping of tender forms.

vi. **Security Money:**

In respect of successful tenders, the deposited earnest money 2.00% (Two Point zero percent) of the amount put to tender will be converted as a part of Security Deposit and an additional security @ 1% (one percent) of the tendered amount has to be deposited within 10 days of issuance LOA. In case lump sum deposit in this respect together with EMD value falls short of 3% of Tendered Amount, balance amount will be deducted from the progressive bills.

All Contractors will be treated as outsider Contractor and deduction of security deposit will be followed as above.

4B. Refund/Settlement Process for EMD:

i. Once the bid evaluation is processed by the TEC, EMD of the bidders other than that of the successful bidder will be refunded, on receipt of application from the bidder in that respect within 2 working days.

ii. As soon as the successful bidder is awarded the contract (AOC), the same will be deposited to the specific head of security deposit against concerned operating code of the Executive Engineer.

iii. If the tender is cancelled, then the EMD draft would be released by the **Executive Engineer (SDP), RRI, I&W.D**.

iv. TIA reserves the right to forfeit the EMD Draft or electronically after depositing in specified head of account in case of breach/violation of tender rules as defined under clause 8 & 9.

5. Credential Certificate (CC) as Prequalification Work Credential:

i. Credential Certificates (CC) for one/single 100% completed work within last five financial years on the date of publication of NIT will only be accepted as valid PQ credential of work. Incomplete ongoing work shall not be considered for valid PQ Credential. Payment Certificate without containing mandatory details shall not be treated as valid.

ii. It is desirable that CC should preferably contain the name with designation, postal address of office, contact Telephone No./FAX / e-mail ID of the authority issuing the CC for the work along with name of work, amount put to tender, date of completion of the work, gross final billed value of the 100% completed work, certificate of issuing authority indicating successful and satisfactory completion. Illegible certificates, absence of contact details making it time consuming for verification purposes of CC issued by authorities outside the State are liable to be rejected by the Bid Evaluation Committee (TEC).

iii. Credential Certificates (CC) of successfully completed works in any Department/autonomous authority of the Government of West Bengal will be considered. CC of 100% completed works executed under any other State / Central Government Ministry / Department / Nationalized Financial Institution Organization / Govt. Undertaking / Govt. Enterprises or Government Institutions or Local Government Bodies (Municipalities, Zilla Parishad & Panchayat Samities within West Bengal, will also be considered as valid PQ Credential. Such CC are to be issued by an officer/authority not below the rank of Executive Engineer / Divisional Engineer /District Engineer/Project Manager of the State/Union Government Departments/ Organizations; authorized signatories of CC for Panchayat Samities and Municipalities shall be the BDO & Executive Officers or equivalent administrative officers respectively. It is desirable to have telephone and FAX or e-mail addresses of the signatory of the CC for all offices outside West Bengal for verification purposes.

6. Pre-Qualification (PQ) Eligibility criteria

Prequalification (PQ) eligibility of a contractor/ bidder based on one single 100% completed works contract and financial capacity achieved within the zone of last five financial years will be determined as per Rules stated below:

6 I (a). Firstly, the gross value of the work submitted as PQ Credential as per CC of similar in nature completed during the current financial year before date of publishing of NIT or within the preceding five FY will be multiplied by the following factors to take care of the inflationary effects to arrive at the gross notional amount.

Year	Description	Multiplying factor to arrive at gross notional amount
Current	The financial year of floating of NIT	1.00
1st	1year preceding the current financial year	1.08
2nd	2year preceding the current financial year	1.16
3rd	3year preceding the current financial year	1.26
4th	4year preceding the current financial year	1.36
5th	5 year preceding the current financial year	1.47

Note: For cases where two contractors/bidders are participating in a Tender for a particular work are such that one happens to have worked as a sub-contractor of the other, and both the contractors/bidders PQ submit work credential of having completed the same job either wholly or partly, then in such case the PQ credential of the

principal contractor will be considered while that of the sub-contractor will not be taken into consideration for determining the eligibility criteria of the contractor/bidder during technical evaluation of the tender. If the PQ Credentials submitted by hitherto contractors/bidders are for different works, then both the PQ Credentials will be considered for determining the eligibility criteria of the individual contractors/bidders.

6II. ***Submitted Bid of contractor/bidder will come under consideration only when the Technical PQ criteria mentioned below are satisfied and fulfilled in the "Application for Tender Paper" Evaluation stage.***

Gross notional amount calculated from Credential Certificate (CC) of a single works contract completed within the zone of immediately preceding five financial years on the date of this NIT, issued in favour of the contractor/bidder /Agency/Firm/Registered Co-operative Society for a similar work defined in the tender should be **at least 30%**of the amount put to tender for the work it is bidding. The power to decide on the criteria of similarity rests without any prejudice, solely with the Bid Evaluation Committee (TEC).

7. Additional eligibility criteria for participating in more than one serial of work in a SNIT

If the same bidder bids separately for on behalf of another Firm or in a different capacity having financial interests in the same work, all the tenders would be rejected.

8. Penalty for suppression /distortion of facts and withdrawal of SUCCESSFUL bidder before acceptance of LOI

If a contractor/bidder fails to physically produce the originals of documents (especially the Credential Certificates and P/L accounts with audited balance sheets), or any other bid document on demand by the Tender Evaluation Committee (HTEC/TEC) which were submitted as photo copies with their bids within a specified time frame, need arising due to any material deviations detected in the uploaded soft copies, leading to specific doubts which could not be cleared by enquiry from issuing authority of these documents or if there is any suppression/distortion/falsification noticed/detected/ pointed out at any stage of the tender process at any stage prior to signing of Contract-Agreement or the issue of LOA or AOC, the Tender Inviting Authority will immediately bring the matter to the notice of the concerned Chief Engineer and appropriate penal measures as stated in Clause 10 below will be taken. The concerned Chief Engineer then will issue the necessary order in writing with intimation to the defaulting contractor/bidder, other Chief Engineers, Centralized e-Tender Cell and also the Government in the Irrigation & Waterways Department. Copy of the order/starting penal measures should invariably be communicated to the Nodal Officer, e-Governance Cell of the Department with a request for uploading the order in the Departmental website in the link "List of suspended/debarred contractors".

9. PROCEDURE FOR SUSPENSION AND DEBARMENT OF SUPPLIERS/ CONTRACTORS

A. SCOPE:

The procedures laid down in subsequent paragraphs shall govern the suspension and debarment of suppliers, contractors and bidders ("Contractors" for brevity) involved in Government procurement for offenses or violations committed during competitive bidding and contract implementation, or even later for the works under Irrigation & Waterways Department, Government of West Bengal. The concerned Chief Engineer shall publish the suspension and debarment order in the Departmental website with the approval of I&W Department in the designated link within 1 (one) working day of issuance of such order. The TIA shall recommend the case to HTEC/TEC who with opinion of Chief Engineer will place it before DTC/QBEC/DTTC for approval.

B. PROHIBITION ON SUSPENDED / DEBARRED PERSONS / ENTITIES TO PARTICIPATE IN THE BIDDING OF GOVERNMENT PROJECTS / CONTRACTS OF THE DEPARTMENT

A person / entity that is suspended / debarred by a procuring entity shall not be allowed to participate in any procurement process under Irrigation & Waterways Department during the period of suspension / debarment unless the same has been revoked by the competent authority.

A Joint Venture or Consortium which is suspended / debarred or which has suspended / debarred member/s and/or partner/s as well as a person/entity who is a member of suspended / debarred Joint Venture or Consortium shall, likewise, not be allowed to participate in any procurement process under Irrigation & Waterways Department during the period of suspension / debarment unless the same has been revoked.

C. DEFINITION OF TERMS: -

i. Bidder: A person/Contractor/Agency/Company/Society/Corporation participating in the procurement process and/or a Person/Contractor/Agency/Joint Venture/Consortium/ Corporation having an Agreement/ Contract for any procurement with the Department shall be referred as bidder.

ii. Bid Evaluation Committees or Tender Evaluation Committees (HTEC/TEC/QBEC in short):

a. Short Notice Bid / Tender Evaluation Committee (TEC) for the bids upto tender value of Rs. 20.00 lakh (TEC) invited by the Executive Engineer will be comprising of i) Concerned Executive Engineer as Chairperson and Convener, ii)

Assistant Engineer concerned to the work as Member, iii) Another Assistant Engineer from Division as Member or the Junior Engineer posted as the Divisional Estimator.

b. Bid / Tender Evaluation Committee'(TEC) for the bids up to tender value of Rs. 1.00 lakh (TEC) invited by the Sub-Divisional Officer will be comprising of i) Concerned Sub-Divisional Officer as Chairperson and Convener, ii) Junior Engineer concerned to the work as Member, iii) Another Junior Engineer from Sub-Division as Member.

c. or, Evaluation Committee constituted by the Department from time to time.

d. Bid/Tender Evaluation Committee' (TEC) for the bids invited by the Superintending Engineer up to Rs. 250.00 lakh value will be comprising of i) Concerned Superintending Engineer as Chairperson and Convener, ii) Concerned Executive Engineer as Member, iii) T.A to Superintending Engineer of concerned Circle or any other Executive Engineer of the Circle as Member, (iv) Junior Engineer functioning as an Estimator of the Circle Office.

iii. Consolidated Debarment List: A list prepared by the Departmental Debarment Committee/Chief Engineer containing the list of bidders debarred by the Irrigation & Waterways Department, Government of West Bengal. The list would be displayed prominently in the designated link in website of the Department clearly stating the period of suspension/debarment.

iv. Contract implementation: A process of undertaking a project in accordance with the contract /Agreement documents.

v. Debarment: An administrative penalty, in addition to the contract/Agreement provisions, disqualifying a bidder from participating in any procurement process under Irrigation & Waterways Department, Government of West Bengal for a given period.

vi. Debarred Bidder: A Bidder who was disqualified by the competent authority of the Irrigation & Waterways Department, Government of West Bengal.

vii. Department: Irrigation & Waterways Department, Government of West Bengal

viii. Entity: A person/Contractor/Agency/Joint Venture/Consortium/Corporation participating in the procurement process and/or a Person/Contractor/Agency/Joint Venture/Consortium/Corporation having an agreement/ contract for any procurement with the Department shall be referred as entity.

ix. Offence: A violation or breach of the Constitution of India, laws, regulations, laid down procedure, etc under Prevention of Corruption Act, 1988, Code of Criminal Procedure, 1973 u/s 195(1) and Section 197(1), Competition Act, 2007 and IT Act, 2000 as amended.

x. Procurement: It is the act of buying goods, services or works from an external source. It is favorable the goods, services or works are appropriate and that they are procured at the best possible cost to meet the needs of the acquirer in terms of quality and quantity, time and location.

xi. Procuring Entity/Authority: The officer authorized by the Irrigation & Waterways Department, Government of West Bengal for procurement.

xii. Suspension: Temporary disqualification of a bidder from participating in the procurement process of Irrigation & Waterways Department for a period of 6 (six) months when an offence is made against a bidder.

D GROUNDS FOR SUSPENSION AND DEBARMENT

i. Submission of eligibility requirements containing false information or falsified documents.

ii. Submission of Bids that contain false information or falsified documents, or the concealment of such information in the Bids in order to influence the outcome of eligibility screening or any other stage of the bidding process.

iii. Unauthorized use of one's name/digital signature certified for purpose of bidding process.

iv. Any documented unsolicited attempt by a bidder to unduly influence the outcome of the bidding in his favour.

V. All other acts that tend to defeat the purpose of the competitive bidding such as lodging false complaints about any bidder, posting baseless allegation about any officer duly authorized by the Department, restraining any interested bidder to participate in the bidding process etc.

vi. Refusal to accept an award after issuance of 'Letter of Acceptance' or enter into contract with the Government without justifiable cause.

vii. Refusal or failure to post the required performance security/earnest money within the prescribed time without justifiable cause.

viii. Subcontracting of the contract or any part thereof without prior written approval of the procuring entity.

ix. Failure solely due to fault or negligence of the Contractor, to mobilize and start work within the specified period as mentioned in the 'Letter of Acceptance' / 'Letter of Acceptance cum work Order' / 'Work Order' / 'Notice of Process' / 'Award of Contract' etc. ultimately resulting in rescindment of contract.

x. Failure to fully and faithfully comply with the contractual obligations without valid cause, or failure to comply with any written lawful instruction of the procuring entity or his representative(s) pursuant to the implementation of the contract, ultimately resulting in rescindment of contract.

xi. For the procurement of goods, unsatisfactory progress in the delivery of the goods by the manufacturer, supplier or distributor arising from his fault or negligence and / or unsatisfactory or inferior quality of goods, vis a via as laid down in the contract.

xii. Refusal or failure to upload a self-declaration in specimen format of Form-4 to the effect of any previous debarment imposed by I & WD., any other Department of State Government and or Central Government.

xiii. Willful or deliberate abandonment or non-performance in a project or contract by the contractor / suppliers resulting to substantial breach thereof without lawful and / or just cause(s).

xiv. The Additional Performance Security shall have to be submitted by the selected L1 bidder after issuance of Letter of Acceptance / Letter of Invitation (LOA/LOI) within next seven working days and before issuance of Award of Contract (AOC) in the form of "Bank Guarantee" of any Scheduled Bank approved by RBI, payable at Kolkata or / in West Bengal, as per specimen format Form-6. Else, its/their Earnest Money Deposit (EMD) will be forfeited without any prejudice by the Tender inviting authority.

xv. Non-submission of a sufficient sum, which together with the Earnest Money deposited by him/her with his/her tender, will make the full security/performance- security amounting to 3% of the tendered amount and in such a case, there shall be no further deductions from the progressive bills so long as value of work does not exceed the tendered amount by the selected bidder in a tender for Procurement of Works, within 10 days of receipt of 'Letter of Acceptance' (LOA) from the Tender Accepting Authority.

E. CATEGORY OF OFFENSE:

a. First degree of offense: Clause 9 D (i) up to (vii), (xii) & (xiv) is to be considered as first degree of offense.

b. Any of the offence under Clause (viii) to (xi) & (xiii) shall lead to termination of contract and its determinations in accordance with Clause (ii) & Clause (iii) of Agreement Form No. WB-2911 and simultaneous debarment for a period of 2 years

c. Second degree of offense: Any one of the offenses as mentioned under Clause 9D (i) to (xiv), committed by a particular bidder/contractor/supplier on more than one occasion would be considered as second degree of offense. Period of debarment will be 2 times the corresponding period penalty applicable for 1st degree offence in addition to other penal provisions contained in 1st degree offence.

F. Procedure and Rules of Debarment:

Debarment procedure and rules are published as Departmental Notification to be read in conjunction with the Corrigenda issued from time to time, as may be seen in the Notification Link of the Departmental website wbiwd.gov.in

G. PENALTY FOR OFFENSE:

a. For committing 1st degree offense any of the cases referred under Clause 9 D (i) to (v), forfeiture of earnest money and debarment for a period of six months, if the offense is detected during technical evaluation. If the offence is detected after award of the contract and if the offender happens to be the agency selected for work, and such selection is made due to oversight, forthwith termination of the contract and determination of contract value in accordance with clause 3(ix) (c) of West Bengal Form No. 2911, and simultaneous debarment for a period of six months. Further, in case the offense is detected after completion of work and payment of final bill the Work credential earned would be declared as 'null and void', so that the same cannot be used in future as PQ credential for securing other works contracts in the Irrigation & Waterways Department, together with debarment for a period of six months.

b. For committing 1st degree offense in any of the cases referred under Clause 9 D (vi), (vii),(xiii) to (xv), forfeiture of earnest money and debarment for a period of one year. For committing offenses under Clause 9D (xv), debarment period shall be for one calendar year preferably from the date on which the due date for submission of BG had expired (i.e., 8thor 15thworking day from date of receipt of LOA /LOI) by the concerned Chief Engineer to be notified in the Departmental website.

c. For committing 1st degree offense in any of the other cases under Clause 9 D (viii) to (xii), termination of contract and its determination in accordance with Clauses 2 & 3 of West Bengal Form No. 2911, including debarment for a period of two years.

d. For committing 2nd degree offenses under above all categories, period of debarment will be twice the corresponding period for 1st degree offenses, in addition to other penal provisions for 1st degree offense.

10. Taxes & duties to be borne by the Contractor/bidder

In view of introduction of GST with effect from 01.7.2017, all the bidders intending to participate in this tender should offer their financial bids inclusive of GST applicable for entire composite works/Procurement of goods &

services, labour intensive component contained in the BOQ. Income Tax, Royalty, GST (CGST, SGST, IGST), Construction Workers' Welfare Cess, Labour Insurances EPF and similar other statutory levy / cess will have to be borne by the contractor/bidder and his/her quoted rate should be quoted accordingly after considering all these charges, and no separate payment towards any of the statutory taxes rents or levies shall be made by the work implementing authority.

11. Site inspection prior to submission of tender

Before submitting a tender, the intending contractor/bidder should make themselves acquainted thoroughly with the local conditions prevailing at site of implementation of the work by undertaking field inspections and taking into consideration all probable factors and difficulties to be involved during execution of the work as per specification in all respects including transportation of materials, communication facilities, climate conditions, nature of soil, availability of local labourers and market rates prevailing in the locality etc. and no claim whatsoever will be entertained on those accounts afterwards. The contractor/bidder may also contact the office of the Assistant Engineer/Sub Divisional Office the designated Assistant Engineer/Sub Divisional Officer/Executive Engineer (SDP), RRI in between 11.30 hours to 16.30 hours on any working day, prior to the date of last date for submission of bid in the tender.

12. Conditional and in complete tender

Conditional and incomplete tenders are liable to be summary rejected. No further/separate document will be entertained until completion of Tender process by way of acceptance of SUCCESSFUL bid by the competent Tender Accepting Authority/Government.

13. Opening & evaluation of tender

13.1 Opening of Tender

All works above tender value of 0.10 lakh for which tendering is mandatory shall be awarded through open tenders without reservation for any particular class of contractors/bidders. Notices for open off-line tenders for each tender value below Rs 1.00 lakh shall include such clauses as is notified by the Department from time to time.

i. Tender will be opened by the Tender Inviting Authority or his/her authorize representative/sat the scheduled time as mentioned in Annexure.

ii. Intending contractors/bidders may remain present if they so desire.

iii. Outer sealed cover documents (vide Clause 3.2&4) will be opened first and if found in order, will be evaluated for acceptance of application for Tender Paper (vide Clause 3.2A). If there is any material deficiency in either of the documents, the Application is liable to be disqualified & rejected and EMD will be released.

iv. Documents of the Pre-Qual Technical Credential and Other required Documents will be evaluated by the Tender Evaluation Committee (TEC).

13.2 Process of Bid Evaluation in a Tender

Each document submitted (vide Clause 3.2& 4) with Application for Tender Paper will be scrutinized and if found in order/as desired will be accepted by the TEC and then only tender of the particular bidder will be declared eligible for further process/evaluation. During the application evaluation process, intending contractors/bidders may remain present and no subsequent objections whatsoever, raised by any participant, not present during the opening of tenders will be entertained.

13.3 Acceptance/Rejection of Application for Tender Documents

i. Pursuant to decision arrived after a Technical Bid Evaluation and review, the acceptance of contractors/bidders' application in the Application Evaluation stage for a particular serial of work whose tender proposal will be thus considered, will be intimated to bidders present verbally.

ii. While evaluating, the TEC may, if they so desire, sum on the contractors/bidders and seek further clarification/information or seek verifications of original hardcopy of any of/all the documents already submitted, and If these cannot be produced within stipulated time frame, their bids will be liable for rejection.

13.4 Evaluation of Tender/bid

i. Inner Cover labeled **"Tender Documents of Sl. No. of SNIT No."** of the bidders/contractors who's Application for Tender Documents are declared accepted by the Bid/Tender Evaluation Committee (TEC) will be opened by the Tender Inviting Authority stated above.

ii. The rates will be read outvote contractors/ bidders remaining present at that time.

iii. If the Tender Accepting Authority (TAA) is satisfied that the rate obtained is fair and reasonable and there is no scope of further lowering down of rate, he/she may after having the comparative statement test checked by the Divisional Accountant / Divisional Accounts Officer attached to his office and after their acceptance may formally issue LOA against each work.

iv. If there is any scope for lowering down of rate in the opinion of the Tender Accepting Authority being abnormally

high, i.e above 10% of the amount put to tender (Tender value), the SNIT shall be cancelled and invited afresh 2nd or 3rd re-tender. **No post tender negotiations are permitted.**

v. If there is any scope for lowering down of rate in the opinion of the Tender Accepting Authority being abnormally high above 10% of the amount put to tender i.e. Tender value, the SNIT shall be cancelled and invited afresh. No post tender negotiation is permitted.

vi. If there is no contractor/bidder or the number of contractors / bidders in the 1st tender is less than three, the tender has to be cancelled. In case of participation of more than three bidders, if the number of technically qualified bidder falls below three, the tender/SNIT is to be cancelled as well and fresh tender vis-a-vis 2nd call Tender or even 3rd call Tender may be invited by suitably lowering of minimum eligibility PQ criteria (work & financial) for bidders with wide publicity of Re-tender notices through electronic and print media.

vii. Final result after acceptance of the rate by the Tender Accepting Authority, if within the delegated power of acceptance would have to be intimated through LOA. Otherwise, the matter may be referred to the Government Appointed DTC and the appropriate Government for decision.

viii. The Tender Accepting Authority may ask the SUCCESSFUL bidder/contractor to submit analysis of rates to justify the rate quoted by that bidder after declaration of financial bid evaluation result.

ix. If the lowest (SUCCESSFUL) bidder/contractor backs out there should be Re-tendering in a transparent manner. In such a situation the TIA may call for re-tender with bid submission time period should normally be 14 days for value above Rs. 10.00 lakh, and 7 days for value exceeding Rs. 1.00 lakh but up-to Rs. 10.00 lakh.

13.5 Tender Accepting Authority (TAA)

Authority to which the power has been delegated to accept tenders as per latest Finance Department Notification will function as the Tender Accepting Authority (TAA) for evaluation of technical and financial proposals of works having tender value within his/her range of acceptance. As per present delegation, TAA for different tenders within the range above Rs 0.10 Lakh upto Rs 40.00 Lakh would be as follows:

a. For off-line Tenders of value up to Rs 1.0 Lakh tendered by Sub-Divisional Officer, in a single bid system in off-line mode, it will be evaluated by a committee comprising the Sub-Divisional Officer, concerned Junior Engineer, another Junior Engineer and accepted by the Sub-Divisional Officer, I&W Directorate. [off-line single bid Tenders]

b. For off-line Short Notice Tenders of value up to Rs 20.0 Lakh tendered by Executive Engineer, in a single bid system in off-line mode, it will be evaluated by a committee comprising the concerned Superintending Engineer, the Executive Engineer and the Divisional Accounts Officer and accepted by the Executive Engineer, I&W Directorate. [Off-line single bid Tenders] **as per Notification No. 11-(W)_2023-24 dated 20.06.2023 of I&WD**

c. For off-line Short Notice tenders of value from Rs 20 Lakh up to Rs 40.0 Lakh relating to works only, tendered by Superintending Engineer, in a single bid system in off-line mode, will be accepted by Superintending Engineer, I&W Directorate [off-line single bid system Manual Tenders**]. as per Notification No. 11-(W) _2023-24 dated 20.06.2023 of I&WD**

13.6 Procedure to be followed for final acceptance of tender & Award of Contract

i. The lowest (SUCCESSFUL) financial bid for all works tenders is accepted as a rule. If for any reason the lowest (SUCCESSFUL) bid is not accepted, reference is to be made to the appropriate Government for orders as to which of the contractor /bidder the work should be awarded.

ii. Maximum 5 % excess beyond the 'Tender Value' (Amount put to Tender) may be accepted above tenders of value below Rs 5.00 lakh up to 5% above amount put to tender and also 5% excess over administratively approved amount, proposal for revised administrative approval/Expenditure sanction would have to be submitted to the Government, but acceptance of tender and issue of work order may not be kept pending for want of revised approval.

iii. Above 5% and up to 10% of the Tender Value can be recommended to the Government for acceptance by the Departmental Tender Committee (DTC) subject to the conditions that valid technically qualified bids should not be less than three and SUCCESSFUL bid is accepted and tendered amount is within the administratively approved cost. In case of excess over administratively approved amount, revised administrative approval would have to submitted to the Government but acceptance of tender, and issue of work order may not be kept pending for want of Revised Administrative Approval/ Revised Financial sanction.

iv. If the response to a Tender is less than three, then Tender should be invited afresh. Such Re-Tender notice shall be published in widely circulated dailies as per guidelines and also through Departmental web portals. Prior to invitation of Re-Tender / fresh Tender, the eligibility criteria and other terms & conditions as contained in the first 'Notice Inviting Tender' shall have to be reviewed/relaxed by the Tender Inviting Authority, to ascertain whether (i) it was too much restrictive, say, specifications and qualifications were fixed at higher standards than required, (ii) advertisements in the widely circulated Newspapers were properly published and (iii) other related procedural matters were observed in its entirety.

v. If the number of valid bids received even in re-tender is less than three, it should be referred by the TIA to the DTC and even the appropriate Government along with the recommendation of the DTC for decision, in accordance with Finance Department Memorandum and other relevant orders in vogue at the time of publication of the tender.

vi. For acceptance of SUCCESSFUL bid after 2nd / 3rd re-tenders is still above 10% of the Tender Value (Amount put to tender), upon specific recommendation of the DTC as mentioned at clause 13.4, with that of the Department shall have to be sent to the Finance Department for decision.

vii. All above tender rules applies for all types of works and procurements i.e. Plan, Non Plan, deposit works tenders.

14. General guidelines for acceptance of Tender

Lowest valid rate should normally be accepted in accordance with the procedure stated in clause 13.4. The Tender Accepting Authority reserves the right to distribute the work amongst more than one contractor/bidder with same SUCCESSFUL rate.

15. Signing of formal tender contract/agreement after acceptance of tender

The contractor/bidder, whose bid is approved for acceptance, shall within **2 days** of the receipt of Letter of Invitation (LOI) or Letter of Acceptance (LOA) in his / her favor will have to execute a 'Formal Agreement with the Engineer-in-Charge in quadruplicate in W.B.F.2911 and all other contract documents entire set of which may be obtained free of cost from the office of the designated Executive Engineer (SDP), RRI in-charge of the work tendered.

If the selected SUCCESSFUL bidder fails to turn up even after **3 days** after the initial **2 days** from the date of issuing of the AOC in the e-mail ID of bidder or the dispatch date of official communication for signing of the Contract/Agreement, the selected bidder is liable for penal actions which shall comprise blacklisting, debarring from future participation in Government tenders, immediate forfeiture of the Earnest Money deposited in the tender, other penal actions as stipulated under clause 9 & 10 of the e-NIT, the Departmental Notification and also contained in contract W.B Form No. 2911 Agreement.

16. Payment against bills raised by the contractor

Periodic Tax invoice/bills containing bidders GSTIN & other details needs to be submitted by the supplier/contractor/Agency/bidder to the DDO for raising claims for receiving payments of work executed under this contract /upon achieving physical Milestones clearly showing separately the Tax charged in accordance with the provisions of the GST Act, 2017.

The payment of Running Accounts well as final bill for any work based on progress and performance will be made according to availability off end and no claim due to delay in payment will be entertained.

17. No cost escalation in any form is included in the Tender Contract Agreement.

18. Bid validity

The Bid will be normally valid for **120 days** from the date of opening of the financial proposal. However, extension of bid validity may be suitably considered by the Tender Inviting Authority, if required, subject to written confirmation of the contractor/bidder (s) to that effect.

19. Definition of Physical Milestones:

The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor, and which shall be reckoned from the date on which the order to commence work is given to the contractor. The work shall throughout the stipulated period of the contract be proceeded with all due diligence. Time being deemed to be the essence of contract on the part of the contractor; the contractor shall be bound in all cases, to achieve the 'Milestones' as specified by the Engineer-in-Charge with the AOC, defining pertaining to the work. The contractor within 15 days of receipt of Letter of Acceptance shall submit a work program commensurate with period of construction in the form of a Bar Chart work program, stating the timeline of such different Milestones. In the event of the contractor failing to comply with any of the conditions related to achieving the 'Milestones' within the specified time period prescribed for such 'Milestone' plus one month, he/she shall be liable to pay compensation.

If the contractor fails to commence and/or maintain required progress over the total time allotted for its full completion and fails to complete the work and clear the site on or before the end of contract period or extended date of completion, he/she shall, without prejudice to any other rights or remedy available under the law on account of such breach, pay as agreed compensation to the implementing Department. This will also apply to items or group of items for which a separate period of completion has been specified.

20. The tender with overwriting, illegible writing, erasing and incomplete or conditional one is liable to rejection

21. In the event of tender being submitted by a Partnership Firm it must be signed by each of the partners of the firm or a Power of Attorney holder, as stipulated in the Indian Partnership Act.

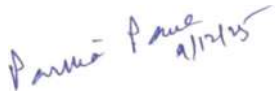
22. All the tenders in which any one of the prescribed conditions is not fulfilled will be rejected

23. In case of any nonscheduled Holiday/ Bundh /Strike in the aforesaid dates the next working will be treated as the scheduled date for that purpose.

24 In case of work containing laboratory test in laboratory **other than Departmental Lab** necessary document showing own set up for Lab test, like test equipment purchase document & valid calibration certificate in the name of Agency or Authenticated consent letter of laboratory authority & declaration of Agency for Lab test to be done in any Govt. BE/B.Tech University/College, IIST (Shibpur), National Test House

25 In case of work containing laboratory test **at Departmental Quality Control Laboratory**

For Geo-technical investigation work, for "Testing at Dept. Laboratory", Agency has to dispatch the samples collected at site to the Departmental Quality Control Laboratory for testing. After obtaining results from the Laboratory through the undersigned the Agency has to prepare and submit the necessary Report.



(Tender Inviting Authority)
Executive Engineer (SDP)
River Research Institute
Irrigation & Waterways Directorate
Government of West Bengal

Additional Terms & Conditions

1. The Executive Engineer of the concerned Division shall be the Engineer-in-Charge in respect of the works contract and all correspondence concerning rates, claims, change in specifications and/or design and similar important matters will be valid only if accepted/recommended by the Engineer-in-Charge. If any correspondence of above tender is made with Officers other than the Engineer-in-charge for speedy execution of works, the same will not be valid unless copies are sent to the Engineer-in-Charge and also approved by him/her. Instructions given by the Sub-Divisional Officer/Assistant Engineer and the Junior Engineer/Section Officer (SO) on behalf of the Engineer-in-Charge shall also be valid (who have been authorized to carry out the work on behalf of the Engineer-in-Charge) regarding specification, supervision, approval of materials and workmanship. In case of dispute relating to specifications and work, the decision of Engineer-in-Charge shall be final and binding. The Engineer-in-Charge will however take all decisions relating to works contract only after recommendation/ advice of the Tender Accepting Authority. If there is more than the Executive Engineer assigned for the tender, the Chief Engineer would designate the Engineer-in-Charge for the work.

2. Acceptance of the tender including the right to distribute the work between two or amongst more than two bidders with same SUCCESSFUL rates will rest with the Tender Accepting Authority without assigning reason thereof to any of the bidders. The tender accepting authority reserves the right to reject any or all tenders without assigning sufficient justification thereof to the bidder/contractor. No additional or excess work or additional items of work beyond the tendered amount would be generally allowed. All excess, supplementary or substitute supplementary items of work, if unavoidable are to be accepted by the Tender Accepting Authority only if the total value of work on completion is within the tendered amount. The exiting contract would be terminated after achieving work up to tendered cost (gross value) and balance work would be taken up afresh after fresh sanction and new tender, except in the interest of public services, in rare & special cases under specific approval of the Government.

3. The Contractor/bidder shall have to comply with the provisions of (a) Contract Labour (Regulation & Abolition) Rules, 1970 including its revisions (b) Minimum Wages Act 1948 and the modification thereof or any other laws relating thereto as will be in force from time to time.

4. Engineer-in-Charge shall not entertain any claim whatsoever from the contractor for payment of compensation on account of idle labour on such grounds including non-possession of encumbrance free land. Escalation of cost due to inflationary effects or any other reason is not permitted during construction period or extended time period of contract.

5. Engineer-in-Charge shall not be held liable for any compensation due to machines &equipment's becoming idle or any circumstances including untimely rains, other natural calamities, strikes etc.

6. All statutory taxes, viz. GST / labour welfare Cess, labour insurance etc. or revision of taxation rates even after AOC or commencement and before final completion of the work are to be borne by the contractor/bidder. Original tax invoice/challan or bill of those materials, which are procured by the bidder, may be asked to be submitted for verification if required.

7. Labour Welfare CESS @ 1% of the cost of construction works shall be deducted from the Gross value of all works bills. Also, it is instructed to compulsorily register his/her establishment under the Act, under the competent registering authority, i.e. Assistant Labour Commissioner / Dy. Labour Commissioner of the region for disbursing PF and ESI benefits of workers. The bidder should be mandatorily be registered online with Employees Provident Fund Organization (EPFO) in the on-line system and possess EPF code and all current documents. Penalties and complaints due to noncompliance of on-line EPF registration and default is the full responsibility of the bidder even if the TIA is by default the principal employer.

8. No mobilization / secured advance will be allowed unless specified otherwise in the contract or the e-Notice Inviting Tender.

9. GST, Cess, License fees, Royalty for construction materials, forest product etc., Toll Tax, Income Tax, Ferry Charges and other Statutory Government Taxes as applicable during project implementation are to be paid by the contractor/bidder. The rates of supply and finished work items are inclusive of these taxes and levy. Tax invoice/bills needs to be submitted by the supplier/bidder for raising claims under the contract after attaining of physical milestones showing separately the tax charged in accordance with the provisions of GST Act, 2017.

10. All working tools & plants, scaffolding, construction of vats & platforms and arrangement of Labour Camps will have to be arranged by the contractor at his/her own cost. The contractor shall clear the site of work and restore all damages made due to the Labour camp, erection of yards and go downs, stores etc within 30 days of completion of work.

11. The contractor shall supply mazdoors, bamboos, ropes, pegs, flags T&P, Machineries and equipment's etc. for laying out the work and for taking and checking measurements for which no extra payment will be made.

12. The contractor/bidder should see the site of works and tender documents, drawings etc. before submitting tender and satisfy himself/herself regarding the condition and nature of works and ascertain difficulties that might be encountered in executing the work, carrying materials to the site of work, availability of drinking water and other human requirements & security etc. Work on river banks may be interrupted due to a number of unforeseen reasons e.g. sudden rise in water levels, inundation during flood, inaccessibility of working site for carriage of materials. Engineer-in Charge may order the contractor to suspend work that may be subjected to damage by climate conditions. No claim will be entertained on this account. There may be variation in alignment, height of embankment or depth of cutting, location of revetment, structures etc. due to change of topography, river condition and local requirements etc. between the preparation and execution of the scheme for which the tendered rate and contract will not stand invalid. The contractor will not be entitled to any claim or extra rate on any of these accounts.

13. A machine page numbered Site Order book (with triplicate copy) will have to be maintained at site by the contractor and the same has got to be issued from the Engineer-in-Charge before commencement of work. Instructions given by inspecting officers not below the rank of Assistant Engineer will be recorded in this book and the contractor must note down the action to be taken by him in this connection as quickly as possible.

14. The contractor shall be bound to comply with all the Central & State Pollution Control Acts & Rules during entire construction period.

15. All possible precautions should be taken for the safety of the people and work force deployed at worksite as per safety rule in force. Contractor will remain responsible for his labour in respect of his liabilities under the Workmen's Compensation Act etc. He must deal with such cases as promptly as possible. Proper road signs as per P.W.D. practice will have to be erected by the contractor at his own cost while operating public thoroughfares. Also, display boards containing brief description and name of project with completion target dates shall be erected at a prominent location at the work site by the contractor for public awareness.

16. The contractor will have to maintain qualified technical employees and/or Apprentices at site as per prevailing Apprentice Act or as stipulated in the contract. No compensation for establishment charge will be entertained.

17. The contractor will have to accept the work programme as per modifications and priority of work fixed by the Engineer-in-Charge so that most vulnerable reach and/or vulnerable stretch is completed before impending monsoon or rise in river flood water level or commencement of canal irrigation water release or for other suitable reasons.

18. Quantities of different items of work mentioned in the departmental tender schedule/BOQ or in work order are only tentative. In actual work, these may vary considerably. Payment will be made on the basis of works actually completed in different items as per specifications and codes, and no additional claim will be entertained for reduction of quantities in some items or for omission of some items. For execution of any additional item or supplementary works within the tendered value with the total completion value remaining within the accepted tendered cost, approval of the Tender Accepting Authority/Government in the Irrigation & Waterways Department would be required.

19. In order to cope with the present system of e-pradan billing, departmental supply of construction materials is discouraged. However, Departmental materials may be issued to the contractor/ bidder to the extent of requirements as assessed and following accounts procedure in the Treasury system of bill payment and in installments as decided by the Engineer-in-Charge. Issue of materials may be of three categories.

    a) Materials issued directly to the work and subject to recovery.
    b) Materials issued from departmental go down and subject to recovery.
    c) Materials issued free of cost.

    Decision of the Engineer-in-Charge should be final and binding in this regard. He also stands solely responsible for reconciliation of accounts, if materials are issued to the contractor.

20. Any materials brought to site by the contractor subject to approval of the Engineer-in-Charge. The rejected materials must be removed by the contractor from the site at his own cost within 48 hours of issue of the order to that effect. The rates in the schedule are inclusive of cost and carriage of all materials to worksite. The materials will have to be supplied in phase with due intimation to the Sub-Divisional Officer/Assistant Engineer concerned in conformity with the progress of the work. For special type of materials, i.e. Geo Synthetic Bags, HDPE Bags, Geo Textile Filter, Geo jute Filter etc. if any, relevant Data Sheet containing the name of the Manufacturers, Test Report etc. will also be submitted in each occasion. Engineer-in-Charge may conduct independent test on the samples drawn randomly before according approval for using the materials at site. In this regard decision of Engineer-in-Charge shall be final and binding.

21. For materials under category 19(a),(b)&(c), the contractor will act as the custodian thereof. The materials will have to be carried from the nearest Departmental go-down to worksite by the contractor at his own cost. The contractor shall remain responsible for the proper storage and safety of the materials. Suitable Go-down/ Store shall have to be made by the contractor at his/her own cost. Penalty charges shall be levied at higher rate for loss, wastage, misuse. Surplus materials of the departmental if any, shall have to be returned to the issuing Go-down or store at the contractor's cost within the time frame as fixed by Engineer-in-Charge, otherwise, the cost at penal rate will be recovered from the bill. Indent for departmental materials shall be submitted by the contractor to the AE/S.D.O. at least 7 days in advance of actual requirement. No claim will be entertained for non-issuance of such materials in time but reasonable extension of time will be granted. All materials, whatever be the category thereof, shall be properly stored by the contractor in suitable go downs near the site of work at his own cost & under no circumstances whatsoever shall any material be removed from the site of work without prior written permission of the Engineer-in-Charge. The contractor shall be responsible for any damage, wastage or loss of such materials.

22. The contractor shall also have to satisfy the Engineer-in-Charge regarding the proper utilization of materials which have been issued departmentally.

23. Value of the material, under category (a) & (b) of clause 19, will be recovered from the bills of the contractor in one or successive installments as may be decided by the Engineer-in-Charge.

24. Requisite quantity of cement as may be required for the work will be supplied from the nearest Departmental go down if stock permits. The issue rate of cement is shown in the Schedule of materials attached. Any excess consumption of cement by more than 5% over the final consumption statement drawn up as per consumption rate specified in the Schedule will be recovered at a penal rate shown in schedule.

25. Reinforcement steel rods/MS sheet piles/bitumen will be issued when stock permits, from the nearest departmental go-down where such material is available in marketable length/quantities. While issuing the same, for any particular work the quantity actually required as per approved drawing shall only be issued. While executing the work, it will be responsibility of the Contractor/bidder as well as the Engineer-in-Charge to get this quantity properly utilized in the work. Cut pieces, if any will not be taken back by the Department. Recovery for the total quantum of steel issued will be made at the issue rate shown in the Schedule below. In case of misuse over +10%, deduction will be made at a penal rate shown in the Schedule below. This whole principle shall apply in case of other M.S materials like sheet piles and structural steel members as well.

26. SCHEDULE OF MATERIALS TO BE SUPPLIED DEPARTMENTALLY AND THEIR RECOVERY RATES

Sl. No	Name of materials	Issue rate (In Rs.)	Unit	Penalty recovery rate for loss or misuse or wastage (if otherwise not mentioned specifically in the S O R)	Place of delivery
01	Cement		MT	2 (Two) times issue rate	Departmental Go-down
02	Reinforce-ment steel rods,struct ural steel members, M.S sheet Piles	52035.20	MT	2 (Two) times issue rate	-do-
03	Bitumen		MT	2(Two) times issue rate	-do-

Partha Paul 9/12/25

(Tender Inviting Authority)
Executive Engineer (SDP)
River Research Institute
Irrigation & Waterways Directorate
Government of West Bengal

09/12

Government of West Bengal
Irrigation & Waterways Directorate
Office of the Executive Engineer
River Research Institute, Mohanpur, Nadia - 741246
e-Mail id – ee-sdprri@wbiwd.gov.in & rrisdp@gmail.com; Ph no. (033)25872233

LIST OF WORKS

SHORT NOTICE INVITING TENDER No:- 03/EE/SDP /2025-26
(For works of estimated cost up to Rs 20.00 lakh)
Circulated Vide T. O. No. 1460 dated 09.12.2025

LIST OF WORKS FOR SHORT NOTICE INVITING TENDER NO-03/EE/SDP /2025-26 OF EXECUTIVE ENGINEER (SDP), (I & W Dte.) WITH ADDITIONAL TERMS AND CONDITIONS (TO FROM A PART OF THE TENDER DOCUMENTS).

Sl. No	Name of Work	Amount put to tender (In Rs.)	Earnest Money (In Rs.)	Time allowed for completion	Minimum eligibility criteria to match the Prequalification (PQ) credential	Physical Milestones for completion of each work within stipulated time (Refer to Clause 19 of the SNIT)
1	Estimate for collection of soil samples for Geotechnical Investigation at different location including laboratory testing for design of bridge & guard wall at Kanchantala over river Khaldari khal at Maheshtala block under the jurisdiction of Suburban Drainage Division to be conducted by River Research Institute, I&W Dte, Govt of West Bengal.	Rs 3,04,692.00	Rs. 6,094.00	7 (Seven) Days	Bonafide contractors/bidders having credential of execution of similar nature of work of value 30% Value Rs. 91,407.60 of the amount put to tender within the last 5 years from the date of publishing of SNIT	Complete the work as specified & handover site within 7 days from issue of WO

2.	Survey work of new alignment of retired embankment at country side of Paschim ratanpur alongwith BM carry & connection at different points under Malda irrigation Division in respect of urgent flood mitigation work of bhutni char,Paschim ratanpur in the district of Malda to be conducted by River Reseach Institute, Mohanpur, Nadia during the year 2025-26.	Rs. 1,79,724.00	Rs. 3,594.00	7 (Seven) Days	Bonafide contractors/bidders having credential of execution of similar nature of work of value 30% Value Rs. 53,917.20 of the amount put to tender within the last 5 years from the date of publishing of SNIT	Complete the work as specified & handover site within 7 days from issue of WO

Parma Paul 9/12/25

(Tender Inviting Authority)
Executive Engineer (SDP)
River Research Institute
Irrigation & Waterways Directorate
Government of West Bengal

09/12

TIME SCHEDULE OF SHORT NOTICE INVITING TENDER

SHORT NOTICE INVITING TENDER No: - 03/EE/SDP/ 2025-26
(For works of estimated cost up to Rs 20.00 lakh)
Circulated Vide T. O. No. 1460 dated 14.12.2025

a	Date of publication	**10.12.2025**	**Up to 10:15 Hours**	***In the Executive Engineer (SDP) officer chamber, River Research Institute, I&W, Mohanpur, Nadia.***
b	Last Date & Time for application for issue of Tender Form	**15.12.2025**	**Up to 14:00 Hours**	
c	Last Date & Time for issue of Tender paper.	**16.12.2025**	**Up to 14:00 Hours**	
d	Last Date & time and Place for Dropping Tender Forms with documents	**18.12.2025**	**Up to 14:00 Hours**	
e	Date, time and Place for Opening Tender Forms in the office of the undersigned.	**18.12.2025**	**After 1400 Hours**	

N.B: Original copies of all attested copies which one enclosed with the application should be produced for verification on demand. Payment will be made as per availability of fund of SUNDARBAN DELTA PROJECT DIVISION.

Parna Paul 9/12/25

(Tender Inviting Authority)
Executive Engineer (SDP)
River Research Institute
Irrigation & Waterways Directorate
Government of West Bengal

09/12

FORM-1
APPLICATION FOR TENDER

To,
Executive Engineer (SDP),
River Research Institute,
Irrigation & Waterways Directorate,
Govt. of West Bengal,
Mohanpur, Nadia.

SNIT No: - 03/EE/SDP /2025-26

Serial No of Work applied for: -.....

Amount put to Tender: Rs.....
(Tender Value)

Dear Sir,

Having examined the SNIT documents, I/we hereby would like to state that I/we willfully accept all your conditions and offer to execute the works as per Tender no and Serial no stated above. I/We also agree to remedy the defects after/during execution of the above work in conformity with the conditions of contract, specifications, drawings, bill of quantities and addenda.

Dated this _____ day of _____ 2025___

Full name of Bidder / Contractor: _____

Signature: _____

In the capacity of: _____

Duly authorized to sign bids
For& on behalf of (Name of Firm): _____
(In block Capital letters or typed)

Office address with seal if any:

Telephone no(s) (office): _____

Mobile No: _____

Fax No: _____

E mail ID: _____

FORM – 2
Declaration against Common Interest

(To be submitted in plain paper/letter head as per specimen, duly filled up and uploaded with digital signature, which shall be treated as the self declaration of the bidder)

SNIT No: 03/EE/SDP /2025-26

Sl. No. of work ……. (in the list of work in the SNIT)

To,

Executive Engineer (SDP),
River Research Institute,
Irrigation & Waterways Directorate,
Govt. of West Bengal,
Mohanpur, Nadia.

I/We, Sri/Smt.....The authorized signatory on behalf of..... do hereby affirm that/We/any of the member of..... bidding against SNIT No. ..... Sl.No...Do not have any common interesteitherasapartnerinanyotherpartnershipfirm/consortium/JointVenturersProprietor/ Principal Share Holder of any of the Firm/Company in the same serial for the work I/we want to participate.

Dated this _____ day of _____ 2025___

Full name of Bidder / Contractor: _____

Authorized Signatory: _____

In the capacity of: _____

Duly authorized to sign bid

for & on behalf of (Name of Firm): _____

(In block Capital letters or typed)

Office address with seal: .....

Telephone no(s) (office): _____

Mobile No: _____

Fax No: _____

E mail ID: _____

*In case of Joint Venture & Consortium the Lead Member to submit this format.

FORM –4
Declaration on antecedents and performance

(To be submitted in plain paper/letter head as per specimen, duly filled up and uploaded with digital signature, which shall be treated as the self-declaration of the bidder)

Ref:- SNIT No. - 03/EE/SDP /2025-26

Work Sl. No…….

To,

Executive Engineer (SDP),
River Research Institute,
Irrigation & Waterways Directorate,
Govt. of West Bengal,
Mohanpur, Nadia.

I/We, Sri/Smt., the authorized signatory on behalf of ..... do hereby affirm that/We/any of the member of..... bidding against SNIT No. ..... Sl. No..... Are not black listed suspended or debarred from participation in State Government procurements and tenders in the Irrigation & Waterways Directorate, Government of West Bengal, and other Departments of the State Government and Government of India on the date of publication of this Notice Inviting Tender (SNIT).

If at a later stage this submission (undertaking) is found incorrect, the bidder company along with all its constituent members/owners/partners would be liable to penal actions as decided by the Government under the law.

Dated this _____ day of _____ 2022___

Full name of Bidder / Contractor: _____

Authorized Signatory: _____

In the capacity of: _____

Duly authorized to sign bid

for & on behalf of (Name of Firm): _____

(In block Capital letters or typed)

Office address with seal: .....

Telephone no(s) (office): _____

Mobile No: _____

Fax No: _____

E mail ID: _____

(SIGNATURE OF BIDDER)

FORM-6*

SPECIMEN FORMAT FOR THE BANK GUARNATEE FOR ADDITIOANAL PERFORMANCE SECURITY DEPOSIT

(*To be submitted only **if the bid price quoted by the bidder is below 20% of the estimated cost put to tender,** non-submission within 7 working days from date of issuance of LOA which may be maximum extended to 14 working days after issuance of LOA/LOI will lead to rejection of selected bidder. Similar standard format issued by RBI approved Bank pledging Bank Guarantee of the required value and period in favour of Engineer-in-Charge is acceptable)

To,

---------- (Designation of Engineer-in-Charge)

---------- (Office address of Engineer-in-Charge)

WHEREAS (name and address of Contractor) (hereafter called "the Contractor") has undertaken, in pursuance of Contract No: dated to execute (name of Contract and brief description of Works) (hereinafter called "the Contractor").

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a Scheduled commercial bank for the sum specified therein for '**ADDITIONAL PERFORMANCE SECURITY DEPOSIT**' for compliance with his obligation in accordance with the Contract:

AND WHEREAS we (Indicate the name of the bank and branch) have agreed to give the Contractor such a Bank Guarantee:

NOW THEREFORE we ; (Indicate the name of bank and branch) hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, upto a total of Rs. (Amount of guarantee) (in words). We undertake to pay you, upon your first written demand and without cavil or argument, a sum within the limits of (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We (Indicate the name of the bank and branch) hereby waive the necessity of your demanding the said debt from the contractor before presenting us with the demand.

We (Indicate the name of the bank and branch) further agree to pay to you any money so demanded not withstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present absolute and unequivocal.

The payment/so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s) shall have no claim against us for making such payment.

We (Indicate the name of the bank and branch) further agree that no change or addition to or other modification of the terms of the Contract or of the works to be performed there under or of any of the contract documents which may be made between you and the contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

We (Indicate the name of the bank and branch) lastly undertake not to revoke this guarantee except with the previous consent of you in writing.

This guarantee shall be valid up to ----------. It come into force with immediate effect and shall remain in force and valid for a period up to the time of completion of the work under the stated contract plus claim period of six months for

the Bank Guarantee. Notwithstanding, anything mentioned above, our liability against this guarantee is restricted to Rs (Rs.) and unless a claim in writing is lodged with us within the validity period, i.e. up to…….of this guarantee all our liabilities under this guarantee shall cease to exist.

Signed and sealed this day of 2022 at

SIGNED, SEALED AND DELIVERED

For and on behalf of the BANK by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

i. The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee

The address, telephone number and other details of the Head Office of the Bank as well as of issuing Branch (within West Bengal/AT PAR ANYWHERE IN INDIA only to be accepted) should be mentioned on the covering letter of issuing Branch.

Additional Terms & Condition (Special T.O.R)

For Survey works only:

1. SCOPE OF WORK:

- Establishment of various permanent and temporary Ground Control Points (GCPs) by Differential Global Positioning System (DGPS) and Digital-level (DL) surveying instruments along the river bank /drainage channel bank and construction of permanent bench mark (BM) structures.
- Bathymetric survey for obtaining river cross sections at specified intervals and long section, river bed profile using Real Time Kinematic (RTK) enabled Acoustic Doppler Current Profiler (ADCP), Echo sounder or RTK/DGPS based on the requirement.

- Topographic survey for obtaining details of bank cross sections at specified intervals along-with details of hydraulic structures, embankments, natural or artificial channels, canals, chars and other topographic features viz. transportation lines, electricity lines, forests, water bodies, residential areas, public utility structures (schools, hospitals, police station, market, park, auditorium, electricity sub-station, bus stand, railway station etc.) within the specified area from the river banks.

- Submission of the survey data with topographical maps, cross section, long section and other detail drawing, also in tabular data forms using PDF, Auto Cad, MS Excel or other software in both hard copy and soft copy format. Necessary pictures and videography of the work also to be appended.

- General Scope of work should be properly maintained as given in below.

- Submission of survey report should be properly maintained as given in below.

- Qualification and Competence of the staff for assignment should be properly maintained as given in below.

2. DETAILED SCOPE OF WORK WITH TECHNICAL SPECIFICATIONS:

A. Establishment of Permanent and Temporary Ground Control Points (GCPs)

I. Location of GCPs:

There will be **two** Base Points and **two types** of GCPs (Permanent GCPs / Primary Survey Control Points and Temporary GCPs / Secondary Survey Control Points) to be established along the river at strategic locations. The two Base Points to be established at locations equally covering the whole survey area and placed centrally in each of their covered areas. Permanent GCPs to be placed at a maximum interval of 5 km and Temporary GCPs at a maximum interval of 2.5 km.

These points shall be established in such a way that further surveys can be carried out in the same coordinate system. The GCPs will form a network of triangles preferably not too acute nor obtuse covering the survey area.

The locations of these Base points and GCPs to be fixed by the survey agency and will be furnished for approval by the competent authority for commencement of the survey.

The GCPs shall be setup with reference to known Survey of India Permanent Bench Marks. Local geoid corrections are to be made using SOI GTS (Great Trigonometrically Survey)/ Continuously Operating Reference Stations (CORS) with an accuracy limit of 5 mm.

II. Construction of permanent BM pillars and selection of locations for temporary GCPs:

Permanent BM pillars shall be constructed at the locations of the Primary GCPs and to be constructed as per the design and specifications given in the Tender drawing. Bench Mark pillars are to be constructed at suitable locations on embankment proper or at places not more than 100 m from embankment as per direction of the Engineer in charge. Secondary Survey Control Points to be established on any permanent structures of the Govt. The GCPs shall be established at such a location so that it may not be disturbed/damaged by local people.

All GCPs with proper indexing & labelling shall be painted yellow and duly marked for identification with black paint.

III. Datum of Coordinates of the Base Points and GCPs:

The horizontal coordinates of the GCPs will be derived based on WGS 84 Datum and presented both in Geographical Coordinate Systems (Latitude and Longitude in decimal degrees with 9 digits after decimal & Ellipsoidal Height) and Projected Coordinate System (Zone-45N, Easting and Northing values in m, with 9 digits after decimal point).

The vertical coordinates will also be based on WGS 84 Datum and will give the **Ellipsoidal** height in m. The Ellipsoidal values will be converted into **Orthometric** value (MSL) by the client, based on the Survey of India Geoid model (EGM 96 and EGM 08 will not be accepted) and then these values will be used for bathymetric and topographic survey, to be carried out further.

IV. Process of obtaining Coordinates of the Base Points and GCPs:

a) For Base Points survey.

With DGPS instrument from CORS network of Survey of India. (Registration for CORS network will be given by the client). Or, with DGPS instrument in Static mode for a period of **24 hours.** (If mobile network is not available or very poor around Base Point location.).

Only the Latitude, Longitude and Ellipsoidal height from the instrument to be recorded.

b) For Primary GCPs.

With DGPS instrument from CORS network of Survey of India. (Registration for CORS network will be given by the client). Or, with DGPS instrument in Static mode for a period of **6 hours** with the base placed over any nearest established Primary GCP. (If mobile network is not available or very poor around GCP location.)

Elevation of all BM should be measured using Digital level instrument and Static mode in DGPS instrument from the nearest established GCP as a Base point. The final value of the elevation will be finalized after necessary scrutiny by the Engineer In-Charge/ Site in Charge from the data acquired in both modes of survey. All raw data from digital level shall be submitted along with adjusted and unadjusted levels in tabular form & using

applicable Geo-Office software or any other software as per direction of Engineer in-Charge complete.

c) For Secondary GCPs.

With DGPS instrument from CORS network of Survey of India. (Registration for CORS network will be given by the client). Or, with DGPS instrument in Static mode for a period of **3 hours** with the base placed over any nearest established Primary or secondary GCP. (If mobile network is not available or very poor around GCP location).

Elevation of all BM should be measured using Digital level instrument and Static mode in DGPS instrument from the nearest established GCP as a Base point. The final value of the elevation will be finalized after necessary scrutiny by the Engineer In-Charge/ Site in Charge from the data acquired in both modes of survey. All raw data from digital level shall be submitted along with adjusted and unadjusted levels in tabular form & using applicable Geo-Office software or any other software as per direction of Engineer in-Charge complete.

V. Process of measurement with DGPS instrument for better accuracy:

a) Static Observation time frame should be used within preferably 6:00 hrs to 14:00 hrs.

b) DGPS/ GNSS Receiver Accuracy (RMS) should be maintained:

Static & Fast Static: Horizontal accuracy – (5 mm ± 0.5 ppm) or better

Vertical accuracy – (5 mm ± 1 ppm) or better

Kinematic RTK: Horizontal accuracy – (10 mm ± 1 ppm) or better

Vertical accuracy – (15 mm ± 1 ppm) or better

c) The threshold value shall not exceed 02 for PDOP (Positional Dilution of Precision) and HDOP (Horizontal Dilution of Precision).

d) The control point locations should be selected so as to be:

- Clear of HT/LT lines
- Free from multi path problems associated with tall features in the vicinity
- Free from foliage
- Open to sky with a clear view of the horizon

VI. Ground Control Points (GCP) establishment report:

Control point establishment report shall be submitted after completion of activities covering the following:

a) Final list of all Base Points, GCPs with Co-ordinate [X, Y, Z] in Universal Transverse Mercator (UTM) system and Geographical Coordination System with their location with respect to existing roads/identifiable permanent features for easy identification have to be prepared and submitted to Engineer in-charge/ Site in charge.

Geo-referenced digital photographs of these pillars shall be taken from three different directions. A satellite image clip of approximate size 100 X 100m, around the selected location, should also be furnished along with other site photographs. Further description of the selected location should also be provided. The measurements from permanent features identifiable nearest to the point shall also be taken.

b) Both, the Raw Data file [in RINEX (Receiver Independent Exchange Format) or .T02 as well as proprietary formats of DGPS manufacturer] and the Transformed Data for the entire survey area and adjoining areas of interest. The raw data will be checked properly by the concerned authority, if not satisfied after checking the raw data as per technical specification, then the same point should be re-surveyed.
c) The Agency shall download the raw GCP data (static data) on a computer at site or suitable location itself and same working day to be provided to site in-charge.
d) Base line report and necessary correction made during establishment of Control Points.
e) Processed data in MS-Excel Worksheet/ASCII/XML, .kml & .dwg format.
f) Each day's work shall be compiled and mapped/documented the same day to be sent to the site in-charge through electronic medium.

B. Bathymetric Survey

Bathymetric survey will be started with the established GCPs.
Echo-sounder (Dual frequency), RTK/DGPS based ADCP or RTK/DGPS (for shallow depth of water) to be used for developing under water river or reservoir bed profile, cross sections etc. in river channels & other water bodies shall be conducted. The bathymetry setup shall comprise of positioning system and echo- sounder should be of latest specification to meet the specified accuracy levels.

a) Bathymetric details i.e. the river bed elevation, flow bifurcation, tributaries, shoals, dead pools, deep channels, island, char, thalweg etc. shall be clearly indicated. Waterline of rivers and reservoirs shall be marked on survey plan.
b) Survey should be done using Echo-sounder, DGPS & RTK based ADCP and licensed survey software for developing under waterbed profile in river channels & other water bodies.
c) Echo sounder or ADCP data should be interfaced with HYPACK/ Eiva software or equivalent to data logging software in respect of tide correction (if required).
d) Echo-sounder (Dual frequency) & RTK/DGPS based ADCP should be calibrated and checked by concerned authority before using in field.

C. Topographical survey:

Topographic survey will be started with the established GCPs.
RTK/DGPS/TS or Drone to be used for developing a map of the overbank areas of approximate width up-to 50 m from the bank of the river or embankment. The topographic setup shall comprise of instruments which should be of latest specification to meet the specified accuracy levels.

a) All topographic details on both the banks of the river up to a distance of 50 m from the country side toe of embankment or from river bank to be captured with Total station or Drone survey or RTK/DGPS for levels.
b) Topographic survey should show natural features viz. streams, lakes, ponds, forests, hills, caves, low lands, silt depositions, chars, open space water logged areas etc.
c) Topographic survey should also show manmade features viz. communication lines (roads, rail, ferry), electric poles (HT), transformers, rail station, bus terminus, markets,

schools, houses (permanent or temporary), hutments, agricultural fields, tea gardens, important govt. infrastructures and establishments viz. schools, hospitals, markets, water tanks, military camps, police station, forest beat, electrical substation, bridges (temporary and permanent), all hydraulic structures, spurs, canals, important land marks etc.

d) Average G.L. of the flood plain, agricultural fields, village settlements etc. to be provided.
e) Important levels of all the hydraulic structures, embankments and spurs to be provided.
f) Geological features visible on ground such as firm banks, rocky outcrops, etc. to be shown.

D. Plotting of Cross section:

a. The cross sections of river are to be plotted with stitching as per topographical CS survey details in horizontal direction and vertical direction.
b. Offset interval of each cross section shall be taken at an interval of not more than 1m to clearly depict the existing river bed profile.
c. River station should be marked starting from left high bank to the right high bank.
d. Cross section of River/ Khal shall be taken at an interval of 30 m-90 m c/c for straight and uniform reach, and 30 m – 60 m c/c for non-uniform and curved reach. These two types of reaches should be identified, marked and should be approved by the competent authority prior to taking up the survey.
e. The following items shall be shown on the Cross Section survey sheet:

1. Each cross section should be properly indexed and the D/S reach length should be mentioned.
2. Date of survey and water level on that day.
3. Levels and dimensions of embankment, if any.
4. Maximum historical/ observed HFL from any water mark for any particular year, if available.
5. Any hydraulic structure with dimensions of the substructure and superstructure across the river.
6. Existing Bituminous/Cement Concrete/Moorum/ Earth road etc. along the banks or embankments, with width and av. level.
7. Any deep pool formed in the river.
8. Rapids and outcrops in the river bed, if any.
9. Bank locations.

f. Additional cross sections (both U/S and D/S) should be taken at points like bridges, regulators, cross drains, inlets, tributaries, branch channels, drains, out channels from pump houses, important structures etc. If another drainage channel falls into or bifurcates from the drainage channel/canal/river proposed for survey, additional cross section should also be taken at same interval thereon up-to 300 m length u/s from the outfall points.

g. Embankment line along the sloped sides, capturing physical features like bank protection (including the type of protection), present status (damaged or not and degree of damage), vegetative growth, pond, inlet/outlet structure (with details and photograph), jetties, hutments, encroachment etc. to be shown.

E. Plotting of Longitudinal Section/profile along final River/khal/canal alignment:

A longitudinal profile of ground along the final canal alignment (centreline) should be shown. It should have ground levels (as well as bathymetric details in case canal is crossing any water body/Structure should be shown) at every 50 m interval.

F. General Scope of work:

The successful Bidder has to submit a detailed plan of the work after award of the work:

1. Raw data as per specified format (.CSV/.txt etc.) should be submitted in day to day during survey by electronic medium. Failure to provide data on time, data for that day will be considered ineligible/ unacceptable/ tempered data. Thereafter again resurvey will be taken in that part from your end.
2. .dwg & .kmz/.kml and shape file of the detailed topographic survey of the embankment/ bank shall be made from the reconnaissance survey such that the layer can be visualized in Google Earth/Arc GIS Earth.
3. The safety and security of the survey equipment is responsibility of the owner. Survey equipment to be protected from adverse climatic conditions.
4. Arrangement of boats, vehicles, power source, ropes, other necessary tools etc. for surveying to be done by the survey agency.
5. Safety of the survey personnel is the responsibility of the company/proprietor and maximum precaution should be taken for surveying in rivers, jungles, deep forests against snake bite, animal attack etc. Wearing of life jackets and gum boot is a must for ADCP surveys and surveys in marshy land.
6. Necessary ancillary works for accessibility to site like jungle cutting, water hyacinth removal and any other such hindrances to be sorted out by the agency.
7. Coordinates and level of 50 % of the established GCPs will be cross checked by the client with their own instrument and RMS values of errors of horizontal positional values and vertical positional values with that obtained by the agency will be checked. The surveyed data given by the agency will be accepted if the RMS value of errors is within 2 cm for horizontal coordinates and 5 cm for vertical coordinates. The level data given by the agency will be accepted if the RMS value of errors is within 1 cm.
8. Logistic support for carrying instruments from RRI to the site and back and movement to different GCP points for checking by the client, shall be arranged by the agency, and the cost of which shall be included in the quoted rate.
9. In case, the RMS error of any point is more than the acceptable value, a joint survey will be conducted and for that all the logistic support shall be provide by the agency, as mentioned above.

10. The technical evaluation of the tender shall very much depend upon the technical strength of the Bidder. The bidder has to provide inputs to meet the evaluation criteria as given below.

    Adequate technical knowledge, as mention in TOR, the survey agency shall be discussed and evaluated in presence of TIA before final technical evaluation or after opening of tender at RRI. Details in respect of work, instrument calibration, experience of the staff deployed, understanding of scope of work, manpower etc. will also be verified by TIA. If fails to achieve TOR milestone in bid meeting, the concerned bidder will be DISQUALIFIED in technically.

G. Submission of survey report:

The contractor shall submit 1 set of draft report after completion of field activities, processing of data completes in all respect etc. for scrutiny by the competent authority. The corrections, if any, observed by the authority should be incorporated and 5 sets of final drawings to be submitted thereafter. A set of survey document should comprise of the following.

1. Index map of the surveyed area showing all the river network, important features and GCPs in a scale of 1: 5000 (or suitable scale as decided by EIC), all geo referenced. Details like name of GP, name of mouza, name of village and name of local inlet channel related with the survey, any others data etc. should be recorded during survey and to be incorporated into the map. Print copy of this map should be kept at site during detailed survey.
2. Geo referenced maps showing the river stations where cross sections are taken and the length of each cross section, river bank, embankment, and water line, nearest property line, nearby water bodies in a scale of 1:10000 (or suitable scale as decided by EIC).
3. Topographic sheets in a scale of 1:5000 (or suitable scale as decided by EIC), showing necessary details with dimensions where necessary and spot levels of average G.L.
4. Cross section sheets in a suitable vertical and horizontal scale. Observed HFL value to be shown, where such information is available. Water level on the date of survey to be shown on each cross section. Cross sectional value also to be shown in tabular form.
5. Longitudinal sections of river along the thalweg line.
6. Contour of the river bed or reservoir bottom, showing deep pools formed in the river bed, main channel, braided channels etc.
7. Relevant photographs taken during survey.
8. All raw survey control data used or derived from this awarded contract of survey work will be supplied to client to ensure independent Quality Assurance (QA) of the survey operations.
9. The Contractor also shall submit the DGPS survey/ DL survey data in raw format along with processed data in format proper naming convention for the layers and features needs to be developed by the contractor.
10. All type of soft copy in editable formats in Hard disk/Pen drive (32GB).

H. Specification of Instruments/Equipment's : (European make/American make)

1. DGPS:
2. Echo sounder:
3. ADCP
4. Total station:
5. Digital level:

I. Qualification and Competence of the staff for 1 no assignment:

1. Civil Engineer (BE/B.Tech/Diploma) with 5 years of Experience of similar nature of work: 1 no.
2. GIS/ Geo Informatics Expert with 3 years' Experience: 1 no.
3. Auto-cad draughtsman: 1 no.
4. Surveyor with 2 years of related type of work experience: 2 nos.
   The strength of the personnel is the minimum required for this work and may engage more personnel as needed.

J. Documents (in original) to be submitted/presented for the work:

1. Educational Qualification certificate of technical manpower.
2. Latest Pay roll of technical person should be provided in the capacity of the Firm/Agencies.
3. Experience certificate of the technical manpower for similar nature of work.
4. Purchase certificate or challan of all the instruments used for the work viz. RTK/DGPS, ADCP, ECHO SOUNDER, TOTAL STATION, DIGITAL LEVEL INSTRUMENT, DRONE etc.
5. Calibration certificate of all survey instruments. Calibration should be done within 1 year period before commencement of the work.
6. Document of valid licenses certificate of the software's and date of expiry of the software's should be uploaded.
7. In case of machine document, MOU with machine owner/firm regarding supply also be granted. Purchase challan /certificate of the main owner must be uploaded.

For Soil works only:

1. The collection of soil/sand sample will be done in presence of the RRI officials or concerned divisional officials with proper labelling, on the UDS/DS/SPT.
2. The agency may have to mobilize to more than one site, simultaneously depending on the demand from divisions of I & WD and for which the agency may have to deploy sufficient man and machinery to different sites.
3. The time of completion of soil exploration for each site will be on an average of 20m/day. Delay beyond this stipulated time may cause termination of the contract, which may be decided by the Engineer-in-charge.
4. UDS samples to be sealed in a UDS sampler by placing jute, filter paper and bee-wax of required thickness on each site.
5. Document of own laboratory instrument setup for soil testing must be uploaded. If required, some samples to be sent to the RRI QCL for checking as soon as exploration work in as site is complete.
6. Explored holes to be filled with sand.
7. The agency should record the locations of the holes using any GPS instrument and will provide the data to the client.
8. The agency should take photography/videography of the work for record purpose using camera of mobile phones, for this no extra cost will be admissible.
9. The agency should deploy at least one technical personnel of minimal qualification of Diploma in Civil Engineering during work for each site.
10. Experience certificate of the technical manpower for similar nature of work.
11. Latest Pay roll of technical person should be provided in the capacity of the Firm/Agencies.
12. Calibration certificate of all instruments. Calibration should be done within 1 year period before commencement of the work.
13. The necessary following set of instruments are required to be in possession of the Agencies. (Purchase voucher, in the name of the Firm, in original, is required to be produced). The instruments should be of make of any standard company as per market survey and with IS specification & Details given under SOP of Soil sample Testing should be maintained for own lab. In case of machine document, MOU with machine owner/firm regarding supply may also be granted. Purchase challan/certificate of the main owner must be uploaded.

a. TRIAXIAL SHEAR TEST APPARATUS (1 SET)
b. THREE GANG BENCH TUPE CONSOLIDOMETER (1 SET)
c. PERMEABILITY TEST APPARATUS (1 SET).
d. LABORATORY HOT AIR OVEN, THERMOSTATICALLY CONTROLLED (1 SET).
e. LIQUID LIMIT DEVICE (1 SET).
f. SEIVE SET (2 SET).
g. ELECTRONIC BALANCES (SENSITIVITY 0.01 gm, 1 gm, 100 gm one SET EACH).
h. DRILLING EQUIPMENT, DRIVE WEIGHT ASSEMBLY, LIFTING BAIL ETC. FOR SPT TEST. (2 SETS).
i. IN-SITU PERMEABILITY TEST.
j. DETERMINATION OF WATER LEVEL IN BORE HOLES.
k. CALIFORNIA BEARING RATIO TESTS (I SET).
l. ANY OTHER ANCILLIARY GLASSWARE, CHEMICALS ETC.
m. ANY OTHER APPARATUS FOR THIS WORK IF REQUIRED.

SOP for Testing of soil samples in Laboratory

(1)

Standard Operating Procedure (SOP) of Soil Mechanics Laboratory

1. Objective:

To ensure safe, accurate, and consistent procedures for testing the engineering properties of soil in the laboratory.

2. Scope: This SOP applies to all personnel performing soil mechanics tests such as:

(i)Moisture content

(ii) Atterberg limits (Liquid Limit, Plastic Limit)

(iii)Grain size analysis

(iv)Proctor compaction test

(v)Permeability test

(vi)Shear strength tests (Direct shear, Triaxial, Unconfined compression)

(vii)Consolidation test

3. Responsibilities:

Lab Instructor/Technician: Ensure equipment calibration, maintenance, and supervision.

Students/Operators: Follow safety guidelines and testing procedures strictly.

Lab Assistant: Assist with equipment setup and sample preparation.

4. Safety Precautions:

- Always wear PPE (lab coat, gloves, safety goggles).
- Handle soil and chemicals (if used) with care.
- Clean up spills immediately.

- Report damaged equipment to the supervisor.
- Wash hands after testing.

5. General Procedure:

(i). Sample Collection and Preparation

- Collect soil sample using standardized methods.
- Store in sealed containers to avoid moisture loss.
- Label samples clearly.

(ii). Equipment Check

- Ensure all equipment is clean and calibrated.
- Check for mechanical or electrical faults.

(iii) Conduct Test

- Follow the specific procedure for each soil test (refer to individual SOPs for each test).
- Record observations and measurements accurately.

(iv) Post-Test Procedure

- Clean all equipment used.
- Store tools and samples properly.
- Dispose of waste materials according to lab rules.

(v) Data Analysis and Reporting

- Analyze the data as per relevant IS/ASTM standards.
- Prepare test reports with observations, calculations, and conclusions.

(vi) Documentation:

- Test Data Sheets
- Calibration Records
- Test Reports
- Maintenance Logs

Moisture Content Determination as per IS: 2720 (Part 2)

Moisture Content Determination (Oven Drying Method)

- Objective: To determine the natural moisture content of a soil sample using the oven-drying method.

- Scope: This procedure is applicable to all types of soil samples and is crucial for geotechnical engineering analyses such as compaction, consistency, and classification.

- Apparatus Required:

weighing balance (accuracy 0.01g)
Oven (maintains temperature at 105°C to 110°C)

Moisture content containers with lids
Desiccators
Spatula or scoop
Gloves and safety equipment

- Procedure:

Preparation:

1. Clean and dry the moisture container and weigh it with the lid (W1).
2. Place a representative sample of moist soil into the container.
3. Weigh the container with wet soil and lid (W2).

Drying:

1. Place the container (with soil and lid removed) in a hot air oven at 105°C–110°C.
2. Dry for at least 24 hours (or until a constant weight is achieved).
3. Remove from oven, cover with lid, and cool in a desiccator.

Final Weighing:

Weigh the container with dried soil and lid (W3).

- Calculations:

Moisture content (w), expressed as a percentage, is calculated using:

$w = [(W2 - W3) / (W3 - W1)] \times 100\%$

Where:

W1 = Weight of empty container
W2 = Weight of container + wet soil
W3 = Weight of container + dry soil

- Reporting:

Report the moisture content to the nearest 0.1%.
Include container number, all weights (W1, W2, W3), and the calculated moisture content.

- References:

#– Method of Test for Soils

Determination of Atterberg Limits as per IS: 2720 (Part 5)

- Objective: To determine the Liquid Limit (LL) and Plastic Limit (PL) of fine-grained soil for classification and evaluation of its engineering properties.
- Apparatus Required:

Casagrande Liquid Limit Device
Moisture Containers

Grooving Tool (Casagrande type)
Desiccator
Glass Plate (for rolling threads)
Sieve (425 μm)
Oven (105°C to 110°C)
Balance (accuracy 0.01 g)
Spatula

- Sample Preparation:
  1. Take a representative soil sample and air-dry it.
  2. Sieve the sample through a 425 μm IS sieve.
  3. Take about 200 gm of the soil passing through the sieve.
  4. Mix it with distilled water to make a uniform paste.

- **Liquid Limit (LL) Test Procedure:**
  1. Place a portion of the soil paste into the cup of the Liquid Limit device.
  2. Level the surface and cut a groove using the standard grooving tool.
  3. Turn the handle at a rate of 2 revolutions per second.
  4. Count the number of blows until the groove closes over a distance of 10 mm.
  5. Collect a sample from near the closed groove and determine its moisture content.
  6. Repeat the procedure for 3 to 5 trials with varying moisture contents to obtain groove closure between 15 and 35 blows.
- Reporting:

Plot a flow curve: Moisture content vs. log(Number of Blows).
Determine the Liquid Limit corresponding to 25 blows from the graph.

- **Plastic Limit (PL) Test Procedure:**
  1. Take about 20 gm of the prepared soil paste.
  2. Roll the soil on a glass plate into threads of about 3 mm diameter.
  3. If the thread crumbles at 3 mm, stop rolling and collect the crumbled pieces.
  4. If not, continue drying the soil slightly and repeat.
  5. Determine the moisture content of the crumbled threads.
  6. Repeat for two more portions and take the average.

- Calculations:
  # Liquid Limit (LL): Moisture content corresponding to 25 blows.
  # Plastic Limit (PL): Average moisture content of crumbled threads.
  # Plasticity Index (PI): LL - PL

Grain Size Analysis of Soils as per IS: 2720 (Part 4) :

- Objective: To determine the grain size distribution of soil by sieve analysis (for coarse and medium- grained soils) and hydrometer analysis (for fine-grained soils)

- Apparatus Required:

For Sieve Analysis:

Set of IS Sieves (4.75 mm to 75 μm)
Mechanical sieve shaker
Weighing balance (accurate to 0.01 g)
Oven (105°C to 110°C)
Brushes
Mortar and rubber pestle (if needed)
Sample trays

For Hydrometer Analysis:

Hydrometer (Bouyoucos type)
Sedimentation cylinder (1-liter capacity)
Dispersing agent (sodium hexametaphosphate) # Stirring apparatus
Thermometer

- Sample Preparation:

Obtain a representative soil sample.
Oven-dry the sample at 105–110°C.
Break lumps without crushing individual particles.
Weigh approximately 500 g of soil for sieve analysis and 50 g for hydrometer analysis.

- Sieve Analysis Procedure (for particles > 75 μm):

Stack sieves in decreasing order of size with a pan at the bottom.
Place the oven-dried soil in the top sieve.
Shake the stack mechanically for 10-15 minutes.
Weigh the amount of soil retained on each sieve.
Calculate the percentage passing and retained on each sieve.
Plot grain size distribution curve (particle size vs % finer).

- Hydrometer Analysis Procedure (for particles < 75 μm):

Soak 50 g of soil in water with 5 mL dispersing agent for 12-16 hours.
Transfer to a sedimentation cylinder and make up to 1 liter.
Stir the suspension thoroughly using a mechanical stirrer.
Record hydrometer readings and temperature at regular intervals (e.g., 0.5, 1, 2, 4, 8, 15, 30, 60, 120 minutes).
apply corrections for meniscus, temperature, and dispersing agent.
calculate particle sizes and % finer using standard formulae.

- Calculations:
  % Retained = (Weight retained / Total sample weight) x 100
  % Finer = 100 - Cumulative % Retained
  Use hydrometer equations for fine particles (based on Stokes' Law).
- Results Presentation:
  # Plot grain size distribution curve (log scale for particle size vs % finer).
  # Identify D_{10}, D_{30}, D_{60} for classification.
  # Compute Uniformity Coefficient (*Cu*) and Coefficient of Curvature (*Cc*).

Proctor Compaction Test (Light and Heavy) as per IS: 2720 (Part 7 & 8) :

- Objective: To determine the Optimum Moisture Content (OMC) and Maximum Dry Density (MDD) of soil by conducting the Proctor Compaction Test using light and heavy compaction methods

- Apparatus Required:
  # Proctor Compaction Mould (1000 cc capacity with collar and base plate)
  # Rammer (2.6 kg for light; 4.9 kg for heavy compaction)
  # Drop height (310 mm for light; 450 mm for heavy compaction)
  # Oven (105–110°C)
  # Weighing balance (accuracy 1 g)
  # Straight edge
  # Spatula
  # Mixing tray
  # Moisture content containers

- Sample Preparation:

  # Take around 3 to 5 kg of air-dried soil.
  # Pulverize and sieve through 4.75 mm IS sieve.
  # Divide into five portions and mix each with increasing water content (around 2-3% increment).
- Test Procedure:
  # Grease the inside of the mould and assemble it with the base plate and collar.
  # Fill the mould in three equal layers (for light) or five layers (for heavy), compacting each layer with 25 blows using the appropriate rammer.
  # Remove collar and trim excess soil to level with mould top.
  # Weigh the mould with compacted soil.
  # Remove soil and take a sample for moisture content.
  # Repeat the procedure for other moisture contents.

- Calculations:

Bulk Density (g/cc) = (Weight of compacted soil - Weight of mould) / Volume of mould

Moisture Content (%) = (Weight of water / Weight of dry soil) x 100

Dry Density (g/cc) = Bulk Density / (1 + Moisture Content)

- Result Interpretation:

Plot Moisture Content vs Dry Density curve.

Identify the peak point as Maximum Dry Density (MDD) and corresponding moisture as Optimum Moisture Content (OMC).

Permeability Test as per(IS: 2720 Part 17 - 1986)

- Objective: To determine the coefficient of permeability of a soil sample using Constant head & Falling head methods
- Apparatus Required:

For Constant Head Method (Coarse-Grained Soils):

Permeameter apparatus

Constant head water reservoir

Measuring flask

Stopwatch

Balance

Thermometer

Thermostatically controlled water bath (if needed)

Soil sample and compaction tools (for remoulded samples)

- For Falling Head Method (Fine-Grained Soils):

Standpipe with graduated scale

Permeameter cylinder

Connecting rubber tubing

Thermometer

Stopwatch

Measuring scale

- Sample Preparation:

Undisturbed Samples: Extract sample carefully using cutting rings to maintain structure.

#Remoulded Samples: Prepare the soil at required moisture content and density (as per IS: 2720 Part 7 or 8), and compact in layers inside the permeameter mould.

- Saturation: Saturate the sample by applying back pressure or letting water percolate through the sample over time, ensuring removal of entrapped air.

- Test Procedure:

Constant Head Method (For k > 10^{-3} cm/s; usually sands and gravels)

1. Connect the permeameter to a constant head reservoir.
2. Open the outlet and allow water to flow through until steady flow is established.

Measure:

(i) Volume of water collected (Q)
(ii) Time (t)
(iii) Length of sample (L)
(iv) Head difference (h)
(v) Cross-sectional area of soil sample (A)

Repeat readings for consistency.

Falling Head Method (For k < 10^{-3} cm/s; usually silts and clays)

1. Connect the standpipe to the permeameter and fill with water to initial head (h□).
2. Allow water to flow through the sample and start the stopwatch.
3. Record time taken for head to fall to final head (h□).

Measure:

(i) Cross-sectional area of the standpipe (a)
(ii) (ii) Cross-sectional area of the soil sample (A)
(iii) Length of the soil sample (L)
(iv) (iv) Time interval (t)

Calculations:

Constant Head Method:

$$k = \frac{Q.L}{A.h.t}$$

Falling Head Method:

$$k = \frac{a.L}{A.t} \log_e \frac{h1}{h2}$$

Where: k = Coefficient of permeability (cm/s); Q = Volume of water collected (cm^3)
L = Length of soil sample (cm); A = Cross-sectional area of the sample (cm^2)
A = Cross-sectional area of the standpipe (cm^2); t = Time (s)
h_1= Hydraulic head (cm) (initial) and h_2= Hydraulic head (cm) (final)

- Reporting:
  (i) Report method used (constant/falling head)
  (ii) Soil description (grain size, dry density, moisture content)

(iii) Test temperature
(iv) Average permeability coefficient
(v) Corrections if required for temperature (reference temp: 27°C)

Shear Strength Test of Soil (As per IS: 2720)

Applicable IS Codes:
IS: 2720 (Part 13) – 1986: Direct Shear Test
IS: 2720 (Part 10) – 1991: Unconfined Compression Test
IS: 2720 (Part 11) – 1993: Triaxial Compression Test (optional)

- Objective: To determine the shear strength parameters (cohesion C and angle of internal friction φ) of a soil sample using laboratory methods in accordance with IS: 2720 standards.

- Apparatus Required:

For Direct Shear Test:

Direct shear box apparatus
#Proving ring/load cell
Dial gauges (vertical and horizontal)
Weights for normal load
Soil sample (undisturbed or remoulded)
Water supply (for saturated tests)

For Unconfined Compression Test:

Unconfined compression machine (with proving ring or load cell)
Dial gauge for deformation
Sample trimming tools
Vernier calliper
Balance
Soil sample (cohesive soils only)

- Sample Preparation:

1. Undisturbed Sample: Extract using core cutter or sampling tube.
2. Remoulded Sample: Prepare at required moisture content and density as per IS: 2720 Part 7 or 8.
3. Trimming: Ensure correct dimensions—e.g., for UCC test, height to diameter ratio of 2:1.

- Test Procedure:

Direct Shear Test (IS: 2720 Part 13 – 1986):

1. Place the soil sample in the shear box (usually 60 mm x 60 mm x 25 mm).
2. Apply the required normal load using weights.
3. Allow consolidation (if needed).
4. Apply horizontal shear load at constant strain rate (typically 1.25 mm/min).
5. Record shear force and horizontal displacement until failure.
6. Repeat for at least three different normal stresses.

Unconfined Compression Test (IS: 2720 Part 10 – 1991):

1. Measure initial dimensions and weight of the cylindrical specimen.
2. Place the specimen in the loading device.
3. Apply axial load at a constant strain rate (typically 0.5–2%/min).
4. Record load and deformation at regular intervals until failure.
5. Note peak load and corresponding strain.

- Calculations:

Direct Shear Test:

Shear stress, $T = \frac{Shear\ force\ at\ failure}{Area\ of\ shaer\ box}$

$$\sigma = \frac{Normal\ load}{Area\ of\ shear\ box}$$

Unconfined Compression Test:

Axial strain (%), $\varepsilon = \frac{\Delta L}{L0} \times 100$

$$q_u = \frac{P}{A} \quad \text{where} \quad A = \frac{A0}{1-\varepsilon}$$

Shear strength (S) = $\frac{qu}{2}$

- Reporting:

(i) Test type and IS reference
(ii) Soil type and preparation method
(iii) Sample dimensions
(iv) Applied loads and corresponding stresses
(v) Shear strength values (c and φ for DST; qu and S for UCC)
(vi) Moisture content and dry density of sample
(vi) Stress-strain or shear stress-normal stress graphs

Triaxial Compression Test (As per IS: 2720 Part 11 – 1993)

- Objective:To determine the shear strength parameters (cohesion c and angle of internal friction φ) of soil under controlled drainage and loading conditions using a triaxial compression test.
- Types of Triaxial Tests:
  (i) Unconsolidated Undrained (UU): No drainage, no consolidation

(ii)Consolidated Undrained (CU): Consolidation allowed, no drainage during shear

(iii) Consolidated Drained (CD): Consolidation and drainage allowed

- Apparatus Required:

Triaxial compression cell with loading frame
Specimen mould (typically 38 mm diameter, 76 mm height)
Porous stones, filter paper, rubber membrane
De-airing system and vacuum pump
Pressure panel (for cell pressure and back pressure)
Dial gauges or LVDTs
Proving ring or load cell
Stopwatch
Thermometer
Water bath (for temperature control)

- Sample Preparation:

1. Undisturbed Sample: Carefully trim to cylindrical shape using a sampler or cutting tool.
2. Remoulded Sample: Compact soil at desired moisture content and density.
3. Place specimen between porous stones and enclose it in a rubber membrane using a membrane stretcher.
4. Mount the sample in the triaxial cell.

- Test Procedure (General Steps):

A) Saturation:

1. Apply back pressure and cell pressure gradually to ensure full saturation.
2. Confirm saturation by measuring B-value (>0.95 preferred).

B) Consolidation:

1) Apply the required confining pressure (σ□) and allow sample to consolidate (only in CU/CD tests).

2) Wait until volume change or pore pressure stabilizes.

- Shearing:

Apply axial load at a constant rate of strain (typically 0.5–2%/min).
Record:
(i) Axial load
(ii) Axial deformation
(iii) Pore water pressure (if measured)

- Continue until sample fails or 20% axial strain is reached.
- Calculations:

Total Stresses:

Deviator stress: $\sigma_d = \sigma_1 - \sigma_3$

$$\sigma_1 = \sigma_3 + P/A$$

Corrected Area: $A = = \frac{A0}{1-\varepsilon}$

Effective Stresses (for CU/CD tests):

Effective stress:

$\sigma'_1 = \sigma_1 - u$, $\sigma'_3 = \sigma_3 - u$

- Shear Strength Parameters:
  # Plot Mohr's circles for failure
  # Draw best-fit line (Mohr-Coulomb envelope)
  # Determine cohesion (c) and angle of internal friction (φ)

7. Reporting:
   # Soil type and condition (undisturbed/remoulded)
   # Type of triaxial test (UU, CU, CD)
   # Dimensions and water content of sample
   # Confining pressure, deviator stress, pore pressure (if applicable)
   #Stress-strain and pore pressure graphs
   # Mohr's circles and shear strength parameters (c, φ)
   # Mode of failure (brittle, ductile)

Consolidation Test (As per IS: 2720 Part 15 – 1986):

- Objective: To determine the rate and magnitude of consolidation of a saturated soil sample under controlled loading conditions and obtain parameters like coefficient of consolidation (Cv), compression index (Cc), and coefficient of volume compressibility (mv).

- Apparatus Required:
  # Consolidation apparatus with loading frame
  # Consolidation cell with fixed or floating ring
  # Porous stones
  # Dial gauge (least count 0.01 mm)
  # Water reservoir
  # Weighing balance
  # Stopwatch
  #Oven
  # Soil trimming tools
  # Filter papers
  # Sample extractor

- Sample Preparation:

Undisturbed Sample: Extract using a thin-walled sampler and trim to fit the consolidation ring (typical size: 60 mm diameter, 20 mm height).

Remoulded Sample:

(i) Compact soil in ring at required moisture content and density.

(ii) Ensure sample is flush with both faces of the ring.

(iii) Place filter papers and porous stones above and below the sample.

- Test Procedure:

A) Assembly and Saturation:

1. Assemble the consolidation cell with the sample, porous stones, and filter papers.
2. Immerse the cell in water and allow saturation (typically 24 hours).

B) Loading:

1. Place the assembly in the loading frame.
2. Apply a seating load (typically 5 kPa) for 5–10 minutes.
3. Apply load in geometric progression (e.g., 5, 10, 20, 40, 80, 160, 320 kPa).
4. For each load increment: Record deformation readings with time (e.g., at 0, 0.25, 1, 2.25, 4, 6.25, 9, 12.25, 16, 25, 36, 49, 64, 81, 100 minutes). Continue until primary consolidation is complete (typically 24 hours).
5. Reduce load in similar steps and observe rebound for 24 hours.

C. Post-Test:

1. Carefully remove the specimen.
2. Determine the final water content by oven drying.

- Calculations:

A. Settlement:

Plot compression (dial reading or strain) vs. log time and square root of time.

Determine initial height, final height, and consolidation settlement (ΔH).

B. Void Ratio (e):

$$e = \frac{H.w.G}{100}$$

C. Compression Index (Cc):

$$C_c = \frac{\Delta e}{\log(\frac{\sigma 2}{\sigma 1})}$$

D. Coefficient of Volume Compressibility (mv):

$$m_v = \frac{\Delta e}{(1+e_0).\Delta\sigma}$$

E. Coefficient of Consolidation (Cv):

From square root of time plot:

$$C_v = \frac{T_{v.}\, H_d^2}{t}$$

where, T_v = time factor (≈ 0.197 for 50% consolidation); H_d = drainage path (typically H/2 for double drainage); t = time for 50% consolidation

- Reporting:

1) Soil description
2) Sample dimensions
3) Initial and final water content
4) Load vs. settlement data
5) e-log σ plot
6) Cc, mv, Cv values
7) Consolidation settlement curve

<u>Detailed list of common instruments used in a Soil Mechanics Laboratory along with their standard specifications (as per IS: 2720 series and typical field labs):</u>

1. Core Cutter:

Use: For in-situ bulk density determination
IS Code: IS: 2720 (Part 29)
Material: Mild steel or galvanized iron
Dimensions: 100 mm internal diameter, 130 mm length
Accessories: Dolly, steel rammer (2.5 kg)

2. Proctor Compaction Apparatus:

Use: To determine optimum moisture content and maximum dry density
IS Code: IS: 2720 (Part 7 & 8)
Compaction Moulds: 1000 cm^3 or 2250 cm^3 volume
Light Compaction: 2.6 kg rammer, 310 mm drop
Heavy Compaction: 4.89 kg rammer, 450 mm drop
Material: Gunmetal mold with detachable collar

3. Liquid Limit Device (Casagrande Apparatus) :

Use: To determine liquid limit
IS Code: IS: 2720 (Part 5)
Cup Material: Brass or hard rubber
Grooving Tools: Standard and ASTM type
Drop Height: 10 mm (adjustable crank)

4. Plastic Limit Apparatus:

Use: For plastic limit determination
IS Code: IS: 2720 (Part 5)
Components: Glass plate (300 × 300 mm), spatula, moisture containers, oven

6. Direct Shear Test Apparatus:

IS Code: IS: 2720 (Part 13)
Shear Box Size: 60 mm × 60 mm × 25 mm (standard)
Proving Ring: 0.1 – 2 kN capacity
Dial Gauges: 0.01 mm least count
Motorized strain rate: 1.25 mm/min (typical)

7. Triaxial Shear Test Apparatus :

IS Code: IS: 2720 (Part 11)
Specimen Size: 38 mm dia × 76 mm height (standard), larger sizes optional
Cell Pressure Range: 0 – 10 kg/cm²
Axial Load Capacity: Up to 5 kN or 50 kN
Pore Pressure Measurement: Bourdon gauge or pressure transducer

8. Unconfined Compression Test Apparatus:

IS Code: IS: 2720 (Part 10)
Loading Frame: Manual or motorized
Dial Gauge: 0.01 mm least count
Load Measuring: Proving ring or load cell
Specimen Size: 38 mm dia × 76 mm height

9. Permeability Apparatus:

IS Code: IS: 2720 (Part 17)
For Coarse Soils: Constant Head Permeameter
For Fine Soils: Falling Head Permeameter
Specimen Molds: 100 mm height × 100 mm dia or standard compaction molds
Standpipes: Graduated, 6–10 mm diameter

10. Consolidation Apparatus:

IS Code: IS: 2720 (Part 15)
Specimen Size: 60 mm dia × 20 mm height
Load Frame: Up to 10 kg/cm²
Dial Gauge: 0.01 mm least count
Accessories: Water reservoir, filter papers, porous stones

11. Sieve Analysis Set:

IS Code: IS: 2720 (Part 4)
Sieves: 4.75 mm to 75 micron (IS sieves)
Shaker: Motorized with timer
Pan and Lid: Stainless steel

12. Hydrometer Analysis Set :

IS Code: IS: 2720 (Part 4)
Hydrometers: ASTM 152H type
Sedimentation Cylinder: 1-liter capacity, graduated
Thermometer: 0–50°C
Dispersing Agent: Sodium hexametaphosphate

13. Pycnometer :

Use: Specific gravity determination
IS Code: IS: 2720 (Part 3)
Capacity: 1 liter for coarse soils; 50–100 ml for fine soils
Material: Borosilicate glass or plastic

14. Oven:

Use: Drying samples
Temperature Range: Ambient to 110°C
Capacity: 50–200 liters (lab scale)
Type: Thermostatically controlled

15. Electronic/Analytical Balance:

Capacity: Up to 5 kg
Accuracy: 0.01 g or better
Pan Material: Stainless steel

Memo No. 1460/10 Dated: 09.12.2025

Copy for information & wide Circulation to the:-

- Director, River Research Institute, W.B., HCL, Mohanpur, Nadia, WB.
- Deputy Director (Hyd.), RRI, HCL, Mohanpur, Nadia, WB.
- Deputy Director (Engg.), RRI, HCL, Mohanpur, Nadia, WB.
- Sub-Divisional Officer, Sub-Division No.-I, RRI, HCL, Mohanpur, Nadia, WB.
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- Divisional Estimator, R.R.I., HCL, Nadia.
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Parna Pane 9/12/25

(Tender Inviting Authority)
Executive Engineer (SDP)
River Research Institute
Irrigation & Waterways Directorate
Government of West Bengal

09/12/25